Household Energy Affordability Data and Indicators

A methodological framework for national monitoring

International Energy Agency

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Executive summary

Energy affordability has become a central issue for energy security, social well-being and the success of energy transitions. Recent crises, such as escalations of energy prices, supply disruptions and extreme weather, alongside low efficiency levels of buildings and appliances have been exacerbating existing vulnerabilities related to affordability challenges in accessing adequate energy services.

While physical energy access has been monitored globally as part of Sustainable Development Goal 7, the systematic and comparable monitoring of how affordable energy is for households remains fragmented. Even where physical access to energy is ensured, the ability of households to afford essential energy services remains highly uneven and insufficiently understood. Across countries, affordability is measured using diverse definitions, indicators and data sources, limiting comparability, weakening policy targeting and constraining the ability to assess progress across countries.

This report addresses this gap by providing a practical and structured methodological framework that enables countries to design and implement household energy-affordability monitoring systems. Drawing on expert consultation across IEA member countries, survey evidence and existing national practices, it moves beyond a review of approaches to propose a clear framework:

- what to measure (dimensions of affordability)
- how to measure it (indicators and methodologies)
- how to operationalise it (data sources and collection strategies).

In doing so, the report translates existing experience into a coherent and operational approach that supports more consistent and policy-relevant monitoring across countries.

The report identifies that, despite national differences, energy affordability for a household is consistently shaped by a core set of drivers: household income, energy expenditure and energy efficiency. Household characteristics also play a role together with other factors, such as cultural factors. Energy affordability also has broader impacts on living conditions, health and social inclusion. Importantly, these dynamics do not affect all households in the same way: differences across population groups, including, for instance, income level, geographical location and housing conditions, play a critical role in shaping how affordability challenges are experienced. This highlights both the need to capture the distributional dimension of affordability and the need to ensure that monitoring frameworks can identify and distinguish between groups that are more exposed or at risk.

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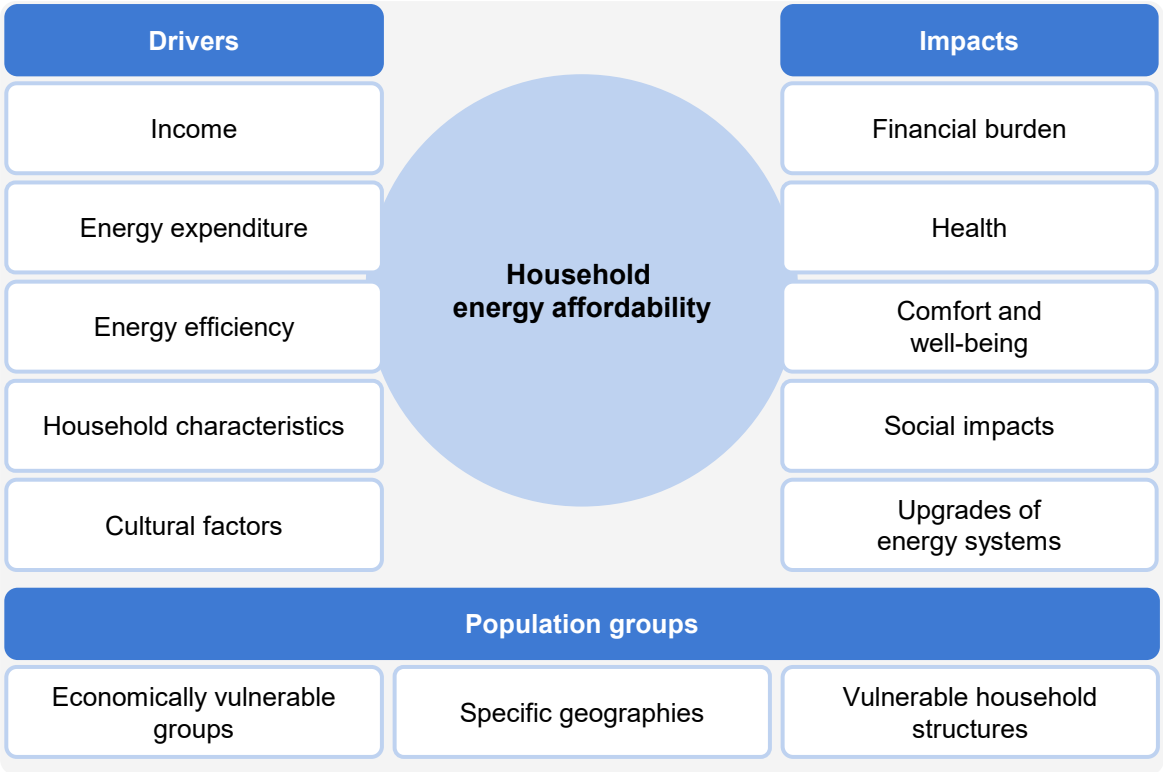
To reflect this complexity, the report structures affordability around a set of core dimensions, each highlighting a distinct but interrelated aspect of how households experience and manage energy costs, covering:

- The drivers and other underlying factors shaping households' ability to address affordability challenges.
- The impacts and outcomes of affordability challenges on households.
- The population groups affected or at risk.

Figure ES.1 Summary of drivers impacting households' ability to afford energy costs; impacts; and impacted population groups, as detailed in the report



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The report organises these dimensions within a coherent methodological framework, providing a conceptual foundation for selecting indicators and identifying relevant data sources. This framework provides practical guidance for countries to:

- Identify nationally relevant affordability dimensions, in line with policy priorities.
- Select complementary sets of indicators reflecting different dimensions.
- Design coherent data collection strategies.

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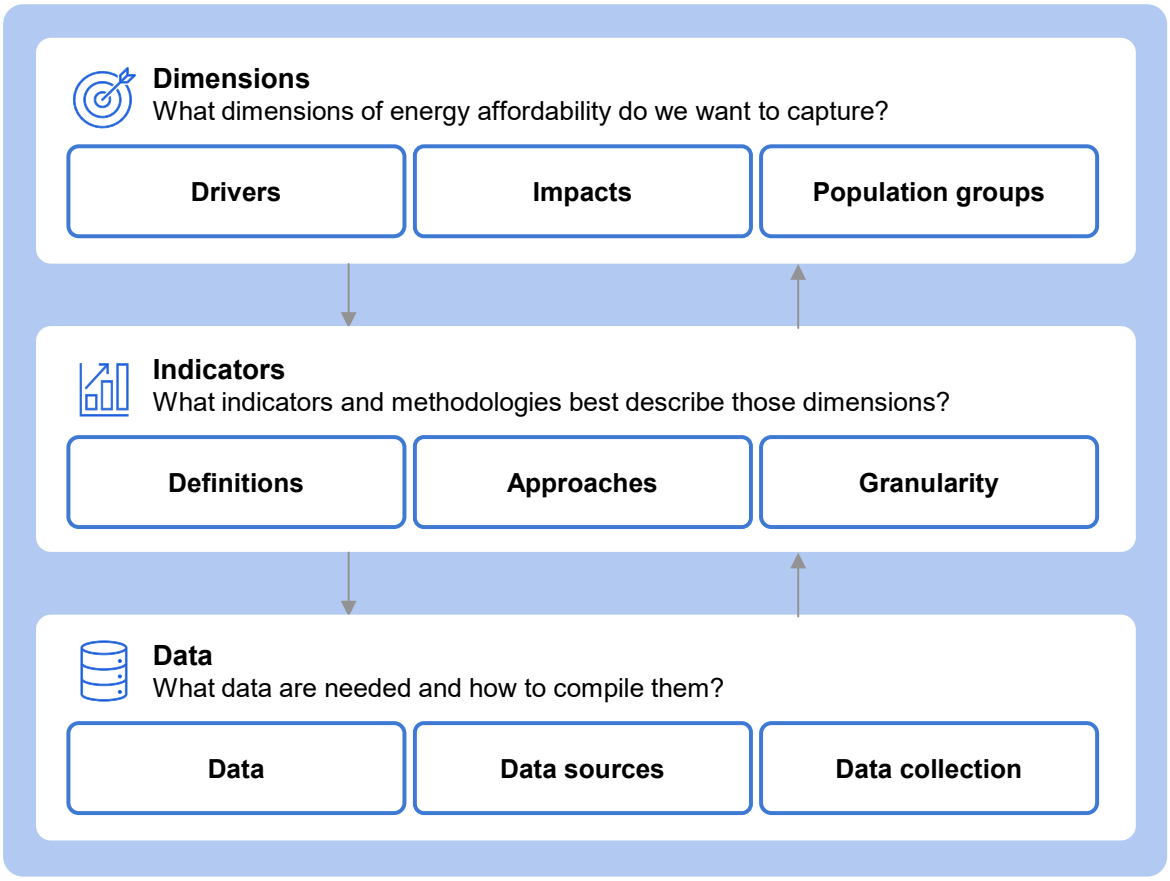
Figure ES.2 Schematics of the methodological framework to monitor household energy affordability described in the report



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The starting point is to identify and select the dimensions that matter the most in each national context, driven by policy priorities and covering drivers, impacts and how different population groups are affected. A set of relevant indicators can be defined – recognising that multiple approaches and alternative indicator choices are possible – and the data required need to be compiled, leveraging readily available data first and addressing data gaps through a structured data collection plan. It is of course relevant to ensure that the indicators obtained are appropriately disseminated, reaching the intended target audiences, notably by feeding back into national policies.

While this report focuses on the methodological aspects of energy affordability data, it recognises that policy priorities ultimately shape how affordability is defined, measured and monitored. Indicators are selected, adapted and interpreted in light of specific policy objectives, such as targeting vulnerable populations, assessing the distributional impact of price changes or evaluating the effectiveness of support measures. At the same time, robust indicators and data systems play a critical role in informing policy decisions, strengthening evidence-based design and enabling policy evaluation. This report therefore positions the

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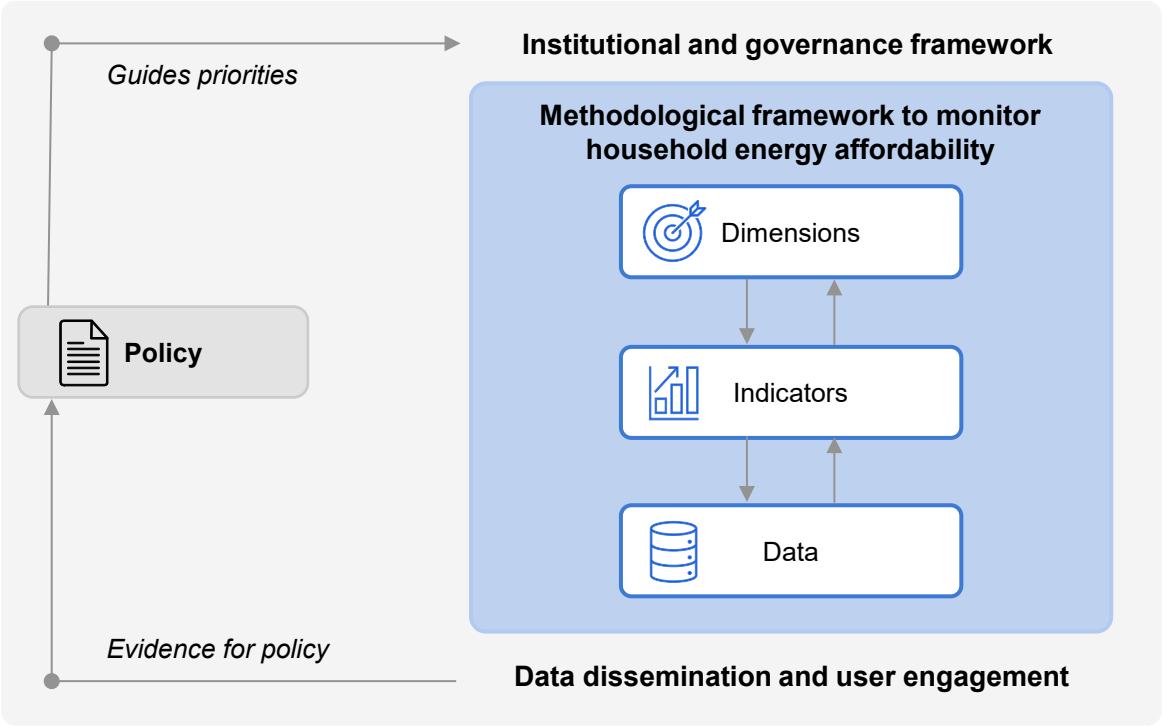
methodological framework as part of a broader policy–data feedback loop. A detailed analysis of policy design, instruments and governance frameworks falls outside its scope.

Figure ES.3 A methodological framework feeding the policy-driven monitoring of household energy affordability, as described in the report



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International collaboration is a key enabler to advance methodologies, improve comparability and strengthen national monitoring frameworks. Sharing good practices and joint collaborative efforts help advance existing work. The IEA is keen to support its member countries and beyond in developing and strengthening their energy-affordability monitoring frameworks and in facilitating collaboration in relevant forums.

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Chapter 1. Reasons for monitoring household energy affordability

Energy is a fundamental resource in modern societies, as it is a cornerstone for economic development and social well-being. Energy also plays a key role in the transition towards a cleaner and more sustainable future. However, access to basic energy services is not yet a given in many countries around the world. Even if households have physical access to energy, the ability to afford it may become a challenge.

Energy affordability[1] sits at the intersection of many of today's challenges. Surging energy prices led by supply disruptions and market volatility increasingly put pressure on household budgets. Climate change may alter demand patterns, with insufficient efficiency levels in buildings and appliances exacerbating existing vulnerabilities. At the same time, improving energy affordability is essential to ensure that energy transitions deliver direct benefits to populations around the world.

Physical energy access is tracked globally under the Sustainable Development Goals (SDGs). Specifically, SDG target 7.1 calls for "universal access to affordable, reliable and modern energy services". However, historically energy-affordability monitoring work has been scattered at the national level, lacking systematic and comparable monitoring frameworks.

An inability to afford essential energy services, such as space heating and cooling, cooking or the use of domestic appliances, can severely impact quality of life, potentially affecting mental and physical health, including with an increased risk of cardiovascular and respiratory diseases. High energy bills can also put other essential services at stake, such as food or social participation.

The motivations and aims of this report

Energy affordability is a fundamental part of secure energy transitions and also is core to countries' efforts to reduce overall poverty and improve quality of life. Monitoring energy-affordability issues contributes to countries' preparedness for crises. In 2024, G20 leaders endorsed ten voluntary principles for just and inclusive energy transitions. Notably, Principle 2, "End energy poverty", and

[1] Energy affordability, in itself a complex and multi-dimensional topic, is found to be a common element comprised in the various definitions adopted across countries, such as energy poverty, fuel poverty, energy hardship and energy vulnerability, among others.

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Principle 7, “Invest in affordable and reliable solutions for just and inclusive energy transitions”, directly relate to energy affordability. In 2025, the IEA Global Commission on People-Centred Clean Energy Transitions worked towards operationalising these principles and launched the Global Indicators Handbook for Just and Inclusive Energy Transitions, which proposes indicators for each of the G20 principles.

Complementing these and other initiatives, this report is a key component of the IEA’s broader initiative to support its members in advancing people-centred energy transitions. It reviews energy-affordability definitions and monitoring frameworks across IEA member countries to provide an overview of the current monitoring landscape. A particular focus is placed on indicator methodologies and respective data needs.

In the report, examples from across IEA member countries illustrate activities and approaches currently in place. Case studies demonstrate the specificities of established monitoring frameworks and highlight good practice examples across the IEA.

This report will improve the understanding of how energy affordability is monitored across IEA member countries and present an overarching methodological framework to develop indicators and collect the necessary data, with a focus on households.

The need for a methodological framework

The very understanding of energy affordability for households, across its multiple dimensions and related concepts, differs significantly across countries and so do the affordability indicators and respective methodological frameworks. Some variability reflects the diversity of national priorities and contexts, but even so, it hinders data comparability and achieving a common understanding of factors, impacts and alleviation measures across population groups.

Most countries recognise the importance of household income, energy spending and energy efficiency as key factors. The analysis highlights that no single indicator approach can sufficiently capture energy affordability across contexts. In addition, all approaches have their advantages and disadvantages, all of which need to be carefully considered when selecting an indicator set for monitoring purposes.

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Historically, economic indicators based on energy spending and household income have been widely adopted (for instance the 10% indicator[2] was referred to in the UK fuel poverty strategy of 2001) and continuously revised and improved. However, an important complementary approach is the use of surveys to gather household perceptions and lived experiences.

Furthermore, energy efficiency is increasingly acknowledged as an important driver of energy affordability and has been integrated into national monitoring systems. However, an evaluation of the ability to pay for energy efficiency upgrades is largely absent from current monitoring frameworks, and is revealed in this report as an important dimension to be monitored.

While a significant part of energy-affordability data originates from surveys (mainly from household budget and living conditions surveys), the use of administrative data holds a vast potential to improve both the granularity and accuracy of monitoring work (e.g. as is being done in Denmark, Ireland and the Netherlands). The use of administrative data sources to monitor affordability can also reduce reliance on survey data and provide complementary insights.

Many countries have shown substantive experience in designing and adopting national energy-affordability definitions, strategies and indicator frameworks for monitoring purposes. Nevertheless, there are important differences regarding how energy affordability is monitored, both conceptually and methodologically, challenging comparability across regions.

Regardless of the country context, reliable data and indicators are essential to designing effective policies that ensure affordable energy for all. The report provides an overview of current practices in energy-affordability monitoring in households across three core steps:

i) Understanding and concepts (dimensions).

ii) Measuring through indicator design (indicators).

iii) Data sources and collection methodologies (data).

Monitoring energy affordability starts with identifying the key policy questions that authorities and policy makers need to address, in line with the respective definition of energy affordability adopted (covering all relevant dimensions), to ensure that it is comprehensively described and hence appropriately addressed. This helps guide the selection of relevant indicators and the definition of their methodologies, taking the national context into account. The availability of data sources and the feasibility of collecting missing data also need to be assessed, so that the

[2] The UK fuel poverty strategy mentions "The common definition of a fuel poor household is one needing to spend in excess of 10% of household income to achieve a satisfactory heating regime (21ºC in the living room and 18C in the other occupied rooms)".

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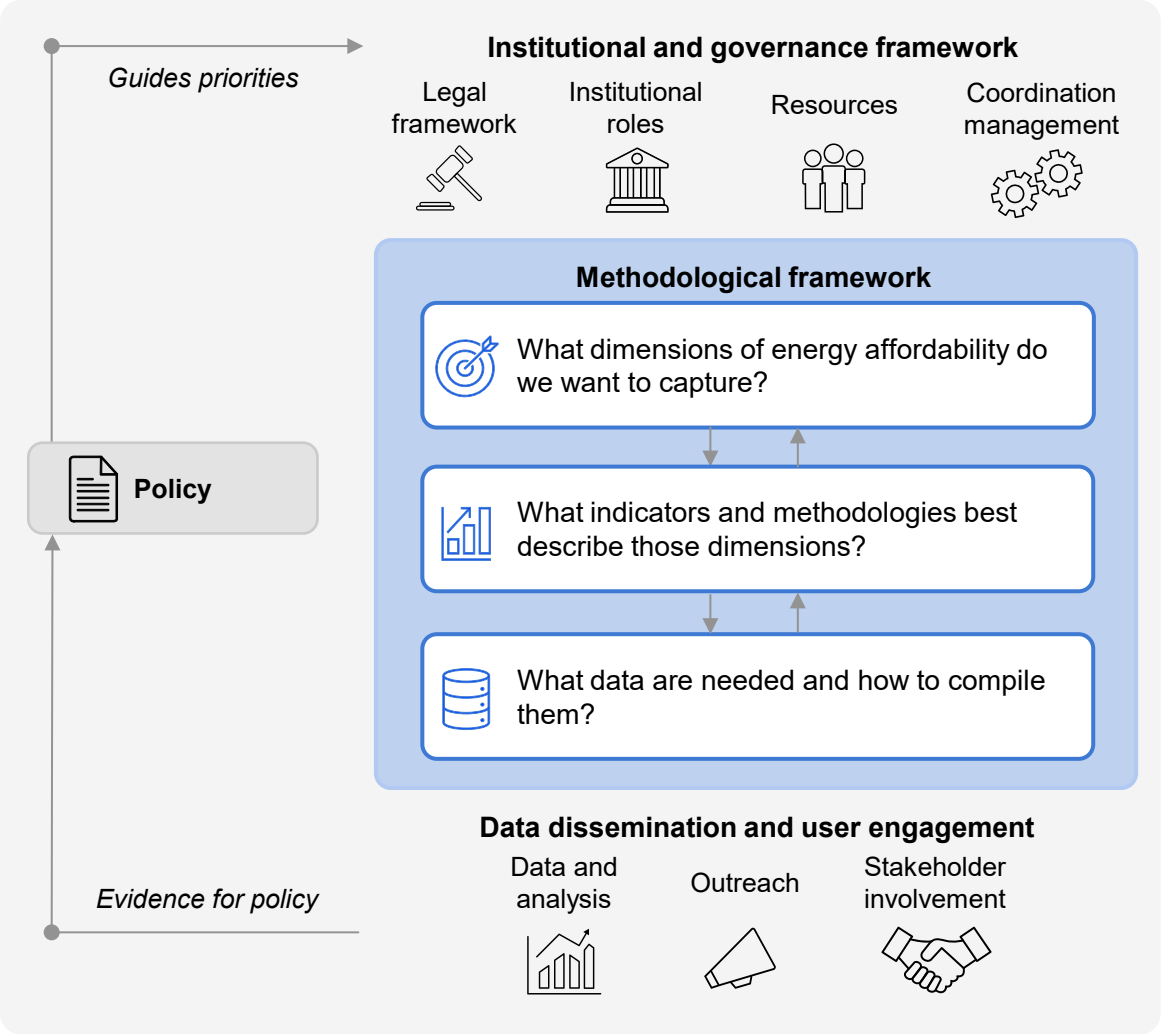
framework remains both policy-relevant and feasible in practice. Finally, it is important to consider the intended uses of the indicators and the users they are meant to inform. Together, these elements shape a methodological framework to monitor energy affordability that can support policy action and be adjusted over time as circumstances and needs evolve (Figure 1.1).

Figure 1.1 Household energy affordability monitoring process



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Several countries acknowledge the importance of energy affordability and have established national-level observatories. In the European Union, several national (and also local) observatories have been established (e.g. in France and Portugal), with the Energy Poverty Advisory Hub observatory being a key reference at EU level. These constitute important tools in providing official and consistent information, enabling the systematic monitoring of energy affordability.

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While establishing a monitoring system, in addition to deciding what indicators to use, other relevant aspects include defining indicator methodologies (e.g. observation units or level of disaggregation), investigating available data sources and any possible gaps, and designing a data collection plan.

Because of its inherent complexity, definitions and boundaries can be blurry, posing a challenge to tracking progress. Differences in the conceptual framework adopted, methodological approaches and data issues (coverage, completeness and reliability) may lead to different interpretation of energy-affordability indicators across the countries and institutions who produce and use them. Specifically, this can happen when choosing the unit of analysis (e.g. individual vs. household) or the boundaries of energy services considered (e.g. focusing on energy uses in the dwelling only or also considering energy use for mobility, or focusing on heating only or also considering cooling needs). Although it may be difficult to capture all these elements, being aware of the implications of choices constitutes an important step to interpreting affordability indicators and subsequently designing relevant action plans.

Following this introduction, Chapter 2 focuses on the multi-dimensional nature of the energy-affordability concept and analyses its different dimensions; Chapter 3 presents a review of existing approaches to define and calculate energy-affordability indicators; Chapter 4 describes data collection methods to develop the indicators wished for; and finally Chapter 5 concludes by presenting a methodological framework to monitor household energy affordability.

How this report was developed

This report draws on a mix of desktop research, semi-structured interviews with key national experts and a survey of national counterparts from IEA member countries. The interviews covered a set of core topics, while allowing for flexibility to explore further particular points that interviewees deemed relevant. The survey collected written feedback in a more structured way than the interviews. It included questions on definitions, indicators and data sources used to monitor energy affordability and on potential avenues for the IEA to support member countries in their efforts (see Annex B). The input gathered from both the interviews and the survey is presented in Annex A and Annex B, respectively.

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Chapter 2. Dimensions: Understanding household energy affordability

Energy affordability is not an absolute concept and depends on a range of drivers and other underlying factors such as income, costs, housing quality and behaviour. Affordability challenges also reflect broader impacts on living conditions, health and social inclusion and how they are perceived may vary between households and over time.

Countries use various concepts related to energy affordability, such as energy poverty, fuel poverty, energy vulnerability and energy hardship. It is often found that the same terms can be used with different meanings, and conversely, that different terms are used to refer to the same concept.[3] All these aspects are complex and multi-dimensional, and it is beyond the scope of this report to propose a single definition for each of them.

This report focuses on energy affordability, understood as the economic accessibility of basic energy services. This is a common element in all the various definitions adopted across countries. While acknowledging that complex interlinkages among the concepts mentioned above remain, energy affordability is a simpler and relatively less abstract concept for measuring and monitoring.

This report takes a comprehensive perspective and considers energy affordability in relation to different units of analysis, energy end uses and energy carriers (see Figure 2.1 on the energy-affordability elements considered in this report). Still, some elements may have been more strongly emphasised in this report than others, depending on national work and practices covered.

[3] Energy affordability challenges can affect households in different ways. Some households experience affordability pressures when a significant share of their income is spent on to covering energy costs. Others are simply not able to physically access or afford to meet their basic energy needs and are considered energy poor. See (IEA, 2026).

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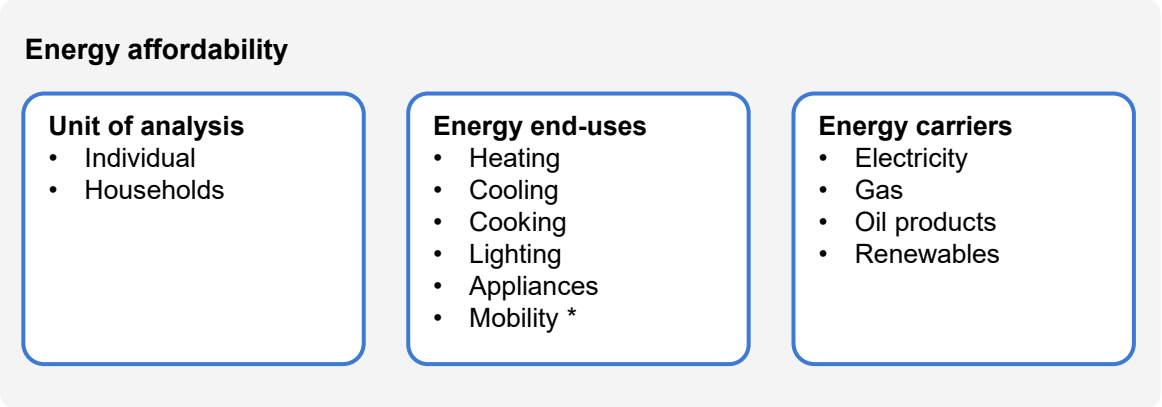
Figure 2.1 Household energy-affordability: elements covered in this report



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*See Box 2.1.

