Analysis of Household Energy Consumption Choices

Objective: Develop a data-based analysis of US household energy use that provides a solid framework for understanding how policies such as carbon pricing could affect various subgroups of household energy consumers.

Background: Household energy use in the US constitutes about one fifth of total national energy use, meaning that US households are significant direct and indirect contributors to total US carbon dioxide emissions. To understand the current greenhouse gas (GHG) emission picture, and to accurately create future GHG scenarios, we need accurate assessments of the demand drivers, including the household sector. This sector can be significantly influenced by policies such as carbon pricing, home energy auditing, and energy assistance. But any sound proposals for changing household energy use patterns must be based upon a detailed understanding of current household energy use characteristics. Our understanding is now quite limited, e.g., with respect to how such policies impact specific demographic groups, and how they might disparately affect urban and rural households. More and better data and models could help us evaluate whether carbon price rises would amount to a regressive tax with disproportionate impact on the poor. Other factors play a part in energy demand: urban and land-use policies; and forms of residence (e.g., concentrated urban housing vs. suburban sprawl. Sophisticated efforts to model household energy use have been carried out in the UK, Denmark, and the Netherlands, but studies of the US are more limited.

Suggested Approaches: In Phase 1, create a usable dataset; estimate total household energy use as function of demographics, housing characteristics, and socioeconomic variables; and estimate heating/cooling costs with a similarly detailed analysis. In Phase 2, develop models to determine the extent to which government programs for energy assistance may have the perverse effect of worsening carbon emissions; analyze the degree to which wealthier households might reduce carbon emissions if so motivated; and consider possibilities for fuel choice substitution. In Phase 3, determine which socioeconomic groups would be most affected by carbon pricing; and systematically analyze how a cap-and-trade program would impact household energy users across a panoply of parameters: socioeconomic level, census divisions, race and ethnicity, urban/rural, owner/renter, worker/fixed income.