The three chapters of this dissertation aim at better understanding the effectiveness of pollution mitigation policies on the one hand, and who contributes to pollution at the sectoral and individual level, on the other hand.

The first chapter, *Carbon Pricing and Power sector Decarbonisation: Evidence from the UK*, examines the effectiveness of a carbon tax introduced in the UK power sector in 2013, the CPS, which increased from €5.9 per ton of CO_2 in 2013 to €26 per ton of CO_2 in 2017. Since its introduction, the UK power sector has undergone a rapid transformation, with a decrease in the share of coal in electricity generation from 40% to 7% between 2012 and 2017. Given the high emission-intensity of the displaced coal, power sector CO_2 decreased by 57% over the same period. I evaluate the causal impact of the CPS on power sector emissions in the UK with the Synthetic control method: I compare the trajectory of UK emissions to that of a counterfactual UK made of a weighted combination of other European countries. I find the CPS led to a decrease in UK emissions by between 20.5 and 26 percent on an average year between 2013 and 2017, depending on the assumptions made for potential confounding factors. I highlight three mechanisms via which the tax affected emissions: first, the carbon tax decreased the emission-intensity of plants staying in the market over the entire period, allegedly via a fuel switch from coal to gas; second, the carbon tax induced the net closure of some high-emission plants; finally, plants already at risk of closure due to European regulations on industrial emissions had a higher probability to effectively close than in the rest of the EU.

The second chapter, *Estimating the Causal Effects of Cruise Traffic on Air Pollution using Randomization-Based Inference*, is a joint work with Léo Zabrocki and Marie Abèle Bind. We examine the contribution of cruise vessels to air pollution in Marseille, one of the largest European port cities, in a context of rising concerns over the effects of maritime traffic on pollution and residents' health. We combine a new pair-matching algorithm with high-frequency time series data to create hypothetical randomized experiments where only cruise vessel traffic varies across matched pairs. We estimate the effect of this variation in traffic on city-level pollutant concentrations. We quantify uncertainty with randomization-based inference and build 95% Fisherian intervals (FI). The arrival of cruise vessels in the port increases hourly concentrations of nitrogen dioxide (NO_2) by 4.7 µg/m^3 (95% FI: [1.4, 8.0]), of sulphur dioxide (SO_2) by 1.2 µg/m^3 (95% FI: [-0.1, 2.5]), and of particulate matter (PM_{10}) by 4.6 µg/m^3 (95% FI: [0.9, 8.3]). Having one additional cruise vessel entering the port on a given day increases city-level daily SO_2 by 0.7 µg/m^3 (95% FI: [-0.1, 2.5]), a 30% increase compared to the daily average. City-level PM_{10} and $PM_{2.5}$ are also higher by respec-

tively 3.5 µg/m^3 (95% FI: [0.5, 6.5]) and 2.5 µg/m^3(95% FI: [0.2, 4.9] on the following day, a 13-16% increase which may partly capture an increase in road traffic. Our results suggest that well-designed hypothetical randomized experiments provide a principled approach to better understand the negative externalities of maritime traffic.

The third chapter, *Tackling Transport-Induced Pollution in Cities: A Case Study in Paris*, is a joint work with Philippe Quirion. We examine how much individuals contribute to emissions of CO_2 and local air pollutants in their daily mobility based on detailed mobility survey data from the Paris region, an urban area amongst the most polluted in Europe. We investigate what drives inequalities in emissions and how emissions could be reduced. We document large inequalities, with the top 20% of emitters contributing 75-85% of emissions on a representative weekday, depending on the pollutant. We investigate factors associated with high emissions in two ways: first, in an exact decomposition analysis, we show that distance, modal choices and emission intensity contribute equally to explaining top local pollutant emissions, while for CO_2 emissions, high distances and modal choice drive top emissions the most; second, in a regression analysis, we highlight the association between some employment characteristics and total distances travelled, the car modal share and its emission intensity. We also show the different associations between income and vehicles' local vs CO_2 emission intensity. Finally, we formulate scenarios of modal shift potential based on counterfactual travel times. In our central scenario, 53% of car trips could be shifted to public transport or - for the most part - cycling, in particular e-cycling. This would save an annual €214m of avoided CO_2 and local pollution, which represents 19-21% of the total cost of daily mobility-induced pollution. We discuss what may hinder or encourage such modal shift, and alternative options for those unable to shift.