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What Do Consumers in the Past Tell Us about Future Energyscapes?

As significant players in rising carbon levels, today's domestic energy users face increasing pressure to adopt more sustainable practices and technologies. This is not the first time people have been asked to switch energy sources, accommodate new technologies, or modify their behavior. Transitions from wood to coal, and later from solid fuels to gas and electricity, also meant changes in homes and everyday routines. But domestic energy transitions across the twentieth century show that consumer compliance with providers' and policymakers' visions has rarely been a smooth or predictable process. Here, in order to ask how consumers will feature in the evolution of energy futures, we review their roles in shaping transitions in the past. Offering insights from our historical investigation of changing material cultures of energy in Britain and Canada, we reflect on a central focus of this volume: the spatially differentiated character of energy modernization and the role of consumer agency in forging new energy spaces. We consider how the past can inform current debates about the transition to sustainable consumption.

"Energyscape" is used here to encapsulate shifting connections between energy consumption and production activities across multiple spatial scales: from homes and local communities to regional and national contexts. We draw here on the meaning articulated by Strauss et al: that energy exists at different spatial levels, "shifting its cultural, social, economic, and technological values as it flows from one domain to the next."[1] As fluid entities across space and time, energyscapes encompass both changing expectations of energy use at a broad societal level, and shifting local geopolitical and cultural contexts. Developers' visions of national or regional energy futures may have a strong bearing on how energyscapes evolve locally but they have rarely determined community or household practices in precise terms. Energyscapes reflect patterns of consumer resistance and negotiation, as well as cooperation.

The home within changing twentieth-century energyscapes was like Dorothy's house caught in the twister in *The Wizard of Oz*, spinning through space and time at the

1 Sarah Strauss, Stephanie Rupp, and Thomas Love, eds., *Cultures of Energy: Power, Practices, Technologies* (Walnut Creek, CA: Left Coast Press, 2013).

mercy of complex and unpredictable forces. These forces were generated outside and inside the home. They involved large-scale shifts in the global politics of energy, changing regional fuel availabilities, and local transformations in urban, suburban, and rural spaces. Affecting the finer details of household energy choices were variable income levels, housing regulations, new housing types, generational preferences, and diverse land-tenure and living arrangements. Practices within the home were also influenced by social patterns of work, leisure, and mobility beyond its walls.

To make sense of some of these complex, dynamic forces we consider three past patterns of household-grid interaction that typify the contested evolution of energyscapes. The first interaction highlights tensions between consumers as imagined in developers' visions of the future and consumers' actual behaviors as grids expanded across urban and rural space. Next, we reflect on the material and cultural hybridity of emergent domestic energy spaces that suggests persistent differentiation in users' experiences of energy over time. The third interaction is characterized by the resistance of energy users, who mobilized because of conflicts over tariffs, service contracts, quality of service, and questions of fairness perpetuated by uneven energyscapes. In exploring these key tensions around the household-grid interface in the past and their persistence in the present, we reflect on the challenges they may create in projections for a sustainable energy future.

Modifying Visions of Electrified Life

Electricity was often represented by early twentieth-century suppliers as a transformative, modernizing force that would unite society. Sebastian de Ferranti's statement on Britain's electric future was typically all encompassing: "Wherever coal, gas, or power are now used, everything . . . will be better done when electricity is the medium of application."[2] Consumers were passive beneficiaries in such visions: a captive audience eagerly awaiting the arrival of the grid and its modern conveniences (Figure 1). Behind the scenes, suppliers struggled to understand the behavior of their target audiences; they also struggled with technical and commercial concerns about how to expand their networks and construct the diversified demand they needed to balance system loads. These difficul-

2 Sebastian Z. de Ferranti, "Inaugural Address," *Journal of the Institution of Electrical Engineers* 46, no. 205 (1911): 15.

