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## California energy efficiency: Lessons for the rest of the world, or not?

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### ABSTRACT

Since the 1970s California's residential electricity consumption per capita has stopped increasing while other states' electricity use continued to grow steadily. What accounts for California's apparent savings? Some credit the strict energy efficiency standards for buildings and appliances enacted by California in the mid-1970s. They argue that the growing gap between California and other states demonstrates that other states and countries could replicate California's gains by adopting California-style regulations, and that California should build on its own success by tightening its standards further. Skeptics might point to three long-run trends that differentiate California's electricity demand from other states: (1) shifting of the U.S. population toward warmer climates of the South and West; (2) relatively small income elasticity of energy demand in California's temperate climate; and (3) evolving differences between the demographics of households in California and other states. Today, differences in climate and demographics account for almost 90 percent of the difference between California's and other states' residential electricity use. That difference thus provides no lessons for other states or countries considering adopting or tightening their own energy efficiency standards.

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### 1. Introduction

For the past 40 years, residential electricity consumption per capita has remained nearly constant in California while growing by 75 percent in the rest of the United States. These starkly different trends, plotted in [Fig. 1](#), serve as a key piece of evidence supporting the types of government-mandated energy-efficiency policies California implemented in the 1970s. Yet the figure by itself does not reveal the reason for California's slower-growing electricity consumption or whether that slowdown could be replicated by other states or countries adopting California-style regulations.

Proponents of regulations give credit for California's apparent savings to the California Energy Commission (CEC), which set the nation's first energy efficiency standards for appliances and buildings, and to the California Public Utility Commission (CPUC), which led the country in decoupling utility profits from sales of electricity and natural gas ([Rosenfeld and Poskanzer, 2009](#)). In addition to being the first state to set energy standards, California has maintained its lead. The most recent "State Energy Efficiency Scorecard" ([ACEEE, 2012](#)) ranks California as the best in the nation for its appliance standards and tied for first place with five other states in its building codes. And [Palmer et al. \(2012\)](#) ranks California's energy efficiency resource standard as the ninth most comprehensive among the 19 states with such standards. So there's no doubt that California

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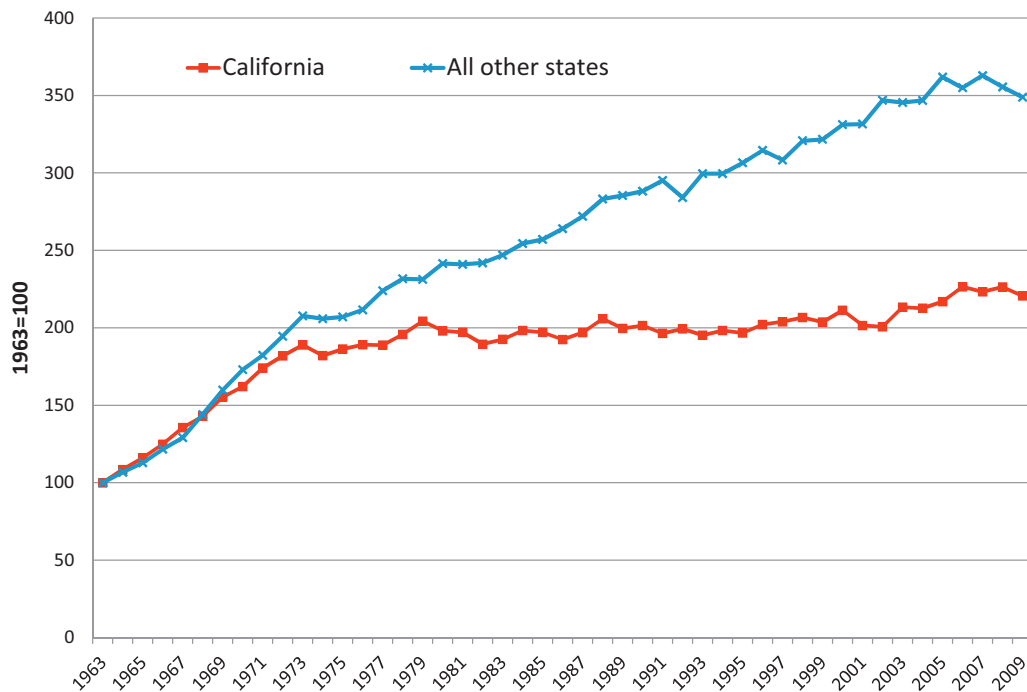


Fig. 1. Residential electricity use per capita 1963–2009.

has some of the longest-standing and most stringent energy efficiency policies. What we do not know, however, is what California has gained from those policies.

Unfortunately, the highest-profile piece of evidence for the efficacy of California’s energy policy is Fig. 1, a simple comparison of residential electricity consumption per capita in California and other states. California regulators claim that “because of its energy efficiency standards and program investments, electricity use per person in California has remained relatively stable over the past 30 years, while nationwide electricity use has increased.”<sup>1</sup> U.S. Energy Secretary Steven Chu attributes California’s savings to its “progressive energy policies.”<sup>2</sup> The Natural Resources Defense Council asserts that California’s policies “offer lessons to states and utilities outside California” (Ettenson, 2011). And the World Bank devoted an entire page of its 2010 *World Development Report* to California and a reproduction of Fig. 1 as a lesson for the rest of the world. In this view, other states and countries could achieve California-sized energy savings by adopting California-style regulations.

There are, however, reasons to be skeptical about attributing California’s apparent residential electricity savings in Fig. 1 to regulatory changes. First, appliance manufacturers quickly began meeting California’s energy efficiency standards nationwide, rather than designing and producing two sets of products. Second, other states and the federal government soon followed California’s lead, in some cases mimicking or adopting California’s standards outright. Third, California’s relative savings, depicted by the bottom line in Fig. 2, appear as a trend that began before 1970, long before the state’s regulations took effect, and continued steadily through periods of high and low energy prices. And fourth, the five other states with the lowest per-capita growth in residential electricity use, also depicted in Fig. 2, are California’s western neighbors: Nevada, Oregon, Washington, Idaho, and Hawaii.<sup>3</sup> All of this suggests the high-profile Fig. 1 may be the result of geographic and demographic trends unrelated to regulations.

If regulations do not deserve credit for California’s declining relative electricity consumption, what can? This paper investigates three hypotheses: population migration, climate, and demographics.<sup>4</sup> First: migration. Over the past fifty years, the United States population has shifted from the North and East to the warmer and more air-conditioned South and Southwest, leading to higher electricity consumption in the comparison group, “other states.” Second: climate. California’s mild climate means that five decades of income and home size growth nationwide has translated into less increased heating and cooling in California than in other states. And third: demographics. Household sizes have shrunk less in California than in the rest of the country, so that California households have gained on average 0.6 members relative to households in other states. Since energy use per capita declines with household size, Californians’ electricity use has increased less than that in

<sup>1</sup> California Public Utilities Commission and California Energy Commission, “Energy Efficiency: California’s Highest-Priority Resource” June 2006.  
<sup>2</sup> Steven Chu interviewed by Larry Klein and published in NOVA Online January 20, 2009. ([www.pbs.org/wgbh/nova/tech/energy-secretary-chu.html](http://www.pbs.org/wgbh/nova/tech/energy-secretary-chu.html)).  
<sup>3</sup> Chong (2012) makes a similar point.  
<sup>4</sup> These have been proposed by others. See Tanton (2008), Clemente (2011), Mitchell et al. (2009), and Sudarshan (2013).

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