Box 2.1 Understanding the boundaries of the analysis

Household energy affordability is a multi-dimensional issue that extends beyond domestic energy use and depends on the national context. It may also encompass related pressures such as transport energy costs, seasonal space heating and cooling needs, and, in some contexts, the energy use of small family businesses that function as extensions of households.

Transport energy affordability is a major component of household financial pressure. In advanced economies, the poorest 10% of households can spend close to a quarter of their income on combined household energy and transport fuels. Transport fuels are a key driver of this burden, as they are highly sensitive to global oil price fluctuations and can disproportionately affect households with limited access to public transport or fuel-efficient vehicles, particularly in rural areas. In addition, the growing uptake of electric vehicles affects household energy consumption, as these are often charged at home, creating challenges in distinguishing electricity use for mobility from other household uses.

Summer energy poverty is also becoming an increasingly important issue. Rising temperatures and more frequent heatwaves increase the need for indoor cooling, placing additional pressure on household budgets, especially where homes are poorly insulated, exposed to overheating or equipped with inefficient cooling systems. Low-income households may face unmet cooling needs if they lack access to affordable cooling equipment or cannot afford to use it. In this report, cooling is treated as part of the essential household energy services while recognising that examples of monitoring approaches and indicators for cooling remain more limited than for space heating.

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In some countries, small family businesses may also play a role, as their energy use can reflect the economic reality of households rather than that of larger commercial entities. While this raises the question of whether such activities can be considered within an affordability framework, they are not explicitly covered in this report.

In the context of this report, energy costs refer strictly to the costs of domestic energy services, such as space heating, cooling, cooking and the use of household appliances. Transport-related energy costs are not included. Furthermore, issues related to physical access to energy services fall outside the scope of this report as it focuses on the affordability of energy for households with access.

Energy-affordability views across IEA countries

Historically, the term fuel poverty emerged to describe insufficient levels of energy affordability in developed economies. In contrast, the term energy poverty was initially used to describe energy deprivation in developing economies, mainly resulting from a lack of physical access to (clean) energy sources. In recent years, the terms have been increasingly used interchangeably.

Countries have adopted different definitions and terms relating to energy affordability. In some cases, these definitions are embedded in national legislation, while in others these are present in official governmental documents. Table 2.1 provides selected examples of definitions or concepts adopted across different countries and regions, either in legal frameworks or in official government documents.

Table 2.1 Examples of country and regional definitions and concepts around energy affordability

Country/ Region	Concept
Australia	**"**Energy equity exists where all consumers can fairly benefit from the energy system and access and use energy services to live a comfortable, dignified and healthy life… "A household is considered in energy hardship when it is unable to afford and/or use energy services in the home to live a comfortable and healthy life." Both definitions come from the National Energy Equity Framework published by the Department of Climate Change, Energy, the Environment and Water.
Canada	A household is considered energy poor if 10% or more of household after-tax income is spent on energy bills for their dwelling. In this way, a single economic indicator is used to track the phenomenon according to the Energy Fact Book 2024-2025 by the Natural Resources Canada.

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Country/ Region	Concept
European Union	The European Union's Energy Efficiency Directive (EU) 2023/1791 defines energy poverty is "a household's lack of access to essential energy services, where such services provide basic levels and decent standards of living and health, including adequate heating, hot water, cooling, lighting, and energy to power appliances, in the relevant national context, existing national social policy and other relevant national policies, caused by a combination of factors, including at least non-affordability, insufficient disposable income, high energy expenditure and poor energy efficiency of homes". Another important concept is that of vulnerable customers, which is to be defined by EU Member States. The Energy Efficiency Directive suggests that such a definition may cover aspects such as "income levels, the share of energy expenditure of disposable income, the energy efficiency of homes, critical dependence on electrical equipment for health reasons, age or other criteria". The Commission Recommendation (EU) 2020/1563 of 14 October 2020 proposes specific energy poverty indicators to be considered by EU Member States. They need to report on energy poverty and on how to address it, in the context of each country's National Energy and Climate Plan submitted in 2019 and updated in 2024.
France	A person in energy poverty is "a person who experiences particular difficulties in their home in obtaining the energy supply necessary to meet their basic needs due to the inadequacy of their resources or their living conditions" following the Law 2010-788 of the 12th of July 2010.
New Zealand	Energy well-being was defined in the Energy hardship definition - final report by the Ministry of Business Innovation and Employment (opposite to energy hardship) is defined as a situation "*when individuals, households and whānau [extended family group] are able to obtain and afford adequate energy services to support their well-being in their home or kāinga [settlement]*".
Spain	Energy poverty was defined in the National Strategy against Energy Poverty 2026-2030 by the Ministry of Ecological Transition and the Demographic Challenge as "the situation in which a household is unable to meet its basic energy supply needs due to insufficient income, which may be further worsened by living in an energy-inefficient home". This definition has been updated in accordance with the definition introduced by Directive (EU) 2023/1791 on energy efficiency in its Article 2.
United Kingdom	Fuel poverty was defined by the UK government in the 2001 Fuel Poverty Strategy, which stated that "a fuel poor household is one that cannot afford to keep adequately warm at reasonable cost." Earlier discussions of the term had been published. The four UK nations have different fuel poverty measures, which typically correspond to their national targets and strategies. Northern Ireland, Scotland and Wales use different measures that are all based upon needing to spend more than 10% of household income on fuel. In contrast, the primary measure in England focuses on the combination of low income and energy-inefficient housing. At present, each of the four UK nations has introduced their own fuel poverty definition, metrics and targets.

Note: Further detail on these and other IEA countries, as well as links to useful resources, can be found in Annex A.

Some countries have not yet developed or are in the process of developing an official definition of energy affordability or related concepts, as illustrated above. For example, the United States Energy Information Administration developed indicators to monitor "energy insecurity" but no official definition has been agreed. Relevant data is collected as part of the Residential Energy Consumption Survey questionnaire. The 2026 release (referring to year 2024) states that factors, such

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as energy costs as a percentage of household income, could be considered determinants of energy insecurity, but these are not included in the survey.

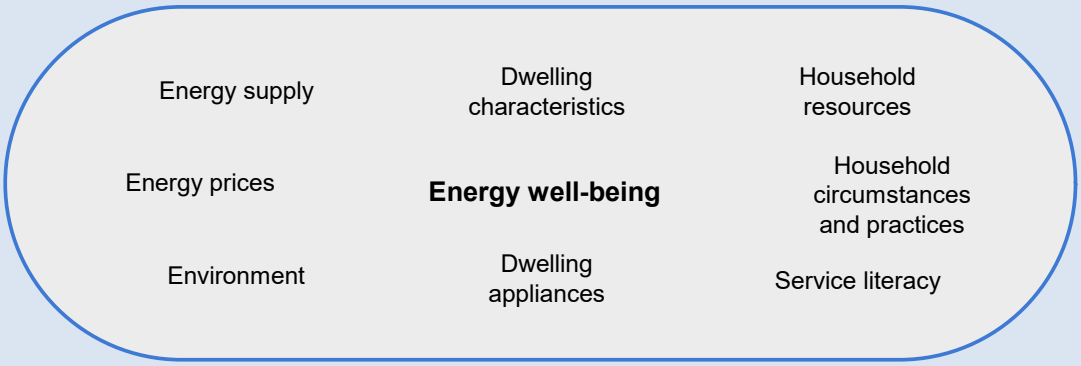
Other countries, such as Germany, Norway and Sweden, acknowledge high energy costs as an important issue, but have not yet adopted a formal legal definition of energy affordability or any related concept. Annex A provides further detail on definitions and concepts adopted in IEA countries and highlights further resources.

Box 2.2 Inclusive approach to defining energy hardship in New Zealand

In 2019, the Government of New Zealand started a multi-step consultation process to develop a widely supported definition and indicators to monitor energy hardship. The consultation included engagement with stakeholders from the government, industry, academia, Māori interest groups and civil society organisations, following another public consultation to integrate feedback from wider society.

This process resulted in the definitions of energy hardship and energy well-being and in the development of a framework capturing various relevant dimensions of energy well-being in New Zealand (Figure 2.2). This includes dimensions such as household resources, dwelling appliances, energy supply, environment, service literacy, dwelling characteristics, household circumstances and practices and energy prices.

Figure 2.2 Energy well-being framework



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Source: Ministry of Business, Innovation and Employment (2023), Components of the energy well-being framework, as modified by the IEA.

To move away from deficit framing and maintain an aspirational perspective, a positive approach was adopted by focusing on the notion of energy well-being. Energy well-being is not only the absence of hardship but also a cornerstone of

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overall well-being. Framing the issue positively can help promoting proactive solutions focused on achieving this positive state.

Energy well-being and energy hardship represent two ends of a continuous spectrum that reflects the many realities of energy affordability. While the aim is to foster energy well-being, the monitoring framework focuses on energy hardship.

Key learnings:

- Inclusive consultation processes can help improve the relevance and acceptance of energy-affordability definitions and indicators.
- Defining a desired goal – for example energy well-being for all – can help shift focus to solutions and ways forward from a focus only on the problem.
- Developing a framework alongside a definition can help shed light on the various factors and dimensions of energy well-being and support development and delivery of programmes targeted at addressing specific factors.

Further resources:

- Defining Energy Hardship.Discussion Document
- Components of the Energy Wellbeing Framework
- Defining Energy Hardship: Summary of Submissions During the Consultation Process
- Energy Hardship Definition and Measures – Final Report

From this, the value of adopting a national energy-affordability definition that captures relevant national dimensions and specificities becomes clear. Another relevant aspect is to ensure that such dimensions can be translated into a set of indicators, ideally capturing the spectrum of drivers and factors affecting the ability of a household to afford its energy cost, the impacts of energy affordability and the impacted population groups. Given the diversity of dimensions, identifying the most relevant for the intended uses is important.

Dimensions of energy affordability

Income and energy expenditure[4] are two key drivers determining a household's ability to pay energy bills. The concept of disposable income may differ slightly across countries, but it typically refers to the total income available to households after taxes and mandatory contributions, including wages, self-employment income, pensions, social benefits and investment income.

In turn, energy expenditure is directly determined by energy consumption and energy prices. Energy consumption depends on household size and

[4] Unless stated otherwise, the use of 'income' and 'energy expenditure' in the text refers to household income and household energy expenditure.

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characteristics (e.g. demographics, ownership structure), building and appliance efficiency, and behavioural patterns of household members. In turn, building efficiency depends on aspects such as building type, age, design, materials and equipment.

Because both income and energy expenditure are affected by other dimensions, it is not sufficient to consider only these. In this light, energy efficiency becomes an additional important driver in the energy-affordability equation.

The ability to participate and benefit from energy transitions often depends on the ability to upgrade to cleaner and more efficient energy technologies and systems. Low-income households tend to live in older, less efficient homes (which are often more affordable), and may lack the capacity (financial or legal) to invest in efficiency improvements or move to more efficient housing, potentially leading to higher energy expenditures compared with higher-income groups. The ability to pay for efficiency improvements is a dimension that is largely absent from current monitoring frameworks and is not only an important factor impacting energy affordability but also an important aspect of just and inclusive transitions that needs to be tracked.

In addition to capturing drivers, understanding how different people address the issue of paying for their energy costs and how these expenses impact their standards of life is an important dimension to consider, including both perceived constraints and more observable effects (e.g. damp, mould or rot).

Some specific population groups have been identified as being at increased risk of poverty. For example, single-person households struggle more than larger households to afford energy services. Women are more likely to be unable to afford energy as they face persistent income gaps (lower wages and pensions) and tend to be the parent that remains in a single parent household. In the European Union, 83% of single parents living with children are women, who disproportionately struggle to pay for energy bills. Also, households with elderly members or members with health conditions may have different energy requirements, often leading to higher energy bills.

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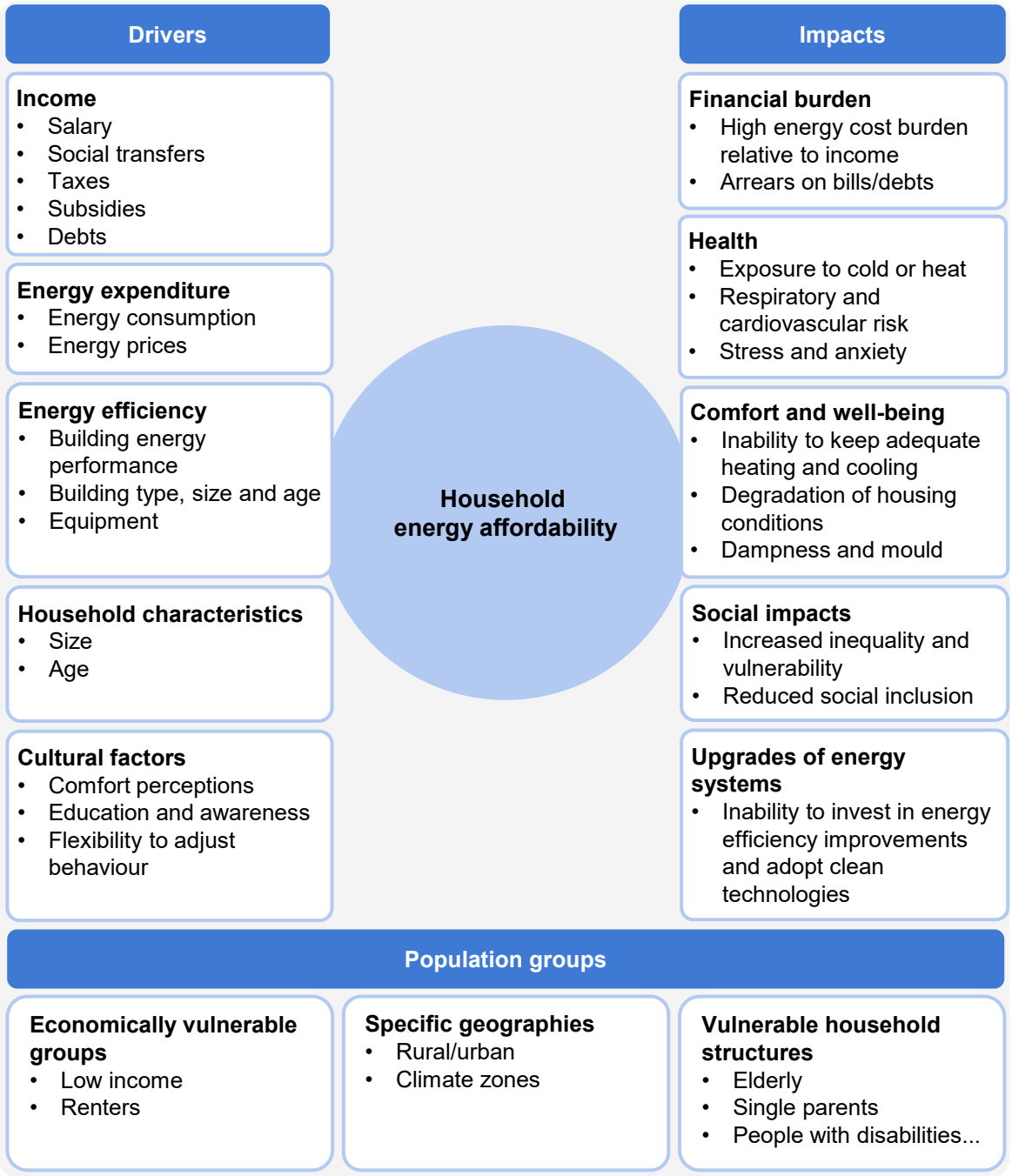
Figure 2.3 Dimensions of energy affordability: drivers and other factors impacting households' ability to afford energy costs, impacts and impacted population groups



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There is a vast body of research exploring the various energy-affordability dimensions, and the overview provided in this report is by no means exhaustive. Table 2.2 provides some examples. The relative importance of factors may also vary significantly across geographies. An important aspect to take away is that in order to improve the understanding of energy affordability, a comprehensive

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consideration of drivers and other factors, impacts of affordability challenges and impacted population groups is needed. Contextual specificities may require targeted monitoring efforts.

Table 2.2 Examples of dimensions to be monitored

Dimension category	Dimension	Example
Drivers	Income	Salary and other revenue sources
	Energy expenditure	Energy consumption Energy prices
	Energy efficiency	Building energy performance Building type, size and age Equipment
	Household characteristics	Size Age
	Cultural factors	Comfort perceptions Education and awareness Flexibility to adjust behaviours
	Other expenditures	Housing costs Food, water, internet, education…
Impacts	Financial burden	High energy costs burden relative to income Arrears on bills/debts
	Health	Thermal discomfort/stress Respiratory and cardiovascular risk Psychological distress and anxiety Aggravation of chronic conditions
	Comfort and well-being	Inability to keep adequate heating and cooling level Degradation of housing conditions Dampness and mould
	Social impacts	Increased inequality and vulnerability Social exclusion and stigma
	Upgrades of energy systems	Capacity to invest in energy-efficiency improvements and adopt clean technologies
Population groups	Economically vulnerable groups	Low-income, middle-income Renters
	Vulnerable household structures	Single-person (often women-led) Children, young adults Elderly Disabilities
	Specific geographies	Urban/rural division Climate zones

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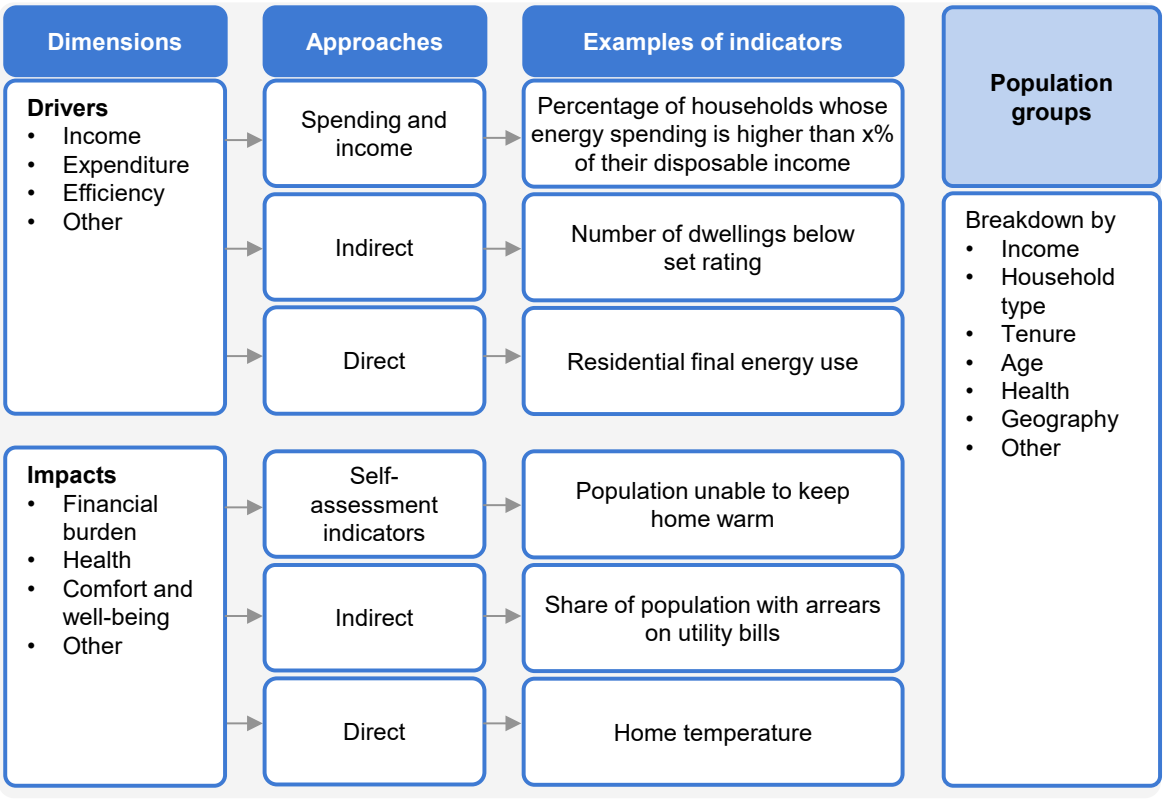
Chapter 3. Indicators: Choosing suitable measures and methodologies

The development of energy-affordability indicators at national level is ideally aligned with the respective definition adopted (covering all relevant dimensions), to ensure that it is comprehensively described and hence, appropriately addressed. Energy-affordability monitoring systems can include a mix of objective indicators, for example focused on income, energy expenditure or energy-efficiency levels, and more subjective indicators, relying on perceptions and lived experiences. Importantly, they capture factors determining affordability and impacts of affordability challenges across different population groups (Figure 3.1).

Figure 3.1 From dimensions to indicators



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Finding a good balance between indicator types, quantity and level of detail can greatly enhance interpretability. Using too many indicators might obscure overall trends, while too few or too simple indicators may skew attention towards the more visible and easily quantifiable aspects of affordability.

Indicator choice may be influenced by the data that is readily available. However, it is recommended that additional relevant indicators be earmarked and included in the monitoring framework, to signal additional data collection needs. Data sources and data collection methods are covered in more detail in Chapter 4.

In addition to indicator choice, methodological aspects such as the level of disaggregation (e.g. by socio-economic group) are also important to consider, as they are key to identify the households struggling the most and the structural issues that may play a role. This is an important step to interpreting affordability indicators and subsequently designing relevant action plans.

Approaches to indicator design

There are different approaches to developing energy-affordability indicators. This report adopts the classification described in the European Commission's Recommendation (EU) 2020/1563 on energy poverty, noting that other types of classifications in literature may be easily mapped to this one. Indicators can be divided into four groups:

- energy spending and income indicators
- self-assessment indicators
- direct measurement indicators
- indirect indicators.

Table 3.1 summarises indicators' main characteristics, advantages and disadvantages. Because of the multi-dimensionality and complexity of the topic, adopting a combination of approaches is often considered good practice.

Table 3.1 Description of the four approaches to indicator design

Approach	Characteristics	Advantages	Disadvantages
Spending and income	Relate energy spending with income, often considering a certain spending threshold	• Relatively easy to measure and interpret • Objective • Comparable • Data are more easily available	• Definition of threshold often not consensual* • Difficulty to fully capturing aspects such as debts • Methodologically challenging to capture underspending

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Approach	Characteristics	Advantages	Disadvantages
Self-assessment	Based on household's perceptions and responses	• Captures non-observable lived experiences • Relatively easy to interpret indicators	• Subjective • Risk of biases • Risk of misreporting due to psychological barriers
Direct	Physical measurements of energy services or environmental conditions (e.g. indoor temperature)	• Objective • Accurate	• Resource intensive • Raises privacy concerns • Difficult to map measured variables against affordability
Indirect	Consider associated factors (e.g. efficiency labels or arrears on utility bills)	• Provide additional information on factors and impacts of non-affordability • Can often be measured from administrative data	• Difficult to disaggregate due to privacy concerns

* Indicators that capture a household's perception of affordability challenges

Spending and income indicators

Spending and income indicators can unfold into a set of different subtypes. While some indicators directly compare household energy spending with income, others measure whether households are left with sufficient income after deducting energy costs. Another option is to only look at energy spending and compare it with the estimated minimum consumption levels required to meet basic energy needs. Table 3.2 provides an overview of these different approaches.

Some countries integrate housing characteristics into spending or income indicators. This can be done to estimate energy needs and compare them with actual expenditures. In other cases, countries explicitly incorporate dwelling energy efficiency into the indicator. For example, in England only households living in an energy-inefficient home that are also left with an insufficient income after deducting housing and required energy costs are considered to be in fuel poverty.

Table 3.2 Indicators relating to energy spending and income

Indicator type	Example indicator	Comment
Energy spending vs. income	Percentage of households whose energy spending is higher than 10% of their disposable income	Aims at capturing high energy costs in relation to income. The specific threshold may vary depending on country, affecting which households are considered.
Energy spending vs. income	Households whose residual income (after energy costs) is below 60% of the national median	Aims at capturing low-income combined with high energy costs. Compares income after energy costs with the minimum income required for decent living.

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Indicator type	Example indicator	Comment
Energy spending	Percentage of households whose energy spending is higher than twice the national median (2M)	Aims at capturing high energy costs. The specific threshold may vary depending on country, affecting which households are considered.
Energy spending	Energy spending is below half of the national median (M/2)	Aims at capturing underspending. Can also refer to estimated minimum energy needs.
Income	Percentage of households whose income is below 60% of the national median (at risk of poverty)	Aims at capturing low-income. An income of 60% of the national median is considered a poverty risk.

A key takeaway from Table 3.2 is that the number and characteristics of households considered captured by an indicator depend on the threshold chosen. Two of the most common are the 10% threshold, capturing households whose energy spending exceeds 10% of their disposable income, and the 2M threshold, capturing those whose energy spending is higher than twice the median energy spending of all households.

The second type of indicator assesses whether a household can still pay for a decent living standard after energy expenses are paid from the household's income. A minimum income standard for different types of households has been defined and used in fuel poverty assessments in the UK, against which the residual income after energy costs can be compared. The definition of thresholds is usually adapted to national contexts.

However, actual energy spending is often unknown or it significantly deviates from estimated levels. This may be simply due to the unavailability of reliable data for estimation or estimation assumptions. An example of such an assumption is home occupancy, as dwellings are often not occupied all day and unoccupied parts of a dwelling are often not heated or cooled. In other cases, households may deliberately adapt their comfort levels (what is known as adaptive comfort), for example, by wearing an additional layer of clothes to limit their energy bills, without necessarily implying affordability issues. It is known that cultural aspects influence heating regimes across regions. All of these more behavioural dimensions are difficult to capture with the first type of indicator that is purely focused on spending and income.

Another dimension is the phenomenon of hidden energy poverty, where households limit their energy spending to a minimum (below adaptive comfort) to be able to afford their bills. Indicators comparing actual energy spending with a spending threshold (e.g. M/2) are built with a view at capturing this, but because there are so many factors in play (e.g. distinguishing between behavioural aspects and actual unaffordability), this is, again, quite challenging to grasp from this kind

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of economic indicator. Self-assessment indicators (discussed below) may provide a complementary view and help to better understand underlying circumstances.

Complementarily, indicators of income may help assess households at risk of poverty. While risk of poverty and energy unaffordability are not necessarily the same thing, income levels are still a key determinant of affordability. They can be used as a complementary indicator to other relevant dimensions. Some examples are given in Table 3.3.

Table 3.3 Selected examples of countries using spending or income indicators

Country	Indicators
Belgium	The Federal Public Service Economy in Belgium uses three main indicators, two of which follow an income/expenditure approach: • Risk of measured energy poverty: Households whose ratio of energy spending to disposable income exceeds twice the national median. • Risk of hidden energy poverty: Households whose energy spending is lower than half the median (M/2) of comparable households*.
France	The French Energy Poverty Observatory uses two key indicators, one being a spending/income indicator. A household is considered in energy poverty when both of the following are met: • Income is within the three lowest income deciles. • Energy expenditure exceeds 8% of the household's income.
Greece	The Ministry of Environment and Energy in Greece uses a composite indicator to identify an energy-poor household when both of the following conditions are met: • The annual cost of energy consumption is lower than 80% of the estimated minimum required energy costs (based on household and dwelling characteristics, climatic conditions and other features). • The net annual income is lower than 60% of the median income.
Netherlands	Statistics Netherlands uses two main spending and income indicators, and two other indicators capturing energy efficiency. A household is considered at risk of energy poverty if conditions are met for the following indicators: • High energy quantities: Share of income spent on energy exceeds 10%. • Low income, high energy costs: Low income (income up to 130% of low-income threshold) and higher than average energy expenditure (equivalised). • Low income, low energy quality home: Income up to 130% of low-income threshold and low energy quality, which is estimated by including all homes whose energy bill is higher than the average energy bill of homes with the same floor area. • Low energy quality home and few investment opportunities: Low energy quality home (whose energy bill is higher than the average energy bill of homes with the same floor area) and low ability to invest in more efficient equipment depending on factors such as the willingness of landlords to invest or the financial capacity of homeowners.

