
From Factor-Four Mitigation to Zero-Net Emissions: Is a fair energy transition possible? Evidence from the French Low-Carbon Strategy¹

Emilien Ravigné^{a,b,*}, Frédéric Gherzi^b and Franck Nadaud^b

^a *Université-Paris Saclay, CentraleSupélec, LGI, 3 rue Joliot-Curie, 91910 Gif-sur-Yvette, France*

^b *CNRS, CIRED, 45 bis avenue de la Belle Gabrielle, 94130 Nogent-sur-Marne, France*

* *Corresponding author. emilien.ravigne@centralesupelec.fr*

ABSTRACT

The distributional consequences of environmental policies are a major issue for the public acceptability of energy transitions, as the recent Yellow-vest demonstrations highlighted. Our research objective is to assess the short and mid-term distributional cross impacts of different policy tools. We compare two successive versions of the official French low-carbon strategy to assess whether its rise in ambition—from the fourfold reduction of emissions to carbon neutrality by 2050—can fairly affect French households up to 2035.

To that end, we develop a numerical method that combines micro-simulation and computable general equilibrium techniques. We explicitly model the heterogeneity of households' behaviour and the distribution of energy-efficient technologies escaping econometric estimation—electric vehicles, energy-efficient housing—among consumers.

Focusing the efficiency gains from such technologies on the largest energy consumers to maximise emission reductions reduces the discrepancy of impacts between rural and urban households. However, it aggravates the regressivity of carbon taxation if households are not rebated their carbon tax payments. Recycling schemes favouring poorer households are powerful means to offset carbon taxation regressivity in the short term. In parallel, policies supporting electric vehicles and thermal renovation are effective in reducing households' tax payments at further horizons.

¹ This paper has been circulated on previous occasions under the name “Micro-macro linkage to evaluate the distributive impacts of carbon taxation on French households”