



LUND UNIVERSITY

Looking back to move forwards: A social and cultural history of home heating (JUSTHEAT)

Interim findings from the first round of case studies

Ambrose, Aimee; Davies, Kathy; Shaw, Becky ; Shahzad, Sally; Jigla, George; Vornicu, Andreea ; Sinea, Anca; Lobont, Denise; Palm, Jenny; von Platten, Jenny; Krishna Ranjan, Ram; Pelsmakers, Sofie; Kilpeläinen, Sarah; Castano De la Rosa, Raul; Aho, Henna

DOI:

[10.7190/cresr.2023.8293971428](https://doi.org/10.7190/cresr.2023.8293971428)

2023

[Link to publication](#)

Citation for published version (APA):

Ambrose, A., Davies, K., Shaw, B., Shahzad, S., Jigla, G., Vornicu, A., Sinea, A., Lobont, D., Palm, J., von Platten, J., Krishna Ranjan, R., Pelsmakers, S., Kilpeläinen, S., Castano De la Rosa, R., & Aho, H. (2023). *Looking back to move forwards: A social and cultural history of home heating (JUSTHEAT): Interim findings from the first round of case studies*. <https://doi.org/10.7190/cresr.2023.8293971428>

Total number of authors:

15

General rights

Unless other specific re-use rights are stated the following general rights apply:

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Read more about Creative commons licenses: <https://creativecommons.org/licenses/>

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00



Looking back to move forwards: A social and cultural history of home heating (JUSTHEAT)

December 2023

**Sheffield
Hallam
University**

Centre for
Regional Economic
and Social Research



Looking back to move forwards: A social and cultural history of home heating (JUSTHEAT)

Interim findings from the first round of case studies

Author(s):

Aimee Ambrose (Sheffield Hallam University), Kathy Davies (Sheffield Hallam University), Becky Shaw (Birmingham City University), Sally Shahzad (University of Leeds), George Jigla (Babes Bolyai University), Andreea Vornicu (Babes Bolyai University), Anca Sinea (Babes Bolyai University), Denise Lobont (Artist), Jenny Palm (Lund University), Jenny von Platten (Lund University), Ram Krishna (Artist), Sofie Pelsmakers (Tampere University), Sarah Kilpeläinen (Tampere University), Raúl Castaño-Rosa (Tampere University), Henna Aho (Artist).

December 2023

DOI: 10.7190/cresr.2023.8293971428

Contents

1. Introduction	1
1.1. Purpose of this report	1
1.2. Structure of the report	2
1.3. Summary of progress to date	2
2. Heating transitions: a historical and policy context 1945-present.....	4
2.1. A brief history of home heating in the UK.....	4
2.2. A brief history of home heating in Romania	7
2.3. A brief history of home heating in Finland	9
2.4. A brief history of home heating in Sweden.....	10
3. Lived realities: key points emerging from the oral histories	14
3.1. The United Kingdom (Rotherham)	14
3.2. Romania (Cluj-Napoca).....	17
3.3. Finland (Joensuu).....	18
3.4. Sweden (Herrljunga and Enhörna).....	20
4. Artists' perspectives.....	24
4.1. What the network of artists have been working on.....	24
4.2. How art-making is contributing to JUSTHEAT	30
5. Injustices emerging from the data.....	31
6. Reflections across the countries.....	34
7. Messages for policy at interim stage	37
8. Next steps.....	39
9. References.....	40

Introduction

This short report is one of a series of outputs to flow from the international, interdisciplinary project '*Looking back to move forwards: a social and cultural history of home heating*' (JUSTHEAT), funded through the Collaboration of Humanities and Social Sciences in Europe (CHANSE) initiative, which began in 2022 and runs until 2025. Within this project, we aim to understand how major changes to home heating and heating technology over the last 70 years have impacted our lives in diverse and often profound ways and how these impacts are experienced differentially across place, time, social groups and even between different members of the same household. Ultimately, we aim to distil learning from these historic accounts to promote a more humane, user centred and just approach to the current transition from fossil fuelled to low carbon heating systems across the UK and the EU. In pursuit of this, the project employs a combination of oral histories, archival research, a network of fine artists and innovative approaches to bridge the chasm between policy makers designing low carbon heating transitions and the needs and expectations of the citizens they serve.

1.1. Purpose of this report

The purpose of this report is to provide a record of the key points emerging from a workshop attended by the majority of research consortium members held in Lund, Sweden in August 2023. The workshop was purposefully convened to capture insights emerging at an interim stage in the project. All participating teams (based respectively at Sheffield Hallam University in the UK, Babes Bolyai University in Romania, Lund University in Sweden and Tampere University in Finland) have recently reached two key project milestones: first, the completion of the first round of data collection, which involved gathering detailed oral histories from a variety of residents living in four case study areas (one in each participating country). And second, the completion of an intense period of archival research to establish key events, policies and movements shaping the provision of heating in each country, revealing key insights into why each country has pursued such different approaches to domestic heating (fuels, policies and technologies) and are therefore at very different starting points in relation to transitioning to low carbon heating. Table 1 provides a summary of the empirical research conducted to date.

The aim of this report is not to provide a comprehensive account of the empirical findings and the archival research – these findings will be published via a separate series of more detailed reports and papers in early 2024. Instead, the report aims to capture some key cross cutting findings and emerging interpretations of them with the aim of maintaining a flow of emerging insights to feed into ongoing policy and academics debates around just and inclusive heating transitions and methods for researching them.

1.2. Structure of the report

This report is comprised of seven sections in addition to this one. Following this introduction, Section 2 outlines a brief history of domestic heating and heating transitions in the participating countries since 1945. Having provided the relevant historical and policy contexts, Section 3 goes on to provide a summary of findings emerging from the oral history interviews conducted in each country. Section 4 discusses the contribution made to the project by the network of artists that form part of the project team and summarises their work and thinking in response to the oral histories. Section 5 reflects on the (in)justices related to domestic heating revealed by the oral histories. Section 6 reflects across the breadth of findings to identify the synergies and divergences between the participating countries revealed by our findings. Section 7 sets out some messages for policy makers working on low carbon heating transitions based on our interim findings. And, finally, Section 8 sets out the next steps for our research.

1.3. Summary of progress to date

Table 1: Summary of research undertaken to date (accurate as of October 2023)

	Phase one case study locations	Description of sample from phase one	Artist activities to date (see Section 4 for further detail)	Archival research undertaken
United Kingdom	<ul style="list-style-type: none"> Rotherham, South Yorkshire (former coal mining stronghold with high dependency on gas for heating). 	<ul style="list-style-type: none"> 30 full length oral history interviews completed. Primarily older, white-British participants of working-class backgrounds. Majority tenants, some homeowners. 	<ul style="list-style-type: none"> Large set of 'listening drawings' made in response to oral histories. Collections of fire images from children's book illustration, Christmas cards and museum displays. Series of rough 'stop motion' films and collages exploring bringing past and present home heating together. 	<ul style="list-style-type: none"> Analysed newspaper sources, government reports, policy documents, parliamentary debates, and other material using Hansard and UK Parliamentary Papers Online; Churchill Archives (Cambridge); the National Gas Archive (Warrington); and the National Union of Mineworkers (Barnsley).
Romania	<ul style="list-style-type: none"> Cluj-Napoca (Cluj County, North Western region), developed urban locality, mix of collective communist 	<ul style="list-style-type: none"> 23 interviews, 90% women, 65-80 years old (two 40-50), living alone or with a partner. 	<ul style="list-style-type: none"> Three growing sets of photographic images including 'alaindelon' fur coats, 'get round' gas heating supplies and 	<ul style="list-style-type: none"> Review of policy documents used in order to document the specific dynamics mentioned in the interviews, partly overlapping with

	Phase one case study locations	Description of sample from phase one	Artist activities to date (see Section 4 for further detail)	Archival research undertaken
	residential buildings and new booming construction dynamics of collective and individual households, ca 15% still on district heating, 80% gas		solar heating installations.	the strand 2 report.
Finland	<ul style="list-style-type: none"> Joensuu, North Karelia. 	<ul style="list-style-type: none"> 47 interviews with 54 participants, primarily homeowners with diverse occupational backgrounds. 	<ul style="list-style-type: none"> Film and photo documentation and experiment from Joensuu. Collection of paintings, one for each oral history. Experiments with interactive assemblages. 	<ul style="list-style-type: none"> Review of policy documents and government reports in addition to reviewing newspaper articles on home heating.
Sweden	<ul style="list-style-type: none"> Herrljunga and Enhörna (semi-rural areas with older population) and Lund/Malmö (student-dense areas). 	<ul style="list-style-type: none"> 11 interviews with 14 people (3 couples) in Herrljunga and Enhörna, primarily with white, older homeowners with diverse backgrounds. 4 interviews with students in Lund/Malmö. 	<ul style="list-style-type: none"> Diary entries and video diaries based on conversations with the interviewing researcher, interview transcriptions and summaries of general findings. 	<ul style="list-style-type: none"> Extensive review of newspaper articles relating to home heating from 1940 – present, as well as analysis of key policy documents from the same period of time.

