

Author's Accepted Manuscript

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Magali A. Delmas, Matthew E. Kahn, Stephen L. Locke



www.elsevier.com/locate/rie

PII: S1090-9443(16)30254-X
DOI: <http://dx.doi.org/10.1016/j.rie.2016.12.002>
Reference: YREEC704

To appear in: *Research in Economics*

Received date: 3 November 2016
Accepted date: 2 December 2016

Cite this article as: Magali A. Delmas, Matthew E. Kahn and Stephen L. Locke
The Private and Social Consequences of Purchasing an Electric Vehicle and
Solar Panels: Evidence from California, *Research in Economics*
<http://dx.doi.org/10.1016/j.rie.2016.12.002>

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The Private and Social Consequences of Purchasing an Electric Vehicle and Solar Panels:
Evidence from California^{*}

Magali A. Delmas^a, Matthew E. Kahn^b, Stephen L. Locke^c

^aUCLA

^bUSC and NBER and IZA

^cWKU

mdelmas@ioes.ucla.edu

kahnme@usc.edu

stephen.locke@wku.edu

Abstract

Rising greenhouse gas emissions raise the risk of severe climate change. The household sector's greenhouse gas emissions have increased over time as more people drive gasoline cars and consume electricity generated using coal and natural gas. The household sector's emissions would decline if more households drove electric vehicles and owned solar panels. In recent years automobile manufacturers have been producing high-performance electric vehicles, and solar panels are becoming more efficient and less expensive. Using several data sets from California, we document evidence of the growth of the joint purchase of electric and hybrid vehicles and solar panels. We discuss pricing and quality trends for these green durable goods.

Introduction

All over the world, more households are living at low density in the suburbs of metropolitan areas. Improvements in road networks, rising incomes and the demand for newer, larger homes have fueled this trend (Margo 1992, Glaeser and Kahn 2004, Baum-Snow 2007, Baum-Snow et. al. 2012). Such suburbanization offers private benefits but imposes social costs. In the absence of a national carbon tax, decentralized living can significantly contribute to greenhouse gas emissions through a reliance on gasoline fired cars and ample use of electricity for large suburban homes with the electricity generated by fossil fuels (Jones and Kammen 2014, Graff-Zivin et. al. 2014). The transportation and residential and commercial sectors are responsible for 38% of U.S greenhouse gas emissions.¹

Suburban household carbon emissions would decline if they install solar panels and buy an electric vehicle that charges at home.² If such households reduce their carbon emissions, then

^{*} We thank Matthew Shepherd for excellent research assistance. We thank the UCLA Ziman Center for Real Estate and the UCLA Transdisciplinary Seed Grant for generous funding.

¹ <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>.

² See Borenstein and Bushnell (2015) for a discussion of issues associated with the growth in intermittent renewable generation sources such as solar PV systems.

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