ENERGY earthshots
U.S. DEPARTMENT OF ENERGY

Affordable Home Energy™

U.S. Department of Energy Affordable Home Energy Shot™

Overview

The U.S. Department of Energy's (DOE) Energy Earthshots™ Initiative is designed to accelerate breakthroughs of more abundant, affordable, and reliable clean energy solutions.

Achieving the Energy Earthshot™ targets will help break down the biggest scientific and technical barriers to tackling the climate crisis and help reach the Biden-Harris Administration's goal of net-zero carbon emissions no later than 2050, while creating good-paying jobs and growing the economy.

The Opportunity

Seventy-five percent of today's homes will still exist by 2050. Meanwhile, nearly one-third of U.S. greenhouse gas (GHG) emissions are attributable to America's 130 million homes and commercial buildings, which use 40% of the nation's energy and 75% of its electricity for power, heating, and cooling. But today, buildings waste up to 30% of that energy.

The intent of the Affordable Home Energy Shot™ is to address the persistent burdens faced by low-income households and communities of color. Nearly 1 in 4 households nationwide experience high energy burdens; as a result, more than 20% fell behind on their energy bills in 2022. These trends disproportionately impact lower income residents who live in older homes that often lack adequate insulation and energy-efficient appliances. Households who report some form of energy insecurity reside in homes that are nearly 20% less efficient.

To decarbonize American homes and improve energy affordability nationwide, DOE launched the eighth and final Energy Earthshot—the Affordable Home Energy Shot™—to accelerate innovative retrofit solutions that reduce up-front costs, lower utility bills, improve safety and comfort, and address communities' broader needs.

This effort aligns with the Biden-Harris administration's Justice40 Initiative to increase energy equity and environmental justice by lowering the cost of energy-efficient retrofits and reducing the overall energy costs and carbon intensity of homes across the United States.

Impact

The Affordable Home Energy Shot™ will reduce the cost of energy-efficient retrofits in affordable homes by at least 50% and decrease residents' energy costs by at least 20% within a decade.This Energy Earthshot focuses DOE's research and development (R&D) strategy and resources to ensure that households in the greatest need will benefit from decarbonization solutions—specifically, the 50 million single-family, multifamily, and manufactured homes rented or owned by households earning less than 80% of the area median income. With this focus on energy issues impacting affordable housing, DOE is committing to serve a sector historically underrepresented in buildings R&D. This Energy Earthshot will help ensure benefits of the clean energy economy reach all U.S. communities.

Goal: The Affordable Home Energy Shot™ focuses DOE's R&D strategy and resources to ensure that households in the greatest need will benefit from decarbonization solutions and lower greenhouse gas emissions by 2035.

50%+ Technology Cost Reduction

20% Lower Cost

Within the Decade

DOE has identified three key R&D areas to enable cost savings and energy efficiency improvements through integrated designs that deliver whole-home solutions:

BUILDING UPGRADES

Improved livability and comfort make homes more resilient.

- Advanced leakage detection
- Low-impact retrofit techniques
- Panelized exterior insulation

EFFICIENT ELECTRIFICATION

Innovations that streamline systems and lower costs enable affordable and adaptable installation.

- Lower-voltage equipment
- Plug-and-play heat pump designs
- Integrated ventilation packages

SMART CONTROLS

Flexible energy loads transform homes into energy resources.

- Smart electric panels and load management
- Grid-interactive technologies
- Shared circuit control between loads

Alignment of Resources

This Energy Earthshot is a DOE effort to drive the major innovation breakthroughs needed to address the climate crisis. Several DOE offices will implement and support this work, including the Office of the Under Secretary for Science and Innovation, the Office of Energy Efficiency and Renewable Energy's Building Technologies Office, the Office of State and Community Energy Programs, the Office of Economic Impact and Diversity, the Federal Energy Management Program, the Office of Science, the Office of Policy, the Office of Technology Transitions, and the Advanced Research Projects Agency–Energy.