

## ENERGY SPACES – EXPANSION & CONNECTION

### Expanding Networks

Energy has transformed space and society in the twentieth century. In contrast to the fragmented local systems of the early decades, today's integrated National Grid carries electricity from generators to users across the UK and beyond, balancing variations in supply and demand. In Canada, hydropower is delivered through vast networks of power lines and pylons that cut across hundreds of miles to connect electricity consumers in distant cities. These contemporary energy landscapes are defined by the expansionary visions and connection policies of the past.

### KEY FINDINGS

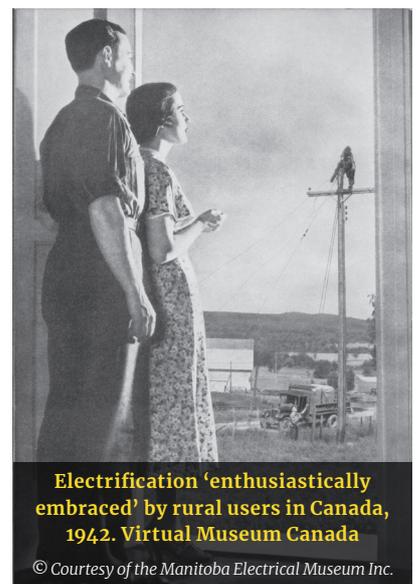
- Energy transformed space and society unevenly in the twentieth century.
- Connection priorities divided town and country but also different categories of users.
- Diverse energy networks and fuel mixes persisted as electricity grids expanded.
- Connecting to networks took commitment, time and learning new skills.
- People modified energy spaces to meet their own diverse needs.

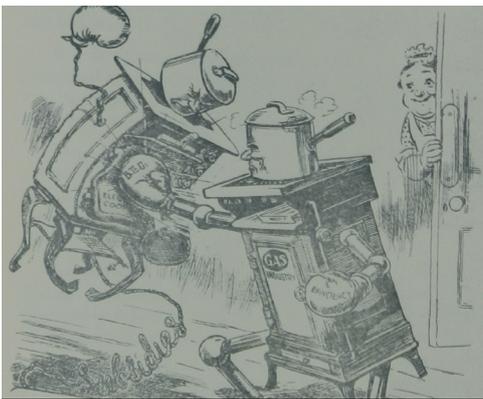
Britain's electrical pioneers imagined an 'all-electric' future that would replace coal or gas. Early hydropower advocates in Canada promised 'Power for All', including housewives, farmers and the poor. But these ambitions were often scaled back as the rollout of grids faced material, social and cultural roadblocks. Electrical promoters later acknowledged the difficulties of rural services: high operating costs, low demand and small returns. As connection plans and policies were modified, energy spaces took on a more nuanced or hybrid socio-material form. Expanding electricity networks met resistance from existing energy suppliers. Generational and regionally distributed preferences for gas or solid fuel use in the home affected the speed and shape of electrical expansion. But the definitive 'knock-out' fight between electricity and gas did not occur.

### Making Connections

**Getting connected to networks took commitment, time and effort.**

Experiences of becoming electrified in the countryside were different from those in the city. Would-be users in rural Canada had to make a strong economic case for the extension of grids. One resident of a remote Ontario community, not connected until the mid-1960s, recalled having to convince his neighbours that they wanted to live electrically before embarking on four years of negotiations with the utility company. In rural East Anglia in the 1950s some residents wired their own homes in the hope of speeding up the arrival of electricity, without success. Visions of service uniformity dissolved in the fine detail of service contracts: rural Ontario in 1935 had 14 categories of customer differentiated by voltage, electrical applications, location and rate structures. Britain's regional boards were still converting supplies to standard 'alternating current' in the 1970s; those who moved house could find that their appliances became useless.





Gas providers fought back against expanding electricity networks. *Gas Progress: The Annual Bulletin of the Bedford District Gas Company and Co-Partners' Journal* (Dec 1932)

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Electrifying the home involved learning new practical skills in wiring, adapting fittings and reading meters. New users needed instruction on how to cope with intermittent service, regulate peak consumption and avoid being electrocuted. As late as the 1960s and '70s, rural Alberta residents had to be warned against climbing utility poles to make DIY repairs. And they were urged 'to educate ... children not to shoot at the glass insulators on the line'.

## Uneven Connections

The expansion of networks was uneven in time and space. Electricity grid extensions were derailed by economic depression, war and shifting political regimes, as well as by territorial difficulties. Britain's nationalised regional boards were candid about the gamble between post-war economizing on infrastructure and being ready to meet future growth in demand. At regional and local

scales, electrification was gradual, discontinuous and incomplete – a result of differentiation in demand as well as supply problems. Those likely to consume least had to wait. In Britain, almost half the farms in South Wales remained unconnected in the late 1950s; of those that were connected, over 40% were using under ten pounds worth of electricity annually.