* Comparable households are characterised using five key characteristics: number of rooms, primary heating source, Nomenclature of Territorial Units for Statistics 1 region, number of people and dwelling type. To group households, a cascade approach is applied, ranking these characteristics by their relative importance in determining household energy costs. If a combination of characteristics results in a group of fewer than 50 households, the least important explanatory characteristic is dropped until a satisfactory sample size is reached. This way, the median energy costs are compared with households that are as similar as possible while maintaining a robust number of observations.

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Even if relatively simple at first glance, there are several methodological considerations in relation to spending and income indicators. As discussed, aspects such as the choice of threshold can impact the number and characteristics of households at risk, and these usually reflect local contexts. Initially, the 10%, 2M and M/2 indicators were designed to reflect conditions in England. However, the share of energy expenditure deemed affordable in one country might be different when compared with another country, for example, due to differences in household budget structures and because relative scales have some limitations.

Box 3.1 Beyond the numbers: Insights from comparing fuel poverty indicators in England

The United Kingdom has a long history of fuel poverty monitoring. The four UK nations have different fuel poverty measures, which typically correspond to their national targets and strategies. In England, households were initially considered to be in fuel poverty when their energy expenditure exceeded 10% of household income. In 2015, a new indicator focused on low income and high energy costs, and since 2021 the Low Income Low Energy Efficiency (LILEE) indicator has been used (Department for Business, Energy and Industrial Strategy, United Kingdom, 2021). Under this indicator, a household is considered to be in fuel poverty if the following conditions are met:

1. The household is living in a dwelling with an energy efficiency rating[1] of Band D or below.
2. Its equivalised[2] disposable income (after housing and modelled energy costs) is below the poverty line (60% of the national median).

England's statistics are based on required energy costs rather than actual spending. These assume a household's heating pattern and calculate the respective energy consumption required to have a warm, well-lit home with hot water for everyday use and to run appliances. This ensures that those households with low energy bills resulting from actively limiting energy use at home, for example by not heating their home, are not overlooked. However, this modelled energy use differs from actual consumption values.

Alongside the extent of fuel poverty (number of households), the LILEE indicator also measures the depth of fuel poverty (fuel poverty gap). The fuel poverty gap represents the reduction of energy costs needed to remove a household from fuel poverty. The LILEE indicator is specifically designed as a measure of progress towards the statutory fuel poverty target for England. The Fuel Poverty Methodology Handbook provides a detailed overview of the LILEE indicator calculation.

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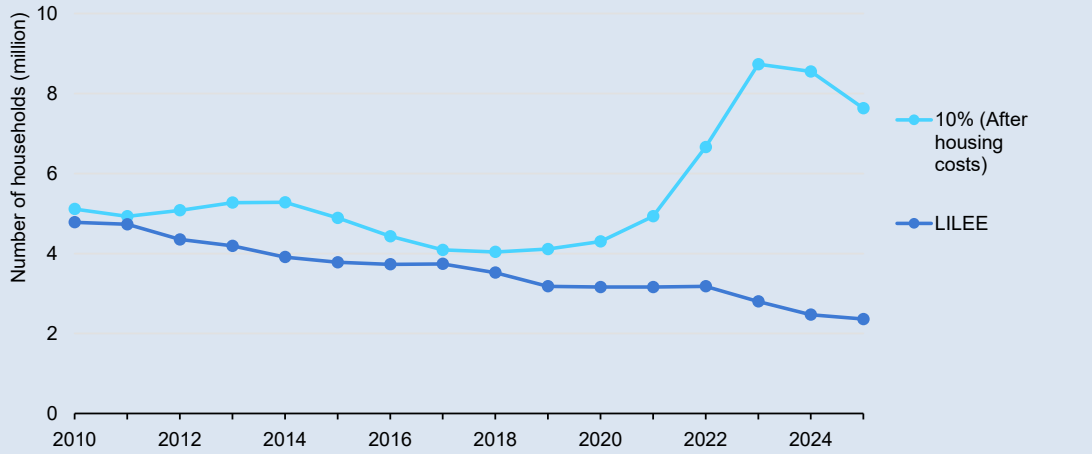
The LILEE indicator is not purely based on household energy spending and income; it relates fuel poverty to dwelling efficiency. For example, a household in an energy-efficient dwelling is not captured by the LILEE indicator. By comparing the LILEE indicator with the 10% indicator over time (the proportion of households who are required to spend more than 10% of their income after housing costs on energy costs), as seen in Figure 3.2, it is possible to see that they measure different aspects of fuel poverty and even show distinct patterns over time.

The slow but continuous decline of fuel poverty measured by the LILEE indicator can be mainly attributed to energy efficiency improvements over time. The sharp increase in fuel affordability measured by the 10% indicator from 2021 is mainly due to rising energy prices, suggesting increased economic pressures on household budgets.

Figure 3.2 Development of the LILEE and 10% indicators over time



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Note: Values for 2025 are estimated. To ensure better comparability with the LILEE indicator, the 10% indicator considers income after housing costs.

Source: Department for Energy Security and Net Zero, United Kingdom (2025), Annual Fuel Poverty Statistics in England, 2026 as modified by the IEA. Contains public sector information licensed under the Open Government Licence v3.0.

A report by the Committee on Fuel Poverty (2024) recommended a review of the LILEE indicator, arguing that it does not adequately capture "the full range of households facing unaffordable energy bills". It claims that the revised fuel poverty indicator needs to more accurately reflect the economic pressures posed by rising energy prices rather than focusing too much on energy efficiency.

The latest Fuel Poverty Strategy for England (2026) confirmed that the LILEE indicator will remain the primary measure used to track progress towards the statutory 2030 fuel poverty target. At the same time, recognising the wider energy-affordability challenges faced by households, the strategy introduces a complementary measure of energy affordability based on the proportion of

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household income required to meet energy costs, providing a broader perspective beyond LILEE; further details on this approach are presented under the "Energy affordability" section of the Fuel Poverty strategy.

Key learnings:

- An indicator's design and methodology have a strong influence on which and how many households it captures.
- Indicator design can direct attention towards more long-term structural aspects (e.g. energy efficiency) or more short-term issues (e.g. economic pressure due to rising energy prices).
- Using multiple indicators and comparing them can give valuable insights into the nature of energy deprivation.
- Regularly reviewing methodologies of energy-affordability indicators may be necessary to adapt to changing circumstances and/ or priorities.

Notes:

[1] The LILEE metric uses the Fuel Poverty Energy Efficiency Rating system, which is a modified version of the standard assessment procedure used to generate energy performance certificates. More information is available in the Fuel Poverty Energy Efficiency Rating methodology handbook.

[2] Equivalisation adjusts household income or expenditure to reflect differences in household size and composition, improving comparability across households. Common scales include the OECD scale and the English scale, which assign different weightings to adults and children.

Further resources:

- Fuel Poverty Methodology Handbook 2025. Department for Energy Security and Net Zero
- Annual Fuel Poverty Statistics in England, 2025 (2024 data)
- Commons Library Research Briefing on Fuel Poverty; Can Fuel Poverty be Ended? Committee on Fuel Poverty Annual Report 2024

Other methodological aspects include the equivalisation[5] of household income and energy expenditure, as well as the calculation of households' disposable income. These ultimately impact the number and what households are identified, but due to their very specific nature and considerations (which may hold across geographies) they are not explored in additional detail in this report.

Self-assessment indicators

This approach offers an alternative to monetary indicators by emphasising households' or individuals' lived experiences. Often called consensual indicators, these seek to capture a household's perception of affordability challenges around maintaining adequate levels of energy services or how a household faces the impacts of affordability challenges (e.g. environmental degradation of homes). For

[5] Equivalisation adjusts household income or expenditure to reflect differences in household size and composition, improving comparability across households. Common scales include the OECD scale and the English scale, which assign different weights to adults and children.

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example, this can involve asking a household if they are able or unable to afford to sufficiently heat their homes in winter or to keep them sufficiently cool in the summer. Table 3.4 provides examples of self-assessment indicators.

Table 3.4 Self-assessment indicators

Indicator type	Example indicator	Comment
Comfort	Percentage of population unable to keep home adequately warm Percentage of population unable to keep home comfortably cool	Depends on perceived comfort and adequate levels
Behaviour	Percentage of households who deliberately underheat to keep energy costs down	May be difficult to capture due to stigma

The relative simplicity of this type of indicator makes it easier to implement and facilitate cross-country comparisons. Moreover, it can capture broader dimensions of the impacts of affordability challenges, including social exclusion and material deprivation. However, a key limitation of the self-assessment approach lies in its reliance on subjective responses. Some households may not perceive themselves as deprived despite being identified as such by expenditure-based indicators, or vice versa.

Individuals may also underreport affordability difficulties due to stigma or differing cultural perceptions of comfort and warmth. In contrast, even households with above-average income might report difficulties in heating their homes. Slight differences in the phrasing of survey questions can also change meaning or understanding. This may impact survey results and cross-country comparability, for example, due to translation.

Table 3.5 provides an overview of applications of self-assessment indicators in different countries. Some countries use similar indicators with slightly different wording, adapting the phrasing of questions to the local context.

Table 3.5 Examples of self-assessment indicators across countries and regions

Country/Region	Indicators
European Union	The European Union has used self-assessment indicators to measure energy affordability for many years. This is done based on data from the EU Survey on Income and Living Conditions (EU-SILC), which asks respondents if they are able to keep their home adequately warm in winter (or cold in summer).

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Country/Region	Indicators
New Zealand	In 2023, New Zealand started reporting on a set of self-assessment indicators. These include: • The ability to afford to keep homes adequately warm in winter. • Deliberately underheating to keep costs down. • The proportion of households where dampness and or mould is a problem.
Portugal	Portugal considers the intersection of income poverty with other types of indicators, including self-assessment indicators. For example, it identifies households that are both income-poor and unable to keep their homes adequately warm.

Direct approach indicators

The direct approach assesses household energy deprivation through physical parameters, such as indoor temperature or lighting levels. By considering physical variables such as indoor temperatures, it assesses whether the variables measured fall within an acceptable range, where the lowest value corresponds to the heating setpoint in winter and the highest value to the cooling setpoint in summer. Defining the thresholds for this range can depend significantly on cultural and contextual settings. For example, disabled or elderly household members might require higher indoor temperatures in winter than those often assumed adequate.

Alternatively, and if available, actual energy consumption levels per unit of interest, such as per person or per square metre, can also be considered. Examples are given in Table 3.6.

Table 3.6 Direct approach indicators

Indicator type	Example indicator	Comment
Temperature	Average daily room/home temperature lower than *x*° Celsius in winter Average daily room temperature higher than *y*° Celsius in summer Number of hours with average hourly room/home temperature lower than *x*° Celsius in winter Number of hours with average hourly room/home temperature higher than *y*° Celsius in summer	Where *x* is the minimum assumed comfortable indoor temperature Where *y* is the maximum assumed comfortable indoor temperature
Energy	Final energy use per capita, climate-corrected Final energy use per dwelling, climate-corrected Final energy use per square metre, climate-corrected	Climate correction allows offseting weather fluctuations in indicators

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While direct measurements avoid the issue of subjective responses from surveys, they may involve privacy concerns. Additionally, it is quite resource intensive to develop a representative monitoring system based on direct measurements of indoor temperatures or energy use, for example. Because of this, direct measurements are typically not used in national monitoring systems and are not further covered in this report.

Indirect approach indicators

The indirect approach infers affordability drivers and other factors and impacts of affordability challenges from associated factors that are either factors of energy affordability, such as energy efficiency, or a consequence of affordability challenges, for example, arrears on utility bills, disconnections from utilities or housing quality problems with dampness or mould.

This approach takes advantage of often available administrative data (e.g. energy performance ratings from buildings certificates or utility data). Dwelling energy efficiency in particular plays a significant role in determining energy costs, with several countries including energy efficiency as an element of energy-affordability monitoring.

In the case of Denmark, England and Portugal**,** energy efficiency is measured through a stand-alone indicator in bands or ratings. Households with higher efficiency levels are typically considered more resilient to price fluctuations. Efficiency can also be included implicitly in the calculation of the required energy expenditure by taking building energy performance into account. For example, this is done in the Netherlands; see Table 3.7.

Table 3.7 Indirect approach indicators

Dimension	Example indicator	Comment
Utility bills and services	Share of population with arrears on utility bills Number of energy disconnections	–
Housing	Share of population living in a dwelling with leaks, damp or rot	–
Energy efficiency	Dwelling energy efficiency (number of dwellings below given rating)	The choice of the reference rating can vary

Table 3.8 provides some examples of countries including indirect indicators in their monitoring approaches. Most of the indicators are quite similar across countries, only with slightly different wording.

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Table 3.8 Examples of indirect approach indicators focusing on impacts of low energy affordability adopted by countries

Country/Region	Indicators
Austria	Austria uses composite energy poverty indicators. Its primary composite indicator captures households at risk of poverty and facing above-average energy costs and those unable to adequately heat their homes. This is extended by two additional indirect indicators: • Households with arrears on housing-related bills. • Households at risk of poverty and with poor housing conditions (leaks, dampness, rot).
Czech Republic	The Czech Republic's National Energy and Climate Plan mentions the following indirect indicators (among others): • Households with arrears on utility services. • Population living in a dwelling with a leaking roof, damp walls, floors or foundation, or rot in window frames or floor.
New Zealand	In addition to self-assessment direct indicators, New Zealand uses the following self-assessment indirect indicator: • Proportion of households where dampness and or mould is a problem.
Portugal	In its National Long-Term Strategy to Combat Energy Poverty 2023-2050, Portugal uses the following indirect indicator to monitor progress against national targets: • Proportion of households with problems of leak, humidity or rotten elements. In addition, as part of its monitoring work, the number of beneficiaries of both electricity and gas social tariffs (available to low-income households) is also considered.

Combining and composing indicators

The previous section illustrates the diversity of energy-affordability indicators typically in use across countries. An individual indicator sheds light on a specific driver or impact of energy unaffordability. Using a set of distinct indicators to monitor energy-affordability drivers and other factors as well as impacts of affordability challenges can shed light on its different dimensions and manifestations.

For example, using an indicator based on energy spending and household income alongside a self-reported one allows for a comparison between objective financial burdens and subjective perceptions of affordability challenges. While a policy intervention may increase the ability of a household to pay for energy services, this may not necessarily translate into improved perceptions. A complementary set of indicators may capture these nuances. Some countries also complement energy-affordability indicators with a measurement of income poverty.

Current practice has shown that using different indicators will identify a different set of vulnerable households. In Belgium, fewer than half of the households that

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state that they are unable to afford adequate levels of energy services are identified as struggling to pay for energy according to indicators based on spending and income. In line with this, only a small proportion of those households identified by economic indicators also self-report energy-affordability difficulties. Similar results have been found in Australia.

Some argue that using a set of different indicators complicates the interpretation of results, obscures potential trends and may lead to uncertainty about which households should be prioritised in policy responses. However, reports by the Federal Public Service Economy in Belgium and Energy Consumers Australia both highlight the importance of identifying divergences to better reflect on how different population groups are affected.

Another monitoring approach consists of the use of composite indicators to address the multi-dimensionality of energy affordability. For example, while the aforementioned LILEE indicator in England combines household income and energy efficiency as key criteria, Austria combines energy costs, income and the reported ability to heat homes adequately into a single composite indicator.

Such composite indicators may be helpful in indicating the severity of energy unaffordability in a single metric. It also suggests that a household is more likely to struggle with energy costs when multiple risk factors coincide. Nevertheless, the conditions or criteria considered in defining households experiencing energy hardship is an important aspect to reflect on, as these might not be affected by all risk factors at the same time. For example, a household living in an energy-efficient home but with a low income might still struggle to pay energy bills due to rising energy costs and while such a household would not be captured by the English LILEE indicator, it would be captured by the 10% indicator.

Box 3.2 Belgium's multi-indicator approach to monitor energy poverty

Belgium uses two objective indicators based on energy spending and household income as well as one subjective indicator to measure energy poverty. Households that meet at least one of the following criteria are classified as being at risk of energy poverty:

1. The proportion of energy spending compared with household income (equivalised residual income after subtracting housing costs) exceeds twice the national median (2M).
2. The household's energy expenditure falls short of half the median (M/2) of comparable households.

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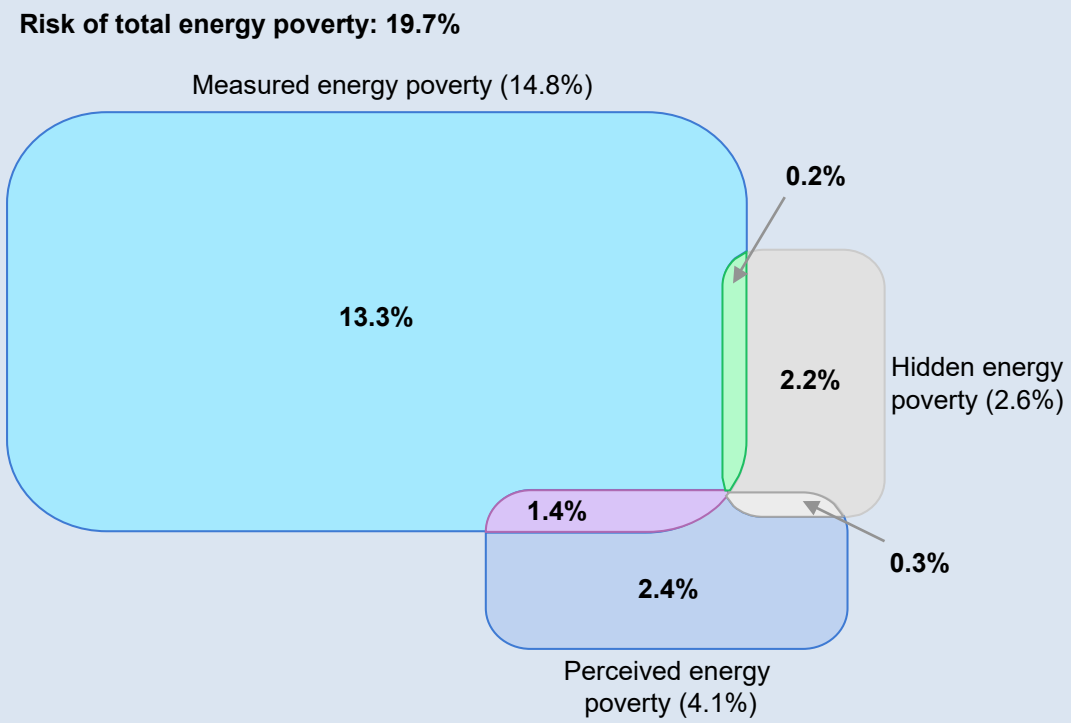
3. The household states that it is unable to afford to heat the home sufficiently.

For Indicators 1 and 2, the extent (how many households) as well as the severity of energy poverty (in Euro) is calculated. All three indicators only consider households in the five lowest income deciles.

Figure 3.3 Intersecting three different energy poverty indicators in Belgium



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Source: Federal Public Service Economy, Belgium (2025), modified by the IEA.

Households that struggle to afford energy may be captured by one, two or all three indicators at the same time. Analysing how these do or do not coincide demonstrates how unaffordability can manifest in different ways and illustrates why multiple indicators may be necessary to capture various dimensions (Figure 3.3).

Overall, only a small number of households is affected by multiple forms of energy poverty. Most affected households tend to spend a disproportionate amount of their income on energy costs, while a much smaller proportion underspends to save money. Fewer than half of the households who self-reported financial difficulties to keep their home warm in winter are also considered to be in energy poverty in financial terms. Interestingly, there is zero overlap between all three conditions.

The proportion of households that are captured by at least one of the three indicators is also compared with the proportion of households considered to be in

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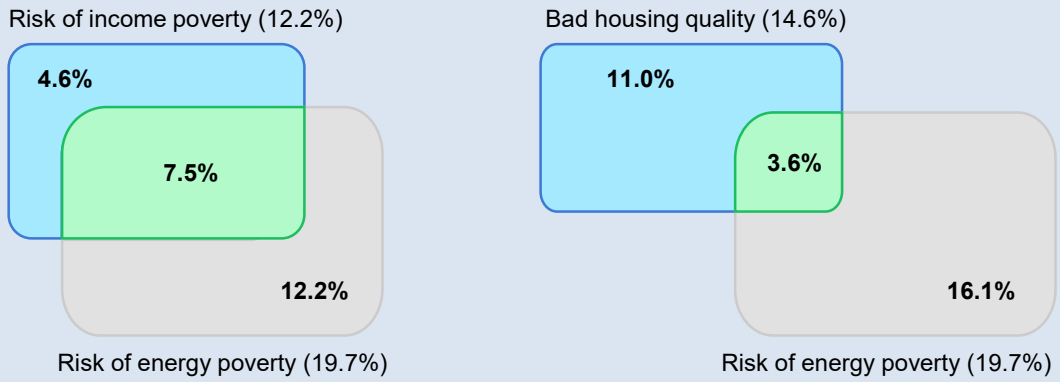
income poverty (Figure 3.4). Households are considered to be in income poverty when their income is below 60% of the national median equivalised income. By this definition, in 2024 12.2% of all households in Belgium were in income poverty and 61.3% of those were also at risk of energy poverty. While there is significant overlap between those types of poverty, this demonstrates that energy unaffordability is not necessarily implied by income poverty.

There is also significant overlap between the risk of energy poverty and low-quality homes; 14.6% of households with low-quality dwellings were also at risk of energy poverty.

The Federal Public Service Economy has already made changes to the risk of hidden energy poverty indicator, mostly to the definition of a comparable household. Currently, the Federal Public Service Economy is still improving its indicators, and it is now assessing the risk of measured energy poverty. After initial analyses, it has become apparent that this indicator may not optimally target the correct households.

Figure 3.4 Relation of energy poverty to income poverty and housing quality



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Source: Federal Public Service Economy, Belgium (2025), as modified by the IEA.

Key takeaways:

- Intersecting different types of indicators demonstrates that each captures distinct household groups. This underscores the need for a multi-indicator approach.
- Considering the risk of income poverty as it relates to the risk of energy poverty shows that these are distinct topics, which, although significantly overlapping, may impact different household groups.

Further resources: Energy Poverty Indicators 2025.

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Box 3.3 The Energy Poverty Indicator Calculation (EPIC) project (Italy)

The Energy Efficiency Directive (EU) 2023/1791 sets out the reference regulatory definition of energy poverty currently in force at the EU level. When transposing the Directive into national legislation, each Member State may introduce further specifications and identify monitoring indicators, taking into account those suggested by the European Commission.

In Italy, the current framework – including the policy approach, measures and targets related to energy poverty – is outlined in the National Energy and Climate Plan. The Plan also examines the various indicators that may be used to assess the phenomenon, selecting two indicators to monitor trends and reduction targets: "inability to keep the home adequately warm" (affecting 8.6% of the population in 2025) and "arrears in the payment of utility bills" (affecting 5.9% of the population in 2025).

Given the growing relevance of the phenomenon of energy poverty, both at national and EU level, several Italian institutions and research organisations have developed projects and initiatives in recent years to strengthen the energy poverty monitoring activity. In this regard, a notable initiative with a broad European scope is the Energy Poverty Indicator Calculation (EPIC) project, which provides new methodological insights for a European-Union-wide harmonised measurement of energy poverty.

The project is a European-Union-funded initiative launched under the Eurostat call SMP-ESS-2022-ENERGY-IBA on the modernisation of energy statistics. Running from 2023 to 2025, the project was implemented by a consortium composed of the Italian Ministry of Environment and Energy Security, Energy Services Management (Gestore dei Servizi Energetici – the State-owned company that promotes renewables and energy efficiency), and Single Buyer Italy (Acquirente Unico – the State-owned company providing services to the energy markets and supporting consumers).

The project seeks to improve the energy poverty statistical measurement by developing new analytical methods, expanding existing indicators and making use of additional data sources. The result is the design of an indicator that could be applied consistently at the European level.

The different stages of the work carried out in the EPIC project were shared throughout the project with Eurostat and the European Commission, as well as with a panel of institutional experts on energy poverty at the European level who contributed to the assessment and review of the work. IEA experts were also involved in the project's exchange and feedback activities.

The project's framework is based on the energy poverty definition set out by the European Commission in the Energy Efficiency Directive. Reflecting this definition,

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the project identifies three main dimensions of energy poverty: income, energy expenditure and dwelling energy efficiency, which remains one of the most difficult factors to quantify.

Employing a European-Union-level harmonised statistical methodology and data, the project developed three sub-indicators, one for each component of the definition (income, energy expenditure and dwelling energy efficiency), and integrated them into a single composite indicator to summarise the multiple dimensions of energy poverty. The sub-indicators also take into account elements such as household composition and territorial factors.

The energy poverty indicator is measured through a linear combination of the three sub-indicators, which are continuous variables. This means that a deprivation in one single dimension does not automatically imply energy poverty; this is determined by the combined values of the three sub-indicators.

This approach does not consider energy poverty to be driven by a single factor but rather to be the result of the combined effect of its three main components. In taking this perspective, it grasps the complex and multi-dimensional nature of the phenomenon by looking at how each dimension contributes to it.

The final indicator assigns a score to each household and compares it against a threshold that reflects national specificities. Households whose indicator value falls below this defined threshold are classified as “energy poor”. By design, the indicator thus serves a dual purpose. In addition to quantifying the number of energy-poor households, it is also suitable for assessing the risk of falling into energy poverty for households not currently labelled as energy poor.

The application of the final indicator to the available 2023 Italian data shows that the number of energy-poor households was estimated at 2.4 million, corresponding to 9.1% of all Italian households.

The harmonised methodology developed in the project ensures that the final indicator can be calculated across the European Union and replicated by all Member States; in addition, the project produced suggestions to Eurostat for strengthening and expanding data collection and statistical analysis at the European level.

Finally, the project highlights the need not only to define the phenomenon from a statistical perspective but also at the household level. It provides a tool that mirrors the approach adopted for the statistical indicator and can be used to assess the level of vulnerability of individual households.

Further resources: EPIC project page.

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Disaggregating energy-affordability indicators

The inability to afford adequate levels of energy services varies across population groups. Some of the most relevant population characteristics that have been associated with varying affordability risks are illustrated in Table 3.9.

Table 3.9 Examples of parameters to disaggregate household energy-affordability indicators

Parameters
Age
Gender
Ethnicity
Household size and composition (e.g. presence of children)
Health condition
Employment status
Tenure status
Income level
Rural/urban
Climatic zone

The ability to develop indicators disaggregated by such specific population groups can move the spotlight from the "average" population behaviour to the population groups that may actually be most vulnerable. Understanding not only how many but also what kind of households or population groups struggle to afford energy services can significantly enhance the understanding of factors and impacts by pointing out potential underlying structural problems and helping inform more targeted policies.