Whilst we are not aiming to capture oral histories from a representative sample of local residents in the case study locations, there will be opportunities within the second round of data collection (November 2023 to March 2024) to return to the first case studies and seek to redress, as far as is possible, significant imbalances within the sample. For example, it is our intention in the UK to target ethnic minority and younger participants in Rotherham, given the current bias within the sample towards older, White British people.

Heating transitions: a historical and policy context 1945-present

The workshop began with presentations from each country team summarising the key milestones (policy, political, cultural, exogenous and to some extent, technological) that have shaped heating pathways in each participating country since 1945. An overview of these narratives is provided here on a country-by-country basis. These narratives were primarily shaped through research within national and specialised archive collections and play an important role in setting the oral histories in their broader context. Generally, we found the oral histories shared by participants to operate in the minutiae, focussing in detail on the rhythms, routines, relations and practical intricacies of daily life and how they have evolved over time. Perhaps curiously, participants did not tend to link the memories they shared back to the (often profound) broader events shaping them, such as (for example) deindustrialisation, prolonged industrial action (i.e., the Miners' Strike), economic crises, war and conflict and major political shifts (i.e., the fall of the Soviet Union).

The research team are reflecting on this trend, considering whether the oral history method (and the focus on *domestic* heating) encourages limited reflection on broader contexts, whether this reflects an aspect of how memory functions or simply reflects the level at which home heating is experienced and engaged with. In any case, the archival research plays a crucial role in situating the oral histories within their evolving political, policy and cultural contexts, revealing the determinants of the conditions households were experiencing.

2.1. A brief history of home heating in the UK

Through the presentations, we heard how the UK heating context evolved rapidly in the three decades following the Second World War. Key milestones include the post-war fuel crisis which extended the war time practice of rationing until the mid- 1950s and included coal rationing. Willing compliance with long term rationing relied, in the UK at least, on maintaining the strong sense of nationalism (putting your country first) that had pervaded during the war. The housing stock and the fiscal environment were also re-shaped significantly in the post war period through major municipal housebuilding programmes in response to massive housing shortage and a booming population, the birth of the National Health Service (free at the point of access) and re-invention of the welfare state with the aim of providing 'cradle to grave' welfare.

Throughout this social re-invention, the country continued to warm itself on coal (as it had done for more than one hundred years) or the gas generated by burning coal (Town Gas). But that was about to change.



Source: JUSTHEAT Photograph Collection, 'Mary's coal fire', Rotherham (2023)

From 1960 the country embarked on an unprecedented period of energy transition, the scale of which has never been matched since. Spurred on by the Clean Air Act (1956) designed to clean up air quality and address the associated public health emergency and the concurrent discovery of massive reserves of natural gas under the North Sea offered a fast track to cleaner air and energy sovereignty. During this period, the heating systems of 14 million households were substituted from coal to natural gas over ten years, involving the replacement of 40 million heating appliances. This scale of transition relied on strong leadership on the part of local authorities (some of which pioneered coal phase out on clean air grounds before they became national policy), compelling public information campaigns and the co-opting of mothers as advocates of the transition away from the grime of coal to 'clean, fast and responsive' gas for heating, water heating and cooking.

MODERN WOMAN

Wherever, *whenever*
we want it
our hot water's *hot!*

NOW WE'RE UP-TO-DATE
WITH **GAS**

None of this "Sorry-there's-no-hot-water-I-haven't-kept-the-fire-up" business. All round the clock the water's good and hot. Because when gas heats your water it does it automatically — you need never give your water-heater a second's attention, and yet you know that the gas is only burning full on when you're actually needing hot water. Most economical. And the new gas water-heaters are so pleasant to the eye. Finished in gleaming enamel and chromium. See them for yourself at your gas showrooms!

GAS GIVES YOU CHEAP HOT WATER ON TAP WITHOUT WAITING, DIRT OR WORK
Issued by the BRITISH COMMERCIAL GAS ASSOCIATION, 28, Grosvenor Gardens, London, S.W.1.

VISIT YOUR
GAS SHOWROOMS
— they will advise you
which gas water-heater
you should choose

alamy Image ID: KKM0FJ
www.alamy.com

Source: 1935 UK magazine gas heating advert.

The 1970s brought unrest in oil producing nations causing massive peaks in oil prices, leading to economic crises and the rationing of energy. Households had to deal with massive inflation of the prices of everyday commodities and rolling blackouts to reduce energy consumption. Although the transition to North Sea natural gas helped ensure that access to fuel for domestic heating and cooking was unaffected, increased financial pressure on households would have restricted consumption. The impact on mining households would have been lessened by the free coal allowance, in many cases. Rural households reliant on oil-based heating systems would have suffered greatly during this period.

The 1980s brought huge disruption to coal mining communities across the UK as the Thatcher government sought to weaken coal mining trade unions and move rapidly towards deindustrialisation and the establishment of a tertiary economy. Those interviewed in Rotherham as part of our first round of oral histories would have been profoundly affected by prolonged periods of industrial action (the Miners' Strike), during which wages and access to concessionary fuel would have been withheld. Some references to this period have emerged through the oral histories, in rare examples of references to events beyond the home.

The 1980s and 90s saw sustained falling gas prices but high interest rates pushed up other costs. The problem of fuel poverty (an inability to afford to heat the home to a safe and comfortable level) gained recognition around this time, highlighting how, despite the apparent affordability and plentifulness of natural gas, around ten per cent of UK households consistently struggled to afford to adequately heat their homes due to a combination of low incomes, high energy prices relative to income and energy inefficient homes. The rate of fuel poverty remained static for decades, until the current energy crisis which has rendered 20 per cent of households fuel poor.

The 'New Labour' era from 1997 triggered further transition, albeit incremental. The Kyoto Protocol of 1997 pushed climate change up the political agenda and triggered more ambitious standards for the energy performance of new homes, leading to significant increases in numbers of low energy homes. Low carbon heating systems such as Air Source Heat Pumps became more common during this period, with installations peaking in 2011 at the end of that political era. However, these developments are unlikely to have impacted beyond the small proportion of the population living in new homes and certainly would have benefitted few households in our case study area, which is dominated by pre-war housing.



Source: Air Source Heat Pump, internal unit marketing image. Copyright: Beko.

At the time of writing, the transition from Gas Central Heating to low carbon heating systems (primarily Air Source Heat Pumps or ASHPs) proceeds very slowly. However, dependency on GCH is creeping down from a peak of 95 per cent being heated in this way in 2018 to around 74 per cent in 2023¹ (partly due to electric heating systems increasingly being installed in new homes in cities). A significant milestone also passed during May 2023, when the burning of bituminous (house) coal was banned in the UK, signalling the end of an era.

2.2. A brief history of home heating in Romania

The histories of the heating transitions in Romania should be deciphered against the larger historical backdrop. Starting with 1945/1946, which marks the beginning of the Communist regime and its planned economy, the successive political eras that characterise a state of constant reinterpretation of its international standing and development model in relation to URSS and the Western powers, the energy crisis

¹ [2021 census: What types of central heating do households use? \(parliament.uk\)](https://www.parliament.uk/research-briefings/2023/02/22/2021-census-what-types-of-central-heating-do-households-use/)

and the economics of penury of the 1970s and 1980s, the fall of communism and the long process of political and economic transition and market liberalisation, the process of European integration and its full membership. From another perspective, we are looking at the processes of fast industrialisation, deindustrialisation and reindustrialisation, which were major turning points that had relevant economic, technological and social impacts, which impacted both the material and philosophical aspects of heating.

The first modern heating installations emerged in the second half of the 18th century and were based on steam, with hot water based heating systems following during the 19th century. Bucharest was the most important landscape for these developments, even if later they were also implemented in buildings of other important cities. They were mainly installed in landmark buildings, including privately owned houses whilst the majority of homes used wood stoves. Rural homes lagged far behind their urban counterparts and are more likely, to this day, to rely on wood stoves.

Things changed during communism (from 1945), as the process of nationalisation led to the development of a different housing concept under the soviet-type economy. The buildings erected rapidly to host the workforce for growing industrial centres were not developed to be energy efficient. The systems built around these housing facilities did not consider comfort, but were instead designed to serve a much broader economic nexus.



Source: Soviet era housing, Cluj-Napoca. Copyright: George Jigla

The communist model of economic transformation also determined the development of quite particular energy systems, infrastructure and consumption patterns, under the paradigm of 'Energetics'. The philosophy around this was rather systemic. Economic development at this time was based on five-year plans which included broad energy-related arrangements that were backed by science tainted by political spin. The concept of Energetics had two main foundations: an economic model/function and a material/technological component. This paradigm was in opposition to Western capitalist "wastefulness" and needs-based energy management, which was perceived

to be chaotic. This essentially resulted in the relegation of individual comfort and prioritisation of economic ambitions.