ties shaped the nature of electrical development. Private providers often chose to serve lucrative industrial users first, adding domestic connections only when beneficial, to supplement off-peak loads. Public providers promised more inclusive landscapes of connectivity. Adam Beck, chair of the Hydro Electric Power Commission of Ontario (founded 1906), advocated "Power for All" citizens at low cost in the first decade of the twentieth century, but this promise was frequently reinterpreted as the physical and economic difficulties of rural extension became evident. The equalizing public-service ethos belied great unevenness in grid connections. By 1921, only half of Ontario homes had electric lighting, and electricity did not reach many urban homes until the early 1940s. Well over half of rural homes had no electrical services at this time.[3] Customers struggled to understand the rationale behind this differentiation, with advocates for Ontario's rural users often challenging the fairness of service extension priorities and seemingly arbitrary pricing policies that divided neighboring districts.[4]

Figure 1:
Energy users were often portrayed as awaiting electrification rather than being actively involved in modernization. Virtual Museum Canada, 1942. Used with permission from Manitoba Electrical Museum Inc.

The envisaged mass of new consumers did not simply materialize, either in urban or rural settings. Many were neither convinced by an electric future nor in a position to choose one, with its new equipment, complex rates, often-unreliable service, and upheavals in everyday routines. By 1948, almost 25 percent of UK households were still without electricity, the majority being tenants in poor urban housing, and rural in-

3 Ruth W. Sandwell, "Pedagogies of the Unimpressed: Re-Educating Ontario Women for the Mineral Economy, 1900–1940," *Ontario History* 107, no. 1 (2015): 36–59.

4 *The Globe* (Toronto), "Advocate Flat Rate for Hydro Power in Rural Ontario," 17 December 1926, 11; "Hydro Meters," 1 March 1935, 4.

Figure 2: "Are you having baking problems . . . ten chances to one it is not your range." BC Hydro Home Service Centre, pamphlet, ca. 1960s, Box 2 File 3, Beatrice Millar Home Economics Ephemera Collection, University of British Columbia Library, Rare Books and Special Collections. Used with permission from University of British Columbia Library.

habitants.[5] Britain's nationalized energy sector, created that year, aimed to smooth out spatial and social inequalities in grid access and services. Aided by postwar urban housing programs, this figure was reduced to less than 10 percent by 1958. But even within wired households, UK consumers proved highly selective in their electrical applications, frustrating providers' efforts to "build the load." A national survey in 1953 found one-fifth of farmers to be using electricity only for domestic purposes, despite intensive "electricity on the farm" campaigns designed to boost agricultural uses.[6]

Energy users were significant in defining the terms of energy use and were often seen as impediments to progress. Providers frequently expressed frustration with those who failed to appreciate the benefits of new services or to use appliances as intended (Figure 2). "Don't Blame the Appliance," a 1968 article published by the BC Hydro Home Service Centre,[7] highlighted an enduring perception of customer misuse, claiming that almost half of service calls could be eliminated if homemakers would simply follow the instruction booklet. In reality, there were many complex practical and cultural reasons why consumers did not fully embrace electric cooking, heating, or laundering.

5 L. Needleman, "The Demand for Domestic Appliances," *National Institute Economic Review* 12, no. 1 (November 1960): 39–40.

6 Anthony Hurd MP, "Electricity Supplies (Rural Areas)," Hansard Parliamentary Debates, Commons, 5th series, volume 516, column 1355 (19 June 1953), available at http://hansard.millbanksystems.com/commons/1953/jun/19/electricity-supplies-rural-areas.

7 BC Hydro Home Service Centre, "Don't Blame the Appliance," *The Tie-In*, Aug–Sept 1968, B. Millar and BC Hydro Home Service Centre Collection, UBC Rare and Special Collections, Vancouver.

