



Funding Programme: ACRP 16th Call
Funding No.: FO999913152

D2.1 Concept for introducing the energy service level into Austrian policy making for vulnerable groups

Work package 2: Energy and climate policies: effects on vulnerable groups

Task 2.1: Energy service-based concept of energy poverty to harness energy efficiency potentials

Work package leader: ZSI
Delivery date: August 2026



Document sheet

Project acronym	ADJUST
Project full title	ADjusting policy measures to achieve a Just transition preventing ineqUalities and fostering Solidary parTicipation
Funding number	FO999913152

Deliverable number	D2.1
Deliverable title	Concept for introducing the energy service level into Austrian policy making for vulnerable groups
Lead	ZSI
Work package	2
Related task(s)	2.1
Delivery date	August 2026
Main author(s)	Richard Anar (ZSI)

Document History

Version	Date	Changes	Reviewer/Contributor
0.1	16.03.2026	Initial set up	ZSI
0.2	07.04.2026	Draft for internal review finalized	ZSI
0.3	03.08.2026	IIASA review complete (Miguel Sanchez Romero)	IIASA
Final version (1.0)	20.08.2026		ZSI

Disclaimer of warranties

This document is part of the deliverables from the project ADJUST, which has received funding from the Austrian Climate & Energy Fund within the Austrian Climate Research Programme (ACRP) 16th call.

This document has been prepared by ZSI accepted under the review of all ADJUST project partners as an account of work carried out within the framework of the project.

Neither Project Coordinator, nor any signatory party of the ADJUST Project Consortium Agreement, nor any person acting on behalf of any of them:

- makes any warranty or representation whatsoever, expressed or implied,
- with respect to the use of any information, apparatus, method, process, or similar item disclosed in this document, including merchantability and fitness for a particular purpose, or
- that such use does not infringe on or interfere with privately owned rights, including any party's intellectual property, or
- that this document is suitable to any particular user's circumstance; or
- assumes responsibility for any damages or other liability whatsoever (including any consequential damages, even if the Project Coordinator or any representative of a signatory party of the ADJUST Project Consortium Agreement has been informed of the possibility of such damages) resulting from your selection or use of this document or any information, apparatus, method, process, or similar item disclosed in this document.

The opinions expressed in this document reflect only the authors' view and reflect in no way the Austrian Climate and Energy Fund's nor the Austrian Research Promotion Agency (FFG). Neither the Austrian Climate and Energy Fund nor the Austrian Research Promotion Agency (FFG) are responsible for any use that may be made of the information it contains.

Abbreviations, Units & Chemical formulas

ACRP	Austrian Climate Research Programme
AK	Arbeiterkammer (Chamber of Labour)
BMSGPK	Federal Ministry of Social Affairs, Health, Care and Consumer Protection
DEV	Double energy vulnerability
EED	Energy Efficiency Directive (Directive (EU) 2023/1791)
EI-JKU	Energieinstitut an der Johannes Kepler Universität Linz
EIWG	Elektrizitätswirtschaftsgesetz (Electricity Industry Act)
EnDG	Energiearmuts-Definitions-Gesetz (Energy Poverty Definition Act)
EPAH	Energy Poverty Advisory Hub
EPBD	Energy Performance of Buildings Directive (Directive (EU) 2024/1275)
EU-SILC	EU Statistics on Income and Living Conditions
IEA	International Energy Agency
IIASA	International Institute for Applied Systems Analysis
kea	Koordinierungsstelle zur Bekämpfung von Energiearmut
LILEE	Low Income Low Energy Efficiency (England)
MBIE	Ministry of Business, Innovation and Employment (New Zealand)
NECP	National Energy and Climate Plan
ONPE	Observatoire National de la Précarité Énergétique (France)
PV	Photovoltaics
RECS	Residential Energy Consumption Survey (United States)
SCF	Social Climate Fund (Regulation (EU) 2023/955)
WP	Work package
ZSI	Zentrum für Soziale Innovation (Centre for Social Innovation)

Table of content

1 Introduction.....	6
2 Conceptual background: from fuels and technologies to energy services	7
2.1 Why energy services.....	7
2.2 Four adjacent concepts	8
2.3 Energy services as the common denominator.....	9
3 Method.....	10
4 Energy services in definitions of energy poverty across Europe and the OECD	11
4.1 European Union	11
4.2 United Kingdom.....	12
4.3 France	13
4.4 Spain	13
4.5 Ireland.....	14
4.6 Germany	14
4.7 OECD comparators outside the EU	14
4.8 Synthesis: which services appear where.....	15
5 The Austrian situation.....	16
5.1 Legal and institutional framework.....	16
5.2 Measurement and prevalence	17
5.3 Affected groups and structural patterns.....	17
5.4 The policy environment read through the service lens	18
5.5 Interim conclusions for the concept.....	19
6 A systematic and assessed list of energy services.....	19
6.1 Space heating	20
6.2 Space cooling.....	20
6.3 Hot water.....	21
6.4 Cooking.....	21
6.5 Lighting	21
6.6 Refrigeration and food storage.....	21

6.7 Operation of household appliances	22
6.8 Digital connectivity	22
6.9 Mobility and transport demand	22
6.10 Assessment overview	23
7 A concept for introducing the energy service level into Austrian policy making	23
8 Conclusions	25
References	26

1 Introduction

Climate and energy policy in Austria is entering a phase in which the composition of household energy supply will change deliberately and rapidly: fossil heating systems are to be phased out by 2040, network tariffs are being redesigned, carbon pricing is set to continue under the EU ETS 2, and the instruments that cushioned households through the 2021 to 2022 price crisis have largely expired. For vulnerable households, the question is not which fuels they can afford but whether they can secure the services that energy provides: a warm dwelling in winter, a tolerable one in summer, hot water, cooked food, light, cold storage, working appliances, and the ability to reach work, education and care. Policies that are formulated at the level of fuels and technologies can miss this point in both directions, by subsidising carriers that are being phased out and by leaving service deprivation unaddressed that are not captured by expenditure data.

This deliverable responds to Task 2.1 of the ADJUST project. Its purpose is to develop a concept for introducing the energy service level into Austrian policy making for vulnerable groups, including a systematic and assessed list of energy services suitable for inclusion in a revised definitional and monitoring framework. It contributes to the work package objective of providing insights on the effects of climate policies on vulnerable groups (RO#1 to RO#3) and complements the parallel analyses of the Austrian carbon pricing and refund system and of future network tariffs under PV expansion and the gas phase-out.¹

The deliverable proceeds as follows. Section 2 develops the conceptual background, relating the energy service perspective to the four concepts under which the phenomenon is discussed internationally. Section 3 describes the method, combining a snowballing review of peer-reviewed literature, a structured review of grey literature, and stakeholder input from the first ADJUST workshop. Section 4 reviews how representative European and OECD countries define energy poverty and which services their definitions name or

¹ ADJUST Deliverables D2.2 and D2.3 (EI-JKU, 2026).

imply. Section 5 analyses the Austrian situation, including the Energiearmuts-Definitions-Gesetz of 2025, the new composite indicator, and the support environment. Section 6 presents the systematic and assessed list of energy services. Section 7 formulates the concept for Austrian policy making, and Section 8 concludes.