Connection priorities divided not just town and country but also different categories of users into urban cores, suburbs, rural peripheries, villages and remote outposts. These often seemed unfair. Urban residents of Vancouver Island, for example, complained that the mainland city of Vancouver enjoyed cheaper rates and more reliable service. Electricity providers pointed to the relative costs of supply extensions, technological or terrain difficulties, and variable demand. There was also persistent social differentiation within cities. Around a quarter of all British households remained off-grid when electricity was nationalized in 1948 – mostly the urban poor. While this was addressed in the 1950s and 60s, connections to new housing developments were prioritized over those in existing housing. New estates became a battleground between different nationalized energy providers.

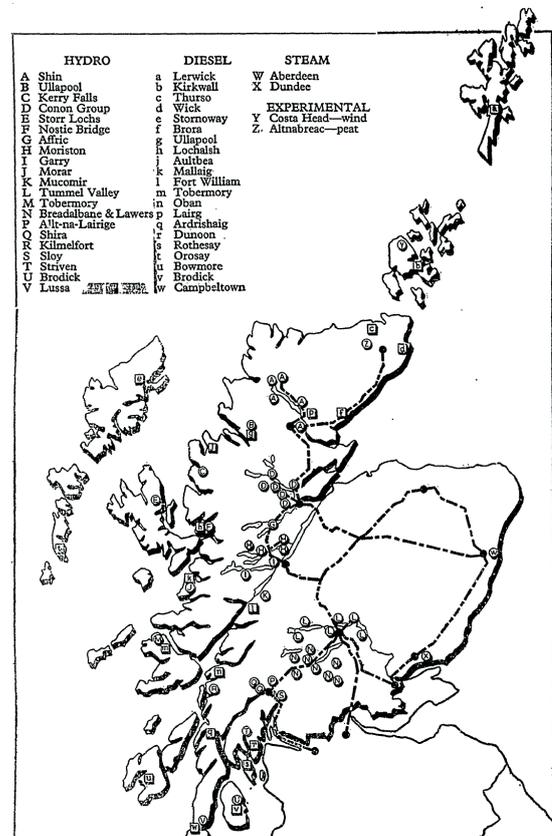
## Hybrid Energy Landscapes

Alternative energy networks and diverse fuel mixes persisted as electricity grids expanded. Many people living in remote Scottish islands in the 1950s had no prospect of networked electricity and were instead supplied by diesel generators or Calor Gas shipped in by the electricity board, among other methods. While Ontario stands out among the Canadian provinces for its early efforts to electrify rural areas, some remote communities still waiting

for electricity in the 1960s made do with coal, oil or gas. Households in different regions used different combinations of fuel.

'This year has seen the completion of the Electrical Grid ... This means that a very strong attempt will be made by our competitors to capture some of the Gas industry's business. Needless to say, we cannot both have the heating and cooking business ...'.

*Gas Progress: The Annual Bulletin of the Bedford District Gas Company and Co-Partners' Journal* (Dec 1933).

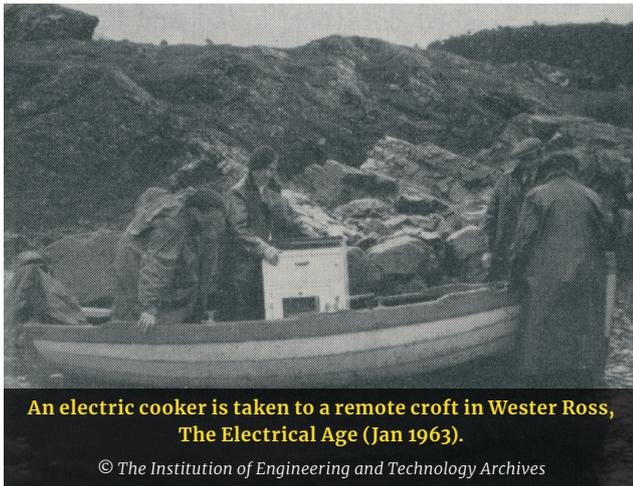


'Generating Stations and Main Transmission Lines', Annual Report and Statement of Accounts of North of Scotland Hydro-Electric Board, 1953

© North of Scotland Hydro-Electric Board

## Users – Connections and Disconnections

**State intervention in post-war Britain and Canada helped to narrow the gap between the electrically connected and unconnected.** In the Scottish Highlands and Islands, extreme efforts were made to provide electrical services and appliances to the remotest areas, in line with the region’s unique ‘social clause’. Rural consumers in other parts of Britain complained that they were being left behind.



An electric cooker is taken to a remote croft in Wester Ross, The Electrical Age (Jan 1963).