Hybrid Energyscapes across Time

Figure 3:
A 1930s cartoon shows a "knock-out" fight between gas and electricity, with the cook egging on the traditional gas cooker. Government "subsidies" (the wire trailing from the electric cooker) helped electricity move into some rural areas at this time. Gas Progress: *The Annual Bulletin of the Bedford District Gas Company and Co-Partners' Journal* 1, no. 8 (Dec 1932). © Bedfordshire Archives & Records Service.

A common way of looking at energy developments in the past was as a series of zero-sum conflicts between competing fuels resulting in a single-source transition. The 1932 cartoon in Figure 3 portrays this, with its "knock-out" fight between a gas and an electric cooker. "Needless to say, we cannot both have the heating and cooking business," claimed the Bedford gas company. In fact, households relying on a single energy source were a rarity for most of the twentieth century. The persistence of both coal and wood in postwar rural Canada, for instance, has been well documented (see Sandwell in this volume). Regional availability of fuels, the cost of electrical service extensions, and versatility of traditional appliances all influenced household energy decision making. Fuel substitutability and competition also lingered in Britain. Early domestic electricity was often used only for lighting a single room, alongside gas or oil lighting in other rooms, for complex reasons relating to cost, technical capacity, and preferences for comfort. Such diversity is captured in a 1942 depiction of the "average British household" in Figure 4, with heat and power matched to different practical and affective purposes, including electrical appliances, a gas cooker, and an open fire for relaxing after dark. Electricity's domestic role expanded significantly in the postwar years, but most households remained stubbornly entangled in multiple energy networks. In a 1951 social survey of British households, 66 percent used both gas and electricity; 98 percent still used a coal fire in their living room. A 1963 British government report on *Domestic Fuel Policy* noted the continued widespread use of solid-fuel fires and paraffin heaters, as well as electric heaters and gas fires, attributing differences in household transitions to prices, available fuels, local habits, and the influence of local authorities and suppliers.[8]

8 Leslie T. Wilkins, *Domestic Utilization of Heating Appliances and Expenditures on Fuels in 1948/49*, Government Social Survey Publications NS, 130 (c) (London: Central Office of Information, 1951); Ministry of Power, *Domestic Fuel Supplies and the Clean Air Policy*, Cmnd. 2231 (London: HMSO, 1963).