2 Conceptual background: from fuels and technologies to energy services

2.1 Why energy services

Households do not demand energy for its own sake. They demand warm rooms in winter, tolerable indoor temperatures in summer, hot water, cooked meals, light after dark, cold storage for food, functioning appliances, and the ability to reach workplaces, schools, shops and medical care. Energy carriers and conversion technologies are means to these ends, and the same end can typically be reached through several combinations of carrier, technology and building fabric. A warm living room can be produced by a gas boiler in an uninsulated building, a heat pump in a renovated one, or district heating in a dense urban block, at very different costs, emission levels and levels of exposure to price shocks. This distinction between energy and the services it provides has a long history in energy economics and social research, but it acquired its central place in the energy poverty debate through the capabilities framework developed by Day, Walker and Simcock (2016). Drawing on Sen and Nussbaum, they define energy poverty as an inability to realise essential capabilities as a direct or indirect result of insufficient access to affordable, reliable and safe energy services, considering available reasonable alternative means of realising those capabilities. Two features of this definition matter for the present deliverable. First, it locates deprivation at the level of services and the capabilities they support, not at the level of kilowatt hours or specific fuels. Second, it opens the space of policy responses beyond income support and price subsidies: if the object of concern is the service, then efficiency improvements, technology substitution and changes to the built environment are equally legitimate, and often more durable, remedies.

The service perspective has practical consequences under decarbonisation. Climate policy deliberately changes the relative prices and availability of energy carriers, through carbon pricing, the phase-out of fossil heating systems, or the redesign of network tariffs. A definition of energy poverty that is anchored in a specific carrier, for instance affordability of heating oil or gas, becomes progressively less meaningful as those carriers are withdrawn, and it risks steering support toward the preservation of fossil consumption rather than toward secure access to the underlying service. A service-based definition remains stable across the transition: the policy objective is that households can keep their homes adequately warm, not that they can afford a particular fuel. This is the sense in which Task 2.1 seeks to "disentangle" energy services from fuels and technologies.

The workshop with Austrian stakeholders in September 2025 pointed to a further, more practical reason for the service perspective. Practitioners from social organisations reported that energy is rarely the category in which affected households themselves think about their situation. Households experience cold rooms, broken appliances, the fear of the next bill, or the impossibility of reaching a job without a car. A framework that starts from these concrete services is closer to the lived situation of vulnerable households than one that starts from expenditure ratios, and it lends itself more directly to the design of support that practitioners can actually deliver.

2.2 Four adjacent concepts

The task description names four concepts under which the phenomenon is discussed internationally: energy poverty, energy insecurity, energy inequality and energy affordability. These are not competing labels for the same idea. Each carries its own analytical emphasis, its own implicit set of relevant energy services, and its own measurement tradition.

Energy poverty is the dominant term in European research and policy. It descends from the British fuel poverty tradition, in which Boardman (1991) proposed the influential threshold of ten percent of income spent on required fuel costs. The concept has since broadened considerably. Bouzarovski and Petrova (2015) reframed it as energy vulnerability, a dynamic condition produced by the interaction of prices, incomes, dwelling efficiency, tenure and household needs, rather than a fixed attribute of a household. The measurement literature distinguishes expenditure-based indicators, which compare actual or required energy costs to income, from consensual or self-reported indicators such as the EU-SILC item on the inability to keep the home adequately warm (for a systematic review of indicators see Siksnyte-Butkiene, 2021). A well-documented weakness of expenditure-based indicators is hidden energy poverty: households that ration heating below comfort and health thresholds report low expenditures and therefore disappear from the statistics. Eisfeld and Seebauer (2022) demonstrate this mechanism empirically for Austria, showing that a substantial share of deprived households self-restrict their heating and would be missed by conventional classifications. The relevance for a service-based concept is direct: rationing is visible at the service level (cold rooms, unheated bedrooms, forgone hot water) even where it is invisible at the expenditure level.

Energy insecurity is the leading concept in the United States. Hernández (2013, 2016) defines it as the inability to adequately meet basic household energy needs and distinguishes three dimensions: an economic dimension (energy burdens and arrears), a physical dimension (housing quality and appliance condition), and a behavioural dimension (coping strategies such as underconsumption, foregoing food or medicine to pay energy bills, or the use of risky substitutes such as ovens for heating). The concept is closely tied to health outcomes and to disconnection risk, and it is operationalised in the

Residential Energy Consumption Survey (RECS) through five service-level outcome items: reducing or forgoing food or medicine to pay energy costs, keeping the home at a temperature the respondents felt was unhealthy or unsafe, receiving a disconnection or delivery stop notice, and being unable for cost reasons to use heating or air conditioning equipment (EIA, 2026). For the present deliverable, energy insecurity is instructive because its behavioural dimension captures precisely the coping practices that Austrian practitioners described in the project workshop, and because its indicators are formulated as service outcomes rather than expenditure ratios.

Energy inequality shifts attention from a deprivation threshold to the distribution of energy use, expenditure and emissions across the population. For Austria, Theine, Humer, Moser and Schnetzer (2022) document pronounced disparities in income, expenditure and carbon footprints, and the parallel ADJUST work in Tasks 2.2 and 2.3 shows how carbon pricing and network tariff design redistribute burdens across household types. The inequality lens matters for a service-based concept because it draws attention to horizontal differences: households with similar incomes can face very different service costs depending on dwelling, heating system, location and mobility needs, a point developed empirically in the parallel ADJUST analysis of the Austrian carbon tax.²

Energy affordability is the framing most common in the work of international organisations and regulators. It concentrates on the relation between energy prices and household budgets and typically motivates instruments such as social tariffs, price caps and direct payments. The IEA's 2026 Energy Policy Review of Austria treats affordability as a central and persistent concern after the energy crisis. It documents that the temporary crisis instruments, including electricity price caps and reduced levies, expired by the end of 2024, that the Klimabonus was cancelled in 2025, and that the EIWG adopted in December 2025 introduced a capped social electricity tariff for low-income households in their place (IEA, 2026). The affordability lens is the narrowest of the four with respect to energy services, since it usually takes the household's service demand as given and asks only whether the resulting bill is payable. Its strength is administrative tractability, which explains its prominence in regulatory practice, including the Austrian social tariff debate informed by WIFO (2026).

2.3 Energy services as the common denominator

Despite their different emphases, all four concepts converge on the same underlying object once their definitions are read closely: a set of household energy services whose adequate provision is treated as necessary for a decent standard of living and health. The convergence has recently become explicit in law. The recast Energy Efficiency Directive

² See ADJUST Deliverable D2.2, Working paper on the evaluation of the Austrian CO₂ tax and refund scheme (EI-JKU, 2026), which finds that more than 90 percent of the dispersion in carbon tax incidence occurs within rather than between income deciles.

contains the first EU-wide legal definition of energy poverty and defines it as a household's lack of access to essential energy services that provide basic levels and decent standards of living and health, "including adequate heating, hot water, cooling, lighting, and energy to power appliances" (Directive (EU) 2023/1791, Art. 2(52)). The Austrian legislator followed the same logic in December 2025: § 4 of the Energiearmuts-Definitions-Gesetz (EnDG, BGBl. I Nr. 91/2025) defines energy poor households by reference to expenditure for household energy for "Strom, Heizung, Warmwasser, Kälte, Kochen, Beleuchtung, Betrieb von Haushaltsgeräten", that is, by enumerating services rather than fuels.