What followed after communism was a massive process of deindustrialisation, privatisation, reindustrialisation, in pursuit of a transition to a liberal democracy. The process had an important impact on the energy market and household consumers and household heating needs and costs became prominent within the public agenda.

Currently, the energy market is still adjusting following the profound process of liberalisation of supply for residential consumers finalised in 2021. The rise in energy prices has led the government to introduce price caps for electricity, gas, and firewood, which have further distorted interactions between the state, the market, and consumers. Out of the 7.5 million households which are permanently inhabited, close to four million rely on individual gas boilers for heating and warm water, and over three million, mainly in rural settings, rely on wood. Bigger cities such as Bucharest or Cluj still use district heating relying on gas, but they are considered to be inefficient in terms of cost, since they are heavily subsidised by local budgets, and in dire need of investment and upgrading. Meanwhile, the renovation rate in residential buildings is picking up at about one per cent of buildings per year, yet the overall percent of renovated buildings is still below ten per cent.

2.3. A brief history of home heating in Finland

In the late 1940s and throughout the 1950s, Finland was recovering from the Second World War and rebuilding its economy. As part of these efforts, the country aimed for improved energy efficiency and energy security and started to develop district heating systems in urban areas. Outside of urban areas, oil powered heating systems became dominant.

The oil crisis of the 1970s led to a shift in priorities away from oil heating systems to increasing the use and production of bioenergy as part of efforts to increase self-sufficiency and increase the security of energy supply. Further expansion of district heating systems followed during this period, as well as the introduction of the first renewable energy sources (heat pumps) for heating. Biomass and biomass-based heating systems played a key role in this shift.

During the 1980s the government's energy programme continued to include the goal of increasing the share of renewables, however to limited effect. In addition, with oil prices dropping, also a first uptake in heat pumps came to a halt and the nascent heat pump sector faltered.

In the early 1990s, heat pumps re-emerged via Sweden where the heat pump market had benefited from government support. While the initial uptake in Finland was slow, the increase in heat pumps coincided with a stronger government push for decarbonising the heating sector which included higher heating oil taxes and measures rooted in taxation policy that allowed support for covering the installation costs of heat pumps. Also, the role of biomass in the heating system continued to increase in the 1990s, partly connected to its potential to reduce the carbon emissions of the Finnish heating sector.



Source: Air Source Heat Pump (external unit), Finland. Copyright: Sarah Kilpeläinen

The early 2000s saw more direct government support for heat pumps and the decarbonisation of domestic heating via direct subsidies for phasing out oil heating systems as well as energy renovation grants that were also available for the installation of heat pumps. At the same time, the structure of these grants raised questions over accessibility for low-income households.

The trend of phasing-out fossil-fuel based energy systems and moving to either district heating systems or heat pumps continues and is one key component of Finland's climate strategy which targets climate neutrality by 2035. At the same time, the current government plans to phase-out subsidies for heating mode change by 2025, meaning a more insecure future for realising domestic heating transitions.

2.4. A brief history of home heating in Sweden

Prior to the Second World War, the housing standard in Sweden was low in comparison to many other European countries. The extensive investments in welfare in the post war period thus had a particular focus on housing. The aim was to build the Swedish "Folkhem" ("People's Home") based on principles of equality, inclusivity, and universalism. This meant that social housing reserved for lower income households was not established in Sweden; instead, public housing companies were responsible for provision of housing *for all*. In the publication of a government committee report in 1945, which came to be formative for Swedish housing policy until 1991, it was stated that the municipal housing companies should aim for reasonable rent levels, preferably below 20 per cent of household disposable income, in which "peace-time heating" should be included, i.e., heating at pre-war prices. It could be suggested that this constitutes part of the reason for why the 'warm rent' system, i.e., including heating costs in the rent, came to dominate in Sweden and still does to this day. Heating was seen as a service that should be provided to all households alike.



Source: Radiator painted red in an apartment that benefits from 'Warm Rent', Sweden. Copyright: Jenny von Platten.

The Second World War forced a shift from heating with solid fuels to increased use of oil in individual oil burners. Central heating had grown increasingly common prior to this period, and with rapid increases in fuel prices came a lot of conflict and discussion on how to distribute heating costs between tenants and landlords – something that had not been an issue when households were individually responsible for their heating. Landlords started implementing fuel clauses in their rental leases that would remain for decades to come. Discussions on whether to implement meters in each household to measure energy use were also raised since incentivising households to save energy was seen as beneficial from a national perspective. Tests were even carried out and loans came to be provided to landlords that wanted to install individual meters, but these loans were abolished in the 1950's as interest dropped; landlords found that the administrative costs and burdens of managing individual meters for heating were not compensated by the rather limited energy savings. Since then, individual metering and billing of energy for heating has continued to decrease, and 'warm rent' has been the most common system in Swedish multifamily housing.

In the 1950's and 1960's, individual oil boilers dominated the Swedish home heating market in multifamily as well as in single-family housing. The 1960's however saw an increased recognition of the air pollution caused by oil burning and thus sparked an interest in collective heating systems that would remove the combustion, and thus the pollution, from urban areas. The top contestants as alternatives to oil boilers were district heating in multifamily housing and electric heating in single-family housing. Swedish electricity generation had up until the 1960's tried to keep up with growing electricity demand, but was now (for the first time in history) able to meet and exceed the demand owing to the expansion of hydropower in the north of Sweden. Moreover, ambitious plans for nuclear power plants to provide cheap electricity led the state-owned electricity provider to strongly promote electric heating. During this period, direct electric heating, i.e., systems with electric radiators, came to be very common in single-family housing.

A political decision in 1964 to build one million homes in ten years alongside increased municipal responsibility for heating provision became a springboard for district heating expansion in Sweden. Municipalities were suddenly coordinating the construction of new residential areas and had the opportunity to provide collective heating via municipal district heating plants. Oil was still the dominant fuel used in district heating at this time.



Source: District heating pipeline maintenance, Lund. Copyright: Aimee Ambrose.

The oil crisis in the 1970's brought many changes to energy policy in general and to domestic home heating. Municipal responsibility for heating supply continued to increase, further favouring district heating in multifamily housing in particular. While direct electric heating was now being recognised as an inefficient mode of heating, it continued to increase as it allowed a phase out from oil in single-family housing. In rental housing, private landlords were still applying the fuel clauses from the Second World War, which allowed them to drastically increase rent levels as oil prices increased. This caused conflict and a strong mobilisation among tenants' associations in favour of abolishing the fuel clauses and adopting the public housing companies' model of fixed heating costs (i.e., 'warm rent') across the rental housing stock. In 1979, an agreement was made that one of the largest private landlords was to transition to warm rent, which led to the phase-out of fuel clauses all over Sweden, thus further anchoring warm rent as the dominant system.

But that was not the only major shift related to home heating that occurred in 1979. It was also the year of the Three Mile Island accident (an accident at a nuclear power station in the USA) which brought the already agitated debate on nuclear power in Sweden to a head. A public election was held in 1980 where it was decided that a long-term phase-out of nuclear power should be initiated where existing reactors could keep running and reactors under construction could be finalised and put into use, but that all nuclear should be phased out by 2010.

The transition from oil to electric heating in single-family housing continued in the 1980's but left homeowners confused and worried about how to heat their homes in the future. The policy programme also entailed a strong political and economic promotion of district heating where oil was now starting to be replaced with biofuels in the power plants. In parallel, the Swedish government was also supporting the development of heat pump technology which reached maturity for the home heating market by the mid-1990's.

Thus, heat pumps became increasingly common in single-family housing in the 1990's, and district heating continued to expand; now with waste incineration alongside biofuels facilitating the shift away from oil. There were political ambitions in the 1990's to prepare for an early phase-out of nuclear following the Chernobyl disaster in 1986 by providing subsidies for households to move away from electric heating, but this was not successful due to the cheap electricity prices at the time.

As oil prices increased in the early 2000's partly due to increased energy and CO₂ taxation, a rapid phase-out of oil took place among Swedish homeowners and Swedish home heating is today very close to being completely decarbonised. Heat pumps play a central role on the Swedish home heating market alongside district heating. The large share of electric heating has made solar PV an increasingly popular option among homeowners with a heat pump, showcasing the progressive development of the Swedish home heating transition. At the same time, there are lower income homeowners who are stuck with direct electric heating that became highly expensive during the most recent energy crisis and who cannot afford to convert to a system that is more affordable to run. Perhaps at an unprecedented pace, there is an increasing distance between those leading the heating transition and those being left behind.

