

Combating residential energy poverty in existing dwellings: eco-social policies and sustainable welfare in Denmark and Ireland

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Introduction

Residential energy poverty (EP) is a significant challenge in many countries, including relatively wealthy ones. It has both ecological and social dimensions, and adopting an eco-social perspective reveals a range of important challenges which are not easily addressed by traditional social and environmental policies. For example, some lower-income households depend on fossil fuels because they cannot afford renewable energy systems. Similarly, their homes may be poorly insulated, causing them to consume more (fossil fuel) energy than would be the case if they were insulated. EP contributes to and exacerbates some significant social and environmental problems, including poor mental and physical health; social exclusion, stress and stigma; lower educational outcomes; and fossil fuel usage and energy consumption levels which are unhealthy for humans and the planet. Some climate mitigation strategies can have disproportionate negative effects on lower-income or vulnerable households and disproportionately benefit higher-income groups (Wang et al, 2016; Büchs et al, 2021; Lowans et al, 2023). These policies may undermine the effects of social policies aimed at improving the situation of EP households or even increase poverty (Schechtel, 2022). A *just transition* requires that mitigation strategies be progressive, that is, have a positive effect on those at the lower end of the income distribution, but some social policies to address energy costs have regressive distributional effects (Barrett et al, 2022).

Eco-social policies (ESPs) aim to tackle poverty and environmental problems (Fitzpatrick, 2014; Gough, 2017; Koch, 2018; Stamm et al, 2020). They intend to address the ‘double injustice’ (Walker and Day, 2012) where the poorest households who are least responsible for environmental damage are in the worst position to cope with and afford climate mitigation and adaptation. It would entail a shift away from a focus on strategies which

emphasise environmental behaviour change and education towards systemic issues of poverty and inequality (Büchs, 2021).

This chapter explores the extent to which ESPs to address residential EP are evident in two case study countries: Denmark and Ireland. These cases represent different welfare regimes in different climatic or geographic regions. The first section starts with a discussion of sustainable welfare, the conceptual underpinning of our analysis. This is followed by a review of the literature on EP. The subsequent sections provide an analysis of EP in each case and evaluate their residential energy policies and instruments to assess the extent to which ESPs are in place to retrofit the existing housing stock.

Data and methods

Our principal research method was secondary analysis of existing data. Following an extensive literature review, we conducted a comparative analysis of relevant policies and strategies in each of the case study countries. To contextualise this, we examined relevant data on the housing and welfare systems for each setting as well as the EP situation using the EU Survey on Income and Living Conditions (EU-SILC) and national-level databases. EU-SILC is the established source for statistics on material deprivation and poverty across the EU, and the paper draws on two indicators of EP from that dataset, available on the Eurostat website: i) inability to keep homes warm in winter; and ii) arrears on utility bills. Data on ‘home uncomfortably hot in summer’ was only collected in 2012, therefore we exclude this, but regular inclusion of this question in EU-SILC is essential to provide a more complete picture of residential EP. While there are some limitations to data on household perceptions of EP as an indicator (Bouzarovski et al, 2014), subjective experiences are important, because if people feel that they are not warm enough or not able to afford energy, they may view more extreme coping mechanisms as legitimate, which could lead to other health and social problems (Middlemiss and Gillard, 2015, p 152).

Sustainable welfare and ESPs

Many social policies are disconnected from environmental and climate policies, which can result in substantial ecological footprints for welfare states. Hirvilammi and Koch (2020, p 448) argue that ‘welfare states should be seen as embedded in eco-systems and in need of respecting the regeneration capacity of the biosphere’. Calls for more sustainable welfare have been increasing, including in the energy sector (Fitzpatrick, 2014; Gough, 2017). Sustainable welfare systems have been defined as the ‘satisfaction of basic human needs within ecological limits in an intergenerational and global perspective’ (Koch and Mont, 2016, p 107). They involve policy