Three boundary questions remain contested in the literature and in policy, and they structure the assessment in Section 6. The first concerns space cooling. Cooling appears in the EU legal definition and in the EnDG, but its systematic measurement is recent. Eurostat data show that in 2023 roughly a quarter of European households could not keep their dwelling comfortably cool in summer, with substantially higher shares in the lowest income quintile (JRC, 2026), and the Energy Poverty Advisory Hub now recommends regular collection of summer-related indicators (EPAH, 2026a). The second concerns mobility. Domestic definitions of energy poverty exclude transport, yet the EU has created a parallel legal concept of transport poverty in the Social Climate Fund Regulation (Regulation (EU) 2023/955), and a substantial literature shows that domestic and transport energy deprivation overlap in identifiable population groups and places, a condition described as double energy vulnerability (Robinson and Mattioli, 2020; Simcock et al., 2021; Martiskainen et al., 2023). The third concerns digital connectivity, which is increasingly a precondition for access to work, education and public services, but which appears in almost no official definition. Section 6 treats these three as candidate services whose inclusion has to be argued rather than assumed.

3 Method

The deliverable rests on four sources of evidence: peer-reviewed literature, grey literature from governments, international organisations and civil society, and structured stakeholder input from the ADJUST participation process.

Peer-reviewed literature was identified through snowballing (Wohlin, 2014), as specified in the project description for WP2. A seed set of publications was compiled from the conceptual core of the field (Day, Walker and Simcock, 2016; Bouzarovski and Petrova, 2015; Hernández, 2016) and from recent Austrian empirical work (Eisfeld and Seebauer, 2022; Müller et al., 2024). Backward snowballing followed the reference lists of the seed set; forward snowballing traced citations of the seed publications in Scopus and Google Scholar. Publications from before 2020 were retained only where they are foundational for the conceptual argument. The search was conducted between April 2025 and July 2026.

Grey literature was collected from four channels: 1) Austrian federal sources, in particular the Koordinierungsstelle zur Bekämpfung von Energiearmut (kea), Statistik Austria, E-Control, the BMSGPK and the Rechnungshof; 2) EU sources, in particular the legal acts of the Fit for 55 package, the Commission Recommendations on energy poverty of 2020 and 2023 and the publications of the Energy Poverty Advisory Hub; 3) international organisations, in particular the IEA and the OECD; and 4) civil society organisations active in the Austrian debate, in particular Volkshilfe, Caritas, the Armutskonferenz, Global 2000 and the Momentum Institut. The kea reading list and publication series were used as an entry point into the Austrian grey literature and complemented by targeted searches. Stakeholder input stems from the first ADJUST stakeholder workshop, held in hybrid format at ZSI on 18 September 2025 with participants from social organisations, the kea and other practice actors. The discussion produced a set of recurring themes that inform the assessment criteria in Section 6: policy recommendations should be tested for practicability before publication; implementation gaps between measure design and take-up deserve explicit attention; barriers are financial (subsidies rarely cover full costs, pre-financing is often required), informational and administrative; households under economic pressure do not necessarily frame their situation in energy terms; agency and self-efficacy of affected households should be strengthened rather than bypassed; measures should address the household situation as a whole rather than isolated single interventions; and intersecting disadvantages need to be reflected in any classification of vulnerable groups. These themes are treated as assessment dimensions throughout Sections 5 to 7 rather than as a separate section, so that the practice perspective shapes the analysis instead of being appended to it.

4 Energy services in definitions of energy poverty across Europe and the OECD

This section reviews how representative European and OECD countries define energy poverty and related concepts, with a specific focus on which energy services each definition names or implies, and on the degree to which the definition is tied to particular fuels or technologies. The selection covers the EU level, the United Kingdom as the origin of the fuel poverty tradition, France, Spain, Ireland and Germany as contrasting member state approaches, and the United States, Australia and New Zealand as OECD comparators outside the EU. Austria is treated separately in Section 5.

4.1 European Union

The EU framework developed from soft guidance into binding law within a few years. The Governance Regulation (Regulation (EU) 2018/1999) obliged member states to assess the

number of households in energy poverty in their National Energy and Climate Plans and to set reduction objectives where the number is significant. The Commission Recommendation of 2020 (Recommendation (EU) 2020/1563, with SWD(2020) 960) proposed a portfolio of indicators without a binding definition. The recast Energy Efficiency Directive then introduced the legal definition cited in Section 2.3, which enumerates heating, hot water, cooling, lighting and energy to power appliances, and which attributes energy poverty to a combination of non-affordability, insufficient income, high energy expenditure and poor energy efficiency (Directive (EU) 2023/1791, Art. 2(52)). The 2023 Recommendation on energy poverty (Recommendation (EU) 2023/2407, with SWD(2023) 647) operationalises this definition, distinguishes energy poverty from the wider concept of vulnerable customers, and directs member states toward structural measures, above all energy efficiency and renovation, in preference to income support alone.

Two further instruments extend the service scope beyond the dwelling. The Social Climate Fund Regulation defines transport poverty as a distinct condition alongside energy poverty and requires member states to address both in their Social Climate Plans (Regulation (EU) 2023/955). The recast Energy Performance of Buildings Directive links renovation obligations and financing to energy poor and vulnerable households (Directive (EU) 2024/1275). On the measurement side, the Energy Poverty Advisory Hub has begun to expand the indicator set beyond winter heating, recommending regular collection of indicators on summer cooling, recent efficiency measures and mobility, drawing on EU-SILC, EUROMOMO and Copernicus data (EPAH, 2026a), and has published a harmonised assessment of regional vulnerability that identifies several Austrian NUTS 3 regions as particularly exposed (EPAH, 2026b).

The EU trajectory is therefore one of progressive service enumeration: from an undefined concept, to a five-service legal definition for the dwelling, to a parallel legal concept for mobility, with cooling moving from the margins of the discussion into the binding definition.

4.2 United Kingdom

The United Kingdom is the origin of the concept and remains instructive because its constituent nations now operate different definitions. The original ten percent expenditure threshold (Boardman, 1991) was replaced in England by the Low Income High Costs indicator following the Hills review and, with the 2021 Fuel Poverty Strategy, by the Low Income Low Energy Efficiency (LILEE) indicator: a household is fuel poor if it lives in a dwelling with a Fuel Poverty Energy Efficiency Rating of band D or below and its disposable income after housing and modelled energy costs falls below the poverty line (DESNZ, 2025). The modelled energy requirement is itself a service enumeration, defined as the energy needed for a warm, well-lit home, hot water for everyday use and the running of appliances (DESNZ, 2025). Scotland retains an expenditure-based approach

under the Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019, combining required fuel costs above ten percent of net income after housing costs with insufficient remaining income for an acceptable standard of living; the underlying adequate warmth standard in the UK definitions specifies 21 degrees in the main living room and 18 degrees in other occupied rooms during the daytime (House of Commons Library, 2025). Two features are relevant here. First, the English definition ties energy poverty directly to the energy efficiency of the dwelling, which makes the building fabric, and therefore the service delivery infrastructure, part of the definition itself. Second, all UK definitions model required rather than actual expenditure, which addresses hidden energy poverty by construction: a household that rations heating is assessed on what adequate heating would cost, not on what it actually spends. The service scope is heating-centred, with other domestic services entering implicitly through modelled total energy requirements.