Lived realities: key points emerging from the oral histories

Once the national historic contexts had been established and contrasted, we moved on to a series of presentations summarising key findings from the first rounds of oral history research across the four countries, which reveal the lived experiences of the changing political, policy and technological contexts previously described. Key points from the oral histories are briefly presented here but will be published in more detail in due course.

3.1. The United Kingdom (Rotherham)

The first UK case study location was Rotherham, South Yorkshire, chosen for its strong ties with coal mining, where collieries stayed active for longer than in many other coalfield areas, with the last mine closing in 2013. It was also selected based on its current above national average use of gas central heating (GCH) systems, as dependency on these systems slowly falls across the country. The oral history research focused on three settlements within the broader conurbation: Wentworth (a historic village owned by an aristocratic family where most people privately rent their homes from the estate), Whiston (mixed housing types but a preponderance of larger, private homes for socially mobile households), and Maltby (a former mining town).

The 30 oral histories recorded in Rotherham reveal detailed and personal memories of home heating systems, processes, and routines and methods of keeping warm, as well as feeling cold at home. The recordings demonstrate the significance of the coal fire in the home in the immediate decades after the Second World War and how the transition to GCH reshaped domestic life in the later decades of the 20th century. Some participants bring their accounts right up to the present day, discussing the changing climate, experimentation with modern, low carbon energy systems (i.e., air source heat pumps) or discussing their fears about having to lose the perceived comfort and convenience of GCH.



Source: Christmas by the coal fire, Rotherham 1987. Copyright: Dawn Witherley.

Key findings shared at the workshop:

- Participants rarely reflected on life beyond the household. External factors which determined the fuels, heating technologies and methods that they used to heat the home and the cost and availability of fuel were mentioned only in passing, if at all: i.e. the shift from town gas (produced using coal) to natural gas, the miners' strikes of the 1980s, coal mine closures, the shift to smokeless fuel (via the Clean Air Act, 1956). Major events like The Clean Air Act, 1956, which was pivotal in coal phase out, and the 1970s energy crisis were not explicitly recalled by anyone, although some recollected the impact of them (i.e., buying smokeless fuel, power cuts).
- The oral histories established the coal fire (whether an open fire or a fire powering a range) as the historic centre of the home in Rotherham in the two decades following the Second World War. It was relied upon for heat, hot water and cooking and daily life revolved around the immediate space surrounding it. Usually only one fire was maintained in each home, perhaps two and these were in the main downstairs living area(s).
- Memories of home heating in the era of the coal fire were abundant. It was where participants went to first in their recollections and lingered the longest. As they moved into more recent eras of heating, recollections became less clear and precise, beyond remarking on improved levels of comfort.
- Participants born in the 1940's and 50's recalled childhood memories that resembled a Victorian childhood with little change to the way homes were heated between their generation and that of parents and grandparents. Homes then modernised rapidly for many from the 1960s onwards with an explosion of increasingly affordable domestic innovations (e.g., plug in heaters, gas fires, gas cookers, fridges, electric blankets and later, gas central heating).
- The practicalities of handling fuel, building the fire, lighting it and maintaining it, were explained in intricate detail. Recognition of the fireplace as a 'focal point'

which facilitated social and emotional connections between household members were pervasive, although the labour and grime of maintaining the fire and the discomfort of cold beyond the fire, were widely recognised.

- Lighting the fire and getting it going was a source of anxiety for some and it seems that few took it for granted that they would be able to get a roaring fire going. Wood (kindling) was vital for getting the fire started and was often foraged by children locally.
- The coal fire or range were manual systems that did not evolve rapidly, meaning that knowledge about how to build and maintain a fire was passed between generations through repeat demonstrations. Being able to light a fire was a vital life skill. It was widely remarked that the speed at which heating and domestic technology moves on now is hard to keep up with (for older respondents, at least) and involves a constant process of upskilling and increased digital literacy.
- Coal fires were remembered as comforting, bringing companionship, family togetherness and sitting watching them brought a sensory, meditational quality. The fireside was remembered fondly by many, particularly those who experienced them as children (most participants) and were shielded from the labour of finding fuel and maintaining fires.
- There was great inequity in terms of access to fuel (coal) between those working as miners (who received free coal) and those outside of it. To overcome this, coal was shared within families and an informal economy of selling on surplus coal between households was established.
- Life was lived out in one room in working class households, around the fire until the transition away from coal from the 1960s. Fires were not generally lit in bedrooms, so blankets and clothing were crucial to keeping warm there. Coats were often used as bedding where families could not afford blankets. Hot water bottles were commonly used to help warm the bed (and before that, oven shelves wrapped in blankets) and from the 1960s electric blankets became more common and were a popular innovation.
- Coal merchants were associated with some underhanded practices (underfilled bags, wet coal to maximise profits). The 'coal man' was a prominent figure in daily life but was not always trusted. Stories of sexual exploitation emerged in relation to households who could not afford to pay the coal man. Desperate times were widely recalled (due to economic crises, industrial action), where the coal man had to be placated, furniture was burnt to make a fire or families scrabbled around on waste heaps to find discarded lumps of coal.
- Many recalled the hard life their mothers had lived maintaining the fire(s) and enabling family life. The lives of some mothers were truly revolutionised by the advent of GCH and the critical mass of more labour-saving appliances that emerged around the same time. There are recollections, though, of people finding established ways of doing things hard to part with.
- Care is imbued in the recollections participants shared about the domestic work their mothers and grandmothers did. This care was often remembered as deep, enveloping care in the form of maintaining warmth, cooking, baking, knitting warm clothes, teaching children how to make a fire.
- The concessionary coal allowance received by miners (until well into the 1990s in Maltby) undoubtedly acted as a disincentive to transitioning to GCH. Many households in Maltby moved to GCH 20 to 30 years later than most households and many in Wentworth have still not made this change. For some households, GCH had taken some adjusting to, not least because it could not be budgeted 'by eye' and because it does not offer the same intensity of radiant heat, with several participants lamenting the (by contrast) insipid nature of the heat from GCH.

3.2. Romania (Cluj-Napoca)

The first round of data collection in Romania took place in the municipality of Cluj-Napoca. As with the majority of urban areas, Cluj Napoca bears its communist legacy of an extended network of district heating systems. However, after the fall of communism, under a general discontent with the performance of the heating system, a large number of people decided to disconnect from the system and rely on individual solutions, mainly individual boiler gas which at least afforded them control over their heating and thermal comfort.

All participants recounted their working-class backgrounds. The majority grew up in families with medium income, but there are several who grew up in extreme poverty. The wealthier the household, the more able they were able to maintain a warm home during harsh winters and this is starkly contrasted with the general trend of limited resources and rough living conditions, which characterised the communist era. At the present time all participants are homeowners living either in their childhood house or their own property. Most of them live in multi-family building blocks and just a minority in single unit houses.



Source: Multi-family blocks of housing in Romania. Copyright: George Jigla.

In the broader political context of the communist era, characterised by international isolation and economic hardship, most of the interviewees described the last decade of communism, the 1980s, as the hardest years of their lives, necessitating survival strategies in the face of food and fuel rationing and never having enough to meet the needs of their household.

In Cluj-Napoca, each large residential neighbourhood had a system of district heating developed to supply warm water and heat to each home. But experiences of heating via these systems varied a lot across households, with those living furthest away from the heat source struggling to access sufficient warmth. However, within the 1980's, a lack of maintenance and fuel shortages meant that the situation deteriorated further and even those living close to the heating plant could barely achieve thermal comfort.

This general situation forced people to find alternative solutions, from free standing and sometimes homemade, improvised heating devices to insulation strategies to improve thermal comfort.

For those living in single unit houses, while illegal and extremely risky, one coping solution was to steal gas, or in other words, to improvise a device that would bypass the gas meter and provide fuel directly into the house. This activity was highly risky in terms of safety and legality and possible only when police control was limited. When this alternative was possible, alternative fuels, like walnut shells, were used. Other families installed wood stoves or other devices (i.e., electric hot plates, electric radiators) as supplementary heat sources. Even though these devices were often unsafe, many felt that the risk was worth it to improve thermal comfort. Keeping the home warm for the babies and small children was a key motivation. Respondents recall either their struggle to keep the child's room warm, or their parents' constant attempt to improve the temperature.

The fall of communism brought massive changes across the society that reshaped many processes, attitudes and practices. The decades of the 90s and 2000s became decisive for new patterns of heating and new approaches towards achieving thermal comfort. Most of the respondents remembered that their places became warmer in the 1990s. Those that were in school at the time, recall that the first years of the 1990's erased any practice of saving energy and classes were better heated, even sometimes too hot. The process of heating after the fall of communism was never linear and the experiences vary significantly after this point. However, district heating remained unpopular and the desire was strong to find better alternatives that can offer adequate, reliable heat and affordability. After the fall of communism, and in the context of general dissatisfaction with the operation of the district heating system, a considerable number of people have chosen to disconnect from the system and rely on individual alternatives, mostly individual gas boilers. The process of transitioning to a market-oriented economy was the moment when most participants recalled (re)gaining control over their thermal comfort.

