

Local Money for Global Climate? Impact and Incidence of Regional Renovation Subsidy in Paris Area

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Energy efficiency subsidies are a widespread tool for mitigating greenhouse gas emissions in the residential sector. In France alone, €6 to €8 billion euros have been spent annually on national incentive programs for home energy retrofit including MaPrimeRenov', Certificats d'Economies d'Energie, VAT deductions and Eco-Prêt à Taux Zéro. In addition, myriad programs are implemented at various sub-national levels – e.g., regional, departmental and municipal. These smaller programs have not been exhaustively tallied – let alone well documented or properly evaluated. This is unfortunate, as local programs provide good candidates for policy evaluation, for several reasons. From a theoretical perspective, deploying programs at a small scale should allow local authorities to better identify the most cost-effective retrofit opportunities. From a methodological perspective, the spatial limits defining of sub-national programs tend to make it easier to build a non-treated group than with national programs.

To address the lack of research on local subsidy programs for home energy retrofit, we study a medium-scale program Prime Eco-Logis 91 (PEL), implemented in Essonne. Located in the southern vicinity of Paris, with a population of 1.3 million in 2019, Essonne is one of the 101 *départements* of France, the second highest local jurisdiction after *régions*.¹ Launched in 2019, the program has benefited 30,339 households over 2019-2022, for a total public cost of €54.3 million.

We estimate the impact of PEL on yearly residential energy consumption in a difference-in-differences setting comparing municipalities inside and outside Essonne, within a 5-kilometer bandwidth on each side of the border. After confirming that energy consumption followed parallel trends for the control and treatment groups between 2011 and 2019, we find that the treatment group experienced a statistically significant 7.6% reduction in natural gas consumption in 2020 and 2022. In turn, we find a 2% increase in electricity consumption for the year 2021, which may be due to program-induced heat pump adoption. Under conventional assumptions, these estimates translate into a public cost of €44 per ton of avoided CO₂-equivalent emissions – well below the €250/tCO₂-eq value estimated for France in 2030 (Quinet, 2019) and even below available estimates for national counterpart programs.

Having established the significant impact of the program, we study how local administration makes the program differ from a national counterpart. For a national benchmark, we use the recently launched large-scale subsidy MaPrimeRenov'. Having subsidy-level data on both programs, we focus on the origin of contractors for renovations subsidized in Essonne. We find that PEL-backed renovations are significantly more likely to be carried out by contractors based in Essonne. We attribute this pattern to an implicit advantage given to local contractors, although it is not part of the program design. A complementary mechanism is an informational advantage of local PEL administrators with respect to those of MaPrimeRenov': studying only renovations of Essonne-based firms, we find that PEL-backed renovations are also more likely to be carried out by firms registered in the same zip code as the household. Both patterns are robust to controlling for type of renovation work and municipality of the household.

Finally, we document a strong impact on the dynamics of the local sector of energy efficiency renovation. We study the number of firms and total employment using time, sector and department for a triple difference analysis. While the post-2019 period is impacted by both PEL and

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¹French Departments are NUTS-3 and french Regions are NUTS-2 in the EU classification.

MaPrimeRenov introduction, the additional effect of PEL is expected to be significant: the total amount of PEL subsidies attributed in Essonne is almost as large as that of MaPrimeRenov (€243M vs. €267M in 2021-2022). Accordingly, we find that the renovation sector has generally grown faster than the control sectors after 2019, but the growth in Essonne has been particularly strong. The effect is most stark in the case of employment: we estimate additional 30 percentage points to renovation sector employment growth in Essonne post-2019, relative to control sectors, relative to surrounding departments.

This article is one of the first to provide a causal evaluation of regional energy efficiency subsidies in the European context. For the United States, recent studies include [Rose and Wei \(2020\)](#); [Shen et al. \(2022\)](#); [Christensen et al. \(2023\)](#). In other countries, local subsidies are occasionally studied in the established literature on solar rebound effect ([Boccard and Gautier, 2021](#); [Liu et al., 2024](#)). We contribute to the literature on energy efficiency policies by showing a strong additional effect of a local subsidy with respect to a national one, as well as its biased incidence, with excess benefit accruing to local business.

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