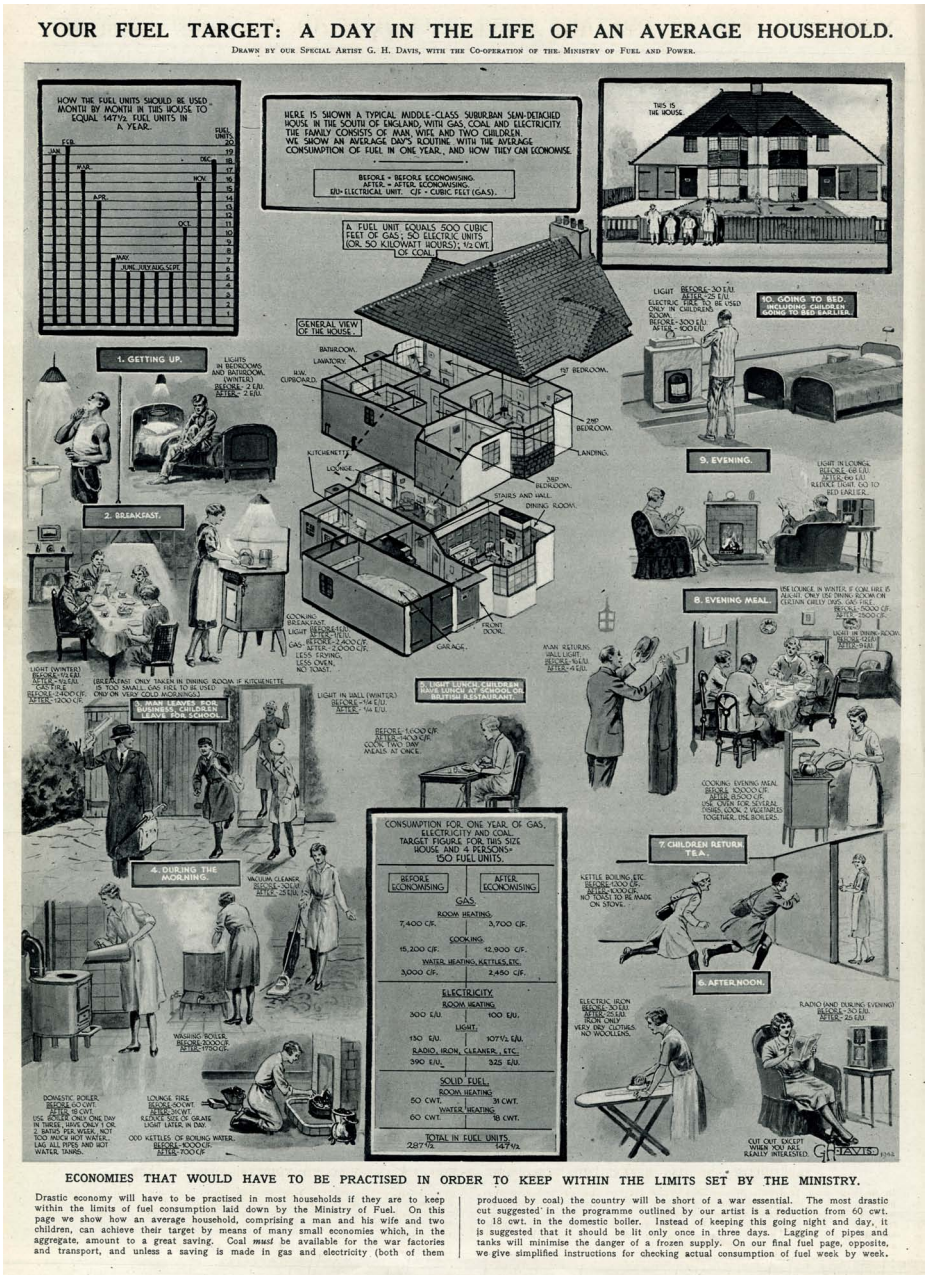

Figure 4:
An average day in "a typical middle-class suburban semi-detached house in the south of England." G. H. Davis, "Your Fuel Target: A Day in the Life of an Average Household," *Illustrated London News*, 2 October 1942. © Mary Evans Picture Library.

Some important regional variations arose where fuels were not easily substituted. In such cases, complementarity shaped the transition. Despite their misleading names, the British Columbia Electric Railway Company (established in 1897) and its successor BC Hydro (created 1961) saw electricity and gas in complementary terms, supporting both options for customers (Figure 5). Home modernization campaigns from the 1930s encouraged consumers in the main urban centers to exercise their preference for a gas or electric water heater, refrigerator, or range. As an example of more extreme diversification, the North of Scotland Hydro-Electric Board (established in 1943) served the remote highlands and islands through diesel generation, Calor gas, and experimental wind power, as well as hydroelectricity (Figure 6). Oil and portable liquid petroleum gas today remain central to the UK's rural heating provision.

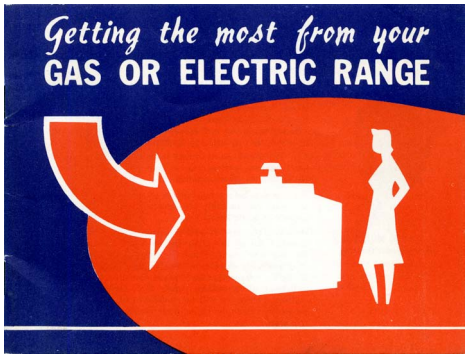

Figure 5:
"Getting the most from your gas or electric range." BC Hydro Home Service Centre, illustrated booklet, ca.1960s, Box 2 File 3, Beatrice Millar Home Economics Ephemera Collection, University of British Columbia Library, Rare Books and Special Collections. Used with permission from University of British Columbia Library.