Memories of the deprivation and surveillance of the communist era are still strong amongst participants. Discussions about the current energy context generate conflicting reactions, with many participants expressing resentment at the idea of receiving political advice about heating their household. For example, recent European debates about the imperative to decarbonise heating and maximise energy savings generated frustration in some participants, who (after decades of deprivation) would always prioritise comfort over climate action.

3.3. Finland (Joensuu)

The first Finnish case study is Joensuu, the regional capital of North Karelia, located in Eastern Finland. Our research was focused on two sub-cases- the more rural case of Eno and the more urban Kanervalä-Noljakka. The current analysis is still ongoing. Here, we draw on initial results from the oral histories that were collected in Eno, where we spoke with 26 participants during February and March 2023. The majority of participants were living alone or with their partner and only two participants reported living with their children. All of the participants we spoke to in this first round of interviews owned their home.



Wood stores for winter, Finland. Copyright: Sarah Kilpeläinen.

Our initial analysis highlights a set of key themes discussed by participants in the oral histories:

- Wood-based heating dominates the oral histories and features prominently both in childhood memories of keeping warm at home and in current practices of heating the home. It was the form of heating that most participants had experienced at one point in their lives. The oral histories also provide rich insights into the labour of keeping warm especially when discussing wood-based heating. This labour, especially the acquisition of firewood, was often described as a chore in childhood. Yet, in some cases there is a change in perception of this labour where its more enjoyable aspects, such as being outside and physically active, brought enjoyment as adults.
- The importance of hybrid heating systems was also a key theme in the oral histories. The possibility to make use of more than one heating system within the home, of which one is often wood-based, opens up the possibility to switch between heating modes. The availability of more than one heating system, and especially the ability to use wood for heating, was seen as important for resilience and preparedness in the case of extreme weather events or other forms of crisis, such as fuel supply problems. Having more than one way to heat the home also meant that participants were able to make flexible choices of how they warm their homes and thus account for seasonal variation or changes in prices and

availability of fuels. The upkeep of a warm home (especially where wood is involved) revolved around a broad set of practices that amongst other things provide rhythm to the year and also supported other activities taking place in the home, especially cooking (certain traditional dishes were felt to taste better and more authentic when cooked using wood).

- Financial aspects of heating were discussed in connection with electricity and the ways in which rising costs can also lead to substituting one form of heating with another in hybrid systems, such as an increased use of firewood to achieve independence. The cost of updating or changing heating systems was also discussed in relation to a perceived lack of suitable subsidies to transition to lower carbon sources and low property values in the region, which further limits options for raising capital.
- The environmental impact of heating and its connection to a rural lifestyle were also discussed. Participants reflected on the impact of their heating practices and connections to other practices of everyday life. In this context, participants reflected on their relationship to the natural world – the tensions between treating the forest as a fuel source and the increasing need to restore the natural world, were present in many interviews.
- Sharing the importance of sensory experiences connected to keeping warm at home, participants referred to the comfort derived from sitting by and looking at the fire. Participants also described that the heat coming from the fire as providing a distinct sense of 'cosiness' and comfort. In addition, keeping warm was also framed as a form of care, either experienced by participants when another member of the family ensured a warm home, but also given by participants, i.e. ensuring elderly relatives or members of the community can manage the work associated with heating.

3.4. Sweden (Herrljunga and Enhörna)

The first Swedish case study mainly focused on collecting oral histories of older people living in semi-rural areas where district heating availability is limited. This represents a significant aspect of Swedish home heating where various heating systems, both older and newer, co-exist, and particularly captures the stories of people who have lived through several past heating transitions. A couple of oral histories were also collected from younger people living in student accommodation; although these interviews are likely to be part of the upcoming case study in Malmö, they will be included here as they were also discussed at the workshop.



Source: Wood stove with Air Source Heat Pump in the background, Sweden. Copyright: Jenny von Platten.

Key findings shared at the workshop:

- **Prominent memories of wood:** Wood and the wood fire formed a prominent part of all oral histories gathered in this case study and was the source of heating that people remembered most vividly. For older people wood had been the main source of heat during their childhood and for younger people it was a supplementary heating source which created a nice home atmosphere, rather than being a necessity.
- **Limited memories of feeling cold:** In general, people do not remember feeling cold at home. Some people had specific memories of being cold at home in certain old houses or particularly cold winters, such as during the Second World War, but the majority said that they have always been warm, and if not, that they would just put on some extra clothing. Memories of feeling cold were often connected to being outdoors, travelling, or during military service.
- **Wood, well-being and self-sufficiency:** Dealing with wood appeared to be connected to feelings of well-being in various ways. Participants connected it to relationships and relational activities with other people, such as partners or parents, as well as the connection it brings to nature. In the countryside in particular, there appeared to be a perceived connection between wood fires and self-sufficiency, as people drew parallels between preparing wood for heating and growing their own food.

- **Gendered roles:** Many participants shared the same story: where the father was the one responsible for bringing home the logs and chopping the wood and mothers were the ones feeding the stove or boiler with the firewood. These gendered practices seem intact in the present day.
- **Gendered roles:** The female experience of the wood fire appeared to be more labour driven further back in time, but more pleasure-driven today. When depending on wood in the past, the oral histories describe loading stoves or boilers with wood as an additional chore for the woman in the household to carry out. Today, as wood is more often used in fireplaces than in boilers and often is not the only source of heating, many women and men enjoy building and maintaining fires.
- **The labour of keeping warm:** Preparing the wood was described as a time-consuming activity that required physical strength and work. One man used the expression “firewood warms time and again” to describe that you get warm from sawing it, stacking it, carrying it, loading it into the stove, and then, finally, from burning it. Despite a general appreciation of wood-based heating, many who describe their transitions away from wood say it has been a relief, even describing it as a “luxury”, to have more self-operating heating systems.
- **Remember cold water more than cold homes:** For many, memories of cold water were more poignant than memories of cold homes. Averting the risk of running out of hot water was a source of teamwork as well as conflict within the household.
- **Oil worked “like a charm”:** Almost exclusively, people describe oil heating using words such as warm, cheap, easy, and reliable. The shift away from oil is almost always described as connected to increased oil prices; more people talked about the prices than about the oil crisis that caused the increased costs.
- **Satisfaction without reflection in apartments:** For people that have lived or were currently living in apartments – where heating tends to be included in the rent – reflections on heating were limited. The source of heating was rarely mentioned; if anything, it was assumed to be district heating, and participants generally remembered heating just “being there” and always feeling warm.
- **Owners feel warmer than renters:** In general, people knew more about their heating systems when living in an owner-occupied apartment than those in rental apartments, even though heating costs are included in both cases. Comfort and general contentment also appeared to be higher among apartment owners, whereas renters were more likely to express a lack of power over their home heating. The students interviewed were particularly discontented with the thermal comfort of their apartments.
- **Direct electric heating:** Many went from oil to an electric boiler or direct electric heating and people recalled that it made their homes “nice and clean”. They remembered electricity being cheap around the 1970’s and 1980’s as well as the government “propagating” electric heating. Direct electric heating was today seen by participants as “stupid” given how expensive and inefficient it is now considered to be, but they also acknowledged that it was “the thing to have” and the cheapest and easiest option at the time.
- **Uneven transitions and crisis preparedness:** People who had transitioned away from direct electric heating had often complemented or replaced the electric radiators with an air-to-air heat pump to reduce their heating costs, and it was not uncommon to also have a wood stove as a supplementary heat source. This provides flexibility and resilience, and constituted a clear benefit, particularly during the energy crisis, in comparison to people who were unable to invest in new heating technology. Those lacking flexibility and affordability were the most economically burdened by the crisis.

- **Lack of heating embodiment:** Transitions away from solid fuels have made heating practices less visible and tangible, particularly for household members who are not in charge of the heating system - a responsibility still generally carried by men. Many older women were unsure of how their heating technology worked and sometimes also struggled to know what heating systems they had or used to have.
- **Knowledge-sharing and knowledge gaps:** Men in particular recall helping and learning from their fathers in the forest when collecting firewood, a form of inter-generational learning that is decreasing as the labour of keeping warm is reduced. Today, the increased 'invisibility' of heating seems to increase the knowledge gaps between those who are responsible for home heating in the household and those who are not; often this entails men having a knowledge and skills-related advantage over women.
- **The feeling of different kinds of heat:** Some people expressed that they preferred some heat sources over others by the "feeling" of the heat. Radiant heat from a fire was preferred and participants felt that the feeling of it could be distinguished from other sources of heating when walking into a room. But there were also preferences as to where the heat should come from, such as preferring heat coming from radiators rather than underfloor heating.