4.3 France

France anchored *précarité énergétique* in law early. The loi Grenelle II of 12 July 2010 (Loi n° 2010-788) defines a person as being in energy precarity if they encounter, in their dwelling, particular difficulties in obtaining the supply of energy necessary to satisfy their elementary needs, owing to the inadequacy of their resources or their housing conditions (ONPE, 2026). The definition is notable for its breadth: it names elementary needs rather than a service list, it includes housing conditions as a cause on equal footing with income, and it is confined to the dwelling. The Observatoire National de la Précarité Énergétique, established in 2011, operationalises it through a basket of indicators, principally an energy effort rate combining energy expenditure above eight percent of income with membership of the lowest three income deciles, complemented by self-reported cold; on this main indicator, around 3.1 million households, roughly ten percent, were in energy precarity in 2023 (ONPE, 2026). The ONPE partners have additionally adopted a working definition of summer energy precarity, the inability to keep the dwelling at an adequate temperature during the hottest months (ONPE, 2026), which places France among the countries extending the concept to cooling. The main policy instrument, the *chèque énergie*, is a means-tested payment usable for energy bills and certain renovation expenses, which keeps the instrument carrier-neutral within the dwelling.

4.4 Spain

Spain adopted its National Strategy against Energy Poverty 2019-2024 following the mandate in Royal Decree-Law 15/2018. The strategy establishes the first official Spanish definition, a situation in which a household cannot satisfy its basic energy supply needs as a consequence of insufficient income, possibly aggravated by an energy-inefficient dwelling, and adopts the four primary indicators of the former EU Energy Poverty Observatory: disproportionate energy expenditure above twice the national median share, hidden energy poverty measured as absolute energy expenditure below half the national

median, the inability to keep the dwelling at an adequate temperature, and arrears on utility bills, each with annual updating and quantified reduction targets for 2025 (Gobierno de España, 2019). A successor strategy for 2026 to 2030 has since been presented, framed to cover energy and transport-related vulnerability (IDAE, 2026). Spain is also among the member states where summer energy poverty has been most clearly recognised in research and increasingly in policy, given the health consequences of overheating in the Mediterranean building stock (Torrego-Gómez et al., 2024). The Spanish case illustrates the measurement response to rationing behaviour through the hidden energy poverty indicator, and comparative work on the Portuguese and Spanish definitions explicitly recommends broadening the representativeness of energy services in national definitions (Utilities Policy, 2024).

4.5 Ireland

Ireland works with an expenditure-based understanding, with the ten percent share of disposable income spent on energy as the principal indicator, and framed its response in the Energy Poverty Action Plan launched in December 2022 (SEAI, n.d.; Oireachtas Library and Research Service, 2022). Irish institutions themselves note the weakness of this indicator with respect to households that ration consumption below the threshold, and estimates of prevalence vary widely with the measurement approach, from 17.5 percent (ESRI, 2020 estimate) to about 29 percent during the price crisis. The Irish case is included because its policy mix leans heavily on deep retrofit programmes targeted at low-income and social housing, which is a service-level response: the intervention changes the cost of producing warmth rather than subsidising a fuel.

4.6 Germany

Germany has no official definition of energy poverty and has historically treated the issue within general social policy, with energy costs covered in principle through basic income support. The German debate is nevertheless productive for the Austrian context in two respects. First, civil society practice developed service-level instruments early, most prominently the Stromspar-Check of the Caritas association, which combines in-home advice, immediate efficiency measures and appliance replacement for low-income households, and which has been adapted in Austria (Caritas Vorarlberg's Stromspar-Check, the VERBUND Stromhilfefonds operated with Caritas, and the Grätzeleltern outreach model in Vienna). Second, recent German studies address the social design of the heat transition in ways directly transferable to Austria, including income-graduated renovation subsidies and the treatment of tenants in the rental stock (Agora Energiewende, 2025; Öko-Institut, 2024; Zukunft KlimaSozial, 2025).

4.7 OECD comparators outside the EU

In the United States, energy insecurity as defined by Hernández (2013, 2016) structures both research and federal statistics. The Residential Energy Consumption Survey measures household energy insecurity through the five service-outcome items listed in Section 2.2; on the preliminary 2024 data, around a third of United States households reported at least one of them, up from 27 percent in 2020 (EIA, 2026). The principal federal instrument, LIHEAP, remains a bill-payment support, but the weatherisation assistance programme operates at the service level through efficiency retrofits. The US case demonstrates a measurement tradition built almost entirely on service outcomes and coping behaviour rather than expenditure ratios.

In Australia, the debate is conducted under the headings of energy stress and affordability and has recently been reframed by electrification. A 2026 report by Energy Consumers Australia argues that household electrification lowers costs in aggregate. However, risks widening inequities without sequencing that prioritises social and rental housing, and it recommends explicit gas phase-out plans including the treatment of gas network charges (Energy Consumers Australia, 2026). The parallels to the Austrian discussion of the gas heating phase-out and the allocation of residual network costs are close.³

New Zealand works with the concept of energy hardship. The definition released by the Ministry of Business, Innovation and Employment in June 2022 states that energy hardship is when individuals, households and whānau are not able to obtain and afford adequate energy services to support their wellbeing in their home or kāinga, with energy wellbeing as the positive counterpart; a supporting framework and an initial set of five monitoring measures were published in 2023, with reporting updated most recently in December 2025 (MBIE, 2022; MBIE, 2025). New Zealand is included because its framework was designed service-first and wellbeing-anchored from the outset rather than retrofitted from an expenditure tradition, and because the definition was developed through structured consultation including Māori communities, an example of the participatory development the ADJUST workshop participants called for.

4.8 Synthesis: which services appear where

Read across countries, the definitions differ less in their underlying concern than in how explicitly they enumerate services and how far the enumeration reaches. Space heating is universal. Hot water, lighting, cooking, refrigeration and appliance use appear wherever definitions enumerate services at all, including the EU legal definition and the Austrian EnDG. Space cooling has moved into binding EU law and the Austrian definition and

³ The Austrian side of this question is analysed in ADJUST Deliverable D2.3, Working paper on the repercussions of promoting renewable energy on vulnerable groups (EI-JKU, 2026), which examines cost shifting to non-PV households under alternative network tariff designs and discusses the gas network phase-out.

working definitions of summer energy precarity now exist in France and Spain, but systematic measurement remains the exception. Mobility is excluded from every domestic definition but has acquired a parallel legal concept of its own at EU level, and the empirical overlap between domestic and transport energy deprivation is well established. Digital connectivity appears in the academic capabilities literature but in no official definition reviewed here. A tabular synthesis is provided in Table 1.

Table 1: Energy services in definitions of energy poverty across selected jurisdictions

Service	EU (EED Art. 2(52))	Austria (EnDG § 4)	UK	France	Spain	US (RECS)	Status
Space heating	explicit	explicit	central	implicit (elementary needs)	explicit	explicit	core service
Space cooling	explicit	explicit ("Kälte")	absent	emerging (ONPE summer definition)	emerging	explicit (incl. AC item)	core service, measurement gap
Hot water	explicit	explicit	modelled	implicit	implicit	implicit	core service
Cooking	absent	explicit	modelled	implicit	implicit	implicit	core service
Lighting	explicit	explicit	modelled	implicit	implicit	implicit	core service
Refrigeration / appliances	explicit (appliances)	explicit	modelled	implicit	implicit	explicit (appliance condition)	core service
Mobility / transport	separate (SCF)	absent	absent	absent	absent	absent	candidate service
Digital connectivity	absent	absent	absent	absent	absent	absent	candidate service

Two observations carry forward into the Austrian analysis. First, the Austrian EnDG enumerates individual energy services in its legal definition, which provides a direct point of connection for the concept developed in this deliverable. Second, the gaps are consistent across countries: cooling is defined but not measured, mobility is measured in a separate silo, and the informational and administrative dimensions of access, which practitioners identify as decisive, appear in no definition at all. These gaps define the agenda for Sections 5 to 7.