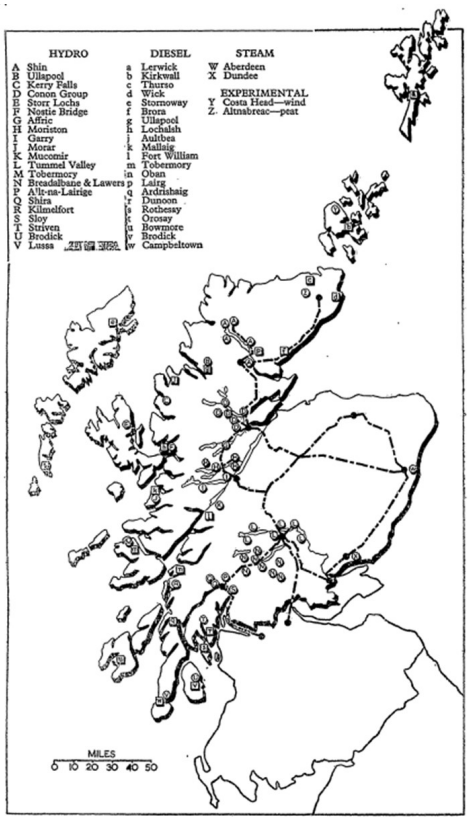

Figure 6:
Hydro, diesel, steam, and (experimental) wind and peat electricity generation in the Highlands and Islands. North of Scotland Hydro-Electric Board, Annual Report and Statement of Accounts, 1 January 1953 to 31 December 1953. © SSE.

Contested Energyscapes

Cost has always been a potential source of conflict and one reason for ongoing reliance on multiple fuels. Householders who were disillusioned with the prices they were paying for limited electrical capacity sometimes returned to older energy systems. One disgruntled Toronto resident reverted to the coal range for the winter to avoid paying the higher ser-

vice cost of adding an additional electrical wire to their home.[9] There were also frequent reports of resistance to costly centralized provision where cheap local resources were available. South Wales collier families who received subsidized coal frustrated electricity suppliers' aims to increase household demand in the region.[10] Conflicts over fair rates arose when urban users were asked to subsidize rural users. And people were often unhappy with the tariff and service differentiations they saw in their own localities. One urban Victoria resident complained to BC Electric in 1930 that his friend living only a short distance away in the city of Vancouver paid lower rates for comparable electrical equipment and usage.[11] But these were not simply rational consumers intent on the best price. Perceptions of material benefit and comfort have been contradictory. In late 1960s Britain, a Norfolk resident complained to the electricity board that after installing seven storage heaters, her house was still cold. But when advised of the draught from her "large Elizabethan type open fire place," she chose to keep using it.[12]

People's capacity to shape their domestic energyscapes was highly variable and affected by structural constraints within and beyond the home. In Britain, housing tenure was particularly influential in this regard. Local councils here held much power as "proxy consumers" of services and appliances, being responsible for almost a third of homes by 1970. Gas and electricity providers competed for services and appliances in new public housing from the 1930s onwards in the name of council tenants' "freedom to choose."[13] Residents were not entirely locked into given energy pathways, turning at times to collective protest. Tenants' rent strikes show how issues such as inadequate heating could become politicized, but their frequent defeats also indicate the odds stacked against tenants with limited legal rights.[14]

Even when electrified homes became normal for the majority, some struggled to get the service they wanted. Some consumers demanded electrical services but were held back