Artists' perspectives

4.1. What the network of artists have been working on

Dr Ram Krishna Ranjan, Sweden

Ram has been making short video diaries to process and extend the oral history accounts gathered by Dr Jenny von Platten. This is an extremely reflective method, where thinking about the relationship between narrative and image extends the stories to make unexpected or unseen connections. Ram has been using ingredients of film-making such as the direction of camera movement, surface and depth, and diverse relationships between voice and image, to synthesise, explore and illuminate some of the following aspects of our data:

- People's experiences and negotiation of efficiency and flexibility in their heating system.
- The relationship between the individual or personal home heating, and the wider community.
- The relationship between need and indulgence or luxury in relation to heating.
- The deeply embodied experiences of warmth and cold, and, at the same time, the invisibility of energy and its intangibility.
- Experiences or views on 'hypertechnologised' heating and the ways that communities may get left behind or divided by digital progress.



Source: Film still from video diary exploring various facets of assumed equality in home heating in Sweden. Copyright: Ram Krishna Ranjan.



Source: Film still exploring from video diary exploring embodied and disembodied relationships to home heating. Copyright: Ram Krishna Ranjan.

Henna Aho, Finland

Henna undertook visits to Joensuu to explore the location, as well as being present when some oral histories were gathered. She has been exploring the oral histories and places in many ways including through making objects, and making paintings that seek to pull together each story. She notes that these paintings are like a 'dream' in that the mode of making is value-free- she just seeks to capture the story rather than make decisions about order or structure. She notes that when working like this, the oral histories are distilled or/and re-made in connection with her own personal experience, in the sense that as she makes images she is relating to her own narratives and personal history. She notes that the act of drawing deepens listening and makes the accounts come alive - the body recognises what is interesting about them.

The aspects of the data she is particularly reflecting on are:

- The relationship between the body and how it is in relationship with its environment – the home. How we create our environment (home) but at the same time the home makes us who we are.
- Negotiation of old and new technologies – exploring the complex assemblages of old and new.
- Control of the self (clothes, blankets) rather than try to control the house-heating.
- Negotiation of old and new technologies – exploring the complex assemblages of old and new.



Source: Work in progress, photography and construction. Copyright Henna Aho

The forest is so much more than just a source of resources (wood). Cutting wood and dealing with it (arranging, restoring, etc.) creates structures related to time using – in one day scale and throughout the year. The forest is a companion throughout the year, a place to live inside, a caretaking parent, and at the same time something you need to take care of and something that you need for your survival

Denise Lobont, Romania

Denise has been undertaking some visits to people who provided oral histories, in combination with visiting sites and key places of interest in the case study area. She has been making collections of images. This includes a collection of women modelling or sharing their 'alaindelon' fur coats. These are a fascinating piece of fashion history where a particular style of fur coat became fashionable after the French actor (Alain Delon) wore a utility fur coat in a very famous 1960s film. Denise notes that not only is the coat very good at keeping the wearer warm, it represents a very particular moment in Romanian cultural history and the relationship between Eastern and Western Europe. Denise noted also that fur coats and their production are deeply problematic in contemporary culture, but that these historical items have been kept a long time and therefore might be considered sustainable. Denise has also been visiting sites of community 'make do' (improvised) heating systems where gas is provided in visible outdoor pipes that work around above ground features rather than being hidden. The systems documented are playful and clever, so the unease and potential danger of these arrangements is contrasted with a sense of practical 'getting by'. The relationship between these two bodies of photography is being explored and particular aspects being explored include:

- Necessary self-reliance: relying on ways to keep your own body warm rather than depending on warmth being supplied by the state and large-scale infrastructure, such as networked gas.
- Relationship between methods of keeping warm in the past (especially during transition from communist era) and now.
- Heating and keeping warm inside the home and the system outside.



Source: Photographs of 'Alaindelon' coats kept by Romanian women. Copyright Denise Lobont.

Becky Shaw, UK

Becky drew while listening to the oral histories, focusing on key small encounters with material objects. The drawings have different levels of intensity- some are worked over and were given more time, so the colours are richer and the build up heavier/more solid. Other drawings are light and fast. The drawings were arranged into sections/themes as part of the collective team analysis process. Becky was particularly interested in embodied effects, as communicated through the oral histories- such as the ways that gas central heating was airy, light and 'marvellous' in contrast to the coal fire which was intense, heavy and drew people together in one place. The drawings also captured detailed accounts of work, such as specialist ways to make the fire at different points in the day, ways to use the fire for waste disposal and cleaning. Becky has begun to explore how to use animation to bring movement to the drawings. At the same time she has been visiting museum collections where open fires appear almost constantly in the 'theatre set' representations of the historic UK home and is keen to explore how the 'set' might make a good mode of encounter for our stakeholder events.

Aspects of the data being explored:

- The ways that the hearth is such an enduring centre of the home, and also a site of ornament, taste and design (as well as clutter).
- The deep manual and bodily skills involved in living with fire, and the inter-relation of keeping warm, eating and cleaning.
- The lives and perspectives of children. There are a series of drawings showing the ways that respondents played with/around the fire as children. Most of the oral histories gathered reflect on the intensity and contrasts of family life including the assemblage of love/care and the coal fire. However its important to ask whether the intensity of these memories is due to coal fire life, or to the act of looking back to memories of childhood.
- The fire constructed how family life is being recounted- is that why we struggle to leave it behind?



Source: Collated drawings from oral history listening that explore childhood activity around the fire. Copyright Becky Shaw



Source: Animation still from The Lives of Children (colliding the fire from children's books with home photography). Copyright Becky Shaw.

4.2. How art-making is contributing to JUSTHEAT

- Aesthetic focus hones in on, and amplifies attention to 'glowing' (especially strange or meaningful) data (MacLure, 2013).
- Art processes 'unpack' the elements of a story, breaking it down into ingredients that the artist can then explore/play with.
- These ingredients are then re-connected differently through the practical ingredients and processes of art-making. This might include changing aspects of space, scale, texture and time within different media. This helps us see different relationships or to see different emphases.
- As a consequence of this activity, past, present and future can appear in different relationships and from different points of view. This might help us understand our relationship to energy, and how it also might be unsettling.
- The literal 'playing with' the data through film, drawing, photography etc. means it is processed and then literally embodied in the works. This offers a way of putting the body back into the story, when it might be hard for us to 'put ourselves' in historic accounts that feel like they belong to a different world.
- The growing artworks offer opportunity to engage stakeholders differently- we need to explore the right times and spaces to do this.
- Potential: when seen together, the four different bodies of artwork carry the specific material, visual and spatial qualities of their contemporary and historical locations, enabling the differences to be experienced by viewers powerfully in both fast and slower ways.

Injustices emerging from the data

There is an explicit focus within the project on exploring the (in)justices associated with past heating transitions, which are highlighted (often indirectly and without explicit intention to highlight injustice) within the oral histories. Justice did not tend to form a consideration within heating transitions past, yet is significant within the discourse around current low carbon heating transitions which are challenged to deliver a 'just transition'. We are therefore motivated to identify the, often unintended, injustices triggered, re-organised or deepened by changes to home heating technologies and fuels. Our objective in doing so, is to highlight the impacts that changes to home heating can trigger across multiple aspects of justice, not just those related to equitable access to affordable warmth, which are typically discussed in the context of domestic heating and justice.

Overall, the findings discussed in the workshop relate to many topics of feminist energy justice: the relationship between the public and the private, between the political and the personal, intersectionality, approaches to care work, and injustices stretching from one's own body all the way to global interrelations. Feminist energy justice has therefore become a key framework for understanding the justice implications of the data we are generating and we continue to explore its potential in this regard.

Some of the issues and debates regarding justice that emerged from the workshop are summarised below.

- **Losing control:** In terms of the transition away from solid fuels (coal and wood) to less tangible and visible heating systems, we observed that many of the injustices apparent within the oral histories were related to gender and power. While the oral histories depict an apparent emancipation of women from the intensive, physical and dirty care work of keeping the family warm with solid fuels, increasingly technological approaches to home heating appear to have shifted (in many cases) knowledge and responsibility for heating systems to men within the household. While women continue to bear responsibility for the thermal comfort of the household, men are more likely to lead on the operation of modern systems and thus exercise control over them – a trend noted more widely within the energy literature (Strengers, 2014). The more labour-intensive heating methods required for solid fuel systems necessitated more participation (to differing degrees) from everyone in the household, meaning that knowledge and responsibilities were shared but differentiated between household members (for example, children gathering kindling, father moving the coal, mother building the fire etc.), i.e., not centralised to one person. Thus, although women have experienced a degree of reduction in domestic labour due to increasingly automated heating systems, this has come at the expense of a centralisation of knowledge and responsibility – and

thus power – over home heating to men. There are examples, within the oral histories, of how women rely on the knowledge, technical skill, and benevolence of a man to achieve thermal comfort in their own homes; much new heating technology depends on apps and devices that have been shown to be designed by and for men (Strengers, 2014; Strengers, 2022).