Various countries disaggregate indicators by socio-economic characteristics. For example, New Zealand disaggregates energy hardship indicators by selected ethnic groups, which shows that households with Māori and Pacific people are more likely to be affected by energy hardship. Data also shows that renters are around six times more likely to experience some measure of hardship than owners.

Canada disaggregates indicators by provinces, age, household type and various housing characteristics. Disaggregation reveals that elderly people and single and single-parent households are more at risk of energy poverty. Unlike in New Zealand, the risk for renters is lower than for owners in Canada.

The disaggregation of energy-affordability indicators implies that detailed data for relevant dimensions is available. In practice, disaggregated datasets, especially

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those from national surveys, may lack sufficient level of representativeness across regions or population groups because of sample sizes. A discussion of different data sources can be found in Chapter 4.

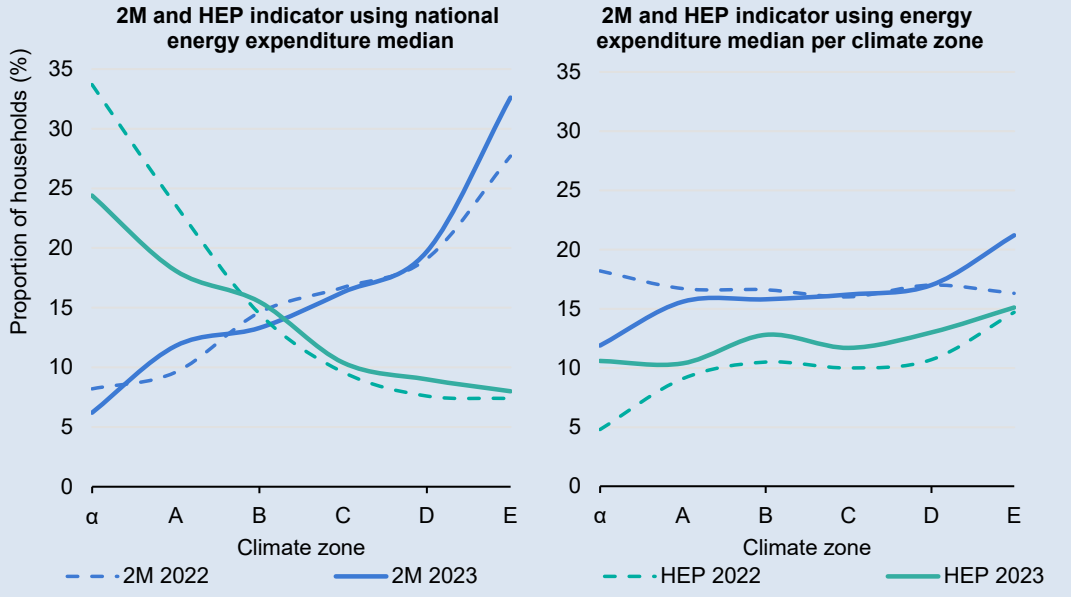
Box 3.4 Disaggregation of energy poverty indicators by climate zones and social electricity tariffs in Spain

Spain has an established energy poverty monitoring system based on four different primary indicators:

1. Disproportionate expenditure: Percentage of households whose share of energy expenditure on income is more than double the national median.
2. Hidden energy poverty: Percentage of households whose absolute energy expenditure is less than half the national median.
3. Percentage of population unable to afford to keep the home adequately warm in winter.
4. Arrears on utility bills: Percentage of the population with arrears on utility bills in the past twelve months due to financial difficulties.

The results are disaggregated by characteristics such as climate zone (Figure 3.5), region, household size, household composition, employment status of main household member, employment status and income quintile.

Figure 3.5 Energy poverty indicators as a function of the climate zone in Spain



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Note: The climate zones used here relate to winter climate severity. In general, areas classified closer to letter E correspond to colder climatic conditions. Zone α is a category established specifically for the Canary Islands.

Source: IEA based on data from Government of Spain (Gobierno de España).

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Figure 3.5 compares the two energy poverty indicators across climate zones. The left chart shows identified households compared with the national median, while the chart on the right shows identified households in relation to the respective climate zone median energy spending. Zones A and B refer to warmer climates while zones C to E correspond to colder winter climates.

The simple choice of the median energy expenditure explains the disparities observed. When using the respective median, the relationships between the climate zones and the two indicators become less pronounced. Overspending seems to be more homogeneously distributed across climate regions than initially suggested. Underspending even shows an inverse relationship, as it seems to be more severe in colder climates than in warmer climates when adjusting the median to reflect climate zones.

An exploratory study by the Institute for the Diversification and Saving of Energy (IDAE, Instituto para la Diversificación y Ahorro de la Energía) aims to address the requirement set out in the 2019–2024 National Strategy against Energy Poverty to improve the understanding of energy poverty in Spain. The study investigates the prevalence and determining factors of energy poverty among a representative panel of vulnerable households in Spain. In particular, it examines the gap between the energy expenditure required and that actually incurred by households to meet their thermal comfort needs in accordance with regulatory standards, taking into account a range of factors that allow for a more accurate diagnosis of the underlying causes of energy poverty. According to the findings, there is a significant gap between actual expenditure and required expenditure across all household types considered, although the extent of this gap varies depending on socio-economic status and residential context. The findings also suggest that disaggregation by climate zones may overlook important factors, such as dwelling typology and heating or cooling technologies. In addition, the general lack of adequate residential cooling systems in Spain seems to result in very low actual cooling expenditures, well below required levels. Furthermore, the study analyses the robustness of commonly used energy poverty indicators and proposes alternative indicators that provide a more comprehensive understanding of the issue. It also evaluates the structural and/or palliative measures aimed at combating energy poverty, identifying their strengths and weaknesses and, where appropriate, formulating recommendations to support a more effective design of policies and measures tailored to different circumstances, particularly those affecting the most vulnerable groups.

The study also highlights that, in general terms, the likelihood of experiencing energy poverty is higher among certain socio-demographic household profiles, including: large households, particularly those with children; single-parent households, most of which are headed by women; low-income households relying on subsidies or social benefits; households with only a female reference person; and households where the main income earner holds a nationality other than

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Spanish or has dual nationality. The results of the study have been taken into consideration in the drafting of the new National Strategy against Energy Poverty 2026-2030 (ENPE II).

Key learnings:

- Disaggregating indicators across different relevant dimensions may reveal interesting hidden trends.
- Cultural norms and/ or biases are important to take into account when constructing and interpreting indicators, as in the case of cooling technologies.
- Greater attention could be paid to the summer impacts of energy poverty, through the development of appropriate indicators and monitoring parameters, as well as the implementation of mitigation policies, particularly in light of the rising temperature trends observed in Spain.
- There is a higher prevalence of energy poverty among specific socio-demographic profiles, including large, single-parent, low-income, female-headed households and households where the main income earner is of non-Spanish or dual nationality

Further resources:

- National Strategy Against Energy Poverty 2019-2024
- Review of Measures to Combat Energy Poverty and Update of Indicators 2018-2024
- Diagnosis of Energy Poverty in Spain: Key Findings Based on a Household Panel

Box 3.5 Energy affordability and gender in the European Union

A growing body of studies highlights the relevance of gender inequalities in the energy sector, and similar concerns apply to energy poverty.

The report Gender and Energy: the Effects of the Energy Transition on Women, co-ordinated by the Joint Research Centre of the European Commission, concludes that women are more exposed to energy poverty due to persistent labour market inequalities (e.g. lower wages and higher prevalence of part-time or precarious employment), differences in energy consumption patterns, and biological factors (women tend to be more sensitive to extreme temperatures, which may translate into higher heating and cooling needs).

Complementary evidence provided by Simionescu & Oancea (2025) highlights women's disproportionate responsibility for unpaid care work for children and elderly family members, increasing their time spent at home and energy consumption. Altogether, this results in greater vulnerability of women and greater exposure to energy-related crises.

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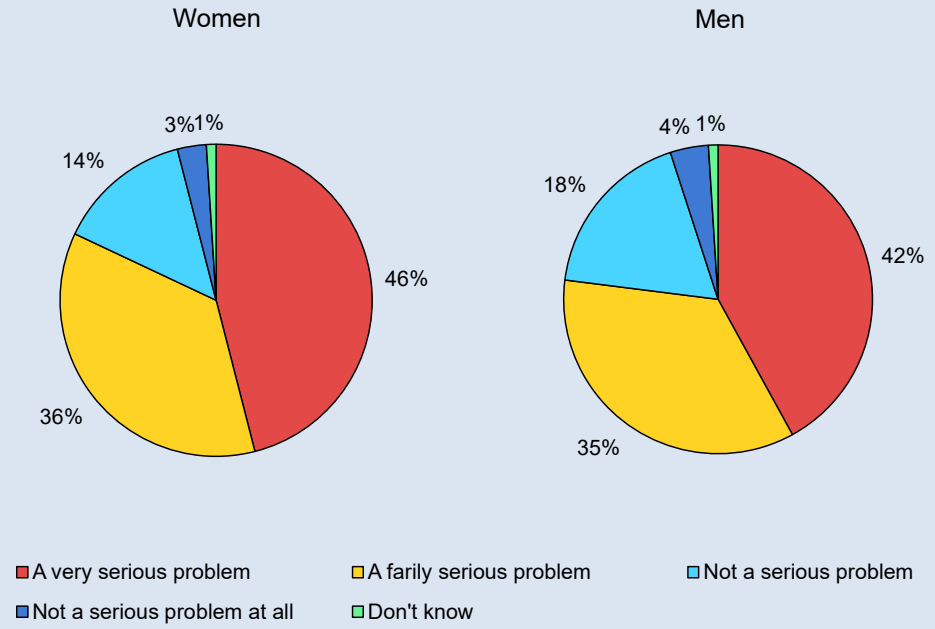
Despite the acknowledgement of gender-sensitive factors and of the impacts of affordability challenges, the systematic collection of gender-disaggregated data remains limited, including at the European level. For example, the European Union's Energy Poverty Observatory includes a diverse set of indicators, but these are largely based on household-level data and are not disaggregated by sex or other relevant characteristics. This data gap contributes to a broader neglect of gender perspectives in energy policy, not only among national and regional authorities but also within civil society.

Nevertheless, some indicators allow for a partial assessment of gender differences. The report Energy Poverty, Transport poverty and living conditions – An analysis of EU data and socio-economic indicators (2022) shows that, on average, 8.1% of households with a female reference person* in the European Union are unable to keep their homes adequately warm, compared with 7.5% of households with a male reference person, and that arrears on energy bills are more frequent among households with a female reference person. Gender differences are also visible on how energy affordability is perceived: data from the 2022 Eurobarometer indicate that women are more likely than men to consider energy costs a "very serious problem", as illustrated in Figure 3.6.

Figure 3.6 Seriousness of the problem of the current cost of the household's energy needs, by the gender of the reference person



Source: European Union/JRC (2024), Gender and energy: the Effects of the energy Transition on women, based on Eurobarometer 2022, as modified by the IEA.

Strengthening women's employment opportunities and economic empowerment are among the most effective mechanisms to address women's higher energy

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vulnerability and improve resilience to energy price shocks. Addressing this requires an integrated cross-sectoral approach.

Key learnings:

- Women in the European Union are more vulnerable to energy poverty than men due to structural inequalities in income, employment and unpaid care work.
- Gender-disaggregated data on energy poverty remain limited, constraining gender-sensitive energy policy development.
- Strengthening women's employment opportunities and economic empowerment is a key mechanism to reduce gendered energy poverty and improve resilience to energy price shocks.

*According to the report, the household's reference person is the person aged 16 or more who most contributes to the household income.

Further resources:

- Gender and Energy: the Effects of the Energy Transition on Women
- Income/Gender Inequality and Energy Use in the European Union
- Women, Gender Equality and the Energy Transition in the EU
- Energy Poverty, Transport Poverty and Living Conditions - An Analysis of EU Data and Socioeconomic Indicators
- Does Energy Poverty Matter for Gender Inequality? Global Evidence.

Final overview of indicators

The choice of indicators is a central element in monitoring energy affordability. This section has shown that there are various types of indicators and that it is good practice to choose a complementary set among such types. In this process, the definition of the indicators' methodologies, including the definition of the unit of analysis, indicator thresholds and the level of disaggregation, is particularly important to monitor energy affordability and to understand who is affected and how. This is to say that, especially regarding this topic, moving from average indicators to disaggregation by different population groups (e.g. age, gender, household type) may provide valuable insights enabling governments to target those that are more at risk.

Given the multi-dimensional and cross-cutting nature of energy affordability, partnering with stakeholders with complementary competences may help advance monitoring work. Specifically, academia often has important methodological knowledge and experience to contribute.

Leveraging existing data sources is of significant importance to start building the wished-for indicators. If certain data needed is not available, it is recommended that these gaps be earmarked for later data collection.

Based on each of the four key types of energy-affordability indicators discussed above and on the examples of combining and developing composite indicators

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presented here, Table 3.10 summarises the main energy-affordability indicators identified by type and dimensions covered, and matches them with key data items that need to be collected or compiled to develop them. The data collection methods that can be considered to collect or compile these data items are described in Chapter 4.

Table 3.10 Examples of affordability indicators adopted in national frameworks and required data items

Example indicator	Approach	Dimension	Data items to be collected
Percentage of households whose energy spending is higher than 10% of their disposable income	Spending and income	Energy spending and income	Energy spending, household disposable income
Households whose residual income after energy spending is below 60% of the national median	Spending and income	Energy spending and income	Energy spending, household income
Percentage of households whose energy spending is higher than twice the national median (2M)	Spending and income	Energy spending	Energy spending
Energy spending is below half of the national median (M/2)	Spending and income	Energy spending	Energy spending
Percentage of households whose income is below 60% of the national median (at risk of poverty)	Spending and income	Income	Household income
Percentage of population unable to keep home adequately warm	Self-assessment	Comfort	Population unable to keep home warm, total population
Percentage of population unable to keep home comfortably cool	Self-assessment	Comfort	Population unable to keep home cool, total population
Percentage of households who deliberately underheat to keep energy costs down	Self-assessment	Comfort /behaviour	Households who underheat, total households
Average daily room/ home temperature lower than x^o Celsius in winter or higher than y^o Celsius in summer	Direct	Comfort	Home temperature (hourly, daily average)
Number of hours with average hourly room/home temperature lower than x^o Celsius in winter or higher than y^o Celsius in summer	Direct	Comfort	Home temperature (hourly)

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Example indicator	Approach	Dimension	Data items to be collected
Residential final energy use per capita, climate-corrected	Direct	Energy use	Residential final energy use, total population, heating and cooling degree days*
Final energy use per dwelling, climate-corrected	Direct	Energy use	Residential final energy use, total dwellings, heating and cooling degree days
Final energy use per square metre, climate-corrected	Direct	Energy use	Residential final energy use, residential floor areas, heating and cooling degree days
Share of population with arrears on utility bills	Indirect	Utility bills and services	Population with arrears on utility bills, total population, ideally complemented by total households by household type
Share of households who have faced energy disconnections	Indirect	Utility bills and services	Number of households who have faced energy disconnections, total households
Share of population living in a dwelling with a leak, damp or rot	Indirect	Housing quality	Household size, total dwellings, dwellings with leak, damp or rot
Dwelling energy efficiency (number of dwellings with rating C or lower)	Indirect	Energy efficiency	Total number of dwellings per rating class
Electricity prices for household consumers – average consumption band	Indirect	Energy prices	Household electricity prices per consumption band
Gas prices for household consumers – average and lowest consumption bands	Indirect	Energy prices	Household gas prices per consumption band
Low Income High Costs (households with fuel costs above national median *and* income below official poverty line)	Cross-category	Energy spending and income	Energy spending, household disposable income
LILEE – Low Income Low Energy Efficiency i) Low energy efficiency: households with energy efficiency rating of Band D or below ii) Low income: households whose residual household income is below the official poverty line if they were to spend their estimated energy costs	Cross-category	Energy spending and income; Energy efficiency	Household size per dwelling rating class, Household disposable income, total households, estimated energy costs based on a certain temperature setpoint

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Example indicator	Approach	Dimension	Data items to be collected
Multi-dimensional Energy Poverty Index (Uses the Alkire-Foster Method, i.e. household is energy poor if considered deprived in two out of five categories)	Cross-category	Cross-dimensions	1. Low income, high costs 2. High share of energy expenditure in income 3. Inability to keep the home adequately warm 4. Presence of leak, damp or rot 5. Inability to pay utility bills
Indicators from Energy Poverty Indicator Calculation (EPIC) project	Cross-category	Cross-dimensions	Three sub-indicators, one for each component of the definition (income, energy expenditure, dwelling energy efficiency) and single composite indicator integrating them

* Cooling degree days are a simplified measure of the intensity and duration of warm weather over a certain period in a given location.

Note: The distinction between the approaches is based on the most common assessments, e.g. indirect approaches may overlap with self-assessment.

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Chapter 4. Data: Collecting relevant data to develop indicators

This chapter outlines the data requirements needed to operationalise the energy-affordability indicators presented in this report. It aims to bridge the conceptual framework and its practical implementation by identifying the key data items, data sources and analytical considerations required to support robust and policy-relevant measurement.

Energy affordability is a multi-dimensional concept and, as a result, the underlying data requirements are inherently diverse and extend beyond traditional energy statistics to include household surveys, administrative datasets, and technical or environmental measurements.

Data needs depend directly on the conceptual approach and methodological design of each indicator. Some indicators can be constructed from relatively simple and widely available data items, such as household income or energy expenditure, while others require more complex data, including self-reported survey responses, detailed building characteristics or high-frequency measurements.

Data collection can target different statistical units, such as individuals, households or dwellings. The design and planning of the data collection process not only for the data items but also for the coverage and frequency of the data to be collected may depend on the intended purposes. Households are common observational units. However, because the lived experience of individuals within households may differ, collecting data at the individual level is also relevant to understand the effects of factors and coping strategies related to affordability challenges.

The chapter provides a structured overview of:

- The core data items required to calculate different types of indicators.
- The data sources from which these data items can be obtained or derived.
- The data collection methods and implementation plan.

By clarifying these elements, this chapter supports policymakers and statistical agencies to design data systems that are fit for purpose, identify critical gaps in existing data infrastructures and prioritise investments in data collection and integration. More broadly, it highlights that building a robust energy-affordability monitoring framework requires not only sound analytical choices but also a sound approach to data development.

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Further guidance on how to design and implement such data development, including the prioritisation of data investments and institutional co-ordination mechanisms, is available in the IEA's Designing an Energy Statistics Roadmap guide, which provides a structured approach to strengthening national energy data systems.

Data items to be collected

As presented in Table 3.10, data needs are intrinsically linked to the specific indicators chosen to monitor energy affordability. Each indicator requires the collection or compilation of a defined set of variables that reflect its conceptual focus. For instance, economic indicators based on spending and income require core monetary variables such as household energy expenditure and disposable income. In contrast, indicators focusing solely on income require only household income data, illustrating how even within a single approach, data requirements may vary depending on the focus.

By comparison, self-assessment indicators depend on entirely different types of data, capturing households' perceptions and lived experiences such as (in)ability to keep the home adequately warm or cool or behavioural responses such as deliberately reducing heating to manage costs. These variables cannot be inferred from administrative or economic data and must therefore be collected directly from households.

Similarly, direct measurement indicators rely on physical or technical variables, such as indoor temperatures or energy consumption per capita, dwelling or surface area. These indicators require detailed and often high-frequency measurements, which may involve specialised equipment or modelling approaches.

Finally, indirect indicators draw on data items linked to the consequences or structural drivers of affordability challenges. These include administrative or survey data such as arrears on utility bills, disconnections, housing quality (e.g. presence of damp or mould), energy-efficiency ratings and retail energy prices. These variables may require harmonisation and linkage across datasets.

An additional layer of complexity arises with cross-dimensional or composite indicators, which combine data items from multiple domains – for example income, energy spending and dwelling energy efficiency – as in indicators such as Low Income, High Costs or LILEE. These indicators require integrated datasets and, in many cases, modelling assumptions (e.g. estimated energy costs), which further increases data requirements.

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Data sources

Monitoring frameworks typically rely on a combination of complementary data sources, each providing specific insights. At a high level, three main types of data sources underpin energy-affordability analysis:

- surveys
- administrative data
- direct measurements.

These are often complemented by:

- linking different data sources
- modelling.

Household and population surveys constitute a primary source of information in most countries. Surveys on income and living conditions, household budgets, housing conditions and energy use can provide detailed and flexible data on key data items such as household income, energy expenditure, housing quality and self-reported affordability challenges. They are particularly valuable for capturing lived experiences, enabling the construction of both objective and subjective indicators. However, surveys may face limitations related to cost, frequency, sample size and potential response biases.

Administrative data sources offer a complementary and increasingly important avenue. These include tax records, social security data, building registers, energy performance certificates and utility billing data. Administrative data can provide extensive coverage, reduce data collection costs and allow for detailed disaggregation, particularly when combined across institutions. At the same time, their use may be constrained by differences in definitions, access conditions, data quality and the need for co-ordination among data holders.

Direct measurement data – such as energy consumption from smart meters or environmental parameters within dwellings – can provide highly accurate and granular insights into actual energy use and conditions. While these sources can enhance the understanding of behavioural patterns and technical factors influencing affordability, their application in national monitoring systems remains limited due to cost, representativeness and privacy considerations.

Beyond individual data sources, linking datasets and applying modelling techniques can significantly enhance analytical capacity. Combining data from surveys, administrative sources and energy systems – for example, by linking income, housing and energy consumption data – can generate richer insights into the drivers

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and impacts of energy affordability. Modelling can further support the estimation of unavailable data and enable more granular or forward-looking analysis.

The advantages and disadvantages of various data sources are described in more detail in Table 4.1.

Table 4.1 Advantages and disadvantages of using different data sources

Data sources	Advantages of use	Disadvantages of use
Administrative data sources	• Avoids the cost of a new data collection process • Relatively quick availability • Increased synergy between institutions • Raises the profile of and interest in energy efficiency among various services	• Boundary issues: potential mismatch between definitions and target populations of existing data and data needed • Challenges in establishing and maintaining communication with the source organisation • Potential costs (direct and indirect, such as purchase of data or establishing agreements, changing data formats) • Time investment in search for data sources
Survey	• Relatively cost-effective, given extensive information collected • Ad hoc design of items collected based on purpose • Representativeness/statistical significance • Overall, comprehensive and good quality information	• Potentially high absolute cost • Time consuming • Need for further estimation work (e.g. extrapolation between years) • Risk of incomplete responses, biases, sampling errors • Requirement of staff training
Measurement	• Provides actual energy consumption at end-use or equipment level • High accuracy of data collected • Can shed light on actual behavioural patterns • Can be a key complement to other methodologies	• High cost of equipment • Small sample of population and time/lack of representativeness • Possible malfunctioning of equipment • Difficulties in finding volunteers
Linking different data sources	• Enhances usefulness of data, including for monitoring energy affordability • Allows combining information from different domains (for example census, administrative, income, housing, energy consumption, and building performance data) • Can support a richer and more comprehensive analysis than using a single source alone	• Relies on availability of common identifiers • Requires cooperation across data holders • Depends on consistency of structures and data quality • May be affected by differences in observational units • May be affected by misaligned reference periods • Representativeness may be an issue, especially for vulnerable groups

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Data sources	Advantages of use	Disadvantages of use
Modelling	• Cost-effective • Designed based on purpose • Can consolidate data from multiple sources • Can provide estimates of variables that cannot be measured • Allows validation of bottom-up estimates against national energy statistics	• Relies on availability of input data • Depends on quality of input data • Depends on assumptions made • Transparency may be an issue

Sources: IEA, based on IEA's Energy efficiency indicators: Fundamentals on statistics.

Table 4.2 provides an overview of the main types of data used to assess energy affordability, together with the corresponding data collection methods. It highlights that energy-affordability analysis relies on a combination of sources, reflecting differences in data availability, national statistical systems and measurement approaches across countries.

Table 4.2 Selected data items for energy-affordability indicators and examples of data collection methods

Variable	Survey	Administrative	Measurement
Household income	Household budget survey	Tax registers, social security data	
Household energy consumption	Energy consumption survey	Utilities, energy bills, grid operators	(Smart) meters and sensors
Energy prices		Utilities, network operators	
Housing quality	Housing census, housing survey, survey on living conditions	Utilities, building registers, energy performance certificates	
Lived experiences	Survey on living conditions		
Demographic characteristics	Population census, various surveys	Registers	
Environmental parameters at home			Indoor temperatures, humidity, and air quality pollutants / risk factors

Surveys

Surveys are often conducted among a representative sample of the population and are widely used in energy-affordability monitoring. Relevant surveys include those on living conditions, household budget surveys, surveys on energy use, time use survey or housing surveys. It may be also the case that different surveys ask similar questions to track common data items (increasing the frequency of

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collection of relevant data). A selection of surveys used to monitor energy affordability for different countries is provided in Table 4.3.

Table 4.3 Example of countries using surveys to monitor energy affordability

Country	Survey(s)	Description
France	National Housing Survey, Energy-Info Barometer	The National Housing Survey is conducted every 5 to 10 years to calculate the energy effort rate of households. The Energy-Info Barometer is conducted every year and includes a self-assessment indicator.
Italy	EU-SILC, Survey on Household Expenditure	According to Italy's National Energy and Climate Plan, the EU-SILC is used to develop self-assessment indicators and other mixed indicators (comprised of a self-reported and an economic part). In addition, the annual Survey on Household Expenditure is used to calculate an energy spending / income indicator.
New Zealand	Household Economic Survey	Conducted on a yearly basis, collects information on economic well-being in New Zealand. Questions are asked on incomes, living costs and well-being, such as respondents choosing to endure feeling cold to keep energy costs low.
United Kingdom	English Housing Survey	Comprises a household questionnaire and a physical survey, i.e. an in-person household inspection by trained personnel to assess the dwellings structure from the inside and outside. The English Housing Survey is conducted on a yearly basis, and around half of all participating households take part in the physical survey. Similar surveys are conducted in the other nations of the United Kingdom.
United States	Residential Energy Consumption Survey (RECS)	The RECS is conducted regularly by the United States Energy Information Administration among a representative sample of housing units. It asks questions on household energy insecurity, for example, whether households reduced or forwent basic necessities to pay for energy, if a household received a disconnection notice or if the home is kept at an unhealthy or unsafe temperature. Additional information can be found in Box 4.2.

Note: Further details on these countries and links to useful resources can be found in each corresponding country summary in Annex A.

Surveys offer flexibility of design, allowing the implementation of focused questionnaires and the collection of high quality and detailed data. Additional questions can be included on a regular basis or one-off modules can be implemented to gain a more complete snapshot. However, the burden on respondents needs to be considered. Some relevant data items to monitor energy affordability are given in Table 4.4, along with examples of possible survey questions.

