

Article

Carbon Footprint Planning: Quantifying Local and State Mitigation Opportunities for 700 California Cities

Christopher M. Jones^{1,*}, Stephen M. Wheeler² and Daniel M. Kammen^{1,3,4}

¹ Renewable and Appropriate Energy Laboratory, Energy and Resources Group, University of California — Berkeley, Berkeley, CA 94720, USA; E-Mails: cmjones@berkeley.edu (C.M.J.), kammen@berkeley.edu (D.M.K.)

² Department of Human Ecology, University of California — Davis, Davis, CA 95616, USA; E-Mail: smwheeler@ucdavis.edu

³ Goldman School of Public Policy, University of California — Berkeley, Berkeley, CA 94720, USA

⁴ Department of Nuclear Engineering, University of California — Berkeley, Berkeley, CA 94720, USA

* Corresponding author

Received: 5 October 2017 | Accepted: 11 January 2018 | Publication: 24 April 2018

Abstract

Consumption-based greenhouse gas (GHG) emissions inventories have emerged to describe full life cycle contributions of households to climate change at country, state and increasingly city scales. Using this approach, how much carbon footprint abatement potential is within the control of local governments, and which policies hold the most potential to reduce emissions? This study quantifies the potential of local policies and programs to meet aggressive GHG reduction targets using a consumption-based, high geospatial resolution planning model for the state of California. We find that roughly 35% of all carbon footprint abatement potential statewide is from activities at least partially within the control of local governments. The study shows large variation in the size and composition of carbon footprints and abatement opportunities by ~23,000 Census block groups (i.e., neighborhood-scale within cities), 717 cities and 58 counties across the state. These data and companion online tools can help cities better understand priorities to reduce GHGs from a comprehensive, consumption-based perspective, with potential application to the full United States and internationally.

Keywords

carbon footprint; climate action plans; climate change; consumption; emissions inventory; greenhouse gas

Issue

This article is part of the issue “Urban Planning to Enable a 1.5°C Scenario”, edited by Peter Newman (Curtin University, Australia), Aromar Revi (Indian Institute for Human Settlements, India) and Amir Bazaz (Indian Institute for Human Settlements, India).

© 2018 by the authors; licensee Cogitatio (Lisbon, Portugal). This article is licensed under a Creative Commons Attribution 4.0 International License (CC BY).

1. Introduction

Stabilizing the climate will require massive changes in systems of production and consumption (Hertwich et al., 2010), with widescale adoption of low-carbon technologies and practices for businesses and households (IPCC, 2014). To-date, local planning and policy have focused largely on production-based emissions (i.e., regulating emissions at the point they enter the atmosphere); however, there is increasing recognition of the value of a consumption-based approach to planning, considering the full life cycle of transportation, energy, food, goods

and services consumed by households within communities (Erickson, Chandler, & Lazarus, 2012). Household consumption drives demand for global economic activity and corresponding emission of greenhouse gases globally. As the closest authority to individuals and households, local governments are widely recognized as critical in changing consumer patterns, yet few studies have evaluated the potential of local government policies to reduce consumption-based greenhouse gases.

This article evaluates the potential to deeply reduce household carbon footprints through state and local policies and programs over a long timeframe (from 2010 to