- **From collective to individual home heating:** A more recent transition in home heating is the transition from collective (district) heating to increasingly individual systems. This development was primarily identified in Romania, Sweden and Finland where district heating has, for a long time, been a common source of heating in urban areas. In Romania, the fall of the Communist regime triggered a shift away from district heating driven by the unreliability of these poorly maintained systems and an attempt to reclaim control and agency over thermal comfort after decades of it being outside of the household's control. Although not nearly as drastic, there appears to be more recent tendencies in Sweden and Finland of some households preferring to have more control and agency over their home heating than district heating allows. Heat pumps are growing in popularity coupled with solar PV among transition frontrunners to bring heating and the electricity supply fuelling it back under their control. With this increased individualisation of home heating seems to come an increased plurality of technology (for example, operating a heat pump alongside log burner(s)) which has multiple benefits for the households, such as flexibility and resilience in times of crisis, but also significant justice implications including the non-human (for wildlife) and colonial justice implications (depleting carbon sinks that support global efforts to minimise climate change) of deforestation.

The Finnish and Swedish teams pointed out how some households opted out from district heating in favour of individual heating systems. This means that those who cannot afford to opt out are left with increasing costs and inefficiencies for the remaining part of collective systems. This reflects a **distributive injustice** where some households are moving swiftly ahead with new technologies, and others are left to bear the increasing costs of district heating systems, that might be in need of upgrading, as is the case in Romania. Here, the oral histories reveal that the distance between frontrunners in the transition and those being left behind is increasing, with the former enjoying greater energy autonomy and the status enjoyed by conspicuously pursuing ostensibly low carbon options.

An example of distributive injustice from the UK was also shared, whereby coal miners had (until the decline of the mining industry from the 1980s onwards) received free coal allowances, i.e., a distributional benefit, but one which delayed their transition to gas central heating and the greater cleanliness and convenience that many felt that it delivered. As a consequence, this free coal allowance created a divide within communities between those in receipt of the allowance and those who did not qualify (because they were not directly engaged in coal extraction). However, there were also **distributive (dis)advantages** to those in receipt of the allowance, with many mining communities (many of which now suffer high unemployment) transitioning late to gas central heating or not at all (Darby, 2017) a situation that may, in turn, leave them amongst the last in the UK to participate in low carbon heating transitions. Within the oral histories from the UK, we see that only more 'socially mobile' households within former mining areas are experimenting with low carbon technologies, such as ASHPs.

Within these examples, we see how distributive injustices are re-organised (locally, nationally and globally), often unwittingly, by policies and initiatives (related directly and indirectly to heating) and cultural and political phenomena, such as: subsidies, how remuneration was arranged, changes to political regimes, the pursuit of a 'frontrunner' identity and a desire for greater autonomy and flexibility at the household level.

- **Traditional versus technological methods and the local and global dimensions of heating change:** With dominant transition pathways and narratives focusing on the significance of new, 'smart' technology, the oral histories reveal concerns about judgement and dismissal surrounding more traditional heating practices. In Finland and Sweden in particular, there was a fear that wood heating would be viewed as environmentally damaging or an 'environmental crime' partly due to the implications for local air pollution. Despite these concerns, participants expressed great joy in dealing with wood, appreciating the connection to nature that it fostered for many, and viewing it as a route to resilience and self-sufficiency in the face of volatile energy markets. These dilemmas point to the strong social and cultural value and significance of particular methods of home heating and suggests that **recognition justice** in terms of acknowledging the perceived and experienced social and cultural (dis)benefits of different forms of heating, is also significant in the context of an inclusive transition. Recognising the value of traditional heating practices not only means acknowledging them, but also considering ways that they may form part of transition pathways and narratives, or ways in which they can be respectfully substituted or transformed. Debates around traditional home heating practices also provides a way into what people consider to be acceptable emissions (i.e. emissions from traditional heating practices may be tolerated due to their almost ritualistic status) and the implications of these perspectives for the transition to more abstracted low carbon heating systems.
- **Politics of transition processes:** The workshop also revealed several instances of injustices related to politics and processes. These were rather interconnected, where the inability to exert power or influence one's own home heating due to energy rationing was present to various extents in the political shift away from communism in Romania, as well as among disempowered private renters in Sweden, for example. Although very different in nature, both situations triggered a desire for more control and autonomy regarding heating, pursued through imperfect and illicit coping strategies documented in the oral histories. In Romania, coping mechanisms included improvised solutions for accessing gas heating that were unsafe and illegal. In Sweden, tenants used portable electric radiators that the landlord did not allow, putting their tenancy in jeopardy in order to stay warm. These examples illustrate the impossible situation that households have been put in when (i) their home is insufficiently heated (ii) they are not in control of their home heating arrangements (iii) the government or the landlord is not responsive to their requests for improved heating, and (iv) coping mechanisms are prohibited, if discovered. A lack of influence on the part of householders, in combination with the prohibition (by governments and landlords) of coping mechanisms can be seen as a form of **procedural injustice**, leaving households without legitimate routes to achieve thermal comfort.
- **Past transitions and the history of the present:** Memories of traumatic heating transitions were disclosed in the oral histories and discussed in the workshop. Both in Romania and in the UK, previous experiences with home heating and heating transitions had been experienced as traumatic and brutal. In Romania, this was related to inadequate heating provision under the Communist regime, whereas in the UK it related to the rapid and brutal transition away from coal and the implications for coal mining communities. In Sweden, political decisions favouring electric heating had locked household into a long-term dependency on electricity (a more expensive way to heat), creating uncertain conditions for households who had simply followed government recommendations. The fact that these wounds are still prominent in the memories of participants will inevitably have implications for how they receive the new transition and highlight the need for close attention to be paid to **restorative and historical justice** considerations. This could entail directing specific efforts and care into building trust with communities previously harmed by heating transitions.

Reflections across the countries

The sharing of the heating trajectories and lived experience of heating change across each participating country prompted a number of emerging cross-cutting reflections regarding the extent of synergy and divergence between countries and what the research so far has revealed to us about the social, cultural and political implications of heating transition and how they impact lived experience on an everyday and longer-term level. Emerging observations include:

- **National versus local action:** within the national accounts, we see abundant evidence of tensions between centrally determined (or 'top down') heating policy and local implementation. This is evident in the UK where certain local authorities (dissatisfied with the perceived lack of urgency around phasing out coal) held their own referenda on the future of heat in the 1960s. And in Romania, where (post communism) citizens in the case study areas have been vigorously exercising their autonomy, often pushing against the grain of national and pan-European policy, defending their right to determine their own energy futures. We also see examples from Sweden where devolution of decisions about heating to local authority level has led to decisions that look very sound, some forty years down the line (notably, the local authority led roll out of efficient and affordable district heating in urban areas). These issues relate to **recognition and procedural injustice** – householders and/or local authorities taking their own action because their needs and views are not heard or respected within national or international policy or are directly undermined by government. **Restorative** efforts are needed to regain the trust of households in relation to heating transition policy, particularly where there has been great abuse of trust (i.e., Romania).
- **Domestic versus industrial priorities:** We also see political tensions between what is prioritised in times of scarcity – domestic heat or power for industry, with the latter often prioritised. Home heating, it seems, can also get caught in the 'crossfire' when a country pursues a major shift in economic direction, such as attempts in the UK and Romania to move rapidly from an industrial to a post-industrial economy from the 1980s onwards, and Finland's aspirations to build an economy based around wood. Heating provision is nearly always affected by major political change and the overthrowing of an autocratic regime in Romania in 1989 provides an extreme example of this. The case of Romania also illustrates how, *in extremis*, heating can be treated not as a vital resource but as something to be foregone or rationed (even weaponised) to enable the dominant economic strategy and exercise control over citizens. These issues illustrate a lesser acknowledged form of **distributive injustice**, where the needs of industry are prioritised over those of citizens.

- **Recurrent issues:** Many of the issues recounted by participants and identified through the archival research can be seen to recur at different points in time and some of the challenges of the past reflect contemporary problems. For example, each country has, at different times, been concerned about the maximisation of energy sovereignty (ability to be self-sufficient as a nation in energy terms and to avoid imports) and since the outbreak of conflict in Ukraine, all participating countries are united in this concern. We see the same objective pursued in the UK with a mass switch to gas central heating to utilise massive natural gas reserves off the North Sea coast and in Finland's post war drive to limit energy imports from Russia. Moves, at times of crisis, to promote energy independence have the potential to galvanise transitions and was a key factor affecting shifts towards heat pumps in Sweden during the oil crisis of the 1970s. However, the pursuit of energy sovereignty should be accompanied by awareness of its implications for **colonial injustice** (i.e., scaling up of production of components for renewable energy generation can fuel modern slavery elsewhere in the world (Cockayne et al., 2022)).
- **Heating affordability and control:** We have also identified evidence of changes to how much of the home it is possible and affordable to heat, with the general trend across the countries being one of heating one or two rooms during the era of burning only solid fuels for heat to the ability to heat the whole home under central or district heating. However, we also see evidence of returns to restricted heating practices due to high energy prices due to the ongoing energy crisis, particularly in the UK. In Finland, we see examples of restricting heating to one or two rooms of the home again, to avoid buying a heat pump large enough to serve the whole dwelling. Those reaping the **distributional benefits** of 'warm rent' (heating costs included in the rent) in Sweden (which might be seen as a **distributionally just arrangement**), are unlikely to need to restrict their heating use. And in Romania, participants are reluctant to restrict their heating use for any reasons, after decades of it being strictly rationed under the communist regime. This does not amount to petulance on the part of Romanian households, it results from deep collective trauma resulting from the injustices of the communist regime, which spanned **distributive, recognition and procedural** issues and requires restorative action.