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Table 4.4 Example of data items and questions in surveys to monitor energy affordability

Type of data item	Example of question
Disposable income	What is the [net] monthly income of your household after deduction of taxes and contributions to social security and pensions?
Household size	How many people usually live in your household? Please include yourself.
Perceived health status	How is your health in general? Is it… very good, good, fair, bad, very bad. (Reference question recommended by the World Health Organization.)
Housing costs	What is the amount your household pays as a total housing cost per month?
Arrears in utility bills	In the past twelve months, has the household been in arrears, i.e. has it been unable to pay utility bills (e.g. heating, electricity, gas, water, waste disposal) for the main dwelling on time due to financial difficulties?
Reduced utility costs / social tariffs / fuel subsidies	Utility cost reduced or fully covered by central/local government or non-profit institutions.
Financial burden of transport costs	To what extent were the costs of public transport a financial burden during the last 12 months? 1. Heavy burden. 2. Somewhat of a burden. 3. Not a burden at all. 4. No one in the household used public transport.
Ability to keep home warm/cool	Can your household afford to keep your home adequately warm/cool?
Inability to keep the dwelling comfortably warm during winter	Is the heating system efficient enough to keep the dwelling warm? Is the dwelling sufficiently insulated against the cold?
Inability to keep the dwelling comfortably cool during summer	Is the cooling system efficient enough to keep the dwelling cool? Is the dwelling sufficiently insulated against the heat?
Heating means	What does this household use to heat the home when needed? For example, do you use a space heater or your stove in the winter for warmth? Please describe the heaters, stoves or heat systems used for the greatest amount of time.

Sources: Methodological Guidelines and Description of EU-SILC Target Variables; Harmonized survey questions for monitoring household energy use and SDG 7.1.1 and 7.1.2

The ability to disaggregate indicators by region, municipality or socio-economic characteristics may depend on sample size – large enough samples and geographical areas may support higher granularities to ensure privacy and confidentiality. Another important aspect to take into account is the private nature

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of the topic and the challenge of ensuring that the most vulnerable are actually reached and surveyed and that responses are accurate and reliable enough (and unaffected by subjectivity and bias).

Box 4.1 Monitoring energy poverty in the European Union using the statistics on income and living conditions (EU-SILC) and Household Budget Survey

Energy poverty is a priority topic for EU member countries. Extensive work has been done to develop standardised indicators to monitor energy poverty at the national and European level. Regulation (EU) 2018/1999 mandates EU member countries to report the number of households in energy poverty in their National Energy and Climate Plans. The European Commission proposed various indicators to measure energy poverty in the Commission Recommendation (EU) 2020/1563, many based on the EU-SILC survey.

Through SILC, data on income, poverty, social exclusion and living conditions are collected. While countries do have some level of freedom in conducting the survey, for example, regarding the wording of questions, it is harmonised through a framework regulation. This framework defines requirements and provides recommendations on question design and survey implementation with the goal of maximising comparability across countries and across time.

The survey is split into household and individual questions. Most questions relevant to energy affordability are asked on a household level. Alongside questions on household income and housing costs, respondents are asked whether they are able to keep their home adequately warm and if the household has had arrears on utility bills in the last 12 months.

The survey also includes a range of personal questions asked to all household members aged 16 or over. These are mainly socio-economic questions, allowing for the analysis of distributional aspects of energy affordability.

In addition to questions asked annually, there are various modules that are either included at a fixed frequency or for a single exercise. In 2023, a module on household energy efficiency was included. So far, the SILC survey has not included questions on energy spending.

Complementarily, EU countries also conduct a household budget survey every five years. HBS data on energy spending and income enable the calculation of economic indicators such as spending/income indicators.

Key learnings:

- EU-SILC data provides a good example of a standardised survey that enables the comparison of energy poverty rates across the EU.

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- Complementary surveys, even if less frequent, can be used to develop relevant national indicators.

Further resources:

- Methodological Guidelines and Description of EU-SILC Target Variables;EU-SILC Methodology – Introduction
- Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action
- Commission Recommendation (EU) 2020/1563 on Energy Poverty

Box 4.2 Residential Energy Consumption Survey in the United States

The Residential Energy Consumption Survey (RECS) is a recurring survey conducted by the US Energy Information Administration that collects detailed data about household energy use.

Data is collected in two steps. First, the Energy Information Administration conducts a voluntary survey among a representative sample of all occupied housing units across the country. The second step is a mandatory survey of energy suppliers to collect data on the energy consumption and spending of the housing units surveyed in the first step.

The household survey includes questions on household characteristics, energy supplier, energy-consuming equipment such as appliances, space and water heating and air conditioning, and energy use behaviour. In the 2020 cycle, new questions regarding the presence of electric or hybrid vehicles as well as installed solar capacity were added.

The RECS household survey does not include questions on energy spending and consumption, but the complementary survey to energy suppliers does (Step 2), allowing the development of spending/income indicators.

The Energy Information Administration asks three questions to monitor energy insecurity: i) whether households have reduced or forgone basic necessities to pay energy bills; ii) whether households have received a disconnection notice; and iii) whether they kept their home and an unhealthy or unsafe temperature. For each question, households are also asked how often they experienced some kind of energy insecurity.

Results show that low-income households, renters and households with children are more likely to be affected by energy insecurity. In addition, households at risk of energy insecurity have higher average energy expenditure per floor area compared with households that did not experience energy insecurity.

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Key learnings:

- Complementary to household surveys, energy suppliers may also provide relevant data to monitor energy insecurity.
- Integrating different data sources in the same data collection cycle may allow the widening of the scope of the data collected.

Further resources:

- 2020 Residential Energy Consumption Survey (RECS) Methodology
- Release on Energy Insecurity Measures
- Detailed Disaggregation of Household Energy Insecurity Data

Censuses, that is, surveys targeting the whole national population, may provide additional relevant data, for instance on characteristics of housing units. Their main advantage is their comprehensiveness, providing detailed geographical coverage and disaggregation by socio-economic characteristics. However, censuses are developed with a broader scope and questions might not exactly match the needs and methodologies defined for energy-affordability indicators.

Censuses are resource intensive, and hence only conducted with a given frequency (e.g. every 5 or 10 years), providing low time granularity. It also takes longer to conduct them and to process the data they collect than it does for other surveys. For this reason, relying on censuses is not suitable to produce timely indicators, as they are useful mainly to generate more in-depth information than other surveys.

Few countries use census data for energy-affordability monitoring. Canada is one such country, having used the 2021 Census of Population (held every five years) to estimate the energy burden of households in addition to the results from the Survey of Household Spending. This allows Canada to further examine energy affordability and to disaggregate features such as income, housing expenditure and home ownership by different socio-economic characteristics. A methodological challenge in both the Census of Population and the Survey of Household Spending is that energy costs are included in housing costs, leading to the underestimation of energy poverty rates.

Administrative data

Administrative data is collected to enable and support various governmental administrative activities, and is often not considered statistical data collection. Data can cover areas such as tax/income, social security, housing and energy use. National statistical offices increasingly leverage the potential of administrative data to complement their data collections, as it is often readily available and

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comprehensive, and avoids duplication in the use of resources; however, its use needs to carefully account for legal frameworks and data protection requirements governing access, sharing and processing.

For instance, tax registers may include data on various income sources (e.g. salaries, pensions and capital income), while utilities have data on energy use, tariffs and bills, which can be helpful in deriving spending/income indicators.

Even if there may be challenges in using administrative data (e.g. mismatch of data needs and data availability or lack of common definitions to map data sources), they remains a valuable source used by various countries to monitor energy affordability (Table 4.4).

Table 4.5 Examples of administrative data uses to monitor energy affordability

Country	Administrative data sources
Netherlands	Statistics Netherlands uses an array of administrative data sources to monitor energy affordability. This includes data from building registers maintained by municipalities as well as data from utilities on energy consumption and diffusion of energy technologies in homes. See also Box 4.4.
Denmark	According to Denmark's National Energy and Climate Plan 2021-2030, the Ministry of Climate, Energy and Utilities uses data from the register of buildings and housing as well as energy certificates data from the Danish Energy Agency to monitor energy poverty.

Identifying and relating existing data sources may not only save important resources but also increase the coverage and accuracy of monitoring systems. However, it may not be completely possible to adapt data collected for other purposes to fit the affordability indicators initially wished for. This may also be the case for administrative data, which often come in a specific format or level of breakdown, requiring methodological adaptations in the indicators developed, hence hindering their comparability across regions.

Measurement

Direct measurements are a primary data source when developing direct approach indicators. These include, for example, measurement of indoor temperatures, humidity or lighting levels as well as other environmental parameters relating to thermal comfort. Other measurement parameters may include air quality (from sensors) and other environmental variables (such as temperature or precipitation) to check for exposure to risk factors such as mould or damp.

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Similar to the direct indicator approach, measurement data are not often used in monitoring energy affordability due to their resource-intensive collection needs and privacy concerns. For this reason, they are not further explored in this report.

A summary of the data collection methods described above, their applications across energy-affordability topics and their uses in national monitoring systems is given in Table 4.1.

Linking different data sources

Bringing together data sources across different domains can greatly enhance their usefulness, including in monitoring energy affordability. For example, Ireland combines various data such as census data with administrative data on building energy ratings; data from the survey on income and living conditions with census data; and energy supply with data on buildings energy performance; see Box 4.3. Similarly, the Netherlands combines various data sources, such as housing and population registers, income data from tax administration offices and gas and electricity consumption data from utilities – see Box 4.4.

Nevertheless, linking different data sources may not be straightforward. Some challenges include the fact that common or compatible identification systems of households or individuals may not exist (and therefore linking data sources requires cooperation) and that data have differences in structure, quality, observational units (e.g. households vs. individuals) and time references (e.g. reference years), potentially leading to distorted analysis. Strategies need to be developed to handle these differences.

When integrating multiple data sources, it is also important to ensure data representativeness. This is especially relevant in monitoring energy affordability to ensure that potentially vulnerable groups are appropriately captured.

Box 4.3 Linking survey and administrative data in Ireland

Ireland uses diverse data sources to monitor household energy deprivation. Historically, data from various surveys such as the EU-SILC survey, the Household Budget Survey and the Living in Ireland Survey have been used to monitor energy poverty.

The Economic and Social Research Institute, in cooperation with the Central Statistical Office and other institutions, is currently developing new measurement approaches beyond surveys. The Central Statistical Office provides various micro-datasets to support the work of the Economic and Social Research Institute.

The Statistics Act 1993 authorises the Office to assess and use administrative data collected by other public authorities. It uses Eircode, a unique identifier of each residential property, to match different datasets. However, not all administrative

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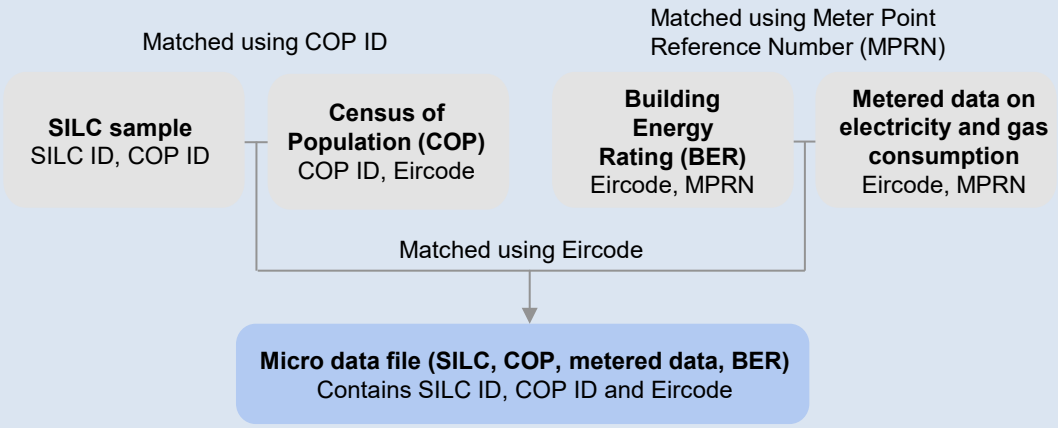
data uses Eircode and the Office does not have direct control over which institutions adopt Eircode in their datasets.

Examples of data sources already combined include data from the Census of Population 2016 with building energy ratings. Matching these two datasets allows to break down the ratings by social characteristics as well as by county, and can help identifying population groups that may struggle in affording energy. The matching process is shown in Figure 4.1.

However, not all buildings have a rating* and an Eircode connected to it, resulting in a matching rate of only 34% of all households. There is also a large fluctuation of matching rates across counties.

The Office is also looking into combining existing data with that from the EU-SILC survey and metered electricity and gas consumption data from energy suppliers. The main challenge remains the use of common identifiers.

Figure 4.1 Matching process to produce microdata



Note: Only around 50% of BER audits are connected to an Eircode. Matching by meterpoint reference number was used to increase the number of building energy rating entries with an Eircode.

Source: Central Statistics Office (2023), as modified by the IEA.

SILC data samples contain the same identifiers as the Census of Population, which also uses the Eircodes. With this, SILC and census data can be combined with energy consumption and building energy rating data.

Key learnings:

- Connecting survey and administrative data have the potential to enhance energy-affordability monitoring.
- The lack of common identifiers is a key challenge in integrating datasets.

*A building energy rating certificate has been mandatory since 2007 for new buildings and since 2009 for all homes being sold or offered for rent. To match census data, only buildings that had a rating in 2016 were included.

Further resources:

- Statistics Act, 1993
- Domestic Building Energy Ratings From a Social Perspective 2016.

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Box 4.4 Linking household microdata in the Netherlands

The Netherlands has started to monitor energy affordability in recent years. Statistics Netherlands established a unique monitoring system that sources its data mainly from administrative sources in combination with other data sources.

The Woonbase database maintained by Statistics Netherlands serves as a foundation for this monitoring, providing information on housing and the housing market. Woonbase makes use of the register of addresses and buildings as well as of the register of persons to achieve full coverage of all dwellings and residents. Both registers are compiled and collectively maintained by Dutch municipalities. Woonbase is then enriched with various data from registers, surveys and model estimates.

Each person, dwelling and housing unit has a unique identifier that enables matching with other datasets. Whenever household compositions change, a new identifier is created, allowing to track changes over time.

In the case of energy poverty, Woonbase data from various different stakeholders is combined. For example, utilities provide data on household energy technologies, such as the main heating system, presence of solar photovoltaic cells and electricity and gas supply. Additionally, data on average energy prices, building labels, household income and household assets are included.

Smart meter data has been recently made available, and is expected to enable obtaining a more accurate picture of household energy consumption that the standard values currently used. Additionally, household energy contract data may become available soon, avoiding the use of average prices.

In total, more than seven million households are included in this data, that is, 87.3% of all households in the Netherlands. Groups not included are mainly those where there are methodological concerns or a lack of data. These include shared flats, households with unknown income and households living in non-residential buildings. The high data granularity allows resulting indicators to be broken down by socio-economic characteristics, province, municipality and neighbourhood, allowing for a very detailed spatial analysis of energy affordability. An overview of the sources is shown in Figure 4.2.

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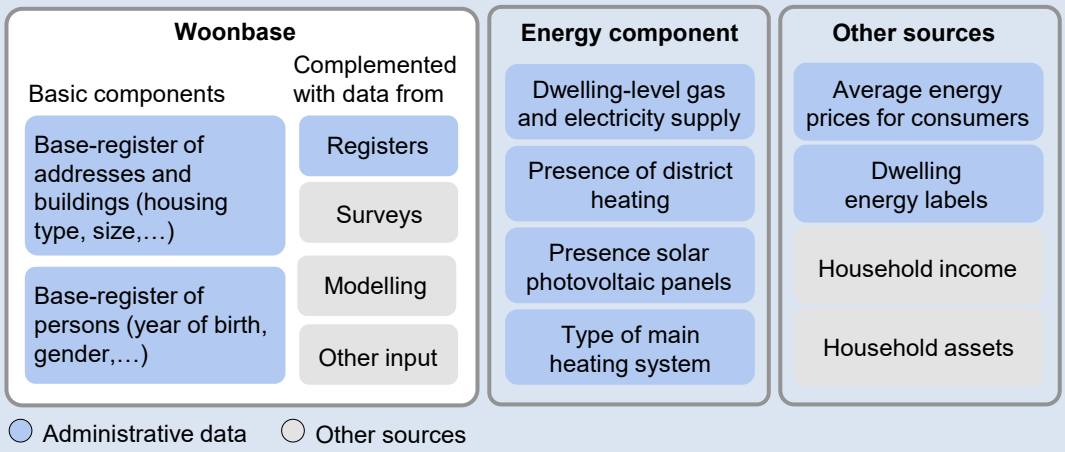
Figure 4.2 Overview of data sources for energy-affordability monitoring in the Netherlands



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Source: IEA, based on Statistics Netherlands.

Key learnings:

- Administrative data may enable a very high coverage of households allowing for a detailed spatial analysis of energy affordability.
- Even when administrative data are available, some groups of households are challenging to cover. It is important to be aware of this when using the data.
- Establishing standardised identifiers allows matching different datasets.

Further resources:

- Information About the Woonbase Housing Database
- Method Document of the Energy Poverty Monitor 2019-2022
- Result of the Energy Poverty Monitor 2023

Modelling

While modelling is not a data collection methodology in itself, it can be useful to either estimate relevant parameters to monitor energy affordability, or to develop analytical frameworks that help assess the risk of energy unaffordability, complementing the data collection methods discussed above.

In the first option, as seen in England (Box 3.1), modelling can be used to estimate minimum energy needs or spending to develop economic indicators (e.g. based on input variables such as building characteristics, occupancy, equipment and climate data). The Netherlands uses a regression model of home energy

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requirements based on building characteristics (surface area, size, age, energy label, heating source and presence of solar photovoltaic panels), household size and income.

In the second option, the likelihood of households struggling to pay energy bills or of experiencing insufficient heating/cooling can be estimated based on socio-economic variables (e.g. energy spending and household characteristics), dwelling features and external factors such as climate. For instance, Greece estimates the chance of a household to be in energy poverty through a logistical regression approach, using as input variables annual electricity costs, construction years, presence of a central heating system, household income and age, employment, household size, home ownership and climate.

Modelling can also be helpful to address some data gaps. For example, France uses a model called Prometheus to estimate yearly energy poverty rates based on its National Housing Survey, which is only conducted every 5 or 10 years. Similarly, the United States uses modelling to improve the geographical granularity of energy-affordability estimates (Box 4.5).

Box 4.5 United States Low-Income Energy Affordability Data Tool

The United States Department of Energy and the National Renewable Energy Laboratory have jointly developed the Low-Income Energy Affordability Data Tool to support data-driven decisions on "energy goal setting and programme planning", for example by local governments and utilities.

The Low-Income Energy Affordability Data tool is an interactive, web-based platform that provides maps, charts and data on household income, energy spending and the average energy burden.[6] Results can be disaggregated by state, county, city, census tract* or tribal area; by income level, housing type (tenure, age of building, number of units and primary fuel type used) and other household characteristics.

The Low-Income Energy Affordability Data tool is based on the most recent five-year estimates of the American Community Survey, conducted by the United States Census Bureau, and which includes questions on the social, economic and housing situation of households as well as their demographics. American Community Survey data is available on a more aggregated level, for what are called Public Use Microdata Areas with more than 100 000 residents. For this reason, more granular values needed to be estimated.

[6] Energy burden defined as the "average annual housing energy costs divided by the average annual household income".

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The downscaling of energy spending to the census-tract level is performed by calibrating energy use from natural gas and electricity utility information provided by the Energy Information Administration of the United States of America. Because utility service areas and census tracts are not exactly the same, an algorithm is used to match these.

Due to the structure of the American Community Survey data and the estimation process, there are some limitations on the results of the tool. Because the survey data are based on five-year rolling averages, the tool does not consider time fluctuations. Gas and electricity spending are reported for one month, potentially reducing the accuracy of annual estimates. Also, households whose energy costs are included in other housing costs are excluded from the analysis.

Key learnings:

- Modelling can increase the level of disaggregation of energy-affordability indicators and act as a foundation for detailed energy support programmes.
- It is important to consider the accuracy and reliability of results when applying modelling approaches.

*Census tracts are small geographical entities determined by the United States Census Bureau and are used to present statistical data. They usually have a population of between 1 200 and 8 000 (United States Census Bureau, 2022).

Further resources:

- LEAD Tool
- LEAD Tool Methodology (December 2024)
- American Community Survey Information Guide.

Data collection

The implementation of data collection for energy-affordability indicators is inherently complex and highly dependent on national statistical systems, data availability, institutional arrangements and many other factors. Approaches vary significantly across countries, reflecting differences in data infrastructure, governance frameworks and policy priorities. A wide range of methodological references and practical experiences exists to support this process. However, a comprehensive review of these approaches goes beyond the scope of this report. Instead, this section focuses on outlining the key steps that underpin the establishment of robust and sustainable data collection systems for monitoring energy affordability.

The first step is data assessment and planning, which involves reviewing existing data sources such as household surveys, utility data or administrative records to determine whether they can support key indicators. At this stage, data gaps are

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identified, for example, where information on energy expenditure or dwelling characteristics is missing, and plans are developed to establish regular data collection processes to fill these gaps.

Once data are available, ensuring their reliability is essential. This is addressed through data quality and harmonisation. In practice, energy-affordability monitoring often relies on data from different systems, such as household budget surveys and energy consumption records. These need to be harmonised – for example, ensuring that energy expenditure includes comparable components across datasets – and validated through quality control checks to guarantee the consistency and robustness of the indicators.

The next step is the preparation of outputs, where data are transformed into policy-relevant indicators. These indicators are then disseminated through reports, dashboards or monitoring tools to policymakers and the public. For example, affordability dashboards can be used to monitor the impact of energy price increases or to identify vulnerable households.

Finally, system management includes maintaining data systems, ensuring reproducibility of indicator calculations and establishing appropriate data governance frameworks for data sharing and protection. Continuous improvement is also important: feedback from users and advances in data sources, such as smart meter data, can help refine methods and enhance the monitoring system.

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Chapter 5. Methodological framework to monitor household energy affordability

Given the increasing importance of energy affordability, international collaboration can support countries that want to develop monitoring by exchanging knowledge and proposing a consistent monitoring framework. Responding to the request of the Committee on Energy Statistics of the IEA and based on consultation with key data providers, this report now presents an overarching methodological framework to develop indicators and collect the necessary data.

The proposed framework for household energy-affordability indicators and data is designed as a thematic extension that complements the general setup of the IEA's energy statistics roadmap. The affordability framework builds on the roadmap's overarching structure, particularly its core components related to institutional arrangements, resources and data processes, while introducing additional, topic-specific elements tailored to the measurement of affordability. In doing so, the framework provides more granular guidance on indicators, data sources and methodological choices specific to affordability, ensuring relevance to this policy area while maintaining alignment with the broader energy statistics system.

While the framework draws on these foundational elements, a detailed discussion of the broader roadmap components, such as the identification of data users and needs, legal and institutional frameworks or the mobilisation of human and financial resources, is beyond the scope of this report. These aspects are comprehensively addressed in the energy statistics roadmap itself and are assumed to underpin the implementation of the affordability framework. Accordingly, this report focuses on the specific methodological and data-related considerations required to operationalise energy-affordability measurement, building on and complementing the general setup without duplicating its overarching guidance.

Beyond using the methodological framework to monitor affordability, data should be effectively disseminated to ensure that insights are clearly communicated and inform policy action (see Figure 1.1).

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Framework description

This report has identified common elements between existing definitions, summarised key indicator approaches and linked these with data collection methods. With a view to facilitating efforts at the national level, a simple methodological framework was developed (Figure 5.1). This is structured into three key overarching blocks (dimensions, indicators and data).

Based on this, recommendations regarding ways forward are proposed. These are structured into the same three overarching blocks considered (dimensions, indicators and data), preceded by a set of relevant questions to ask at each stage, bearing in mind the specificities of different national contexts.

Dimensions of energy affordability to be captured

- *What energy-affordability definition appropriately captures the main national dimensions?*
- *What key energy-affordability dimensions best capture drivers and impacts?*
- *What population groups are impacted?*

Assessing energy affordability requires first identifying its key dimensions, including underlying drivers, resulting impacts and the population groups most affected, and ensuring that the adopted definition reflects the main national specificities and priorities. This involves proposing or revisiting a national definition of energy affordability that captures these dimensions while favouring a positive framing (e.g. focusing on affordability or well-being rather than poverty or hardship). Based on this definition, it is important to determine which dimensions are most critical in the national context and which are secondary or complementary, as this prioritisation will guide the selection of indicators. The three core dimensions are drivers, impacts and population groups.

Drivers: The first dimension underlies factors shaping affordability, including household income, energy expenditures, energy efficiency, households and dwelling characteristics but also cultural factors, behaviours and others. These factors do not operate independently. Affordability emerges from their interaction: a given level of energy prices will have different implications depending on income levels and dwelling conditions.

Example drivers include: income, energy expenditure, energy efficiency, household composition, cultural factors and other expenditures.

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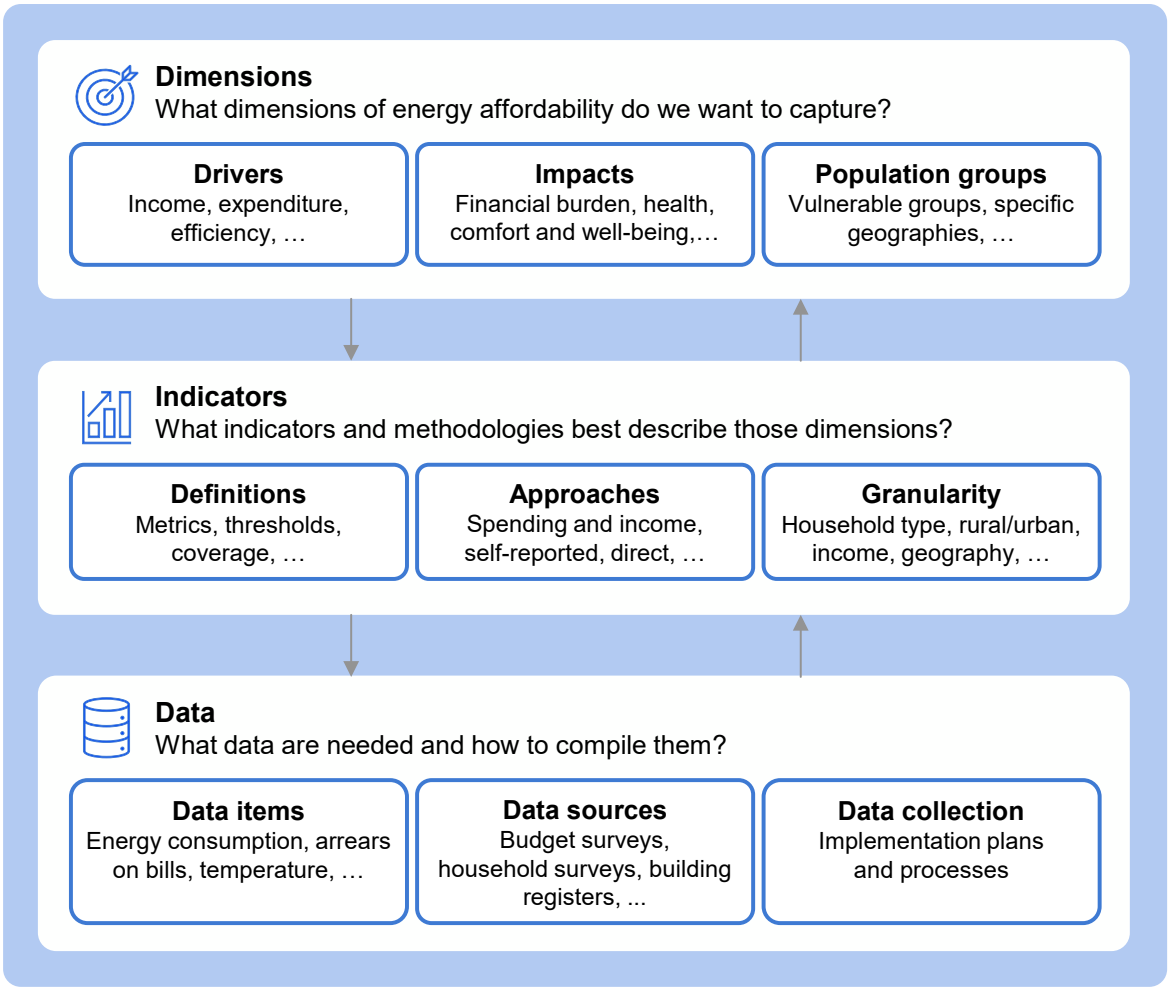
Figure 5.1. Household energy-affordability methodological framework



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Impacts: The second dimension captures how affordability constraints translate into outcomes for households. These impacts extend beyond financial pressure and include reductions in energy consumption, thermal discomfort or broader effects on well-being and living conditions. Two households with similar expenditure patterns may experience affordability very differently depending on their ability to maintain adequate comfort levels. Including impacts ensures that monitoring frameworks do not rely solely on monetary indicators but that they connect economic conditions to lived experience.

