Weighed in the balance – how well do the EU appliance regulations contribute to a just energy transition?

Fiona Brocklehurst,
Ballarat Consulting,
United Kingdom
fiona@ballaratconsulting.co.uk

Abstract

In the past decade ensuring a just energy transition has gained importance as a crucial element in building the public backing needed to achieve climate goals. If citizens see that regulations cutting carbon emissions can reduce rather than increase inequalities they are more likely to support them.

This paper analyses how the European Union's two key regulatory policies for appliance energy efficiency—minimum energy performance standards (MEPS) and mandatory energy labels—address three critical dimensions of justice in the energy transition, reducing carbon emissions in a way that reduces inequality.

Firstly, decision-making processes, enabling broad participation to deliver procedural justice. The paper examines both the theory and practice of how MEPS (known as ecodesign regulations in the EU) and energy label regulations are developed, agreed upon, and revised. It evaluates the breadth of participation in these decision-making processes, including the development of the test standards that underlie them.

Secondly, the design and implementation of policies accounting for the uneven allocation of costs and benefits to deliver distributional justice. The paper outlines how costs and benefits are assessed during regulatory development through ex-ante appraisals. It reviews independent ex-post evaluations of MEPS and labels, adopted in the EU and elsewhere, to assess their equity in practice. Additionally, the paper examines potential inequalities stemming from product selection for regulation and inconsistent standards across similar products, building on concerns previously identified with US MEPS. For example, there have been US MEPS for domestic tumble dryers since 1988 but there are none for the commercial machines used in laundrettes. This means that the higher running costs of the latter are passed on to their customers, generally lower income families who are least able to afford them.

Thirdly, diverse cultures and perspectives should be engaged with and taken into consideration to deliver recognitional justice. This involves acknowledging divergent perspectives rooted in social, cultural, ethnic, racial and gender differences. The paper acknowledges that these cultural aspects of appliance regulation have received little attention. It examines approaches from other energy efficiency policy areas to identify potential insights.

The paper concludes with an overall assessment of how EU appliance policy meets just transition requirements and offers recommendations for improvements.

Introduction

It is widely recognised that the transition to clean energy needs to be just. As Friends of the Earth said in a recent policy document “Fairness isn’t just the right approach economically, legally and morally. It is also the foundation of political legitimacy. If the climate plan is unfair – or feels unfair – it will fail.” (Bosworth and Childs 2025). In the EU the objective of a fair transition is explicit or implicit in many policies. For example, the European Council adopted a recommendation on ensuring a fair transition towards climate neutrality in 2022 (Council of the European Union, 2022) which states the principles of fairness and offers guidance to Member States on how to keep to them. It follows that EU energy policies should be designed and function in a just way. This paper considers how well the main EU regulations governing the efficiency of energy using products: ecodesign and energy labelling, address justice. It does not explore to what extent justice and energy savings are in competition and if so, how this should be addressed.

It is generally accepted that there are three dimensions of justice: procedural justice (who participates in decision-making); distributional justice (allocation of costs and benefits); and recognitional justice (respect for, engagement with and fair consideration of diverse cultures and perspectives) (European Environment Agency

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2023). These are considered in this paper in turn in the context of EU appliance energy efficiency policies[1]. First a description of the policies and their importance.

Ecodesign and energy labelling

Ecodesign and energy labelling are the EU examples of what are often referred to as Energy Efficiency Standards and Labelling (EES&L) programmes. National EES&L programmes have been in existence since the 1970s. As of 2021, EES&L programmes were operating in more than 120 countries around the world and applied to more than 100 types of appliances and equipment in the commercial, industrial and residential sectors (IEA & IEA 4E 2021). EES&L programmes use one or both of the following complementary tools as the basis to improve the energy efficiency performance of appliances and equipment:

- minimum energy performance standards (MEPS), which are used to overcome barriers to improved efficiency – such as potentially higher purchase prices - and provide a level playing field in competitive markets by prohibiting the least efficient products
- energy labels, which are used to address information barriers and enable consumers to make more informed choices at the point of purchase by showing the comparative performance of all appliances (known as rating labels) or by identifying the best-in-class products (endorsement labels) (IEA & IEA 4E 2021)

Ecodesign is the EU's MEPS regulation, the EU energy label is a mandatory efficiency rating label[2].