Across the countries, we find examples of household eager to exercise as much choice and control as possible over their heating (a legitimate desire that should be **recognised**). This desire appears to become more intense as climate policy and the energy crisis threaten change to highly valued practices, such as burning wood – something practiced to different extents in all countries, but particularly vociferously defended in Sweden, Finland and parts of Romania. A common sentiment expressed by participants is that, when you are without choice, that leads to vulnerability. And, the ability to take wood from the forest nearby to burn for heat feels like an important safety net in uncertain times as well as ostensibly bringing a form of ritualistic pleasure and wellbeing benefits to many participants (often those for whom it is not their only form of heating) as well as enabling cultural activities (such as cooking over wood or enjoying a sauna) in Sweden and Finland. In the UK, log burners have become popular as a supplementary heat source. But the ability to participate in these activities is **not evenly distributed** across social groups – those who own forests or have the money to buy wood burners and wood or who live close to common forests will benefit. There are also significant **colonial injustices** associated with burning wood for heating such as undermining the role of forests as carbon sinks and are important for biodiversity, which benefit everyone globally.

- **Collectivism versus individualism:** In Finland, while district heating systems are set to expand in urban areas, they are under pressure from an increasing

share of individual heating solutions, especially with wealthier households possibly disconnecting from (and thus undermining) the district heating network in Finland. We see long standing dominance of individual heating systems in the UK (whether in the form of the fireplace, the range or later, an individual gas boiler) and the continued shunning of Soviet era district heating and moves towards individual gas boilers in Romania. In Romania, these moves towards greater autonomy in relation to heating may ultimately lead to the collapse of district heating networks, which, if modernised, decarbonised and well governed, can represent efficient, sustainable and affordable heating options. Moreover, those left connected to failing systems (and without the means to opt out) are likely to have to pay higher prices. This trend represents a **distributional injustice** towards those who remain on the network, especially those that have no alternative. In Romania, the collective trauma of the communist era where heating was one of many necessities that was severely restricted, means that district heating systems are unlikely to be salvageable.

- **Cosiness and the increasing need for cooling:** The oral histories have revealed the huge significance of notions of ‘cosiness’ particularly in Finland and Sweden where creating a ‘cosy’ atmosphere in the home during winter through heat (often log burning) and soft lighting is considered a vital coping strategy during the long, dark winter. Similarly, in the UK, wealthier households were eager to recreate the sensory comfort and meditational qualities of the fireside that they remember from childhood, leading to investment in log burners as supplementary heat sources. Across all these examples, creating a cosy home atmosphere is employed as a key coping strategy for navigating winter and reinforcing the role of the home as a sanctuary from the trials of everyday life. **Recognition** of these cultural desires and legitimate coping strategies for maintaining wellbeing form important considerations for the transition, without overlooking the multiple negative consequences for nature depletion, air quality and associated consequences for health.

However, the challenge of staying thermally comfortable, was no longer confined to winter. Many participants across the countries remarked on the contemporary challenge of keeping cool during summer. These experiences appear to challenge expectations around how homes should feel at different times of year.

- **Who gets to transition?** Across all countries, we see a general trend towards middle class households exercising choice over whether to participate in the transition to low carbon heating systems or not and making their own decisions about how they do this. In many cases, this entails making some concessions to the need to transition (i.e., opting for low carbon heat sources such as Air Source Heat Pumps) whilst clinging on to treasured, more primitive practices (i.e., burning wood). These decisions appear to be motivated by a drive to ‘do the right thing’ but are also informed by a clear understanding of what they are not willing to part with and that home heating is not just a practical necessity – it is also about pleasure and has huge cultural significance. There are **procedural, distributional and recognitional** dimensions to this, with lower income households feeling much less in control of their destiny, their needs not being accounted for in transition planning, resulting in them becoming locked on to a heating pathway determined by government or their landlord. And for many such households, especially families once bound up with coal mining, this lack of autonomy is very familiar. There is little scope for such households to exercise choice over what sort of heating systems works best for them or to defend their cultural preferences regarding heating, if indeed they remain in touch with what they might be.

Messages for policy at interim stage

The workshop culminated in each team member offering a tentative message for policy makers and practitioners working on heating transitions, based on the deliberations of the day. Here are our brief messages and considerations at this interim stage:

- **Recognise the cultural significance of heat:** The messaging behind heating transition policy and initiatives should be culturally aware – for example, acknowledging long standing preferences and aversions and their cultural significance (e.g., wood burning, the presence of a fireplace), being aware of and sensitive to past trauma (e.g., oppression in Romania). Recognise that heating systems deliver more than just heat- they have the potential to bring comfort, joy, cultural participation and attachment, connection to nature and help us navigate difficult times (e.g., winter, the pandemic).
- **Consider who can(not) exercise choice** over their heating arrangements and how this can be widened to include disempowered communities, who have been exposed to ‘top down’ decision making. Acknowledge what may be lost and not just what might be gained through new technology.
- **Promote awareness of collective responsibilities and interdependencies** in relation to heating choices – for example, a wide range of households stand to benefit from affordable heating if district heating networks remain intact. Opting out of these networks can undermine this potential, but this may not be widely understood. There is great potential for inclusive, low carbon futures within these established systems – transitioning does not always involve reinvention of existing systems.
- **Recognise the importance of control and sense of agency** are important to households, increasingly so given the uncertainties of conflict and climate change. Can a greater sense of autonomy be built into new technology and systems by recognising households’ needs for tangibility (as seen through the attachment to wood) and careful design of interfaces (i.e., control panels). Can we design heating technology in a way that makes me care about it or indeed, love it, as many love their wood burner or crave the coal fire?
- **Upgrade the language around heating transitions:** place less emphasis on efficiency and necessity and more on the potential to thrive through transition, and attain ‘thermal delight’ through low carbon heat sources and a better insulated home and cost savings (Heschon, 1979). There is suggestion with our data that when we are told we have to do something from the top down, our instinct to retain agency resists this, so perhaps an invitation to achieve a more comfortable home life and price stability might be more effective.

- **Recognise the different manifestations of (in)justice:** avoiding viewing justice as a homogenous concept and recognising the many different forms it can take heightens understanding of the (direct and less direct) interactions between heating arrangements and justice. Recognising what types of (in)justice is created (in this case by heating change) provides a more informed starting point for developing fairer and better-informed policies and solutions in future.

Next steps

At the time of writing, the JUSTHEAT teams across the four participating countries are beginning data collection in our second case studies, in locations that provide a contrast (different physical, cultural, social and economic contexts and different heating pathways within the same national context) to the first case studies explored here. We hope to start disseminating findings from the second case studies and reflections across the first and second waves of fieldwork in summer 2024. In the meantime, the detailed archive research undertaken to establish the factors that have shaped heating pathways pursued in each country, will be published via a series of country specific reports and an interactive visual representation in early 2024. Sign up to our mailing list to receive project updates: <https://forms.office.com/e/pJ8KScwua1>

References

- Cockayne, J., Rodriguez-Heurta, E., & Burca O. (2022). *The Energy of Freedom? Solar energy, modern slavery and the Just Transition*. University of Nottingham. <https://www.nottingham.ac.uk/research/beacons-of-excellence/rights-lab/resources/reports-and-briefings/2022/march/the-energy-of-freedom-full-report.pdf>
- Darby, S.J. (2017). Coal fires, steel houses and the man in the moon: local experiences of energy transition. *Energy research & social science*, 31, 120-127.
- Heschong, L. (1979). *Thermal delight in architecture*. MIT press.
- MacLure, M. (2013). The Wonder of Data. Cultural Studies. *Critical Methodologies*, 13(4). <https://doi.org/10.1177/1532708613487863>
- Strengers, Y. (2014). Smart energy in everyday life: are you designing for resource man? *Interactions*, 21(4), 24-31.
- Strengers, Y., Gram-Hanssen, K., & Kryger Aagaard, L. (2022). Energy, emerging technologies and gender in homes. *Buildings and Cities*, 3(1), 842-853.