5 The Austrian situation

5.1 Legal and institutional framework

Austria moved from an implicit to an explicit legal treatment of energy poverty within a short period. The Koordinierungsstelle zur Bekämpfung von Energiearmut (kea) was established in 2023 under the revised Energy Efficiency Act as the national coordination body, with an annual budget of one million euros (IEA, 2026). In December 2025, the Energiearmuts-Definitions-Gesetz (EnDG, BGBl. I Nr. 91/2025) entered into force as part of the legislative package adopted together with the Elektrizitätswirtschaftsgesetz (EIWG). Its § 4 provides the first Austrian legal definition: energy poor are those households that

cannot, or can only insufficiently, raise the means for household energy expenditure for a basic and adequate standard of living and health, with household energy specified as electricity, heating, hot water, cooling, cooking, lighting and the operation of household appliances. § 5 lists the objective and subjective indicators for statistical monitoring and anchors the composite indicator described in Section 5.2. The definition serves two stated purposes, statistical observation and the identification of target groups for support measures, and it is referenced by the ElWG, which ties instruments such as the social electricity tariff to it.

Institutionally, the framework therefore now combines a service-enumerating legal definition, a designated coordination body, a statistical monitoring mandate assigned to Statistik Austria, and sectoral consumer protection instruments in electricity law. Earlier building blocks include the indicator work of E-Control since 2013 and the 2018 definitional study commissioned by the BMSGPK, which had proposed combining social and energy sector perspectives well before the legislative step.

5.2 Measurement and prevalence

The composite indicator developed by Statistik Austria together with the kea in 2025 classifies a household as energy poor if at least one of four conditions holds: above-average equivalised energy costs combined with low income; the self-reported inability to keep the home adequately warm; arrears on energy bills; or at-risk-of-poverty status combined with poor housing conditions such as a leaking roof (Statistik Austria, 2026a). On the most recent EU-SILC data of 2025, around 13.0 percent of Austrian households are affected, corresponding to roughly 544,800 households and 1.07 million persons (kea, 2026); the previous wave for 2024 yielded 12.5 percent and about 517,000 households (Statistik Austria, 2026b).

Two methodological points deserve emphasis. First, the choice of indicator changes the picture substantially. The single EU-SILC item on the inability to keep the home adequately warm stood at approximately four percent of the population in 2024 (IEA, 2026), roughly a third of the composite figure, which illustrates how strongly a heating-only, self-report measure understates the phenomenon that the composite indicator is designed to capture. Second, the composite indicator remains exposed to the hidden energy poverty problem identified by Einfeld and Seebauer (2022): in the quarterly surveys of Statistik Austria, 28.5 percent of households stated that they could afford the energy they needed in the previous quarter only because they had reduced their consumption (kea, 2026). Rationing on this scale is visible at the service level but only partially reflected in expenditure and arrears data.

5.3 Affected groups and structural patterns

The 2026 study by Statistik Austria for the Arbeiterkammer Wien profiles the affected population against the 12.5 percent average of the 2024 wave (Statistik Austria, 2026b).

Prevalence is far above average among households at risk of poverty (47.2 percent), working poor households (45 percent), households with no or almost no labour market participation (42.8 percent), the lowest income quintile (34.1 percent) and households with at most compulsory education (33.4 percent). Housing and heating characteristics matter independently of income: buildings constructed before 1960 (20.6 percent), dwellings of up to 80 square metres (18 percent), rented dwellings (17.9 percent), and households heating with single-room heating systems (26.1 percent), district heating (15.8 percent) or apartment-level central heating (14.3 percent) all show elevated prevalence. The spatial pattern is notable for the urban and rural differentiation required by Task 2.1. In Austria, energy poverty as measured by the composite indicator is predominantly an urban phenomenon: prevalence is highest in Vienna (19.2 percent) and in densely populated areas (17.1 percent), where multi-storey rental housing, older building stock and district heating or gas heating coincide. This inverts the spatial pattern familiar from the transport poverty literature, in which rural and peripheral locations carry the higher risk (Simcock et al., 2021), and it suggests that domestic energy deprivation and mobility-related deprivation in Austria are concentrated in different places and partly different populations. The EPAH regional vulnerability assessment is consistent with a mixed picture, identifying Vienna at NUTS 2 level alongside a set of predominantly industrial and rural NUTS 3 regions (EPAH, 2026b). Heat exposure adds a further urban dimension: in 2023, around 46 percent of persons in Austria reported physical strain from heat, with clearly higher shares among persons at risk of poverty, tenants and residents of Vienna and densely built areas (Statistik Austria, 2025).

5.4 The policy environment read through the service lens

The support environment changed markedly between 2022 and 2026. The temporary crisis instruments, including the electricity price cap and reduced energy levies, expired at the end of 2024, and the Klimabonus was cancelled in 2025 for budgetary reasons.⁴ In their place, the EIWG introduced a social electricity tariff of 6 cents per kilowatt hour for the first 2,900 kilowatt hours of annual consumption, with additional allowances for larger households, covering around 284,000 low-income households, financed through a cost-sharing scheme among suppliers (IEA, 2026). Low-income households remain exempt from the renewable energy support charge. On the heating side, the funding scheme Sauber Heizen für Alle covers up to 100 percent of the cost of replacing fossil heating systems for low-income households, with one billion euros allocated for 2023 to 2030, while the general Renovation Campaign was scaled back for 2026 to 2030, with the maximum funding rate reduced to 30 percent (IEA, 2026).

⁴ The distributional performance of the carbon price and Klimabonus combination is assessed in ADJUST Deliverable D2.2 (EI-JKU, 2026). Following the cancellation of the Klimabonus, no designated use of the national carbon pricing revenues has been announced as of the IEA review (IEA, 2026).

Read through the service lens and against the workshop findings, three features of this environment stand out. First, access barriers of the kind practitioners described are documented at the international level: the IEA review states that most low-income families cannot access the available renovation and heating subsidies because support is paid ex post and requires upfront payment, and that many are ineligible because they do not own their homes (IEA, 2026). Support that is generous on paper therefore does not necessarily reach the households whose service situation it is meant to improve, which is the implementation gap the workshop participants termed the trickle-down problem. Second, the instruments are unevenly distributed across services. Electricity as a service carrier is now addressed through the social tariff; space heating through replacement subsidies; but space cooling, although part of the legal definition, has no dedicated support instrument, and district heating, whose customers are overrepresented among energy poor households, is subject to comparatively weak regulatory oversight regarding prices, billing transparency and dispute resolution (IEA, 2026). Third, mobility sits outside the framework entirely. The Klimaticket lowered the cost of public transport where it is available, but electric vehicle purchase support ended early for budgetary reasons and regional disparities in charging infrastructure persist (IEA, 2026), so that rural households dependent on car travel face a service risk that no energy poverty instrument currently addresses.⁵

5.5 Interim conclusions for the concept

The Austrian situation can be summarised in three points that structure Sections 6 and 7. The legal definition already operates at the service level, so the task of the concept is not to argue for a service perspective in principle but to assess the enumerated services systematically and to examine the treatment of the services the definition omits or leaves unmeasured. The measurement framework captures heating-related deprivation reasonably well but cooling, rationing behaviour and mobility only partially or not at all. And the support instruments show a pattern in which the binding constraint is frequently not the existence of funding but its accessibility for tenants, for households without liquidity for pre-financing, and for households outside the information channels through which support is communicated.

