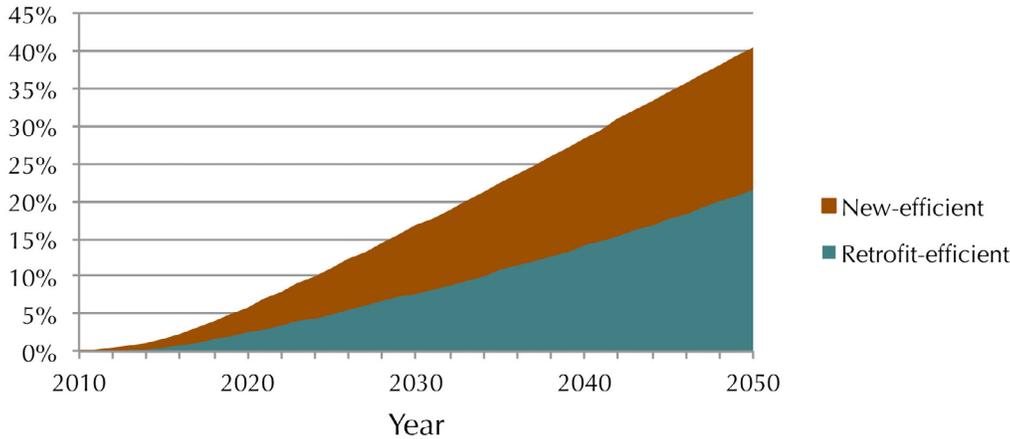




### Cumulative Efficiency Improvement



**Figure:** Cumulative efficiency improvements projected for residential buildings through 2050. From Figure 5, p. 26. The projected rate of improvement for commercial buildings is similar.

#### SUMMARY

This report is part of the **California's energy future (CEF)** project sponsored by the California Council on Science and Technology (CCST) and funded by the **California Energy Commission** and the **S.D. Bechtel Foundation**. The CEF assessed technology requirements for reducing greenhouse gas (GHG) emissions in California to 80% below 1990 levels as required by Executive Order S-3-05 (2005).

Achieving California's emission reduction goals by 2050 will likely require a concerted focus on raising efficiency of both the production and use of electricity, electrification of much of the transportation sector and stationary uses of heat, a doubling of electricity production with nearly zero emissions, and development of low-carbon fuels. This report looks at the realistic potential of these technologies for California in the residential and commercial buildings sector and the industrial sector.

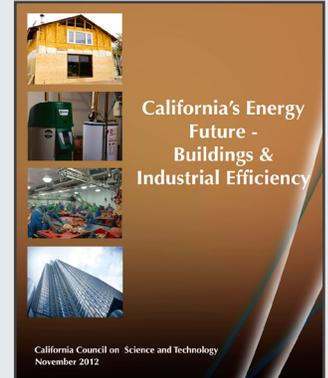
#### BACKGROUND

The goal of the CEF project was to help California develop sound and realistic strategies for meeting its emissions reduction goals, by providing an authoritative, non-partisan analysis of the potential of energy efficiency, electrification of transportation and heat, low-carbon electricity generation and fuel.

In this report, we examine the potential gains to be made from increasing residential and commercial building efficiency. The report assesses the amount of energy used by space cooling, lighting, etc. and explores ways to increase overall efficiency through reducing capacity

(e.g. smaller refrigerators or space conditioning only part of a building), increasing technology efficiency, reducing usage, and integrating different systems to maximize efficiency.

The report examines scenarios in which the state takes aggressive measures to improve technology and electrification, maximizes the use of hydrogen, and a "stress test" in which the state continues with a "business as usual" approach and experiences normal projected growth in population, building, and power demand.



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For the findings, conclusions and recommendations, see the **FULL REPORT** on our website: [ccst.us/publications-projects](http://ccst.us/publications-projects)

This report is part of the **California's Energy Future** project.

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