© The Institution of Engineering and Technology Archives

**The new connections forged by changing networks could be contentious.** Nationalisation was resisted by financial interests and those wanting to retain existing local networks. Some protested that the area electricity boards set up under nationalisation created a new ‘technical’ definition of ‘region’, divorced from existing ties. A Welsh nationalist organisation objected to being tied to England via the North Wales and Merseyside Electricity Board.

**‘The artificial areas created ... do not correspond to areas of strong historical traditions ..., indeed they must break up the units of feeling in Wales...’.**

TNA: BD 21/221: Evan D. Davies to Mr Clement, Secretary, Council for Wales and Monmouthshire, 17 Jan 1955.

**People shaped electrified landscapes as they used energy spaces in ways that met their own needs.** Electrical networks did not emerge within neutral spaces with passive users waiting for their lives to be transformed. The experience of living in electrified spaces remained diverse. Initial connections were often basic, powering only a few lights and simple appliances. The novelty of being electrified often gave way to frustration as load capacity failed to keep up with household service expectations. Spatial reorganization and the scaling-up of grids tried to avoid service variability and intermittency but this was never fully achieved. Inequitable service conditions and rate structures have remained a stubborn focus for customer complaints and protests. Fuel poverty and unequal payment structures have retained a spatial character, reflecting household income, housing type and region. A higher proportion of Welsh and Scottish customers today pay for their electricity and gas by pre-payment meter than in England.

**A century of networked (and non-networked) evolution has produced hybrid, uneven energy spaces that have been forged in diverse and pre-existing social, political and material landscapes.** Gas and electricity continue to co-exist, sometimes in competition, sometimes as complementary sources. People today still rely on dual intersecting networks and multiple fuels. Agitation about the variable quality of electrical service for customers in different regions has not disappeared but has been reignited by protests around privatization and fragmentation. Stark divisions between the energy rich and energy poor persist. This uneven and hybrid character of energy spaces, past and present, is likely to define the emergent energy spaces of the future and user roles in relation to them.

## GAS & ELECTRIC CONSUMERS, BRITAIN 1949-72

	1949	1972
<b>GB Population</b>	<b>49 million</b>	<b>54.03 million</b>
<b>Gas Consumers, Britain 1949-72</b>		
<b>Households consuming gas</b>	11,037,854	12,800,202
Pre-payment Meters	7,694,595	4,887,067
Region with most households	North Thames 1,627,655	North Thames 1,812,280
Region with fewest households	Wales 383,025	Wales 507,976
<b>Electricity Consumers, Britain 1949-72</b>		
	All consumers	Households
<b>Electricity consumers</b>	12,411,174	18,460,841
Region with most consumers	London 1,525,000	Eastern 2,070,990
Region with fewest consumers	North Scotland 222,174	North Scotland 406,339

NB The 1949 electricity figures did not distinguish between households and other consumers.

Sources: Annual Reports of the Gas Council, British Electricity Authority, Electricity Council, North of Scotland Hydro-Electric Board.

## FURTHER DISCUSSION

Report on ‘Transitions in Energy Landscapes and Everyday Life in the Nineteenth and Twentieth Centuries’ workshop, 27–29 April 2017, co-convoked by Material Cultures of Energy, Deutsches Museum and Rachel Carson Center, Munich. ‘Seeing the Woods’ Rachel Carson Center Blog <https://seeingthewoods.org/2017/05/29/transitions-in-energy-landscapes-and-everyday-life-in-the-nineteenth-and-twentieth-centuries/>

V. Taylor and H. Chappells (eds.), *Energizing the Spaces of Everyday Life: Learning from the Past for a Sustainable Future*, *Rachel Carson Center Perspectives* (2018, forthcoming).

H. Chappells and H. Shin, ‘Making Material and Cultural Connections: The Fluid Meaning of “Living Electrically” in Japan and Canada 1920–1960’, *Science Museum Group Journal*, special issue (2018, forthcoming).

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## MATERIAL CULTURES OF ENERGY

**Material Cultures of Energy** has investigated energy transitions in daily life in the twentieth century. Our research seeks to understand better the roles played by people, households and communities in transformations in the past and the light they shed on the challenging task of transitions in the future. Research has investigated case studies in the United Kingdom, North America, Germany, Japan and India.

**Material Cultures of Energy** explores how:

- Networks and grids changed communities and their sense of space
- Transitions worked themselves out in people’s homes
- Societies managed at times of shortages and disruption
- Energy futures were imagined and contested

**Material Cultures of Energy** (2014–17) has been funded by the Arts and Humanities Research Council (AHRC) in its ‘Care for the Future: Thinking Forward through the Past’ initiative. The project is based at Birkbeck College, University of London, and consists of Prof Frank Trentmann (Principal Investigator), Dr Hiroki Shin (Co-Investigator), Dr Vanessa Taylor (University of Greenwich), Dr Heather Chappells (University of British Columbia, Canada) and Dr Rebecca Wright (University of Sussex).

For further details take a look at our website <http://www.bbk.ac.uk/mce>

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