Selected impacts include: financial burden, health, comfort and well-being, social impacts and property maintenance.

Population groups: The third dimension recognises that affordability challenges are not evenly distributed across the population. Vulnerability is often concentrated among specific groups, such as low-income households, tenants or those living in

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inefficient dwellings. This enables the identification of who is affected, how risks accumulate and where targeted interventions are needed.

Selected population groups include: economically vulnerable groups, vulnerable household structures and specific geographies.

Indicators and methodologies best describing the dimensions to be captured

- *What indicators need to be developed to capture energy-affordability drivers and impacts?*
- *What assumptions are required?*
- *What disaggregation is meaningful to target the analysis?*

Designing a robust framework to monitor energy affordability requires selecting a coherent set of complementary indicators aligned with the previously identified dimensions, while clearly distinguishing between primary (priority) and secondary (complementary) indicators. Indicator methodologies should be carefully defined in line with the national context, including choices around the unit of analysis (e.g. households or population), relevant thresholds, levels of disaggregation and key calculation elements. Particular attention should be given to reaching vulnerable population groups, who are often harder to capture in surveys.

Definitions: The selection and precise specification of the indicators to be included in the framework, including what each indicator is intended to capture, how it is interpreted, which thresholds or reference values are applied where relevant and how the chosen set collectively reflects the key dimensions of energy affordability to be monitored.

Selected indicators include: the percentage of households whose energy spending is higher than a given percentage of disposable income and the percentage of the population unable to keep their home adequately warm and the share of population with arrears on utility bills.

Approaches: Different approaches are used to develop indicators, each reflecting a different analytical perspective. Expenditure-based indicators generally target drivers by capturing the financial burden of energy costs relative to household income; self-reported indicators tend to monitor impacts, reflecting households' perceived difficulty in affording adequate energy services; direct indicators rely on measured conditions such as indoor temperatures or energy use; and indirect indicators draw on related signs such as arrears, housing conditions or energy efficiency. Combining these approaches allows for a more comprehensive understanding of affordability and helps explain divergences across indicators.

Approaches include: expenditure-based, self-reported, direct and indirect indicators.

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Granularity: The level of disaggregation applied to the indicator set, including the population groups and household characteristics to be distinguished in the analysis, so that affordability challenges can be identified across different socio-economic profiles, housing situations and geographical contexts.

Disaggregation can be by household characteristics, rural/urban, employment status, income, health condition, climate and geography, among others.

Data needed and how to compile them

- *Are the data already available from existing data sources?*
- *Can existing data be adapted to serve the intended purpose and can they be used for this purpose from a legal point of view?*
- *How can missing energy-affordability data be collected?*

Assessing the availability and use of data for energy affordability requires first determining whether relevant information already exists in current data sources, and whether it can be adapted – both technically and legally –to serve the intended purpose. Existing data should be leveraged as much as possible, prioritising accessible and reliable sources such as administrative records, household budget and consumption surveys and censuses, thereby minimising additional costs and response burden. Any remaining data gaps should be clearly identified, alongside a data collection plan aligned with the defined indicator methodologies and that includes appropriate levels of disaggregation and consistency with international standards.

Data items: Key data items required to build the indicator set, including income, energy expenditure, housing characteristics, socio-demographic factors and other data items needed to reflect the selected dimensions of affordability.

Selected data items include: household income, energy expenditure, energy consumption, arrears on utility bills, household size, dwellings with leak, damp or rot and household electricity prices per consumption band.

Data sources: The main sources used to compile the required data items, such as administrative data sources, surveys, measuring, linking different data sources and modelling.

Selected sources include budget surveys, quality of life surveys, tax registers, building registers and utilities.

Data collection: Energy-affordability data collection requires complex implementation plans and processes that strongly depend on national specificities. Many resources beyond this report can provide appropriate references.

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Selected steps include assessing existing data and filling gaps, ensuring data quality and harmonisation across sources, transforming data into policy-relevant indicators for dissemination and maintaining and improving systems through strong governance and continuous updates.

Use of the framework at a national level

The proposed framework is designed to support the development of coherent and transparent methodological approaches to monitoring energy affordability, thereby contributing to more consistent and effective policy analysis. By structuring the relationships between dimensions, indicators and data, the framework facilitates clearer monitoring and improves comparability across different national work.

The framework is inherently iterative. Dimensions define what matters while indicators translate these dimensions into measurable concepts, and data systems determine what can be implemented. In practice, affordability indicators support policy by, among other things, identifying vulnerable households, guiding targeted interventions and monitoring policy outcomes over time.

At the same time, the implementation of the framework requires active engagement from a broad range of stakeholders, including statistical agencies, policymakers and data providers. Establishing such collaboration, governance arrangements and institutional co-ordination goes beyond the scope of this framework, but remains essential for its successful application in practice.

The role of international collaboration

Consultations held with experts across IEA member countries revealed their interest in and desire for increased international collaboration on indicators adopted across countries and methodologies for collecting underlining data.

Consensus has emerged among national experts that energy affordability is an important societal issue, although the focus and nature of national work vary greatly. The experts consulted indicated that they see strong potential in knowledge sharing across countries, and in the development of an overarching indicator and data framework and standardised measurement approaches.

Many countries have long-standing experience in indicator design and data collection, while others have begun developing their monitoring systems recently.

Sharing good practices across IEA member countries can facilitate further development and contribute to harmonised monitoring approaches, with a view at enabling comparability.

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Annex

Annex A. Overview of household energy affordability monitoring in selected countries

Australia

Relevant national institution(s)	Department of Climate Change, Energy, the Environment and Water Australian Energy Regulator Energy Consumers Australia
Definition	On behalf of the Energy and Climate Change Ministerial Council, the Department of Climate Change, Energy, the Environment and Water released the National Energy Equity Framework, outlining the definition for energy equity and energy hardship. Energy equity "exists where all consumers can fairly benefit from the energy system and access and use energy services to live a comfortable, dignified and healthy life." "A household is considered in energy hardship when it is unable to afford and/or use energy services in the home to live a comfortable and healthy life." The framework also outlines different states of energy hardship and energy vulnerability.
Indicators	The framework proposes metrics that focus on factors (causes of hardship, such as income, high energy bills and energy-inefficient housing), indicators (a state of hardship, such as thermal discomfort, difficulty paying energy bills, indoor temperature and mould), and outcomes (consequences, such as stress, worsened health, energy or non-energy debt, and disconnection). A report by Energy Consumers Australia refers to the definition of energy hardship used in the National Energy Equity Framework and uses the following indicators (all self-reported): • spending more than 6% of income on energy bills • significant difficulty paying energy bills • financial stress and turning off heating and cooling to save money. A household is identified as vulnerable to or experiencing energy hardship if at least one of those indicators was reported. The report is not part of a national monitoring system. There is no nationally agreed upon way to monitor energy affordability or hardship. The Australian Energy Regulator published the State of the Energy Market report, which includes a section energy affordability in Chapter 6. In this report, energy affordability is measured as the proportion of electricity or gas expenditure in relation to average income, disaggregated by different distribution network service providers. The report also looks at the number of customers that need to repay energy debt and the average amount of this dept.

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Latest estimates and data sources	A report by Energy Consumers Australia uses data from the Consumer Energy Report Card survey last conducted in June 2025. Raw data can be downloaded on the website of Energy Consumers Australia, including the data from Consumer Energy Report Card survey December 2025. The raw data of the results of the State of the Energy Market 2025 by the Australian Energy Regulator can be downloaded on their website (Chapter 6).

Austria

Relevant national institution(s)	Statistics Austria (Statistik Austria) Austrian Energy Agency (Österreichische Energieagentur) Coordination Office for Combating Energy Poverty (Koordinierungsstelle zur Bekämpfung von Energiearmut)
Definition	The Federal Energy Poverty Definition Act (Energiearmuts-Definitions-Gesetz) was released in December 2025 and provides a national definition of energy poverty and outlines indicators for measuring it. Previously, Austria used the definition outlined in the Directive (EU) 2023/1791 on energy efficiency.
Indicators	To transpose Directive (EU) 2023/1791, Statistik Austria issued the report Indicators for the Measurement of Energy Poverty 2025. It proposes a total of 17 indicators that are aggregated into three composite indicators: Composite indicator 1 captures households that are at risk of poverty and that are facing both above average energy costs and are unable to heat their homes adequately. Composite indicator 2 extends indicator 1 by including households with arrears on housing-related bills. Composite indicator 3 extends indicator 2 by including households that are at risk of poverty and with poor housing conditions with leaky roofs, dampness in the walls, floor or foundation, or rot. This indicator was selected as the main indicator for the monitoring of energy poverty and is listed in the Energy Poverty Definition Act from December 2025. A full list of indicators can be found in the report.
Latest estimates and data sources	The report on Indicators for the Measurement of Energy Poverty 2025 includes results for the three composite indicators mentioned above and uses data from the EU-SILC Survey 2023. Statistik Austria made the results of the 2024 EU-SILC survey available in 2025. The latest results for the composite indicators are published on the Statistik Austria website. Statistik Austria also uses data from a microcensus that is conducted yearly of a representative sample of Austrian households and that includes questions on household energy expenditure. The report Dimensions of Energy Poverty in Austria 2021/22 compares the results from the micro census 2021 and 2022 with the results from the EU-SILC 2022 survey.

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Other resources	The website of the Coordination Office for Combating Energy Poverty provides a dashboard with up-to-date information on current energy poverty numbers in Austria as well as on the legislative process to define energy poverty.

Belgium

Relevant national institution(s)	FPS Economy (Service public fédéral Economie, SPF Economie) Statbel (national statistical office of Belgium)
Definition	The Royal Decree 2024004117 of 2024 refers to the definition of energy poverty outlined in the Directive (EU) 2023/1791 on energy efficiency. It also outlines indicators to be used to identify the number of households at risk of energy poverty.
Indicators	Until 2025, the King Baudouin Foundation was responsible for monitoring energy poverty in Belgium. In 2025, responsibility was transferred to the FPS Economy. Alongside this process, the indicator methodology was revised. Households that meet at least one of the following criteria are classified as experiencing energy poverty: 1. Risk of measured energy poverty: The proportion of energy expenditure compared with household income (equivalised residual income after subtracting housing costs) exceeds twice the national median (2M). 2. Risk of hidden energy poverty: The household's energy expenditure falls short of half the national median (M/2) of comparable households. 3. Risk of felt energy poverty: Household that states it is unable to afford to heat its home sufficiently. For Indicators 1 and 2, the extent (how many households) and severity of energy poverty are recorded. All three indicators only consider households in the five lowest income deciles. The FPS Economy has revised the indicator of hidden energy poverty, mainly by refining the definition of comparable households. Work is ongoing to improve the indicators, with current efforts focusing on measured energy poverty. Initial analyses suggest that the current indicator may not adequately target the intended households.
Latest estimates and data sources	The latest report on energy-poverty indicators in Belgium was issued in October 2025 by FPS Economy. Indicators are calculated using data from the annual EU-SILC survey that is conducted yearly by Statbel. The most recent Energy Poverty Barometer by the King Baudouin Foundation was issued in 2024.

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Other resources	Work on energy poverty is also being done at the regional level: Vivalis, the public health and social support administration of the Brussels-Capital region, released a report on energy poverty in 2025. It mainly uses data from the SILC survey and relates it to housing quality data from the 2021 census. Wallonia's official institute for evaluation, foresight, and statistics (IWEPS) released a report on energy expenditures and energy deprivation in Wallonia in 2025, using data from the SILC survey.

Canada

Relevant national institution(s)	Natural Resources Canada has been primarily responsible for monitoring energy affordability in Canada. Statistics Canada is collaborating with Natural Resources Canada to assess energy poverty in Canada and provides necessary data.
Definition	The Federal Government of Canada has used the share of household energy spending on total income to measure a household's energy burden. A household is considered to be in energy poverty if this share exceeds 10%.
Indicators	The Energy Fact Book published by Natural Resources Canada uses the 10% indicator to measure energy affordability. The energy needs used to calculate the energy burden are the needs inside the home and these exclude transportation energy needs. In addition, household energy expenditure, the evolution of energy retail prices and an international comparison of household energy prices are used to estimate energy affordability. An article released by Statistics Canada assess energy affordability through various indicators: • share of households that kept their dwelling at unsafe or uncomfortable temperatures for at least 1 month in the past 12 months due to costs • type of heating equipment in dwelling • presence of air conditioning or cooling equipment in dwelling • share of households that received a disconnection, shut off or non-delivery notice • share of households late or unable to pay energy bills due to high energy prices • share of households that need to reduce or forgo expenses for basic necessities to be able to cover energy bills. Results are disaggregated by socio-economic characteristics as well as dwelling type.

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Reports and data sources	The latest Energy Fact Book Spring 2026 Edition uses data from the 2021 Census of Population to calculate the energy poverty rates. Background information on the estimation of energy poverty rates using the 2021 Census of Population, disaggregated by region and other socio-economic characteristics, can be found in the article Estimation of Energy Poverty Rates Using the 2021 Census of Population by Statistics Canada released in 2024. The earlier releases of the Energy Fact Book, such as the Energy Fact Book 2023-2024, use data from Canada's Survey on Household Spending. However, the latest data available from that survey is only from 2019. The article Canadian Social Survey: Energy Use published in 2023 by Statistics Canada uses data from the Canadian Social Survey 2023.

Czech Republic

Relevant national institution(s)	Ministry of Industry and Trade (Ministerstvo průmyslu a obchodu)
Definition	Czech Republic's National Energy and Climate Plan (NECP) refers to the definition of energy poverty outlined in the Directive (EU) 2023/1791 on energy efficiency. The transposition of an adapted version into national law is planned.
Indicators	The National Energy and Climate Plan mentions the following indicators: • inability to maintain sufficient heat at home • arrears for services • population living in a dwelling with a leaking roof, damp walls, floors or foundation, or rot in window frames or floor • at-risk-of-poverty rate (cut-off point: 60% of median equivalised income after social transfers).
Latest estimates and data sources	The NECP provides values for all indicators for the year 2019 and a comparison with European Union levels regarding the ability of households to heat their homes sufficiently for the years 2014 to 2023. The first three indicators are calculated using data from EU-SILC. The at-risk-of-poverty rate is calculated using data from EU-SILC. To calculate values prior to 2002, data from the European Community household panel (1994-2001) is used.

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Denmark

Relevant national institution(s)	Ministry of Climate, Energy and Utilities (Klima-, Energi- og Forsyningsministeriet) Statistics Denmark (Danmarks Statistik)
Definition	Executive Order BEK no. 1346 of 20/11/2025 on requirements for public financial activities targeting energy renovations and on prioritising low-income households with a certain energy burden in certain activities to promote energy efficiency defines these households. Additionally, Denmark's final update of the National Energy and Climate Plan 2021-2030 (NECP) refers to Directive (EU) 2023/1791 on energy efficiency and applies indicators derived from the definition of energy poverty outlined in that Directive.
Indicators	The NECP provides energy poverty measurements using three different indicators: • Low income households: Equivalised disposable income is less than 50% of the national median. • Low energy performance of dwelling: Buildings with energy label E or lower. • High energy consumption: Equivalised energy expenditure is higher than twice the Danish median.
Latest estimates and data sources	The NECP describes the following data sources used to calculate values for those indicators: • income data from Statistics Denmark • building and housing register • register of energy labels by the Danish Energy Agency • energy consumption data from energy supply companies.

Estonia

Relevant national institution(s)	Statistics Estonia (Statistikaamet) Ministry of Climate (Kliimaministeerium)
Definition	According to their National Energy and Climate Plan, Estonia approaches energy poverty under the umbrella of general social policies. When transposing Directive (EU) 2018/2002, a predecessor of Directive (EU) 2023/1791, Estonia linked households at risk of energy poverty to subsistence support. Because of that, the number of households at risk of energy poverty is identical to the number of households receiving subsistence support.

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Indicators	According to the Energy Sector Organization Act, a person affected by energy poverty is a person living alone or a family who has received at least one subsistence allowance in the last six months and whose income per family member for the preceding month does not exceed the minimum wage. According to the Social Welfare Act from 2015, a person living alone or a family is entitled to subsistence benefit if their net income is below subsistence level after deducting housing costs. No established monitoring system specifically for energy affordability was reported.
Latest estimates and data sources	Statistics Estonia provides data on the number of households applying for and receiving subsistence benefits. The latest numbers are from 2025.

Finland

Relevant national institution(s)	Finish Competition and Consumer Authority (Kilpailu- ja kuluttajavirasto) Finnish Energy Authority (Energiavirasto) Statistics Finland (Tilastokeskus)
Definition	According to the National Energy and Climate Plan (NECP) of Finland, energy poverty is treated as part of social policy. The plan refers to the definition of a vulnerable customer from Directive (EU) 2019/944.
Indicators	No established monitoring system for energy poverty in Finland was reported. To assess the number of households in energy poverty, the NECP uses the number of non-payment records with regards to electricity bills. The NECP also refers to the study Energy Poverty in Finland commissioned by the Finnish Energy Authority. It investigates the relationship between the Finnish social security system and energy poverty and concludes that various quantitative and qualitative indicators are needed to capture energy poverty in Finland. It also refers to indicators that can be evaluated from the data of the yearly EU-SILC survey: • inability to keep home adequately warm • arrears on utility bills • the number of the population living in homes with a leaking roof, damp walls, floors or foundation, or rot in window frames or floor • the at-risk-of-poverty rate.
Latest estimates and data sources	The NECP provides data on non-payment records up until the third quarter of 2023, taken from the report Means of Consumer Protection in Combating Energy Poverty by the Finnish Competition and Consumer Authority. The latest numbers of the Finnish EU-SILC survey are from 2025. More information on the survey can be found on the website of Statistics Finland.

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France

Relevant national institution(s)	The National Observatory on Energy Poverty (Observatoire national de la précarité énergétique) regularly publishes reports on the state of energy poverty in France and is part of the French Agency for the Ecological Transition (Agence de la transition écologique). The National Institute of Statistics and Economic Studies (Institut national de la statistique et des études économique) provides data for the analysis. General Commission for Sustainable Development (Commissariat général au développement durable) developed a model called Prometheus that is used to estimate energy poverty rates. The Energy Ombudsman (Médiateur national de l'énergie) is an independent authority that also conducts research on energy poverty. Those results are used by the ONPE.
Definition	Energy poverty is defined in law no. 2010-788 of 12 July 2010 (commonly known as Grenelle II): an individual affected by energy poverty is a person who has particular difficulties in obtaining the energy supply necessary to meet his or her basic needs because of the inadequacy of his or her resources or housing conditions.
Indicators	The ONPE relies on two main indicators to assess energy poverty: • Energy effort rate: A household is considered to be in energy poverty when its income is within the three lowest income deciles and its energy expenditure exceeds 8% of its income. • Feeling cold: A household is considered to be in energy poverty if it declares feeling cold for at least one of the following five reasons: poor insulation, insufficient heating installation, failure of heating, limitation of heating due to cost, energy cut off for non-payment of bills.
Latest estimates and data sources	The report Energy Poverty Dashboard by the ONPE gives an overview of the latest energy poverty figures in France for the years 2023 and 2024. It uses data from the from the INSEE National Housing Survey to calculate the energy effort rate. Because the survey is conducted periodically (every 5 to 10 years), the Prometheus model is used to estimate the energy effort rate between survey years. The latest results from the Energy-info Barometer were published by the National Energy Ombudsman in 2025 using 2025 data and includes estimates of the self-reported measure of feeling cold.
Other resources	National Energy Climate - Plan, France, 2024 Energy poverty in 2023 by the Ministry of Territorial Planning and Ecological Transition, 2025 The Prometheus microsimulation model for household energy bills, 2025

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Germany

Relevant national institution(s)	Federal Ministry for Economic Affairs and Climate Action (Bundesministerium für Wirtschaft und Energie)
Definition	According to Germany's National Energy and Climate Plan, energy affordability is a priority topic in Germany. However, no established definition was reported and energy affordability is approached in the context of broader efforts to reduce poverty.
Indicators	No established monitoring system for energy poverty was reported. The Annual Economic Report 2023 identifies rising energy prices as a key driver of pressure on household budgets. It shows how high energy costs were one of the main reasons for rising consumer prices. The report emphasises that energy costs make up a significant share of overall spending, especially for low-income households.
Latest estimates and data sources	N/A

Greece

Relevant national institution(s)	Ministry of Environment and Energy (Υπουργείο Περιβάλλοντος και Ενέργειας) Energy Poverty Observatory (Παρατηρητήριο Ενεργειακής Ένδειας)
Definition	The National Action Plan to Combat Energy Poverty of 2021 refers to the definition outlined in the Directive (EU) 2023/1791 on energy efficiency.
Indicators	The action plan outlines a composite indicator that identifies a household as affected by energy poverty when both of the following conditions are met: • Low energy expenditure: The annual cost of energy consumption is lower than 80% of the minimally required energy costs. Required energy consumption is estimated based on household characteristics, building characteristics, climatic conditions and other characteristics. Prices are estimated using various different sources, including Eurostat data and data from the Liquid Fuel Price Observatory. • Low income: The net annual income is lower than 60% of the median income of all households (referring to the definition of relative poverty). A second version of the second condition equivalises the net annual income using the OECD scale. Both indicators are also calculated individually. In addition to this indicator, a regression model is proposed that estimates the probability of a household being in energy poverty based on the following characteristics: • annual electricity costs • year of construction of dwelling

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	• use of central heating system • income • size of dwelling • whether tenant or not • number of household members above 65 • number of heating degree days • number of unemployed household members. The plan includes a very detailed description on the calculation methodology for the indicators and the regression model.
Latest estimates and data sources	The Energy Poverty Observatory established by the Greek Government has published estimates up until 2023 using data from the yearly Household Budget Survey. It is also possible to compare results with the 2M and M/2 indicators.
Other resources	The National Energy and Climate Plan provides an overview of efforts to monitor and tackle energy poverty in Greece.

Hungary

Relevant national institution(s)	
Definition	Hungary's National Energy and Climate Plan (NECP) connects energy poverty to the definition of vulnerable customers, as vulnerable customers "are those who have or may have difficulties in meeting their household's energy needs." These include households with high specific energy consumption.
Indicators	In Hungary, a utility protection system is in place that particularly focusses on social groups with at least one of the following characteristics: • Home is connected to natural gas network. • Home is in need of energy refurbishment. • Individuals find it difficult to cover energy costs despite public transfers. • Individuals participate in social fuel programme. Within the utility protection system, households with the following characteristics are considered to be at risk of energy poverty: • Dwelling lacks adequate home heating. • Household has arrears on utility bills. • Dwelling has leaking roofs, damp walls, floors or foundations, or rotting window frames or floors. • Household income is below 60% of the median equivalised income after social transfers.
Latest estimates and data sources	N/A

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Ireland

Relevant national institution(s)	Sustainability Energy Authority of Ireland (An Phríomh-Oifig Staidrimh) Department of the Environment Climate and Communications Economic and Social Research Institute Central Statistics Office (An Phríomh-Oifig Staidrimh)
Definition	The Energy Poverty Action Plan prepared by the Department of the Environment Climate and Communications defines energy poverty as the "an inability to heat or power a home adequately". The report Energy Poverty in Ireland by the Sustainability Energy Authority of Ireland refers to the definition outlined in the Directive (EU) 2023/1791 on energy efficiency.
Indicators	The Energy Poverty Action Plan refers to an expenditure-based 10% indicator that has been calculated in the Energy Poverty and Deprivation in Ireland report by the Economic and Social Research Institute published in 2022. Next to the 10% indicator, the report by the Economic and Social Research Institute also outlines a self-reported indicator based on questions that relate to a household's ability to heat its home. Due to the many problems that arise when using either of these indicators, the Economic and Social Research Institute, in cooperation with the Sustainability Energy Authority, Central Statistics Office and other institutions, is currently working on new ways to measure energy poverty in Ireland. Sustainability Energy Authority of Ireland's report on energy poverty in Ireland uses four different indicators: • Difficulty paying energy bills: This is a subjective measure assessing how difficult it was to pay the most recent energy bill. • Going without heating: This is a subjective measure asking whether a household had to go without heating due to a lack of money. • Cutting back on essentials: This is a subjective measure assessing whether a household had to cut back on other essentials, missed other payments or needed to borrow money in the last month to be able to pay for home energy bills. • Spending 10% of disposable income on energy costs: This is based on responses regarding income and energy expenditure for the preceding month.
Latest estimates and data sources	The expenditure-based indicator report Energy Poverty and Deprivation in Ireland by ESRI uses data from the Irish Household Budget Survey. The latest figures in the report were from 2015/16. For the self-reported measures, Economic and Social Research Institute is using data from the Living in Ireland Survey up until 2001 and EU-SILC data starting from 2003. At the time of release, the latest available SILC data was from 2020. The Household Budget Survey is conducted roughly every five years by Central Statistics Office. The latest available data is from 2022/2023. The latest data from the Irish SILC survey is from 2025. The Energy Poverty in Ireland report by Sustainability Energy Authority of Ireland uses data from the Behavioural Energy and Travel Tracker, data for which is

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	collected by Sustainability Energy Authority of Ireland on a quarterly basis. The report includes results from 2023.
Other resources	Ireland's Integrated National Energy and Climate Plan provides an overview of national research activities related to energy poverty in Ireland.