integration – linking social and environmental policies – to develop ESPs which protect vulnerable social groups from the impacts of environmental challenges and policies while also addressing the environmental impacts of social policies. Progress on this policy integration is limited (Zimmermann and Graziano, 2020). Reasons for this include issues of compatibility and trade-offs between social and environmental challenges (Fritz and Koch, 2014); challenges for political actors promoting ESPs (Domorenok and Trein, 2024), including complexity of coordination across policy domains (Cotta, 2024), and power differentials of social groups in their capacity to influence the development of ESPs (Zimmermann, 2024). Domorenok and Trein (2024, p 76) highlight ‘the need to ensure consistency, coherence and congruence between goals, instruments, and subsystems that deal with both environment and social policy matters’. Much of the early scholarly work on ESPs was impeded by being normative rather than descriptive (Cotta, 2024, p 3). However, Mandelli’s (2022) descriptive and analytical work makes some advances on this. He defines ESPs as: ‘public policies *explicitly* pursuing both environmental and social policy goals in an *integrated* way’ (p 7, italics in original). He creates a typology of ESPs based on i) the direction of ESP integration: reactive (socialising the environmental welfare state) or proactive (greening the welfare state); and ii) links to economic growth: investment (contributing to growth) or protection (not contributing to growth). This results in four types: reactive eco-social protection policies, reactive eco-social investment policies, preventive eco-social protection policies and preventive eco-social investment policies (Mandelli, 2022). This analytical clarity may help progress ESPs.

Residential EP

Residential EP is considered to be a function of energy prices, low and unstable income, dwelling energy inefficiency, poor dwelling quality, energy-inefficient appliances and the specific energy needs of households (Hills, 2012; Snell et al, 2018; Oliveras et al, 2021). Structural determinants of EP include policies and markets for energy, housing and labour as well as political, economic and welfare policies (Karanikolos et al, 2013; Bouzarovski, 2014; Dagoumas and Kitsios, 2014; Fitzpatrick, 2014; Marí-Dell’Olmo et al, 2017). Existing research identifies the wide range and severity of its social and environmental impacts. Low-income households spend a much higher proportion of income on energy than other households, which reduces their capacity to purchase other essential goods (Snell et al, 2018). There is substantial evidence of the negative impacts of EP on the physical and mental health of adults and children (Healy, 2003; Hernandez, 2016; O’Meara, 2016; Peralta et al, 2017;; Thomson et al, 2017; Bosch et al, 2019; Da Silva-Pedroso et al, 2024). Households unable to keep their homes adequately warm most

of the time are almost twice as likely to visit a doctor and twice as likely to use a hospital outpatient department compared with those who are able to heat their homes (Evans et al, 2000). EP is linked to increased stigma, social isolation and stress, each of which detracts from health (Middlemiss and Gillard, 2015). An increased likelihood of depression among parents experiencing EP is linked with negative child outcomes (Mohan, 2021). Studying in cold, damp, ill-lit environments reduces educational achievement (Marmot Review Team, 2011). Low-income households are more likely to use polluting fuels with negative effects on residential and neighbourhood air quality and greenhouse gas emissions (Santamouris, 2016). Their use of coal or wood results in higher likelihood of respiratory disease than energy-poor households connected to district heating (Sokolowski et al, 2020). The inability to cool the home is also crucial due to heat-related illnesses and ambient temperature mortality rates (Baccini et al, 2008).

Existing research suggests some eco-social solutions are limited for households at risk of EP. Many low- and middle-income households dependent on fossil fuels cannot afford to change energy systems or adopt measures to reduce energy use and emissions (Pye et al, 2015). Retrofitting loans are inappropriate for low-income households, as Middlemiss and Gillard (2015) find that taking on debt is considered only in ‘hard times’ and they cannot guarantee a steady income to pay back loans. Lack of social support makes a financial risk like taking on debt with an energy supplier very difficult. By contrast, more successful strategies might adopt area-based approaches, building capacity among community organisations and local authorities to address retrofits in ‘hard to treat’ properties (Bouzarovski and Petrova, 2015, p 37).

EP contextualised: Denmark and Ireland

The countries examined here represent contrasting cases (Table 14.1). Each experienced substantial energy price inflation since 2021 due to the war in Ukraine, but 2022 prices were highest in Ireland. Denmark is a social democratic welfare regime, while Ireland is generally classified as liberal. There are significant differences in poverty risk between them. However, the differential impacts of tax and social transfers significantly reduce this risk in both cases, so that after transfers there was little difference in their poverty risk (12 per cent and 14 per cent, respectively). Housing quality is similar in each case. However, these indicators do not cover insulation, and poorly insulated housing is a significant part of the problem in Ireland due to the later and more limited regulations there (1990 in Ireland versus 1976 for Denmark). Indicators of EP are available from the EU-SILC: ability to keep one’s home warm and going into arrears with utility bills. In 2022, the proportion of households unable

Table 14.1: Country profiles

	Denmark	Ireland
Region	Northern Europe	Western Europe
Climate	Temperate Oceanic	Temperate Oceanic
% in dwelling with leaking roof, damp walls, floors, foundation, rot in window, floor*	16.8	16.6
% at risk of poverty after social transfers**	12.4	14
End-user energy price € per kWh: electricity (gas)***	35.56 (13.51)	47.12 (16.22)
Welfare regime	Social Democratic	Liberal
% unable to keep home warm+	5	7.2
% in arrears with utilities++	3.5	10.6