An assessment of the achievements of EES&L from all jurisdictions in 2021 (IEA & IEA 4E 2021) found that improvements to the energy efficiency of appliances and equipment were some of the lowest-cost options available for reducing energy consumption and associated emissions, with typical society benefit/cost ratios of 4:1. The EU commission an annual review of the impact of ecodesign and energy labelling. The most recently published (VHK 2024) found that energy savings were 7.3% (2023) to 10.2% (2030) of the total EU27 primary energy consumption in 2022 (1,259 mtoe; 14,642 TWh). These, then, are highly cost effective impactful policies. Despite this they are often regarded as 'niche', and attract much lower levels of research, particularly academic, interest, than sustainable energy generation or other forms of energy efficiency policy (industry or buildings). This is evident generally but also specifically in the field of energy justice: a 2021 review of 155 articles published between 2008 and 2019 mentioning Energy Justice (Jenkins et al 2021) found the majority were concerned with energy generation technologies (solar, wind, coal and nuclear being the most popular), far fewer with energy use (only heating/cooling, lighting and cooking. The review did not code for energy efficiency specifically so it is not possible to quantify the number of articles which addressed this).

A previous paper the author was co-author on (Lane et al 2017) looked at the income distribution effects of MEPS, labels and rebates. It found that evidence was limited and more research was needed – in particular on whether and how the efficiency of purchased products varies by income. On the evidence available it suggested that, with a combination of careful design, targeting and combining different policies in a package, the net income distribution effect of product policy could be made neutral, or even progressive.

This paper considers energy justice in some ways more narrowly, focusing on the EU and MEPS and mandatory energy labels, and in other more broadly, covering procedural and recognitional as well as distributional justice. It starts by outlining the methodology then describes the situation for each type of justice in turn. It concludes with an appraisal of what can be said about the energy justice of these EU regulations, areas for improvement and what further research is needed to make a more robust assessment.

Methodology

This paper is based on a review and analysis of white and grey literature found using online searches, substantiated and extended by the author's experience. She has worked as a consultant in product energy efficiency policy for approximately 20 years – coincidentally the lifetime of the EU's ecodesign regulation. Over this time she has been involved in the development of several product specific Ecodesign and energy label regulations and represented public and third sector organisations in the regulatory process.

Procedural justice

[1] This paper only addresses the EU wide mandatory policies: ecodesign and energy labelling. Other policies, such as grants and incentives, are voluntary and used at Member State or regional level are not covered.

[2] There are no energy endorsement labels in the EU. There is an endorsement label, the EU ecolabel, but this covers many different types of environmental impact, not just energy.

This section addresses procedural justice - whether decision-making processes enable broad participation. It assumes that industry (manufacturing and retail) has the finances and influence for their voice to be heard in the process of developing regulation. It focuses on how well citizens (consumers) are represented.

There are overarching laws for both policies, the ecodesign directive (EC 2009) and the energy labelling regulation (EC 2017). These set the framework for the development and adoption of regulations for product groups. They require consultation with stakeholders when setting out the indicative list of product groups which are priorities for the adoption of implementing measures over the next three years (Working Plans) and when preparing draft implementing measures (regulations for specific product groups). Consultation is via a Consultation Forum, comprising Member States' representatives, industry, including SMEs and craft industry, trade unions, traders, retailers, importers, environmental protection groups and consumer organisations[3].

Note: The Ecodesign framework is in the process of being replaced by the Ecodesign for Sustainable Products Regulation (ESPR) (EC 2024). This extends the scope of the regulations beyond energy related products to include a wide range of goods and materials and aims to reduce the impact of a product throughout its complete lifecycle by improving product durability, reparability, reusability, and recyclability. No implementing measures have been adopted yet under the framework. To date the process of adopting measures appears to be similar to that for Ecodesign, although the Consultation Forum will be replaced by the Ecodesign Forum[4].

The process of developing test standards

There is an important step before developing a regulation – first there must be a test standard which ensures that all parties measure relevant parameters (energy use, noise emissions etc) reliably, consistently and in a way which is relevant to a product's use. When test methods are needed to support Ecodesign/Energy Labelling Regulations, the European Commission issues standardisation requests to the European Standardisation Organisations (CEN/CENELEC/ETSI) who then develop the methods. This practice is defined in a standardisation regulation (EC 2012). As reported in Spiliotopoulos (2017) the vast majority of representatives in the standardisation process come from industry and this can tilt the process in their favour and away from consumers or environmental protection. However ANEC[5], an international non-profit association, represents consumers in some European standardisation committees. (ANEC members[6] are consumer organisations in the EU and adjacent countries). This is a public interest activity, dependent upon European public funding financed by the European Union and EFTA under Regulation (EU) 1025/2012 (EC 2012). ANEC is not a formal member of standard working groups and cannot vote on proposed standards.

The process of developing product specific regulation (implementing measures)

[Note: There is no description of the process of developing implementing measures on the European Commission website dedicated to product policy[7]. This description of the process is based on a paper by Siderius (2013) and the author's experience.]

The process for developing and adopting ecodesign regulations is shown in **Figure 1**. Siderius (2013) notes that the timing in Figure 1 is the ideal; the actual time to adoption of a regulation is always longer and often uncertain. He states that uncertainty in the process and in when the measure will be adopted makes it more difficult for stakeholders to participate in the process.