Italy

Relevant national institution(s)	Italian Ministry of the Environment and Energy Security (Ministero dell'Ambiente e della Sicurezza Energetica) The Italian Energy Poverty Observatory (Osservatorio Italiano sulla Povertà Energetica), led by Ministry of the Environment and Energy Security is responsible for monitoring energy poverty in Italy and for proposing a law enforcement strategy. National Statistical Institute (Istituto Nazionale di Statistica)
Definition	According to Italy's National Plan Integrated for Energy and Climate (NECP), there currently is no legislated definition of energy affordability or poverty. However, the transposition of the definition in the Directive (EU) 2023/1791 is planned.
Indicators	Until the implementation of a national definition, the NECP uses the following four indicators to measure energy poverty in Italy: • share of population unable to keep their home adequately warm • share of population with arrears on utility bills • share of population at risk of poverty (income below 60% of national median equivalised income) and unable to keep their home adequately warm • share of population at risk of poverty (income below 60% of national median equivalised income) with arrears on utility bills. The Annual Report 2024 by Istat includes a section on energy poverty. It assesses energy poverty in Italy using the Low-Income High-Cost indicator, which is calculated by the Italian Energy Poverty Observatory using Istat data. According to Italian Energy Poverty Observatory's website, a household is considered to be in energy poverty if at least one of the following conditions is met: • Its equivalised energy expenditure accounts for more than twice the average share of total spending, and its residual expenditure (total spending net of energy costs) falls below the relative poverty threshold defined by Istat. • Its total equivalent expenditure is below the median and its heating expenditure is zero.
Latest estimates and data sources	The latest figures presented in the NECP use data from the annual EU-SILC up until 2020. The Annual Report 2024 by Istat presents energy poverty statistics up until 2022 using the Low-Income High-Cost indicator. It uses data from the annual Survey on Household Expenditure conducted by Istat.
Other resources	Italy launched the Energy Poverty Indicators Calculation project, financed by Eurostat, that aims at developing a composite indicator that can be applied on a European level (see Box 3.3 in the main body of this report). The project's results are expected to be published in 2026.

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Japan

Relevant national institution(s)	
Definition	No official definition for energy poverty was reported. However, some official documents refer to the term energy sufficiency.
Indicators	No established monitoring system for energy poverty was reported.

Latest estimates and data sources	Although there is no nationally agreed definition or established set of indicators to measure energy poverty, the results of Japan's 2022 National Survey on Social Security and People's Life show that:
	• The number of private households unable to keep the house at a comfortable temperature for financial reasons is 4.3% and in total 7.2% (including other reasons).
	• The number of private households with late or non-payment of bills within the last year is:
	  ○ 1.7% for electric bills
	  ○ 1.5% for gas bills.
	There are also scientific studies providing estimates, such as Okushima (2019), who estimates an energy poverty rate of 7.5% in Japan.

Other resources	

Korea

Relevant national institution(s)	Korea Energy Economics Institute developed a Study on the Extent of Energy Poverty in Korea. Statistics Korea developed the Household Trends Survey The Korea Institute for Health and Social Affairs developed the Korean Welfare Panel Survey
Definition	N/A
Indicators	Indicators are currently under development. Korea uses the Ten Percent Rule (10% threshold), which defines households as energy poor when their energy expenditure exceeds 10% of their income. This approach was formally adopted in the late 2000s, as outlined in the First Energy Master Plan (Prime Minister's Office, 2008). Despite this, there is no consensus on how to measure energy poverty in Korea. Studies apply different indicators (e.g., Ten Percent Rule, Low-Income High-Cost, Minimum Income Standard, Multi-dimensional Energy Poverty Index) and rely on diverse baselines, such as utility costs, heating costs, minimum fuel-cost requirements and income-based thresholds. As a result, estimates of the energy-poverty rate vary widely across the literature.

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Latest estimates and data sources	A new survey is currently under development. Energy-poverty estimates in Korea are typically derived from the household income and expenditure data collected by Statistics Korea. Studies report a wide range of results depending on the indicator and cost baseline used, but normally the reported values are between 5.7% and 12.6% (Chang Hwang & Baek, 2025; Shin Dong-Myeon & Kang, 2024; Shin Jeong-su & Korea Energy Economics Institute, 2011). In addition, the results of the Household Trends Survey and the Korean Welfare Panel Survey (2016) indicate that: • The percentage of households whose energy costs exceed 10% of disposable income is 7.2% (Household Trends Survey). • The percentage of households that have ever had their electricity, phone or water service cut off due to lack of money to pay bills is 0.07% (Korean Welfare Panel Survey). The percentage of households that have ever been unable to heat their home during a cold winter due to lack of money is 0.78% (Korean Welfare Panel Survey).

Latvia

Relevant national institution(s)	Ministry of Climate and Energy (Klimata un enerģētikas ministrija) Central Statistical Bureau Republic of Latvia (Centrālā statistikas pārvalde)
Definition	Energy poverty is defined in Latvia's Energy Law, Section 1, Subsection 10.1, as "the inability of a household user to maintain a corresponding temperature in a housing or to use the services provided by energy supply merchants, or to settle accounts for such services due to low energy efficiency or because the payment for such services forms a high proportion of the household income".
Indicators	In Latvia's National Energy and Climate Plan (NECP), the number and share of households unable to afford to keep a warm dwelling due to a lack of money was used to measure the extent of energy poverty, in line with the indicators proposed by the European Union. The Law on the State Aid for Energy Supply Costs refers to households in energy poverty as households with low or medium-low-income levels. Financial aid is provided to these households because of an exceptional increase of energy resource prices.
Latest estimates and data sources	It is not clear what data sources are used to estimate the number of households in energy poverty. According to the NECP, data from the Central Statistical Bureau is used.

Lithuania

Relevant national institution(s)	Ministry of Energy of the Republic of Lithuania (Lietuvos Respublikos Vyriausybė) Statistics Lithuania. State Data Agency (Lietuvos Respublikos Vyriausybė)
Definition	Lithuania's National Energy and Climate Plan (NECP) refers to the definition set out in Directive (EU) 2023/1791 on energy efficiency. A definition of energy affordability or energy poverty has not yet been transposed to national law.

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Indicators	Two indicators are mentioned in the NECP: • The share of persons living in households who cannot afford sufficient heating due to a lack of money. • The share of households that spend a significant part of their income on energy. The National Energy Independence Strategy adopted in 2024 mentions energy-poverty reduction targets tied to the following indicator: • The share of households that allocate a significant portion of their income to energy expenses being no more than 10 percent.
Latest estimates and data sources	EU-SILC data were used for first indicator. The NECP provides numbers for the year 2023. Data from the Household Budget Survey conducted every several years are used for the second indicator in the NECP. The latest results are from 2016.

Luxembourg

Relevant national institution(s)	National Institute for Statistics and Economic Studies (Institut national de la statistique et des études économiques)
Definition	No official definition of energy poverty in Luxembourg was reported.
Indicators	Luxembourg's National Energy and Climate Plan refers to two indicators that have been outlined in the working paper Identifying the disadvantaged in Luxembourg – Measuring multidimensional poverty by statistical matching: • High energy effort rate (TEE): Household considered at risk of energy poverty if expenditure costs exceed 10% of household income. • Low-income, high-cost (BRDE): Households with a residual income (income minus housing costs) of less than 60% of the national median and with above median energy costs per consumption unit are considered at risk of energy poverty. In addition, both indicators are combined into a single indicator (TEE & BRDE). A household is at risk of energy poverty if both indicators are met at the same time.
Latest estimates and data sources	The NECP provides estimates for the combined TEE & BRDE indicator from 2011 to 2023. To calculate the indicators, data from the following three surveys is matched: the EU-SILC survey (yearly), the Household Finance and Consumption Survey (every four years) and the Household Budget Survey (every five years). The methodology is described in more detail in the working paper.

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Mexico

Relevant national institution(s)	Energy Secretariat (Secretaría de Energía)
Definition	No official definition of energy affordability or related concepts was reported. According to a report by the Energy Secretariat, there still are a significant number of households that are not connected to the grid. There are various projects in place to increase the connection rate.
Indicators	No monitoring system in place was reported.
Latest estimates and data sources	

Netherlands

Relevant national institution(s)	Statistics Netherlands (Centraal Bureau voor de Statistiek) was commissioned by the Ministry of Economic Affairs and Climate Policy (Ministerie van Economische Zaken en Klimaat) to establish an annual Energy Poverty Monitor. Their work is based on the Dutch Organisation for Applied Scientific Research (Nederlandse Organisatie voor toegepast-natuurwetenschappelijk onderzoek) who launched the National Energy Poverty Research Programme in 2022. They work in close cooperation with Statistics Netherlands.
Definition	The Netherlands uses the definition from Directive (EU) 2023/1791 on energy efficiency.
Indicators	Statistics Netherlands uses four main indicators that are made up of multiple sub-indicators: • High energy quantities: A household is considered at risk of energy poverty if the share of income spent on energy exceeds 10%. • Low income, high energy costs: A household is considered at risk of energy poverty if it has a low income (income up to 130% of low-income threshold, excluding any household with assets in the top 10% of all households) and if it has a higher than average energy expenditure (equivalised with reference to a single-person household in a dwelling with an energy label C). • Low income, low energy quality home: A household considered at risk of energy poverty when it has a low income and low energy quality. The energy quality of a home is estimated and includes all homes whose energy bill (average of all homes with same characteristics) is higher than the average energy bill compared with all homes with the same floor area. Homes with high incomes are excluded. This indicator is insensitive to fluctuating energy prices and the level of consumption. • Low energy quality home and few investment opportunities (LEKWI): This indicator assesses energy affordability from a transition perspective. Assessing the ability to invest in more energy efficient equipment depends on many factors, such as the willingness of landlords to invest or the financial capacity of homeowners. An additional composite indicator is used:

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	• Low income, high energy costs and/or low energy quality: it combines the above indicators 'low income, high energy costs' and 'low income, low energy quality home'. Details on the calculation of these indicators can be found in the Method Document of the Energy Poverty Monitor 2019-2022.
Latest estimates and data sources	Statistics Netherlands released an Energy Poverty Monitor in 2025 presenting the energy-poverty statistics from 2023 using the indicators described above. The report Energy Poverty in The Netherlands 2019-2024 by the Dutch Organisation for Applied Scientific Research and Statistics Netherlands provides an overview of estimated energy-poverty rates up until 2024, also describing the development over the years. The report uses various data sources, predominantly administrative data. More than 7 million households are included in the analysis, that is 87.3% of all households. Details on calculation methodologies and data sources can be found in the Method Document of the Energy Poverty Monitor 2019-2022. In addition, the various data sources are described in Box 4.4 in the main body of the report.
Other resources	Further information on their approach to energy poverty can be found in the Update of the Dutch National Energy and Climate Plan 2021-2030

New Zealand

Relevant national institution(s)	Ministry of Business, Innovation and Employment (MBIE) Stats NZ
Definition	According to a report on Energy Hardship Definition and Measures, energy wellbeing is defined as "when individuals, households and whānau are able to obtain and afford adequate energy services to support their wellbeing in their home or kāinga." Energy hardship is considered the opposite of energy wellbeing. Alongside a definition of energy wellbeing, a conceptual framework is provided that provides more details on the different dimensions of energy wellbeing. The process that led to this definition and framework is described in more detail in the Components of the Energy Wellbeing Framework report.
Indicators	The report also proposes an initial set of indicators to monitor energy hardship in a household, namely if it: • Could not pay electricity, gas rates, or water bills on time more than once in the last 12 months. • Cannot afford to keep its dwelling adequately warm. • Put up with feeling cold a lot to keep costs down. • Has dampness and/or mould as a major problem. • Trouble heating accommodation and or/keeping it warm in winter.

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Latest estimates and data sources	MBIE published a report on energy hardship measures in June 2023. The most recent release was in December 2025, covering data up to and including the year ending June 2024. The next report is expected to be released in 2027. The indicators are based on the Household Economic Survey conducted by Stats NZ every year. For 2025 onwards, data are collected under a new Stats NZ survey called the Household Income and Living Survey.

Norway

Relevant national institution(s)	Ministry of Energy (Energidepartementet) Fridtjof Nansen Institute (Fridtjof Nansens Institutt)
Definition	No official definition of energy affordability or related concepts was reported. However, the Norwegian Government is concerned with energy affordability as it announced subsidised electricity prices in October 2025 to protect people from unstable energy prices. A research initiative headed by the FNI called PowerPoor aims to develop metrics to measure energy poverty in Norway. Alongside other institutions, Statistics Norway is involved in the project.
Indicators	N/A
Latest estimates and data sources	N/A

Poland

Relevant national institution(s)	Ministry of Climate and Environment (Ministerstwo Klimatu i Środowiska)
Definition	No legislated definition of energy affordability or poverty was reported. However, multiple official documents define energy poverty. In the Polish National Energy and Climate Plan (NECP), energy poverty is referred to as “a situation where a household is unable to provide sufficient levels of heat, cooling, lighting and electricity to power electrical appliances.” The NECP also refers to the definition of energy poverty outlined in Regulation (EU) 2023/955 and further specified in Directive (EU) 2023/1791. The strategic document Energy Policy of Poland until 2040 issued by the Ministry of Climate and Environment refers to households as being affected by energy poverty due to a “lack of financial resources to undertake modernisation investments ... usually [living] in buildings with poor energy performance”. The National Environmental Policy 2030 defines energy poverty as arising when a household has difficulty meeting its energy needs (for heat, hot water and power) because of low income or the characteristics of its dwelling.

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Indicators	The Polish National Energy and Climate Plan refers to the following indicators mentioned in the Directive (EU) 2023/1791 on energy efficiency: • share of households unable to maintain adequate room temperature • share of households with arrears on energy bills • share of households living in a dwelling with leaking roof, damp walls, floors and foundations or crushed windows or floors • share of households at risk of poverty.
Latest estimates and data sources	No data sources indicated.

Portugal

Relevant national institution(s)	National Energy Poverty Observatory (Observatório Nacional da Pobreza Energética) Statistics Portugal (Instituto Nacional de Estatística) Agency for Energy (Agência para Energia) Directorate-General for Energy and Geology (Direção-Geral de Energia e Geologia) Energy Services Regulatory Authority (Entidade Reguladora dos Serviços Energéticos)
Definition	The National Long-Term Strategy to Combat Energy Poverty 2023-2050 (ELPPE) outlined in Resolution No. 11/2024 of the Council of Ministers of Portugal adopted the definition of energy poverty in Directive (EU) 2023/1791 on energy efficiency.
Indicators	The ELPPE outlines the following eight primary and six secondary indicators: Primary indicators: • population living in households without the capacity to keep home adequately warm • population in poverty and living in households without the capacity to keep their home adequately warm • energy performance of dwellings (efficiency class C or below) • population living in dwellings with leaks, humidity or rotten elements • population in poverty living in dwellings with leaks, moisture or rotten elements • population living in dwellings not comfortably cool during summer • population in households where energy expenditure represents +10 % of total income • households in poverty whose energy expenditure represents over 10 % of total income. Secondary indicators: • population at risk of poverty • population with debts to utilities

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	• population living in poverty and with debt to utilities • interruptions attributable to the consumer • share of residential energy consumption satisfied by local renewable energy production • overall energy literacy of private consumers.
Latest estimates and data sources	The National Energy Poverty Observatory provides estimates for most primary and secondary indicators from 2015 up until 2024 and compares them with the goals outlined in the ELPPE. Data are mainly provided by Statistics Portugal, using data from the annual EU-SILC survey and data from the Household Budget Survey that is conducted every five years. Data on energy labels are provided by the Agency for Energy. Data on the residential energy consumption satisfied by local renewable energy production are provided by the Directorate-General for Energy and Geology. Data on the energy literacy of private consumers is provided by Energy Services Regulatory Authority.
Other resources	Portugal's National Energy and Climate Plan 2021-2030

Slovak Republic

Relevant national institution(s)	Slovak Academy of Sciences (Slovenská akadémia vied) Ministry of Economy (Ministerstvo hospodárstva Slovenskej republiky) Statistical Office of the Slovak Republic (Štatistický úrad Slovenskej republiky)
Definition	Act No. 250/2012 on the regulation of network industries defines energy poverty as "a situation where the average monthly household expenditure on the consumption of electricity, gas, heat for heating and for the preparation of hot water, the supply of drinking water through the public water supply system and the disposal of waste water through the public sewerage system constitute a significant share of the average monthly household income." The term "significant share" is not further specified. The Slovak Republic's National Energy and Climate Plan (NECP) mentions the definition of energy poverty in Directive (EU) 2023/1791 on energy efficiency. In addition, the Slovak Republic is currently developing a more detailed definition of energy poverty. According to the 2025 report on energy poverty by the SAV, the Ministry of Economy is proposing a new definition of vulnerable customers in the upcoming Social Climate Plan. It defines a "vulnerable customer threatened by energy poverty as someone living in a household with disposable income lower than the national median of equivalent disposable income, whose household energy expenditures represent 20% or more of disposable income, and who lives in a dwelling with low energy efficiency."

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Indicators	No official energy poverty monitoring system in place was reported. However, the report by the Slovak Academy of Sciences implements the definition proposed in the Social Climate Plan and uses the following indicator to measure energy poverty: • The disposable income of the household is below the national equivalent median. • The household's energy expenditure accounts for more than 20% of its disposable income. Because no data on the energy efficiency of dwellings is available, this dimension of the proposed definition cannot be measured. The report also measures energy poverty using extended indicators: • At risk of energy poverty: Households whose residual income (after energy costs) is less than 1.5 the subsistence minimum and whose net annual equivalised disposable income is less than the national median. • At risk of hidden energy poverty: Household whose annual energy costs are below half the national median (M/2) and whose equivalised disposable income is below 70% of the national median. • Households without physical access to energy.
Latest estimates and data sources	The report by Slovak Academy of Sciences includes figures for 2023 and uses data from the 2023 household accounts survey provided by the Statistical Office of the Slovak Republic.
Other resources	N/A

Slovenia

Relevant national institution(s)	Statistical Office of the Republic of Slovenia (Statistični urad Republike Slovenije)
Definition	Based on the Electricity Supply Act, the Government of the Republic of Slovenia issued a Decree on the Criteria for Defining and Assessing the Number of Energy-poor Households (Ur. l. RS, No. 132/2022 of 14 October 2022).
Indicators	In accordance with the Decree, energy-poor households are defined as households that reporting having an income below the at-risk-of-poverty threshold over the previous year in the Living Conditions survey (EU-SILC) and met at least one of the following three criteria: • They were financially unable to keep the home adequately warm. • They were unable to pay utility bills (waste disposal, water, electricity, heating, energy services etc.) on time due to financial difficulties (in the last 12 months). • They had problems with leaking roofs, damp walls/floors/foundations or rot in window frames/floors in their dwellings (lived in inadequate housing conditions). In energy-poverty calculations, we do not take into account the energy prices (including network charges and other contributions payable from them) or household energy expenditures, nor consumption.

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Latest estimates and data sources	Latest data published on the Statistical Office of the Republic of Slovenia website.

Spain

Relevant national institution(s)	Ministry of Ecological Transition and the Demographic Challenge (Ministerio para la Transición Ecológica y el Reto Demográfico) Spanish Statistical Office (Instituto Nacional de Estadística)
Definition	Spain's National Strategy Against Energy Poverty 2019-2024 provides both a definition of energy poverty and of a vulnerable consumer. Energy poverty is defined as "the situation in which a household is unable to meet its basic energy supply needs due to insufficient income, which may be further worsened by living in an energy-inefficient home." In the strategy document, a vulnerable consumer is defined as someone who is affected by energy poverty and uses electricity or thermal energy, making them eligible for public support measures. This definition is set out in Article 3 of Royal Decree 897/2017 of 6 October, which regulates the concept of a vulnerable consumer, the social tariff and other protective measures for domestic electricity consumers. This legislation has refined and adapt its definition to the actual situation of energy poverty, a situation which will be analysed in the context of the implementation of the National Strategy. According to the current regulatory framework, in order to qualify as a vulnerable consumer and therefore access the Social Electricity Bonus (Bono Social), the consumer must first be supplied under the regulated tariff for small consumers (PVPC). Secondly, they must meet at least one of the following conditions: the income of the household unit to which the supply belongs must not exceed a weighted threshold based on the Public Indicator of Multiple Effect Income (IPREM), taking into account the size of the household and their characteristics (disability, dependency, minors, etc.); or the consumer must hold a large family certificate; or the consumer or a member of their household must be a beneficiary of the Minimum Living Income; or the consumer themselves, and in the case of a household unit all members with income, must be pensioners of the Social Security System receiving retirement or permanent disability pensions at the minimum level applicable at any given time, and must not receive other income exceeding €500 per year in total. In addition, consumers are classified as severely vulnerable when, while meeting any of the above conditions, the combined household income is equal to or below 50% of the applicable threshold based on household composition. Finally, there is also the category of consumers at risk of social exclusion, as defined in Article 4 of Royal Decree 897/2017 of 6 October. Following the expiry of the Strategy ENPE 2019-2024, the National Strategy against Energy Poverty 2026-2030 (ENPE 2026–2030) was approved by the Council of Ministers on 17 February 2026. This new Strategy continues along the path set out by its predecessor, consolidating the progress made and setting new targets. One of the key elements for this new Strategy is an updated, clear, and operational definition of this phenomenon, reflecting its conceptual evolution at both European and national levels and serving as a basis for the design, monitoring, and evaluation of public policies. In this regard, Directive (EU) 2023/1791 on energy efficiency introduces, for the first time, a legal and binding definition of energy

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	poverty in its Article 2, which brings important conceptual advances that have been incorporated into the new Strategy ENPE 2026-2030: • Recognition of access to energy as a right linked to dignity and health, not only a matter of consumption or economic cost. • A multi-dimensional perspective, linking energy poverty to structural causes such as low income, unaffordable prices, high relative energy expenditure and poor energy efficiency of homes. It also includes the issue of inadequate summer temperatures. • Adaptability to the national context. The new Strategy adopts this definition as a reference framework. It is used to more accurately identify households in energy poverty, develop indicators consistent with this comprehensive approach and design measures that go beyond short-term financial support, focusing instead on structural and sustainable solutions that ensure universal access to essential energy services. This definition represents an important shift compared with traditional approaches. The concept of energy poverty has evolved to include basic needs such as cooling, lighting and the use of essential electrical appliances, especially relevant in different climates or situations of health vulnerability. It also recognises structural factors such as poor energy efficiency in homes, dependence on electrical equipment for health reasons and prolonged exposure to inadequate energy conditions. This broader approach allows for a more realistic understanding of the phenomenon, helping to identify affected groups and design more effective and sustainable policies aligned with national social and territorial realities.
Indicators	The energy-poverty strategy lists four primary indicators. The first two indicators (on disproportionate expenditure and hidden energy poverty) are complemented by an adjusted version that uses the average of the medians of the past five years instead of the current median. 1. Disproportionate expenditure (2M): The percentage of households whose energy expenditure share of their income is more than double the national median. 2. Hidden energy poverty: Percentage of households whose absolute energy expenditure is less than half the national median. 3. Inability to keep home adequately warm in winter: The percentage of population unable to afford to keep the home adequately warm in winter. Complemented by a question asking if households can afford to keep the house adequately cool in warm months. 4. Late payment of utility bills: The percentage of the population with arrears on utility bills in the past 12 months due to financial difficulties.
Latest estimates and data sources	Reports The report Reviews of Measures to Combat Energy Poverty and Update of Indicators 2018-2024, published in September 2025 by the Ministry of Ecological Transition and the Demographic Challenge, provides the latest figures on energy poverty in Spain. Data sources Indicators 1 and 2 are calculated using data from the yearly Household Budget Survey conducted by the Spanish Statistical Office.

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	The questionnaire and microdata files for the 2024 round of the Household Budget Survey are available on the website of the Spanish Statistical Office. Indicators 3 and 4 uses data from the EU-SILC, also conducted yearly by the Spanish Statistical Office. The questionnaire and microdata files for the 2024 round of the SILC survey are also available on the website of the Spanish Statistical Office.

Sweden

Relevant national institution(s)	Swedish Energy Agency (Energimyndigheten)
Definition	No official definition of energy affordability or related concepts was reported. However, according to the National Energy and Climate Plan, the Swedish Energy Agency is working to implement the legislative requirements set out in the Directive (EU) 2023/1791 on energy efficiency. The NECP refers to Ordinance (2016:742) that defines vulnerable customers as those who are "who are permanently unable to pay for the electricity or natural gas transmitted or supplied to them for non-business purposes."
Indicators	There are currently no indicators used to monitor energy affordability. The Swedish Energy Agency is working on measurements in accordance with the Energy Efficiency Directive (EU) 2023/1791, taking into account the recommendations of Commission Recommendations (EU) 2020/1563 and (EU) 2023/2407.
Latest estimates and data sources	N/A

Switzerland

Relevant national institution(s)	Swiss Federal Office of Energy (Bundesamt für Energie)
Definition	According to EU-SILC variable HH050 «Ability to keep home adequately warm»: defined by Regulation (EU) 2019/1700 and the methodological guidelines of Eurostat.
Indicators	Percentage of population unable to keep home adequately warm.
Latest estimates and data sources	An annual survey was last conducted in February 2026; for data sources see Statistics on Income and Living Conditions

Republic of Türkiye

Relevant national institution(s)	Ministry of Energy and Natural Resources (Enerji ve Tabii Kaynaklar Bakanlığı)
Definition	No common definition of energy affordability or related concepts was reported.
Indicators	Setup of monitoring system in progress.

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Latest estimates and data sources	N/A

United Kingdom

Relevant national institution(s)	Energy affordability is a highly devolved work area in the United Kingdom with distributed responsibilities. England: Department for Energy Security and Net Zero. Scotland: Scottish Fuel Poverty Advisory Panel is responsible for advising the Scottish Government on their work on fuel poverty. Wales: Welsh Government Northern Ireland: The Department for Communities is currently developing a new fuel poverty strategy.
Definition	In the United Kingdom, fuel poverty was first measured and defined by the UK government in the 2001 Fuel Poverty Strategy. Currently, the strategy related to fuel poverty is largely devolved, with each UK nation having introduced its own fuel poverty definition, metric and targets. The Warm Homes and Energy Conservation Act 2000 provided a first definition of fuel poverty in England and Wales. It considers someone to be in fuel poverty, if he or she "is a member of a household living on a lower income in a home which cannot be kept warm at reasonable cost." Scotland has its own legislated definition of fuel poverty, defined in the Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019 using an indicator described in the indicator section.
Indicators	In England, a household is in fuel poverty if the following conditions are met (Low Income Low Energy Efficiency (LILEE) indicator): • It is living in a dwelling with an energy efficiency rating of band D or below. • Its equivalised disposable income (after housing and modelled required energy costs) is below the poverty line (60% of national median). A fuel poverty methodological handbook with details on the LILEE indicator was published by the Department for Energy Security and Net Zero in 2025. Scotland is using an indicator according to which a household is in fuel poverty if the following conditions are met: • A household is in fuel poverty if, in order to maintain a satisfactory heating regime, the total fuel costs necessary for the home are more than 10% of the household's adjusted net income (after housing costs). • And if after deducting fuel costs, benefits received for a care need or disability and childcare costs, the household's remaining adjusted net income is insufficient to maintain an acceptable standard of living. The remaining adjusted net income must be at least 90% of the UK Minimum Income Standard to be considered an acceptable standard of living, with an additional amount added for households in remote rural, remote small town and island areas.