Sources: * EU-SILC ilc_mdho01 (2020); ** EU-SILC ilc_li02 (2022); *** Household energy price index 2022; +EU-SILC ilc_mdcs01 (2022), ++ EU-SILC ilc_mdcs07 (2022)

to keep their homes warm was higher in Ireland (7 per cent) than in Denmark (3 per cent). However, these national figures mask the fact that high proportions of poor households in each jurisdiction experienced EP problems (Table 14.2). Ireland has lower rates for poor households than Denmark, but poor households in Ireland have a more significant problem with utility bill arrears than their Danish counterparts. Some of the worst figures on both indicators involve households with dependent children. There are variations in the recognition, definition and approaches to EP in each country. In Ireland, EP has been on the agenda since the late 1980s (Healy, 2003). It is currently defined as being when a household spends more than 10 per cent of its income on energy (DECC, 2022), by which standard 29 per cent were experiencing this problem in 2022, the highest rate since 1994–1995 (Pillai et al, 2022). The Danish case is worth highlighting because it illustrates how national figures and household survey data underestimate EP among more vulnerable groups. For example, 35 per cent of poor households with three or more adults and dependent children and 29 per cent of poor households with two adults and three or more children could not keep warm (Table 14.2), yet there is no official definition or indicators for EP in their National Energy and Climate Plan. Long-standing building insulation regulations provide housing with high energy standards, and widespread use of combined heat and power offers affordable district heating, plus a social democratic welfare system means relatively few people are socially distressed. Yet, case

Table 14.2: Characteristics of poor households experiencing energy poverty (%)

Poor and unable to heat	Denmark	Ireland
Three or more adults with dependent children	35.2	0
Two adults, three or more children	28.9	3.8
Single	23	27.7
Single adult with dependent children	9.7	15.8
Two adults younger than 65 years	6	11.1
Poor and in arrears	Denmark	Ireland
Three or more adults with dependent children	0	47.8
Two adults, one dependent child	0	45.7
Single adult, dependent children	26.9	36.1
Two adults, two dependent children	0	30
Two adults younger than 65 years	4.3	19.2
One adult younger than 65 years	8	17.3
Two adults, three or more dependent children	16.6	15.1
Single	6.6	14.7
One adult 65 years or older	3.6	12.4

Sources: EU-SILC ilc_mdcs01 (2021); EU-SILC ilc_mdcs07 (2022)

studies reveal problems in peripheral regions with ageing populations, declining housing markets and poor-quality housing (Jensen, 2017). Some vulnerable groups migrate to these regions due to unaffordable housing elsewhere and welfare cuts; there, they live in poor-quality private rented housing, which is cheaper than social housing in these regions. Struggling to keep warm, many apply for social housing for winter but move again when it is warmer (Byplan Nyt, 2017). Hidden EP is a problem in Ireland too (for example, Kennedy and Winston, 2019).

Current residential EP policies in Denmark and Ireland

This section presents the range of measures to address residential EP in each jurisdiction (Table 14.3; Table 14.4). Measures may have ecological goals (reduce emissions and so on), social goals (meet the needs of more vulnerable social groups, such as those on lower incomes) or eco-social goals (aim to do both). Policies may have unintended consequences, so environmental measures may have socially regressive outcomes, for example, disproportionately benefiting higher-income groups. Similarly, social measures may have negative environmental outcomes, for example, reducing indirect taxes on fossil fuels decreases cost but increases emissions.

Table 14.3: Current ecological, social and eco-social policies to address energy poverty in Denmark

Eco	Social	Eco-social
• Energy retrofitting grants ('Bygningspuljen')	• Heat aid for pensioners (permanent scheme)	• Local initiatives that indirectly reduces EP (for example, outreach to vulnerable families living in poor conditions) and efforts to prevent housing speculation (for example, removal of vacant single-family houses)
• Local climate and energy programmes to motivate local homeowners towards energy retrofitting and to shift energy supply	• Targeted heating allowance (new scheme) • Energy cost deferment scheme (new scheme)	• The National Building Fund initiates large renovation schemes in the social housing sector that include energy improvements