9 The Globe, "Hydro Meters," 1935.
10 House of Commons Parliamentary Papers, South Wales Electricity Board, Fifth Report and Statement of Accounts, Including Report of Electricity Consultative Council, for the Year ended 31 March, 1953.
11 J. Forman, "Letter to A T Goward, Manager BC Electric Railway Company," 12 February 1930, BCER Collection MS-0004, RBC Archives, Victoria.
12 Eastern Electricity Consultative Council, GC473/5/14: Norfolk Local Committee, 9 April 1969, Suffolk Record Office.
13 Frank Trentmann and Anna Carlsson-Hyslop, "The Evolution of Energy Demand in Britain: Politics, Daily Life and Public Housing 1920–1970," *The Historical Journal* 61, no. 3 (September 2018): 1–33; Central Office of Information, *Housing in Britain: Reference Pamphlet 41* (London: HMSO, 1970).
14 Mass Observation Archive, Ref. SxMOA1/2/1/1/F/1, "Housing Conditions and Rent Strikes, 1939–40," The Keep, University of Sussex.

by infrastructural constraints, such as the inadequacy of wiring. As late as the 1960s, residents in remote parts of Ontario rewired their homes in anticipation of Hydro grid connections, only to be told that service was not yet economically or technically feasible in their area. In areas that were especially slow to electrify, rural users were enrolled as voluntary labor to speed up connections or offset costs. Farmers in Alberta's Rural Electricity Associations in the 1950s–60s cooperated both by helping to construct their local power lines and by educating their neighbors on how to live safely with electricity. Such experiences of becoming electrified contrast strikingly with earlier visions of consumers as passive recipients of convenient modern energy forms.

What Can the Past Tell Us about Future Energyscapes?

Returning to our image of Dorothy's spinning house, the home—though increasingly grounded within large-scale integrated networks—has not really stabilized over time. We see a variety of household energy transitions in the twentieth century. But within these changing domestic energy arrangements, there are three broad, persistent patterns that we believe are crucial in considering future transitions.

Firstly, totalizing visions of transformation have rarely materialized. There is no single model for transitions in everyday life: these evolve in myriad ways as new spatial formations meet preexisting material cultures of energy. Despite convergence over time around electrified ways of life, households have remained entangled in multiple energy systems that have worked for them, even where these systems have not been the most rational solution from a provider perspective. Hybrid modes of domestic energy transition are normal—even crucial—in the evolution of energyscapes. This is unlikely to change. Emergent systems today, such as microgrids, must also intersect with existing centralized networks and other entrenched domestic arrangements that people may be reluctant to change. As the experience of blackouts in the past suggests, this hybrid complexity can often support resilience during grid disruptions.

Secondly, domestic users have co-created energy transitions—from their decisions about appliance purchases and fuel mixes, to complaints about service conditions, or direct action in the building of rural networks. Transitions are unpredictable, but it is certain that households will continue to modify energy policies, though on uneven

playing fields in terms of their agency. While domestic consumers are being asked to assist in developing current plans for lower carbon societies, it is not clear that the complexity of domestic energy behavior is fully understood. Much emphasis is placed on green values as a determinant of household energy demand, but not all visions for sustainable living or household arrangements are the same. Nor will all those with green values have similar access to lower-carbon lifestyles. As social equalization in future energy services is far from guaranteed, there is likely to be both accommodation of change in domestic provision and hardwired resistance to change.

Finally, the combination of receptivity, adaptability, and entrenched practices that characterizes past domestic transitions—reflecting rational decision making, affective values, and material constraints—points to an infinite variety of flexible service arrangements in future energyscapes. The complexity of decision making we see in households of the past is an important signal for policymakers and providers currently considering how transitions will evolve to attend to both the internal and external politics of household energy demand. Though electricity networks have expanded and connection rates soared since the mid-twentieth century, people's experience of electrified life is still highly variable. Instead of a common end point, we see ongoing negotiations to mediate the gap between people's expectations and the variable conditions of their energy services. This history suggests that grand transformative visions that ignore spatial unevenness and sociomaterial diversity will not materialize. Diversified energy services aligned to people's everyday ambitions for better lives offer more realistic prospects for sustainable transitions.

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