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	Extreme fuel poverty follows the same definition except that a household would have to spend more than 20% of its adjusted net income (after housing costs) on total fuel costs to maintain a satisfactory heating regime. According to their report on fuel poverty estimates, Wales is considering a household in full income fuel poverty, "if it needs to spend more than 10% of its income (including housing related benefits and net of council tax) on all household fuel use in order to maintain a satisfactory heating regime." According to the Department for Communities, Northern Ireland is considering a household to be in fuel poverty if it needs to spend more than 10% of its income on energy costs.
Latest estimates and data sources	England The latest results have been published in a report by the Department for Energy Security and Net Zero in March 2026 using data from the 2023-24 and 2024-25 English Housing Survey. Data tables on the LILEE indicator from 2010 up to 2025 can be accessed online on the fuel poverty statistics website by the government of the United Kingdom. Scotland The latest publication on fuel poverty was issued in 2026 by the Scottish Government. It uses data from the 2024 Scottish House Condition Survey. Data covering the years from 2012 to 2019 and 2022 can be accessed over the UK Data Service. An End User Licence Agreement needs to be signed. Wales The Welsh Government published modelled estimates on fuel poverty for 2024 in October 2025. The report is using data from the Welsh Housing Conditions Survey 2017-18, based on which fuel poverty estimates for 2024 are calculated. A new survey is planned for 2027-28. Northern Ireland Northern Ireland uses data from the Northern Ireland House Condition Survey. The last survey was conducted in 2023 and the preliminary results were published in January 2026. Data from the previous 2016 survey, including fuel poverty statistics, are available on the website of the Northern Ireland Housing Executive.
Other resources	A document on fuel poverty published by the House of Commons Library provides an overview of fuel poverty work in the UK. The Office of National Statistics published an overview of fuel poverty monitoring in the United Kingdom as of March 2023.

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United States

Relevant national institution(s)	United States Energy Information Administration United States Department of Energy United States Census Bureau
Definition	Different terms are used in the United States. However, no agreed upon definition was reported.
Indicators	The EIA calculates three indicators to measure energy insecurity using data from the Residential Energy Consumption Survey (RECS): 1. Proportion of households that reduced or forwent basic necessities to their pay energy bill. 2. Proportion of households that received a disconnection notice. 3. Proportion of households that kept their home at unhealthy or unsafe temperature. All three indicators are reported based on three frequency levels: almost every month, some months, or 1 or 2 months in the previous year. The RECS also asks households whether they were unable to use their heating or cooling equipment and if medical attention was needed because their home was kept at an unsafe temperature. The Energy Information Administration releases the annual Winter Fuels Outlook that includes estimations of household energy expenditures split by region and the heating fuel used. The Department of Energy developed the Low-income Energy Affordability Data Tool (LEAD-tool) that allows for the examination of the energy burden (proportion of income spent on energy) and energy costs of household across states and counties.
Latest estimates and data sources	The last RECS was conducted in 2024 and the results were released in 2026. The RECS and was used to calculate energy insecurity estimates by the Energy Information Administration; these were published in 2026, including a detailed breakdown of results by socio-economic and geographic characteristics. RECS microdata can be accessed over the website of the Energy Information Administration. The LEAD tool uses data from the American Community Survey that is conducted by the United States Census Bureau on a rolling basis every month.
Other resources	LEAD tool methodology, 2024

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Annex B. Survey

Survey template

Introduction

The IEA Energy Data Centre is carrying out work on energy affordability definitions, data and indicators. The aim of this survey is to understand what IEA member countries are already doing in this field and how the IEA can contribute.

We acknowledge that there is no common definition for energy affordability. In this survey, we use the term 'energy affordability/poverty' as a broad placeholder to encompass all definitions related to this topic, such as energy poverty, fuel poverty, energy vulnerability or energy injustice.

We would appreciate your cooperation in answering this short survey (estimated completion time around 5-10 minutes). Participation is voluntary and you may withdraw at any time.

The primary target group for this survey is statisticians and analysts. However, other stakeholders such as policy advisers are also invited to participate.

If you know other experts on the field that might have valuable insights, please feel free to share this survey with them.

If you have any questions regarding the survey, please contact EnergyIndicators@iea.org**.**

Data Protection Notice for Survey on Energy Affordability/Poverty
The OECD is committed to protecting the personal data it processes, in accordance with its Personal Data Protection Rules.

The IEA Energy Data Centre uses this survey to collect data on energy affordability/poverty tracking. The data will be used to inform a report on energy affordability indicators and data. The responses will be anonymised. Only the IEA Energy Data Centre has access to your data.

Questions

Throughout this survey, we refer to your affiliation simply as *"country/organisation."* This term is used to include both individuals representing a specific country (e.g., government agencies) and those affiliated with organisations (e.g. international organisations, research institutions, NGOs). **Please respond to the questions based on the entity you are affiliated with.**

Question 1:
What organisation/institution are you affiliated with?

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1. National government agency
2. Regional government agency (e.g. state, province, territory)
3. International organisation or supranational body (e.g. European Union, United Nations, World Bank)
4. Non-governmental organisation
5. Other

Question 2:
Please provide the name of the country you represent. Please enter N/A if you do not represent any country.

Open question

Question 3:
Please provide the name of the organisation/institution you represent.

Open question

Question 4:
What is your primary role in your organisation/institution?

1. Statistician
2. Analyst/Modeller
3. Policy advisor
4. Other [*free text field*]

Question 5:
How important is the issue of energy affordability/poverty in your country/organisation?

1. No importance whatsoever
2. Limited importance
3. Somewhat important
4. Very important

Question 6:
Is there an official definition or common understanding of energy affordability/poverty in your country/organisation?

1. Yes
2. No
3. Don’t know/no answer

Question 7 (only if Question 6 got answered with a yes):
Please kindly provide a reference of the definition or common understanding (e.g. link to official document/source where it is defined)

Open question

Question 8 (only if question 6 got answered with a no):
In your view, would an official definition or a common understanding of energy affordability/poverty in your country/organisation be useful?

1. Yes

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2. No
3. Don’t know/no answer

Question 9:
How established is the monitoring of energy affordability/poverty in your country/organisation?

1. No monitoring at all
2. Establishing monitoring pilot
3. Limited monitoring in place
4. Well established monitoring system
5. Don’t know/no answer

Question 10 (if Question 9 was answered with Options 2 to 4):
What indicators are you using to measure energy affordability/poverty?

Open question

Question 11 (if Question 9 was answered with Options 2 to 4):
What data sources are you using to track energy affordability/poverty? Please select all that apply.

1. Quality of life survey.
2. Household budget survey.
3. Energy use survey.
4. Physical home survey (i.e. in person inspection of building characteristics).
5. Administrative data (e.g. tax data, welfare programme registries).
6. Don’t know/no answer.
7. Other [*open text field*].

Question 12 (if Question 9 was answered with Options 2 to 4):
Are there any factors specific to your country/organisation that impact the monitoring of energy affordability/poverty?

Open question

Question 13 (if Question 9 was answered with Option 1):
Are there any specific reasons why there currently is **no** monitoring of energy poverty in your country/organisation?

Open question

Question 14:
Are there any relevant materials or results you would like to share? If possible, please share a link to these materials (documents, regulatory frameworks, existing databases, surveys, co-ordination groups, etc).

Open question

Question 15:
From your point of view, what are the **typical challenges** faced in the monitoring of energy affordability/poverty in your country/organisation? Please select all that apply.

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1. Lack of clear political mandate.
2. Lack of resources.
3. Complexity of the subject (e.g. conceptual boundaries, definitions).
4. Methodological challenges (e.g. assumptions, choice of data collection methods, choice of indicators).
5. Responsibilities for monitoring are unclear.
6. Data limitations (granularity, frequency, volume, timeliness, …).
7. Don't know/no answer.
8. Other [*open text field*].

Question 16:
In your opinion, how important is international cooperation in tracking energy affordability/poverty?

1. No importance whatsoever
2. Limited importance
3. Somewhat important
4. Very important

Question 17:
Please share your reasoning for selecting that level of importance.

Open question

Question 18:
How could the IEA add value to this area of work? Please select all that apply.

1. Facilitate knowledge sharing across countries.
2. Support standardised and coherent international monitoring of energy affordability/poverty.
3. Support capacity development.
4. Other [*open text field*].

Question 19:
Would you be open to sharing your experiences on energy affordability/poverty monitoring with other countries/organisations working on the issue?

1. Yes.
2. No.

Question 20 (only if Question 19 was answered affirmatively):
Please indicate the areas you would like to share your knowledge in.

1. Concepts and definitions.
2. Data collection methodologies.
3. Indicator methodologies.
4. Other [*open text field*].

Question 21:
If you wish to be contacted in the future, please provide your email address below.

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Note that if you choose not to share your contact details, we will not be able to reach out to you.

Open question

Question 22:

Is there anything that you would like to add or complement that was not covered in the previous questions?

Open question

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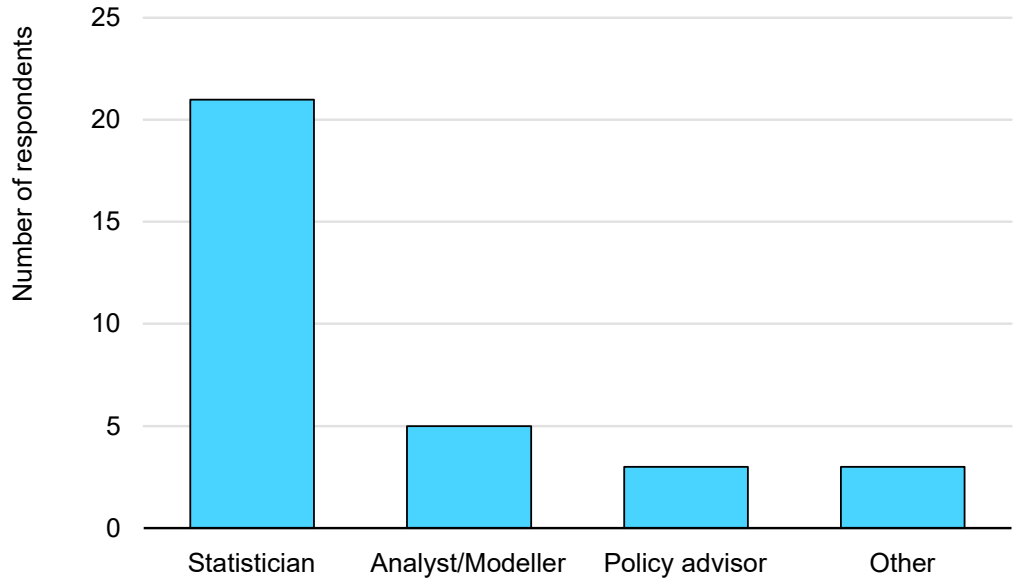
Results

Figures A.1 to A.8 give the results of the survey.

Figure A.1. Question 4: What is your primary role in your organisation/institution?



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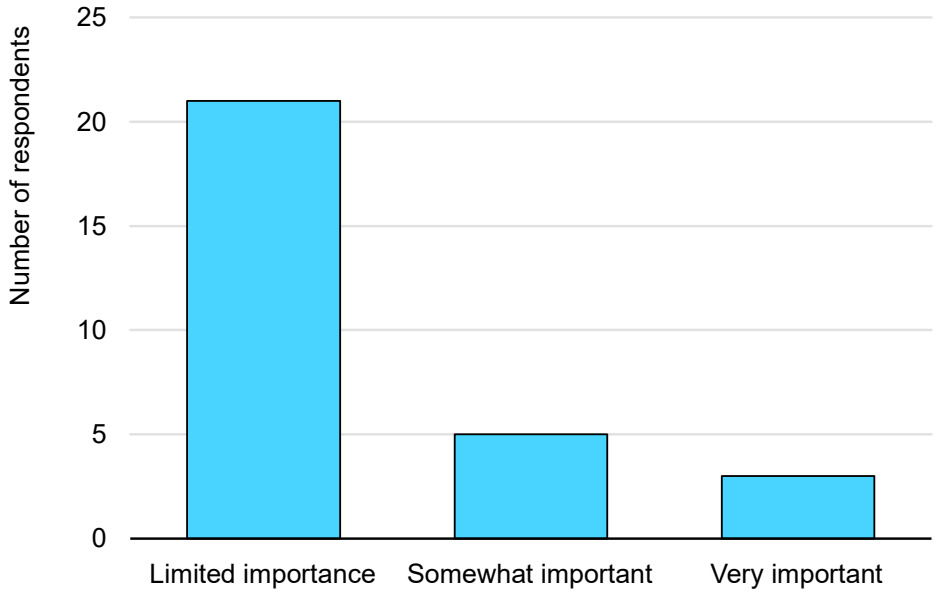
Note: Based on 32 recorded responses.

Figure A.2. Question 5: How important is the issue of energy affordability/poverty in your country/organisation?



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Note: Based on 32 recorded responses.

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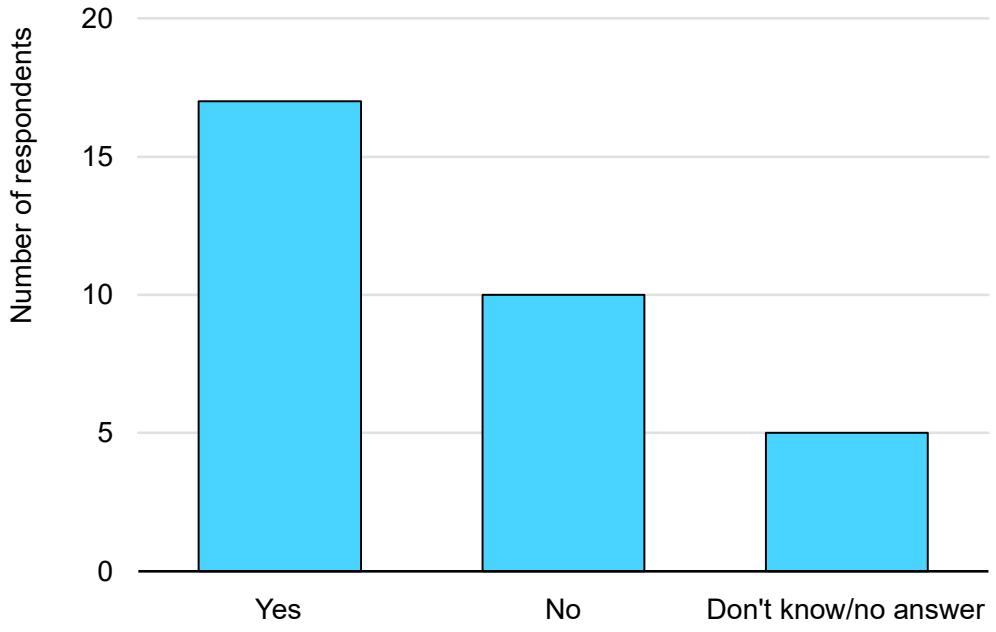
Figure A.3. Question 6: Is there an official definition or common understanding of energy affordability/poverty in your country/organisation?



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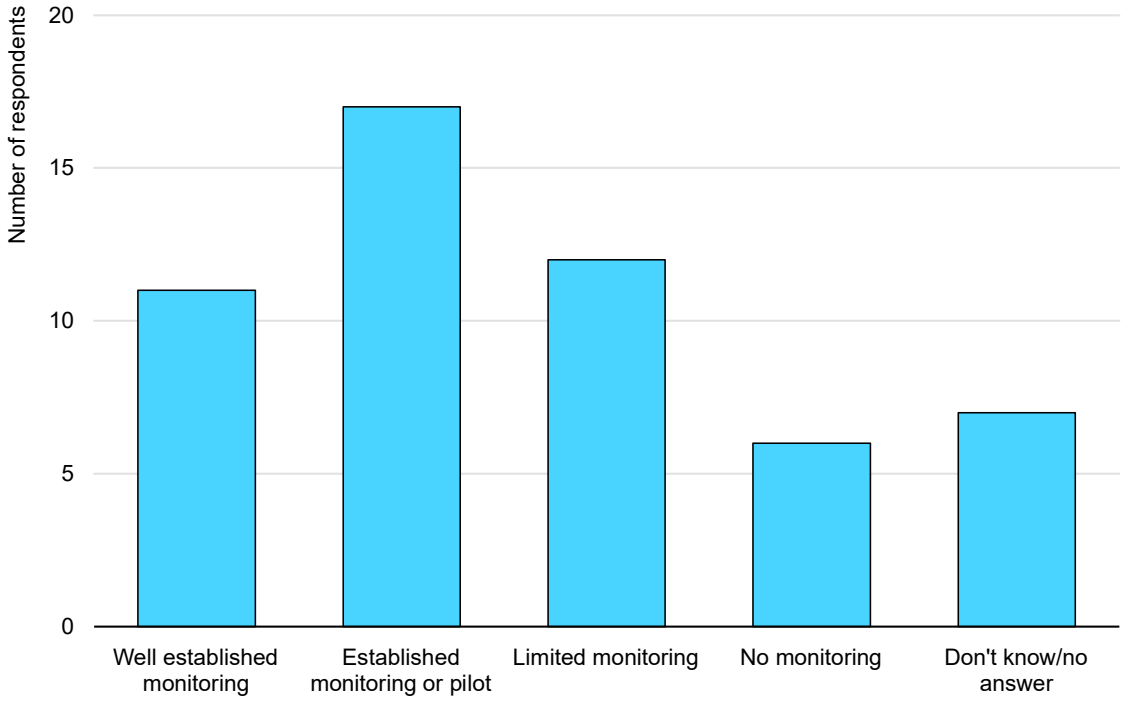
Note: Based on 32 recorded responses.

Figure A.4. Question 9: How established is the monitoring of energy affordability/poverty in your country/organisation?



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Note: Based on 32 recorded responses.

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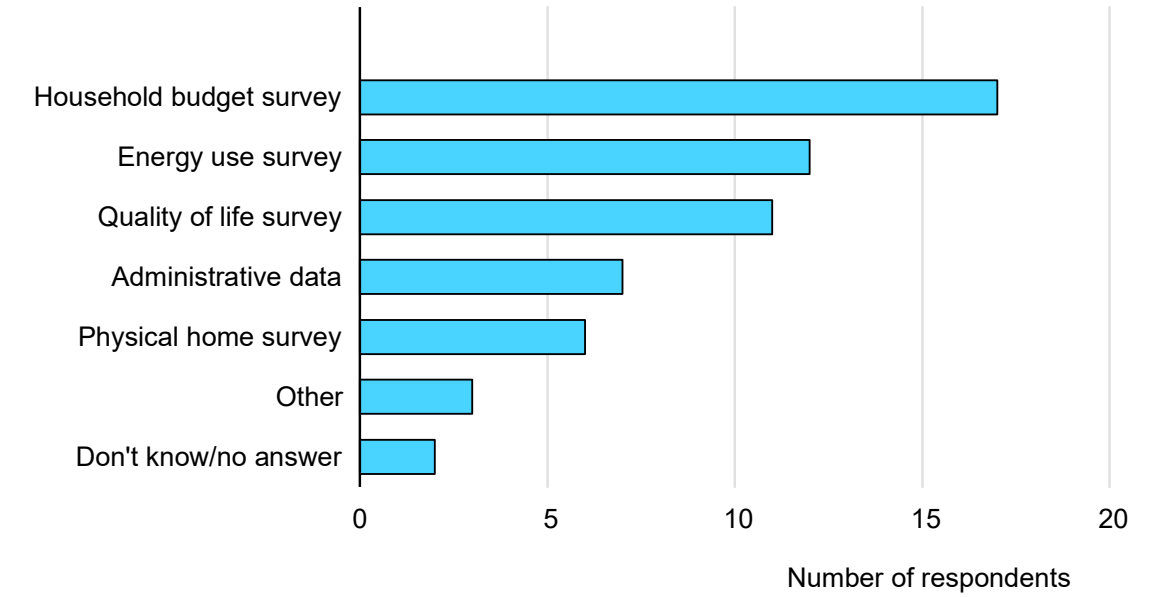
Figure A.5. Question 11: What data sources are you using to track energy affordability/poverty? Please select all that apply.



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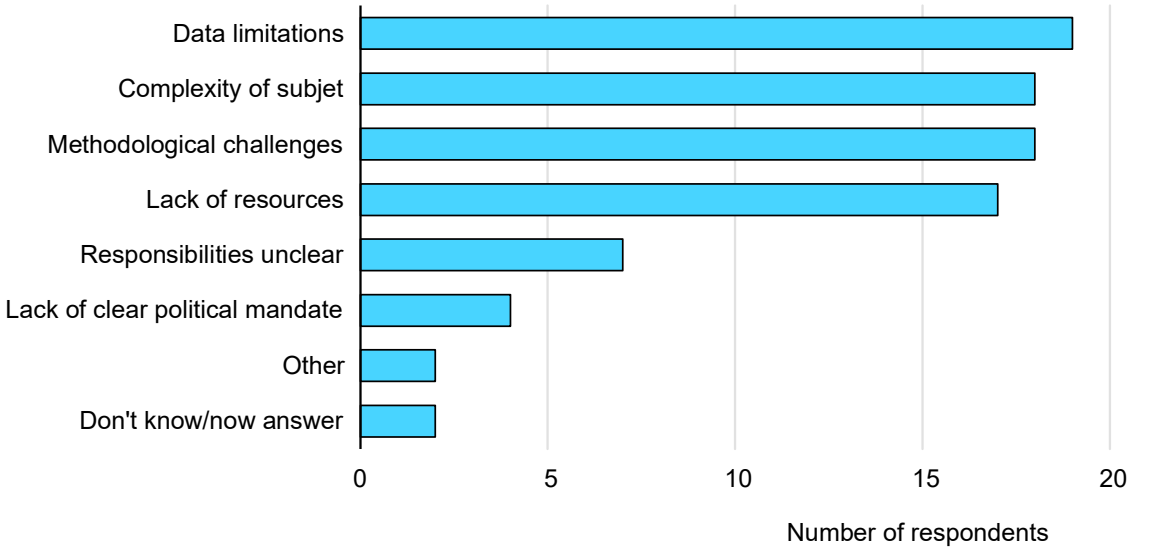
Note: Based on 28 recorded responses.

Figure A.6. Question 15: From your point of view, what are the typical challenges faced in the monitoring of energy affordability/poverty in your country/organisation? Please select all that apply.



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Note: Based on 32 recorded responses.

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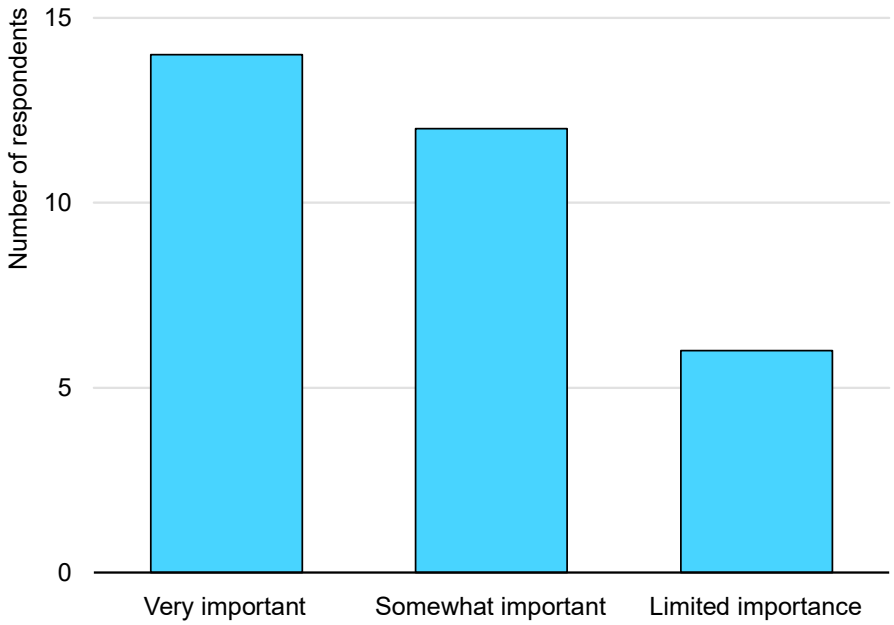
Figure A.7. Question 16: In your opinion, how important is international cooperation in tracking energy affordability/poverty?



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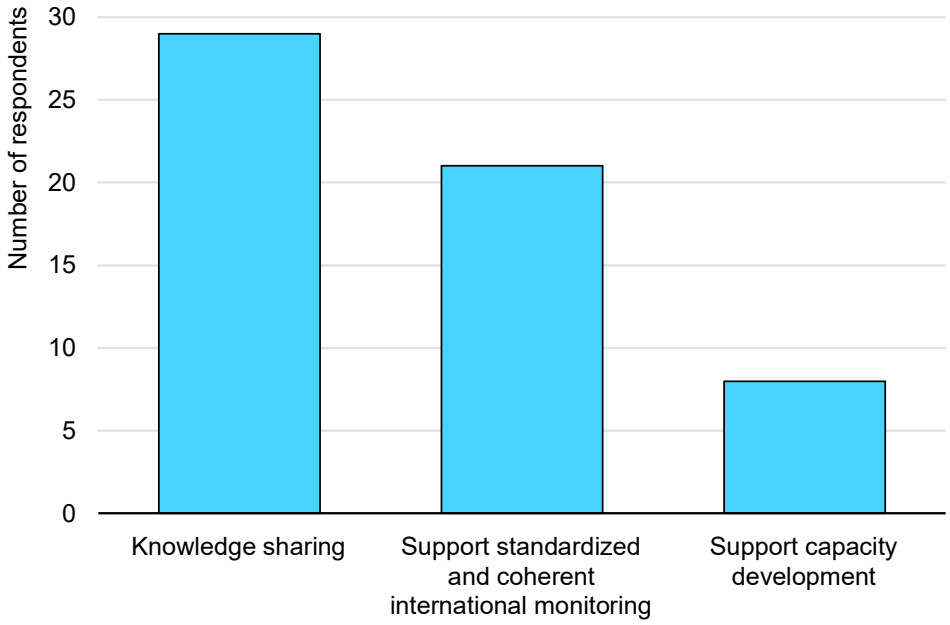
Note: Based on 32 recorded responses.

Figure A.8. Question 18: How could the IEA add value to this area of work? Please select all that apply.



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Note: Based on 32 recorded responses.

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Annex C.

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Abbreviations

2M	Twice the national median
BER	Building Energy Ratings
EC	European Commission
EIA	U.S. Energy Information Administration
EPIC	Energy Poverty Indicator Calculation
ESRI	Economic and Social Research Institute
EU	European Union
EU-SILC	EU Survey on Income and Living Conditions
FPS Economy	Federal Public Service Economy (SPF Économie - Service public fédéral Économie)
HBS	Household Budget Survey
IDAE	Institute for the Diversification and Saving of Energy (Instituto para la Diversificación y Ahorro de la Energía)
IEA	International Energy Agency
LEAD	United States Low-Income Energy Affordability Data
LEKWI	Low Energy Quality Home and Few Investment Opportunities
LILEE	Low Income Low Energy Efficiency
M/2	Half the national median
NECP	National Energy and Climate Plans
RECS	Residential Energy Consumption Survey
SDG	Sustainable Development Goals
UK	United Kingdom
US	United States

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