⁵ Rising network charges add a further service-level pressure: according to E-Control figures cited by the IEA, grid fees accounted for nearly half of the final retail tariff of an average household in January 2026 (IEA, 2026). The distributional consequences of alternative network tariff designs are analysed in ADJUST Deliverable D2.3 (EI-JKU, 2026).

6 A systematic and assessed list of energy services

This section presents the core output of the deliverable: a list of household energy services, each assessed against five criteria that emerged from the literature review and the stakeholder process. The criteria are: relevance for vulnerable groups; access barriers, differentiated into financial, informational and administrative barriers as identified in the ADJUST workshop and confirmed by the IEA review; energy efficiency potential; urban and rural differentiation; and separability from specific fuels and technologies. The first seven services correspond to the enumeration in § 4 EnDG; the final two are candidate services whose inclusion in monitoring is argued rather than assumed. Electricity is treated throughout as a carrier for several services rather than as a service of its own, in line with the conceptual framework of Section 2.

6.1 Space heating

Space heating remains the reference case of energy poverty and is Austria's largest single energy end use, at roughly 240 petajoules (IEA, 2026). Its relevance for vulnerable groups is documented across the health literature and visible in the Austrian data: households in pre-1960 buildings and those with single-room heating show clearly elevated energy poverty prevalence (Statistik Austria, 2026b). The efficiency potential is the largest of any service, through building fabric, heating system replacement and hydraulic optimisation, but it is locked behind the most severe access barriers: renovation and replacement decisions rest with owners, not tenants, subsidies are largely paid ex post and require pre-financing, and the application processes assume administrative capacity that hard-pressed households often lack (IEA, 2026; workshop findings, Section 3). The urban and rural profiles differ by carrier rather than by need, with gas and district heating dominating urban stock and oil, wood and increasingly heat pumps the rural stock. Separability from fuels is high in principle, which is precisely why the fossil heating phase-out is feasible, but the transition itself creates service risk for households locked into the roughly 850,000 gas and 450,000 oil boilers still in operation (IEA, 2026), and for district heating customers exposed to weakly regulated prices.

6.2 Space cooling

Cooling is the service whose status has changed most. It is part of the EU legal definition and § 4 EnDG, and the Austrian heat exposure data show a clear social gradient, with persons at risk of poverty, tenants and residents of Vienna and densely built areas reporting the highest burden (Statistik Austria, 2025). Vulnerability is concentrated where overheating exposure, inability to invest in the dwelling and health sensitivity coincide, predominantly in urban rental housing, which makes cooling the most urban of the services. The efficiency potential lies primarily in passive measures, external shading, ventilation and building fabric, before active cooling, and passive measures face the same

tenure and pre-financing barriers as heating renovation. No Austrian support instrument currently addresses cooling, and no regular indicator measures it, a gap the EPAH now recommends closing (EPAH, 2026a). Separability from technologies is high: the service is a safe indoor temperature, which shading or district cooling can deliver as well as an air conditioner, and an instrument design that subsidised appliance purchase alone would risk locking in the least efficient pathway.

6.3 Hot water

Hot water provision is enumerated in both the EU and the Austrian definitions but rarely measured separately, since it is technically coupled to the heating system in most dwellings. Its relevance for vulnerable groups operates through hygiene and health, and rationing of hot water is one of the self-restriction behaviours reported in the hidden energy poverty literature (Eisfeld and Seebauer, 2022). Efficiency potential exists at low cost, through flow restrictors and appliance settings of the kind delivered in Stromspar-Check style advice visits, and at higher cost through heat pump water heaters in the course of heating replacement. Because the service follows the heating system, its fuel separability and its access barriers are largely inherited from Section 6.1; the practical implication is that hot water should be assessed jointly with heating in any monitoring and support design rather than treated as a separate instrument field.

6.4 Cooking

Cooking appears in § 4 EnDG but not in the EU enumeration. Its relevance is less a matter of cost, since cooking energy is a small budget share, than of service security under the gas phase-out: households cooking with gas in buildings scheduled for network decommissioning face a mandatory appliance and possibly electrical installation change whose costs and coordination burden fall at household level. For low-income tenants this is a barrier profile similar to heating replacement in miniature, financial through appliance and installation costs, administrative through dependence on landlords and network operators. Efficiency potential is modest but real through induction technology. The service is fully separable from any single carrier, and the assessment supports treating cooking as a component of gas phase-out planning for vulnerable households rather than as a stand-alone concern.

6.5 Lighting

Lighting is enumerated in both the EU and the Austrian definitions. Its direct deprivation relevance in Austria is limited following the transition to LED technology, which has substantially reduced the cost of the service. The remaining efficiency potential is small and can be realised at low cost: LED replacement is inexpensive, tenure-neutral, requires no pre-financing and can be delivered within a single advice visit, as established programmes such as the Stromspar-Check demonstrate. Lighting measures are therefore

best understood as one component of low-threshold support and advice programmes rather than as a separate instrument field.

6.6 Refrigeration and food storage

Cold storage of food is a continuous, non-deferrable service whose costs are driven almost entirely by appliance efficiency. Vulnerable households disproportionately operate old and second-hand appliances, so the efficiency potential per euro is high and the health and food safety relevance direct; appliance failure forces immediate replacement expenditure that low-income households cannot smooth. Replacement programmes with in-kind delivery, as practised in the Austrian Caritas pilot projects and the German Stromspar-Check appliance exchange, avoid the pre-financing barrier by design and are tenure-neutral. The service is carrier-independent. The assessment supports refrigeration as a priority field for direct in-kind support, with the practical caveat from the practitioner literature that replacement must be accompanied by disposal of the old appliance to prevent parallel operation.

6.7 Operation of household appliances

The residual appliance category of § 4 EnDG, washing, drying, cleaning and small appliances, shares the structure of refrigeration: efficiency embodied in the appliance stock, an income-correlated stock quality, and a second-hand cascade through which the least efficient appliances migrate to the poorest households. Its distinct feature is partial deferability, which makes it a preferred site of self-restriction; forgone washing and drying carry social participation costs that practitioners describe but no indicator captures. Efficiency potential is moderate and best reached through the same advice and exchange channels as Section 6.6. Separability from carriers is complete.

6.8 Digital connectivity

Digital connectivity is a candidate service. Its energy cost is negligible, but access to work, education, administrative procedures and increasingly to energy support itself presupposes it, and the workshop discussion of information barriers points to the overlap between digital exclusion and non-take-up of energy support. The capabilities literature treats communication as a capability to which energy services contribute (Day et al., 2016), yet no official definition reviewed in Section 4 includes connectivity. The assessment here is deliberately restrained: connectivity belongs in the vulnerability analysis and in the design of outreach, since postal and in-person channels remain necessary where it is absent, but the case for treating it as an energy service within the EnDG framework is weak, because its binding constraints are tariff and device costs rather than energy. It is retained in the list as a cross-cutting access condition rather than as a service to be added to the definition.