Denmark

Social measures: For many years, a national heat aid scheme has been in operation, where pensioners can apply for subsidies if heat costs exceed a certain amount. Following the energy crisis in 2021, a 'heat cheque' was established, aiming to help the hardest hit households with their energy bills in 2021–2022, and this was extended in the first part of 2023. This is a targeted scheme with a single payment of €500 to approximately 320,000 households with incomes below €75,000 per year. It also targets households in the following categories: heated by gas boilers; located in areas with district heating with a share of gas over 65 per cent or a combination of gas and heat pumps that results in the same increases in prices; or with electric radiators or heat pumps as the primary heat source, with a corresponding price increase. The cheque is paid automatically to the target group, and recipients are identified by building and person registers. In the first round, flaws in the registers led to payments to households that did not qualify. In the 2023 round, households could apply for the cheque if they belonged to the target group which resulted in 2,000 households automatically being grant-aided, and 34,000 applications.

An 'energy cost deferment scheme' was introduced in 2021 that made it possible to defer a portion of energy bills for four years, after which payment of the amount plus 2 per cent interest was due. The scheme ended in 2023 but repayments are ongoing. Each of these social measures helps keep costs down but fails to solve the cause of high energy bills.

Ecological measures: To improve the energy performance of existing buildings, 'Bygningspuljen' (the building scheme) was introduced in 2018 for dwellings with Energy Performance Certificates E, F or G. In 2023 it was divided into a heat pump scheme and an energy retrofitting scheme.

The latter gives subsidies to improve insulation, windows and ventilation. Before that, different schemes had been in operation, such as a one-stop shop for energy retrofitting, which had limited success, and local authority schemes to part-subsidise energy retrofitting. In general, those arrangements tended to target homeowners with some resources and, to a lesser extent, low-income households. Under the ‘heat cheque’ initiative, gas boilers are no longer installed in Danish households, and the roll-out of district heating has increased. However, 2023 gas price deflation meant shifting to district heating was more expensive and less attractive for many homeowners.

Eco-social measures: Initiatives to improve the residential energy efficiency of low-income families are rare in Denmark. However, some municipalities in peripheral regions with shrinking populations have introduced outreach initiatives to assist low-income families at high risk of EP. These tenants are renting poor-quality dwellings from private landlords, and some municipalities are declaring the houses unsuitable for living, demanding the owner renovate or demolish it (condemnation), and in some cases offering to demolish the house using national subsidies. In the public housing sector, continuous efforts to improve energy standards are made via the National Building Fund, which uses rental income to upgrade buildings, including energy performance. Under a national agreement from 2021 to 2026, energy saving measures have been prioritised.

Ireland

Social measures: Several measures target vulnerable groups in Ireland to support them with energy costs. These have no environmental dimension, and expenditure on them exacerbates emissions as 86 per cent of Ireland’s energy comes from fossil fuels (SEAI, 2023). These measures include a long-standing ‘fuel allowance’ scheme which is a winter months, means-tested measure to assist low-income households in receipt of social protection and those over 70 years with fuel costs. Another means-tested scheme (the household benefits scheme) operates throughout the year to assist older and disabled people with the cost of electricity and gas. Finally, a one-off payment for exceptional heating or electricity costs can be obtained via the means-tested additional needs payment scheme for those on low incomes or in receipt of social protection. Those with ‘medical heating needs’ in receipt of social welfare can obtain support for heating costs throughout the year. All these schemes operate through the Irish social protection system, which is heavily reliant on means testing. During the current energy crisis, a new universal measure (the electricity costs emergency benefit scheme) has been introduced whereby all households are given electricity credits via energy suppliers. In addition, two energy supplier obligations are in place. First, the Commission for the Regulation of Energy Utilities (CRU) operates a

universal moratorium on disconnections for vulnerable customers, defined on medical, age and disability grounds, from March to November each year. Second, companies cannot disconnect those who depend on electric equipment for health, independent living or age reasons. Customers must register for these schemes, and the CRU is trying to increase registrations. In addition, energy suppliers can sign up to a voluntary code whereby they refrain from disconnecting ‘engaging customers’ who are in arrears or at risk of disconnection. Finally, current policy responses include a reduction in value-added tax on electricity and home heating fuels, which exacerbates existing subsidies for burning fossil fuels, has a significant cost to state revenue in terms of taxes foregone and is regressive in its distributional outcomes. The gains are largest for lower-income households proportionally more affected by price increases, but most of the costs are due to higher-income groups who spend more on fuel (Barrett et al, 2022, p 23).

