

How We Got Here: The Path of Energy Efficiency

This paper, issued by the EE Commission, traces over 35 years' worth of federal, state, and local policies and programs that have affected energy efficiency progress in the United States. Understanding under what conditions energy-focused strategies were successful or insufficient will guide decision-makers in establishing the future course of energy efficiency.

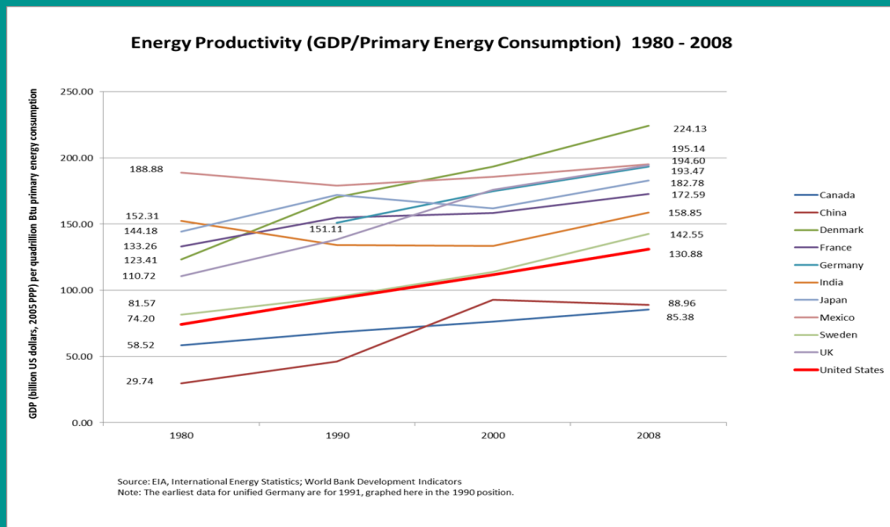
Introduction

Challenges in energy use and energy policy faced in the 1970s, 1980s, 1990s, and even throughout the last decade provide key lessons and experiences likely to be encountered in the coming decades. Over this 35+ year period, federal, state, and local level policies have helped drive an increase in energy productivity, that is, the production of an equivalent or greater output from a given or smaller use of energy.

Historical Energy Productivity Trends in the United States

With the 1973 oil embargo, the ensuing energy crisis exposed concerns about U.S. energy scarcity and energy security, proving to be a game changer in U.S. energy history. Energy efficiency programs, investments, and behavior changes have since emerged to mitigate potential future energy crises. Additionally, economic pressures have transformed the building, transportation, and industrial sectors and pushed them to adopt improved energy efficiency measures.

Federal Policies that Impact Energy Efficiency: 1975 - Present



Many of the most influential energy policies were created in the decade following the oil embargo crisis, under the Nixon, Ford, and Carter administrations. These came with an overarching vision to make the U.S. an energy independent nation and included energy efficiency, educational efforts, and financial incentives as central components of the plan. Over the next three decades many policies, including in the Energy Policy and Conservation Act (EPCA) in 1975, the Energy Policy Act (EPAAct) of 1992, and the Energy Independence and Security Act

(EISA) of 2007, were approved. These, of course, achieved varying degrees of success in terms of maximizing energy efficiency potential and increasing energy productivity. Even so, strategies like the federal appliance efficiency and vehicle fuel economy standards, research and development programs, and the ENERGY STAR labeling, made significant contributions to lowering energy use in the United States.

U.S. Economic Impact: Energy Efficiency

Energy efficiency policies have impacted energy use in the United States for over 35 years, leading to significant economic savings. According to the Rocky Mountain Institute, energy use was projected to reach 207.3 quadrillion Btus in 2007, but changes that enabled an increase in energy productivity brought the United States to half that amount, 101.6 quadrillion Btus.

Energy Productivity Comparison

U.S. States

Energy policies and the success of energy programs at the state level vary drastically between states and over time. Not only do U.S. states encompass a range of demographics, climate zones, and energy prices, but states that were once front runners in the 1970s in terms of implementing energy efficiency have gradually begun to lag behind, while others are quickly racing to the top. Given this, states and cities with the most effective measures tend to target energy use in the sectors that will have the largest impacts on their economies. For example, California's energy efficiency policies focus on many sectors spanning a wide array of existing solutions and energy savings potential. In the residential sector targeted policies have led to household energy savings of \$56 billion from 1976 to 2006. Many of the state and local strategies could also be implemented across the nation to create substantial energy savings across America.

International vs. United States

With Germany and Japan driving energy productivity through their ambitious goal-setting programs, and with countries like China and Canada experiencing challenges in reducing their rates of energy consumption, international collaboration on best practices and lessons learned can be helpful in guiding efficiency policies. Various countries have set economy-wide energy targets, from Brazil's goal to reduce electricity consumption 10% by 2030, to China's 2011-2015 five year plan to reduce energy intensity by 16%.

Conclusion

Though programs for energy efficiency vary greatly among cities, states, countries, industries, and utilities across the globe, it is clear that increasing energy productivity is possible in every economic sector. While

we estimate the United States saves 52 quads of energy a year due to energy efficiency and conservation efforts since 1973, there is much that can still be achieved in terms of energy efficiency, making it a cross-cutting imperative of businesses, governments, towns, states, utilities, countries, and industries.

Case Study: Japan's Energy Program

Japan consumes about 20 quadrillion Btus annually, making it the fourth highest consumer of energy in the world. Since the implementation of its first energy-saving policy in 1947 and 1970s revision, Japan's industrial sector has had minimal to no increase in energy consumption. Following the 1979 energy crisis, Japan issued the Energy Conservation Act and thereby created the Energy Conservation Center of Japan (ECCJ). ECCJ has led many initiatives, including the Top Runner Program which has increased air conditioner efficiency by nearly 40% from 1995 to 2005.

Japan has recently set an Energy Productivity Goal to reduce its overall energy consumption by 30% in 2030.

Case Study: Local Level Programs

- Austin, Texas passed the Energy Conservation Audit and Disclosure (ECAD) Ordinance in 2008 to improve energy efficiency in commercial and residential buildings. In the first year, 4,682 homes were found to have potential annual savings of 7.8 million kWh per year and \$723,650 per year.
- Charlottesville, Virginia enacted the Local Energy Alliance Program (LEAP) in 2009 to help homeowners save money on their energy bills while still enjoying a comfortable lifestyle through home assessments and recommendations. By 2011, LEAP served 310 local homeowners, leveraged \$3.4 million in private investment, saved \$200,000, and 1.4 million kWh.