6.9 Mobility and transport demand

Mobility is the second candidate service and the analytically most consequential. The EU has created a parallel legal concept of transport poverty in the Social Climate Fund Regulation, and the Austrian Social Climate Plan will have to address it; the double energy vulnerability literature shows that domestic and transport energy deprivation overlap in identifiable groups (Simcock et al., 2021; Martiskainen et al., 2023); and the Austrian evidence assembled in Section 5 indicates that the two problems have partly inverse spatial profiles, with domestic energy poverty concentrated in urban rental housing and transport dependence in rural and peripheral areas where public transport alternatives and charging infrastructure are thinnest (IEA, 2026). The efficiency potential lies in modal availability and vehicle efficiency rather than household behaviour, and the access barriers to electric mobility are financial in a way that current instruments do not address for low-income households. The assessment concludes that mobility should not be folded into the EnDG definition, whose statistical and support logic is household energy, but that monitoring and target group identification should be coordinated across the two frameworks, since a household can be service-poor in only one of the two domains and policy needs to see both.

6.10 Assessment overview

Table 2 summarises the assessment. Reading it by column rather than by row makes the policy structure visible: the financial access barrier concentrates in the investment-heavy services (heating, cooling, cooking conversion), the informational and administrative barriers apply across all services and are addressed by channels rather than by instruments, and the tenure problem appears in every service that touches the building fabric.

Table 2: Assessment overview of household energy services

Service	Vulnerability relevance	Dominant access barriers	Efficiency potential	Urban/rural profile	Fuel/technology separability
Space heating	very high	financial (pre-financing), tenure, administrative	very high (fabric, system)	carrier differs, need universal	high, transition-critical
Space cooling	high, rising	tenure, no instrument exists	high (passive first)	strongly urban	high
Hot water	medium, under-measured	inherited from heating	medium	follows heating	follows heating
Cooking	medium, phase-out driven	financial, coordination	modest	urban (gas grid)	complete
Lighting	low (post-LED)	low	largely realised	neutral	complete
Refrigeration	high per euro	liquidity at failure	high	neutral	complete
Other appliances	medium	liquidity, second-hand cascade	moderate	neutral	complete
Digital connectivity	cross-cutting access condition	tariff and device cost	not applicable	rural coverage gaps	not applicable
Mobility	high, spatially inverse	financial, infrastructural	modal and vehicle level	strongly rural	separate framework (SCF)

7 A concept for introducing the energy service level into Austrian policy making

The concept builds on a favourable starting position: the EnDG already defines energy poverty by enumerating services, and a composite indicator exists. What the assessment in Sections 4 to 6 shows is that the service logic is not yet carried through from the definition into measurement, instrument design and delivery. The concept therefore consists of five elements, formulated as proposals for discussion with stakeholders and policy makers rather than as settled recommendations; their refinement is foreseen in the further ADJUST participation process together with WP5.

First, complete the measurement at the service level. The monitoring under § 5 EnDG could be extended so that each service enumerated in § 4 has at least one regularly collected indicator. Concretely, this means adding an indicator on the ability to keep the dwelling adequately cool in summer, in line with the EPAH recommendation (EPAH, 2026a) and the precedent of the French summer definition; making the existing quarterly consumption-restriction question a standing component of the monitoring, so that hidden energy poverty is tracked rather than occasionally observed; and establishing a coordinated data view with the transport poverty assessment required under the Social Climate Fund, so that households affected in both domains become visible without merging the two definitions.

Second, map instruments to services and close the gaps the mapping reveals. Section 5.4 showed an uneven instrument landscape: electricity and heating are addressed, cooling is not, and district heating customers, who are overrepresented among energy poor households, face the weakest consumer protection. A service-by-service instrument map, maintained by the kea, would make such gaps and overlaps a routine object of policy review. The two gaps identified here are a support and advice line for summer heat protection with priority for passive measures in urban rental housing, and the extension of price transparency, billing standards and dispute resolution in district heating, in line with the IEA recommendation (IEA, 2026).

Third, design for access, not only for existence, of support. The workshop findings and the IEA review converge on the same diagnosis: the binding constraint is frequently not the volume of funding but its reachability. The concept proposes four design principles for any service-related support aimed at vulnerable households: payment structures that do not require pre-financing, through direct payment to installers, vouchers or in-kind delivery; tenure-neutral instrument variants, so that tenants are not structurally excluded from service improvements; administrative simplicity with assisted application as the default, building on the one-stop-shop obligations of the recast EED; and outreach through trusted intermediaries, following the demonstrated Austrian models of social organisation involvement, rather than reliance on households finding the support themselves.

Fourth, apply an efficiency-first sequence at the service level. Consistent with Recommendation (EU) 2023/2407, structural measures that permanently lower the cost of a service take precedence over recurring payments, with income-side instruments such as the social tariff retained as the necessary bridge for households whose service costs cannot be structurally reduced in the short term. The service list orders this sequence: fabric and system measures for heating and cooling, in-kind appliance exchange for refrigeration and appliances, and low-threshold immediate measures such as lighting and advice visits as an accessible starting point.

Fifth, institutionalise participation and intersectional target group analysis. The EnDG's second purpose, identifying target groups for support, should draw on the profile evidence of Section 5.3 while recognising, as the workshop emphasised, that categories intersect: tenure, income, health, language and household composition combine into barrier profiles that single-criterion targeting misses. Structured involvement of affected households and of the organisations that work with them, in the design and not only the evaluation of measures, follows both the workshop mandate and the consultative precedent of the New Zealand framework, and can be anchored in the existing kea commission structure.

8 Conclusions

This deliverable set out to identify the energy services contained in definitions of energy poverty and adjacent concepts across Europe and the OECD, to assess their relevance, accessibility and efficiency potential for vulnerable groups in Austria, and to formulate a concept for carrying the service level into Austrian policy making. Three results stand out. The service perspective has moved from academic argument to legal text within a decade. The EU definition of 2023 and the Austrian EnDG of 2025 both enumerate services, and several comparator countries have arrived at service formulations by their own routes, from the modelled service basket in the English fuel poverty methodology to the wellbeing-anchored definition in New Zealand. The task for Austria is accordingly not the introduction of a service perspective in principle but its completion in measurement and instrument design.

The assessment of individual services yields an uneven but tractable picture. Heating carries the largest deprivation weight and the largest efficiency potential, both locked behind tenure, liquidity and administrative barriers; cooling is the fastest-rising and least-instrumented service, with a distinctly urban profile; the appliance-based services offer high returns to low-threshold, in-kind support; mobility requires coordination with, not absorption into, the energy poverty framework; and digital connectivity matters as an access condition rather than as an energy service.

Finally, the stakeholder input proved analytically productive rather than merely additive. The barrier categories named by practitioners, pre-financing, tenure exclusion,

information and administrative burden, recur in the international evidence up to and including the IEA's peer review of Austrian policy, and they explain why support that exists on paper does not reach the households it is meant for. A service-based framework that is completed in measurement and designed for access offers a way to close this gap. Its further development, and the testing of the proposals in Section 7 for practicability, is the subject of the continuing ADJUST participation process.