Ecological measures: Improving the energy efficiency of the Irish housing stock is essential given the late and limited introduction of energy regulations. The establishment of the national energy agency (SEAI) in 2002 resulted in the introduction of a range of schemes involving grants for homeowners covering partial costs of retrofitting. Similarly, there is a solar panel grant for owners of homes built before 2021 and a tax relief for owners wishing to renovate their homes. The latter has ended but claims for work completed can still be made. These schemes are all socially regressive as only wealthier households can afford them due to partial cost coverage, the requirement for up-front payment or grant paid up front, but there are inflationary impacts on costs due to delays in the work being conducted.

Eco-social measures: Local authorities have been energy retrofitting a portion of their housing stock over the years, which has benefited some of their tenants. They have also operated a long-standing housing aid scheme for low-income older homeowners, which could include insulation. In addition, the SEAI now operates full-cost schemes for low-income homeowners of dwellings built before 2006, at risk of EP and in receipt of certain social welfare supports. They also have a grant for private landlords who wish to introduce one or two energy improvements and a one-stop-shop grant for those wishing to apply for a group of measures. A home renovation tax relief for private landlords was introduced; this has now ended but claims can still be made. It is unclear what proportion of the work constituted ‘energy retrofitting’. A similar point can be made regarding i) a grant for refurbishing vacant or derelict private homes for private use or renting and ii) a local authority repair and lease scheme targeting owners of vacant dwellings with financial support for the work as long as the property is available for social renting. While these schemes increase the value of the homes for landlords who can afford them, they can benefit renters if the property remains in the rental sector. Community-level approaches are more efficient, and the

Table 14.4: Current ecological, social and eco-social policies to address energy poverty in Ireland

Eco	Social	Eco-social
• Energy retrofitting grants: homeowners • Solar panel grant: owners of pre-2021 homes • Better energy homes scheme: retrofitting grants for 1–2 items; homeowners; not full cost, payment after • One-stop shop energy upgrade grants: group of measures; homeowners; up-front partial payment (80%); inflation, pay more • Home renovation incentive: tax relief for homeowners (ended, but claims can still be made)	• Fuel allowance: means tested; for those receiving social welfare or aged more than 70 yrs; winter months • Household benefits: means-tested electricity/gas support for older/disabled people and carers; all year • Heating supplement: social welfare and medical heating needs (no fixed rate/duration) • Additional needs: means test, low income/social welfare; one-off exception for heating/electricity costs; no specified rate/time lag • CRU: universal moratorium on disconnections mid-Dec–mid-Jan; moratorium for vulnerable customers (medical, age, disability/health) Nov–March • Energy suppliers' voluntary code (7/12): will not disconnect engaging customers in arrears and at risk of disconnection • Energy suppliers and vulnerable customers: cannot disconnect if dependent on electric equipment on health/independent living/age grounds; self-register • Electricity costs emergency benefit scheme (universal) • Reduced VAT on fuel: socially regressive and negative environmental impact	• Housing aid for older people (means tested, homeowners, some insulation) • Local authority repair and lease: owners of vacant units, €80,000 per unit including furniture, social housing • Social housing retrofit: energy efficiency (insulation, heating system) • Warmer homes scheme: free energy upgrades for homeowners of pre-2006 homes at risk of EP and on particular social welfare benefits • Better energy homes scheme: retrofitting grants for 1–2 items; homeowners and private landlords; not full cost, payment after • One-stop shop; energy upgrade grants for group of measures; homeowners and private landlords; up-front payment but not 100% (80%); inflation, applicant pays more • Community energy grant scheme for rental properties • Better energy communities: community-level (% of homes at risk of EP) • Home renovation incentive: tax relief for landlords (ended, but claims can still be made) • Vacant property refurbishment grant: €50,000 for vacant homes; up to €70,000 for derelict ones; recipients must live in/rent property after refurbishment

SEAI has a scheme for rental properties and one for communities where a proportion of dwellings are at risk of EP. Finally, under the energy efficiency obligation scheme, energy suppliers can obtain credits if they assist owners at risk of EP with home improvements.

Conclusion

Denmark and Ireland have a long history of socially regressive ecological measures and ecologically regressive social welfare schemes. While ESPs are emerging in both countries, there is a need for more of the explicitly integrated ESPs as suggested by Mandelli (2022), including reactive eco-social protection policies, reactive eco-social investment policies, preventive eco-social protection policies and preventive eco-social investment policies. However, both countries would really benefit from more reactive eco-social investment policies, which could involve prioritising funding for area-based approaches to full-cost retrofitting of the homes of lower-income and vulnerable households. This would be an equitable solution while shortages of qualified labour and supplies exist. In both countries, more research is required to explore how to accelerate these and other kinds of ESPs.

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