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Behavioral Assumptions Underlying California Residential Sector Energy Efficiency Programs[1]

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This white paper explores the ways in which residential consumers are addressed by California utility-managed energy efficiency programs, and offers suggestions for improvements in support of the state's ambitious greenhouse gas reduction goals. The report first reviews the assumptions that underlie the state's residential energy efficiency policies and programs. A key set of assumptions can be found in a physical-technical-economic model (PTEM) that has oriented energy efficiency program design for several decades. The model is focused on technical devices and assumes economic motivations and rational choice by energy users. These assumptions are articulated in official program design and management documents, and reinforced in the California Public Utilities Commission's (CPUC) rulings. The origins of the PTEM and its basic assumptions are explored, and the institutional conditions (monopoly regulation) and regulatory requirements (cost-effective supply substitution) that provide it with continuing reinforcement are considered.

The authors examine the portfolio of residential energy efficiency programs currently operated by the regulated utilities. Data sources include utility filings, CPUC rulings and program evaluation reports, interviews with program planners and implementers, and a review of utility web site customer communications content, style and themes. Four somewhat different approaches are being taken by these programs to influence consumer behavior and choice. They are variants of the PTEM, focusing on technology substitutions and monetary inducements, but also with attention to information and communications. The programs also add somewhat more realistic elements, including consideration of market processes taking place outside of the awareness and control of energy users.

The report then considers a series of social science reviews of energy efficiency programs and paradigms. All of those reviews are critical of the PTEM's assumptions about consumer behavior and choice. The various reviewers approach the problem from the perspectives of both the social sciences and multidisciplinary energy analyses, drawing on literatures that report studies of actual consumer behavior. The reviews highlight the facts that household energy use is social and that energy demand is macro-socially influenced and constrained. They point out that environmentally significant behavior such as energy use is quite complexly determined, and that progress has been slow in developing more realistic integrated models of residential demand. A brief review of energy efficiency program approaches, policy frames, and criticisms in the United Kingdom (UK) and the European Union (EU) shows approaches similar to those taken in

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California, but with some differences in focus and a longer history of concern about climate change and emissions resulting from household energy use.

The next section of the report goes beyond critique to consider some alternative perspectives on energy user behavior and choice. These include work in the areas of behavioral economics, economic and cultural anthropology, sociological theories of lifestyle, consumer segmentation approaches, and emerging themes in social science theory and energy efficiency policy development in Europe that focus on macro-systems, markets, and supply chains. For example, there are potential benefits to bringing psychological findings into neoclassical economics – the aim of behavioral economics – but the resulting theory remains individualistic and limited. Anthropological and sociological perspectives are broader and more inclusive, with some of the most directly relevant work focusing on consumer lifestyles. The origins and nature of lifestyles are discussed, and the usefulness of consumer segmentation in programs is assessed. Lifestyle segmentation seems to be promising, but is not easily applied and involves considerable uncertainty in regards to data, statistical techniques and underlying theoretical bases. Innovations in the UK and EU related to conceptualizing lifestyles and potential policy applications are also reviewed, and three emerging novel approaches are sketched: (1) the social practices view, (2) human-technology interactions, and (3) the analysis of consumption in the context of socio-technical systems. A "co-provision" perspective that situates consumer action and agency in larger social and technical contexts is highlighted.

The concluding section of the white paper first draws upon interviews with program planners and managers to consider evolving program perspectives and strategies. Changes are underway that move more toward the market transformation approaches of the 1990s, but there are tensions with regulatory imperatives. At the same time, the CPUC and other agencies are setting very ambitious goals related to climate change mitigation. These goals are discussed, along with the problems of ramping up efficiency activities designed in a regulatory context, and with interventions grounded largely in craft knowledge. Arguing that new imagery is required for policy discussions related to energy, efficiency and climate change, the lessons about consumer choice and behavior from the 2001 crisis are explored and related to the European co-provision perspective.

Because our collective knowledge of consumption and consumer choice in complex systems is limited, a number of key research questions are identified, such as: (1) research on the fundamentals of consumption and choice, (2) research to improve communications and influence, and (3) research to support joint private/public action. The report also considers ways in which we can apply what we think we know and can learn from new research to innovative programs designs. We consider two types of theory-linked efficiency policy innovation. The first involves program experiments, in which elements related to choice, context, intervention design, delivery, etc. are systematically varied, observed and compared across treatment groups and possible control groups at different points in time. The second is a program pilot strategy. It combines the theory-based approach to market transformation and the adaptive management approach to human-environmental resource systems to design, implement, evaluate, and modify pilot interventions, using near real-time information and closely coupled program research. Both the experimental and theory-based adaptive pilot approaches support program evolution in the context of a broader policy frame – one that makes more realistic assumptions about consumer behavior and choice in order to support optimally effective climate change interventions.