

# U.S. energy demand on the decline due to population migration

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(PhysOrg.com) -- As Congress and the White House explore ways to encourage Americans to conserve energy, a new study by the University of Michigan shows that the average individual energy demand for heating and cooling has decreased over the past 50 years.

The reason? The country's population shift to the more moderate and warm climates of the American West and Southwest, says Michael Sivak, a research professor at the U-M Transportation Research Institute.

The study, published in *Cities: The International Journal of Urban Policy and Planning*, found that the U.S. population shift has resulted in an 11 percent reduction in combined [energy demand](#) per person for heating and cooling since 1960.

"The relative increases in population in more moderate climates and, at the same time, in warmer climates imply a reduction in the combined energy per person—the shift to more moderate climates because of narrower ranges between winter and summer temperatures, and the shift to warmer climates because it is more energy-efficient to cool than to heat," Sivak said.

Sivak performed three analyses based on 1960 and 2006 population data for the 50 largest metropolitan areas in the United States, which account for 54 percent of the U.S. population.

The three approaches included: 1) nominal energy demand, based only on "heating and cooling degree days"—units that relate to the amount of energy needed to heat and cool buildings [one heating (cooling) degree day occurs for each degree the average daily outdoor temperature is below (above) 65 degrees Fahrenheit]; 2) effective energy demand, based on heating and cooling degree days and incorporates the energy efficiencies of heating and cooling appliances; and 3) practical energy demand, based on degree days

and appliance efficiencies, as well as the efficiencies of power-generating plants.

Based on climatological considerations only, Sivak found that while the energy demand for cooling (air conditioning) increased by 23 percent from 1960 to 2006, the demand for heating (which dominates the combined demand) decreased by 14 percent. Overall, the nominal energy demand for both heating and cooling dropped 6 percent.

Using the effective energy demand approach, which accounts for energy used by furnaces, boilers, electric heaters and air conditioners, Sivak found a 12 percent reduction in energy demand since 1960.

The most comprehensive practical energy demand measure, which also incorporates the energy used by power plants, yielded the 11 percent figure reported above.

Provided by University of Michigan ([news](#) : [web](#))

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