References

- Boardman, B. (1991). Fuel Poverty: From Cold Homes to Affordable Warmth. Belhaven Press. 112-144
- Bouzarovski, S., Petrova, S. (2015). A global perspective on domestic energy deprivation: Overcoming the energy poverty-fuel poverty binary. *Energy Research & Social Science*, 10, 31-40.
- Bouzarovski, S., Thomson, H., Cornelis, M. (2021). Confronting Energy Poverty in Europe: A Research and Policy Agenda. *Energies*, 14(4), 858.
- Day, R., Walker, G., Simcock, N. (2016). Conceptualising energy use and energy poverty using a capabilities framework. *Energy Policy*, 93, 255-264.
- Eisfeld, K., Seebauer, S. (2022). The energy austerity pitfall: Linking hidden energy poverty with self-restriction in household use in Austria. *Energy Research & Social Science*, 84, 102427.
- Comparative analysis of energy poverty definition and measurement in Portugal and Spain (2024). *Utilities Policy*
- Hernández, D. (2013). Energy Insecurity: A Framework for Understanding Energy, the Built Environment, and Health Among Vulnerable Populations in the Context of Climate Change. *American Journal of Public Health*, 103(4), e32-e34.
- Hernández, D. (2016). Understanding 'energy insecurity' and why it matters to health. *Social Science & Medicine*, 167, 1-10.
- Kyprianou, I., Serghides, D.K., Varo, A., Gouveia, J.P., Kopeva, D., Murauskaite, L. (2019). Energy poverty policies and measures in 5 EU countries: A comparative study. *Energy and Buildings*, 196, 46-60.
- Martiskainen, M. et al. (2023). Eating, heating or taking the bus? Lived experiences at the intersection of energy and transport poverty. *Global Environmental Change*.
- Müller, A. et al. (2024). Why renovation obligations can boost social justice and might reduce energy poverty in a highly decarbonised housing sector. *Energy Policy*.
- Robinson, C., Mattioli, G. (2020). Double energy vulnerability: Spatial intersections of domestic and transport energy poverty in England. *Energy Research & Social Science*, 70, 101699.

- Siksnyte-Butkiene, I. (2021). A systematic literature review of indices for energy poverty assessment: A household perspective. *Sustainability*, 13(19), 10900.
- Simcock, N., Jenkins, K.E.H., Lacey-Barnacle, M., Martiskainen, M., Mattioli, G., Hopkins, D. (2021). Identifying double energy vulnerability: A systematic and narrative review of groups at-risk of energy and transport poverty in the global north. *Energy Research & Social Science*, 82, 102351.
- Theine, H., Humer, S., Moser, M., Schnetzer, M. (2022). Emissions inequality: Disparities in income, expenditure, and the carbon footprint in Austria. *Ecological Economics*, 197, 107435.
- Thomson, H., Simcock, N., Bouzarovski, S., Petrova, S. (2019). Energy poverty and indoor cooling: An overlooked issue in Europe. *Energy and Buildings*, 196, 21-29.
- Torrego-Gómez, D. et al. (2024). Recognising summer energy poverty. Evidence from Southern Europe. *Local Environment*, 29(4), 495-523.
- Wohlin, C. (2014). Guidelines for snowballing in systematic literature studies and a replication in software engineering. *EASE 2014*.
- DESNZ (2025). Annual Fuel Poverty Statistics in England, 2025 (2024 data); Fuel Poverty Strategy for England.
- House of Commons Library (2025). Fuel poverty research briefings (CBP-8730, CBP-10542).
- ONPE (2026). Tableau de bord de la précarité énergétique (onpe.org); Loi n° 2010-788 du 12 juillet 2010 (Grenelle II), Art. 11.
- Gobierno de España (2019). Estrategia Nacional contra la Pobreza Energética 2019-2024. IDAE (2026). Estrategia Nacional contra la Pobreza Energética 2026-2030 (announcement).
- SEAI (n.d.). How is energy poverty measured and why does it matter? Oireachtas Library and Research Service (2022). Energy Poverty in Ireland. Government of Ireland (2022). Energy Poverty Action Plan.
- EIA (2026). Residential Energy Consumption Survey 2024, preliminary household energy insecurity tables (HC11.1).
- MBIE (2022). Defining energy hardship. MBIE (2025). Report on energy hardship measures (December 2025).
- Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019.
- Directive (EU) 2023/1791 (recast Energy Efficiency Directive), Art. 2(52).
- Directive (EU) 2024/1275 (recast Energy Performance of Buildings Directive).
- Regulation (EU) 2018/1999 (Governance Regulation).
- Regulation (EU) 2023/955 (Social Climate Fund Regulation).

Commission Recommendation (EU) 2020/1563 on energy poverty; SWD(2020) 960.
Commission Recommendation (EU) 2023/2407 on energy poverty; SWD(2023) 647.
EPAH (2026a). Expanding Energy Poverty Measurement in the EU. Publications Office.
EPAH (2026b). Assessment of EU regions with higher vulnerability to severe energy poverty. Publications Office.
JRC (2026). Addressing Residential Cooling Demand and Summer Energy Poverty in the EU: Towards a Cooler Future.
Energiearmuts-Definitions-Gesetz (EnDG), BGBl. I Nr. 91/2025, § 4 and § 5.
Statistik Austria (2026a). Energiearmut: Was kann der neue Gesamtindikator? STATjournal 2/2026.
Statistik Austria (2026b). Energiearmut in Österreich 2026 (commissioned by AK Wien).
kea (2026). Infos zu Energiearmut in Österreich (kea.gv.at, EU-SILC 2025 figures).
Statistik Austria (2024). Dimensionen der Energiearmut in Österreich (commissioned by E-Control).
Statistik Austria (2025). Sonderauswertung zur Hitzebelastung (commissioned by AK).
Statistik Austria (2023). So geht's uns heute: Schwerpunkt Energiearmut.
kea (2025). Faktencheck Energiearmut.
AEA (2025). Budgetäre Folgekosten Energiearmut; Energieeinsparungen in energiearmen Haushalten.
WIFO (2026). Leistbare Strompreise durch spezielle Tarifgestaltung.
Rechnungshof (2020). Energiewirtschaftliche Maßnahmen gegen Energiearmut.
BMSGPK (2024). Der Ökosozialstaat. BMSGPK (2025). Kennzahlen zu Lebensbedingungen 2023. BMSGPK (2021). Soziale Folgen des Klimawandels in Österreich.
BMSGPK / INEQ (2018). Studie zur Eruiierung einer Definition von Energiearmut.
IEA (2026). Austria 2026: Energy Policy Review. International Energy Agency, Paris. CC BY 4.0.
Energy Consumers Australia (2026). Power Move: Fair and affordable electrification for Australian households and small businesses.
OECD [affordability publication to be identified].
MBIE New Zealand [energy hardship definition document, to be identified].
Volkshilfe (2024). Gemeinsam für eine klimagerechte Zukunft.
BMK, Volkshilfe (2024). Perspektiven armutsbetroffener Menschen auf die Klimakrise.
Armutskonferenz (2023). Es brennt: Armut bekämpfen, Klima retten.

Global 2000 (2024). Factsheet Energiearmut in Österreich; Global 2000 (2025). Green Deal Briefing Wärme- und Kälteversorgung.

Momentum Institut (2023). Klimafittes Mieten.

eccee (2024). Leveraging energy efficiency to combat energy poverty in the EU.

Kärntner Netzwerk gegen Armut und Ausgrenzung (2024). Kärntner Armutsstudie.

Agora Energiewende (2025). Soziale Wärmewende. Öko-Institut (2024). Sozialgerechte Förderung für energetische Sanierungen im Mietwohnbereich. Zukunft KlimaSozial (2025). Reformvorschlag für soziale Sanierungsförderung.

APCC (2023). Special Report: Strukturen für ein klimafreundliches Leben, chapters 4 and 18.

Note: ADJUST Deliverables D2.2 and D2.3 are referenced in footnotes only, not in the reference list.