[3] Members of the Forum are listed at https://ec.europa.eu/transparency/expert-groups-register/screen/expert-groups/consult?lang=en&groupID=3609

[4] https://green-forum.ec.europa.eu/implementing-ecodesign-sustainable-products-regulation_en

[5] https://www.anec.eu/about-anec/our-mission#:~:text=It%20is%20an%20activity%20dependent,(EU)%201025%2F2012.

[6] https://anec.eu/about-anec/our-members

[7] https://energy-efficient-products.ec.europa.eu/index_en

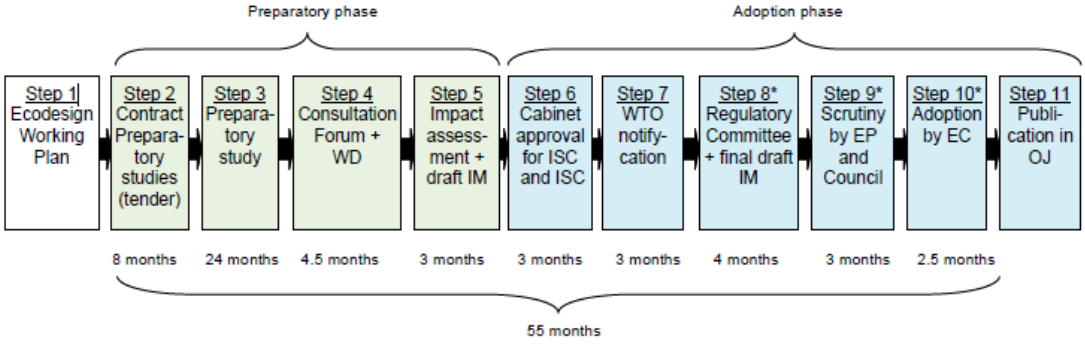

Figure 1 Process for developing ecodesign regulations (Siderius 2013)

Contractors appointed by the European Commission undertake a preparatory study to develop draft implementing measures. The contractors are required to use a standardised methodology, the Methodology for Ecodesign of Energy-related Products (MEErP), a techno-economic-environmental assessment of the specific product group. This means that the type of data used and the criteria applied are consistent and pre-defined. The tasks in MEErP are:

- Task 1 – Scope (definitions, standards and legislation)
- Task 2 – Markets (volumes and prices)
- Task 3 – Users (product demand side)
- Task 4 – Technologies (product supply side, includes both BAT and BNAT[8])
- Task 5 – Environment & Economics (Life Cycle Analysis (LCA) & Life Cycle Costing (LCC))
- Task 6 – Design options
- Task 7 – Scenarios (Policy, scenario, impact and sensitivity analysis)

Tasks 1 to 4 can be performed in parallel, whereas 5, 6 and 7 are sequential.

Consultants are required to consult stakeholders and stakeholders are invited to provide data and present their suggestions and opinions. There are usually at least two hybrid (online and in person) stakeholder meetings where the consultants present interim results, ask stakeholders for feedback and answer their questions. In principle any person can put forward their views, at these meetings or via email.

When draft regulations are being discussed (Step 4 in Figure 1) consumers are represented in the Consultation Forum by ANEC and by BEUC[9], an umbrella group in Brussels for over 40 national consumer organisations from over 30 European countries. BEUC are part-funded by an EU operating grant to support their work on behalf of European consumers as well as membership fees and funds from other sources[10]. BEUC asks their national members for their views on specific points. Industry members are represented by their respective European Trade associations.

There is another mechanism where anyone (EU citizen or not) can express their views on proposed regulation or guidance – "Have your say", Public Consultations and Feedback[11]. Individuals or organisations can submit their views for consideration by the Commission which are then published on the webpage (they can be anonymised). There may be several periods of consultation on a given initiative, for example a call for evidence followed by a consultation on specific proposals. The consultation period can vary from one to several months. The website can be searched for a particular initiative or a user can register and ask to be sent email alerts when a topic is open for consultation.

[8] BAT Best Available Technology, BNAT: Best Next Available Technology
[9] https://www.beuc.eu/
[10] https://www.beuc.eu/about-beuc/financial-information#:~:text=Full%20Members%20contribute%200.45%25%20of,Members%200.30%25%20of%20their%20income.
[11] https://ec.europa.eu/info/law/better-regulation/have-your-say_en

The practicalities of consumer representation in the process

The system is designed to allow all stakeholders to participate in or be represented in the process of developing new product policy regulations. However there are challenges to effective consumer representation including:

- The highly technical nature of the regulations
  A certain level of expertise is required to understand the preparatory study reports and the draft regulations. No consumer or consumer group has this expertise for more than a handful of products if any; they need the support of technical experts (as do the Commission and Member States). There is a direct and overhead cost to the consumer group NGOs in contracting experts. Further, the NGOs need to be assured that these experts do not have a conflict of interest which can limit the pool of suitable contractors.
- The large number of regulations
  Over 30 product types are currently covered by ecodesign regulations[12] of which around 20 have energy labels[13]. New product groups are potentially being added to this list every year and most regulations are reviewed every three to five years. It is a challenge for everyone involved to resource this adequately. Not all product groups are of direct interest to consumers (for example distribution transformers and commercial refrigerators) but even the 20 or so consumer-relevant products are a great many to engage with. Further, it is difficult to know which products have regulations in development or are being reviewed – these are not listed on any public website. Consultation Forum members are informed by the Commission when preparatory studies are starting (Lopez Nera 2025).
- The lack of transparency about the preparatory studies
  The earlier in the process of development of regulation a stakeholder gets involved the more effective they can be and the more efficient overall. It is difficult to make substantive changes to a regulation when the Consultation Forum is consulted, i.e. when there is a working draft, as all involved have invested heavily by this point and resistant to unpicking their work. Thus stakeholders can be more influential during the preparatory study, when the ideas are being developed. However there is no requirement or system for interested parties not represented in the Consultation Forum to be notified that a preparatory study has started, what the timescale is, or how to get in contact with contractors to register as a stakeholder. Most contractors create a dedicated webpage for a study but some do not. Even when they do, they do not generate a great deal of web traffic and so are often difficult to find using internet search engines. Consultants are likely to actively engage with industry as they can be the source of crucial information on sales, stock and technical detail; there is less obvious incentive for involving consumer organisations. This presents a barrier to consumer involvement in the process of developing regulations.

Distributional justice

Distributional justice considers whether the design and implementation of policies result in the uneven allocation of costs and benefits.

Ex-ante assessments of regulations

As part of the development of regulations for specific product groups consultants, following the MEErP (Kemna 2011), assess the effect of adopting the technologies available on the market with the lowest energy use (BAT) and other environmental impacts of appliances, such as water use. They also estimate the effects of the changes on Life Cycle Cost for consumers. This accounts for average purchase price and operating costs (cost of energy and other consumables based on degree of usage), discounted over the lifetime of the product. A sensitivity analysis covering the price of energy or other resources, the cost of raw materials or production costs, discount rates, and, where appropriate, external environmental costs, including avoided greenhouse gas emissions, must be carried out to check if there are significant changes to the least LCC and if the overall conclusions are reliable. In addition an Impact Assessment (IA) is undertaken of the draft proposals[14]. Generally the minimum energy performance standard is set at the performance with the least life cycle cost. This should ensure that the average consumer benefits from the Ecodesign regulation, as their lifetime cost of ownership is reduced by the regulation. However the distributive effect of the regulation, that is how different consumers in different income would be affected, is not assessed in the preparatory study or the IA.

The lowest threshold of the lowest class of the energy label is set by the ecodesign regulation.

[12] https://europa.eu/youreurope/business/product-requirements/compliance/ecodesign/index_en.htm
[13] Listed https://energy-efficient-products.ec.europa.eu/product-list_en. The product groups without energy labels are: hobs, vacuum cleaners, air heating and cooling products, computers, external power supplies, servers and data storage products, circulators, motors, industrial fans, power transformers, water pumps and welding equipment.
[14] https://commission.europa.eu/law/law-making-process/planning-and-proposing-law/impact-assessments_en

There are other benefits for consumers from energy efficiency such as reduced global warming impact and improved air quality. Boucher (2024) modelled the effects of US MEPS on the distribution of some emissions. She found that the MEPS had reduced energy demand[15] and resulting fine particulate matter (PM2.5) and PM2.5 precursor emissions in the US, leading to a decline in PM2.5-related mortality. Furthermore, the public health benefits had been distributed equitably. Boucher considered that this showed that the appliance standards had contributed meaningfully to environmental justice.

Ex-post assessments of regulations

Ecodesign preparatory studies generally assume that more efficient products will cost more to purchase, and that an increase in MEPS performance levels will raise purchase prices (although, as discussed above, they will decrease life cycle costs). This purchase price increase could make it more difficult for low income customers to buy new appliances. However, ex-post assessments have not found the expected increase in purchase price. For example, ACEEE showed that across nine products where US Department of Energy set MEPS, the expected purchase price increase before MEPS implementation was 35%, but there was no observed increase after implementation (the mean price increase was marginally lower, the median marginally higher) (Nadel and de Laski 2013). Similarly, other research also suggests that the expected increase in purchase price is rarely seen, and in some cases purchase prices fall even more quickly following regulation, for example in Australia (Lane and Harrington 2010) and the US (Spurlock et al. 2013).

Few ex-post studies look specifically at the distributive effect. Spurlock and Fujita (2022) examined the effect of 2004 and 2007 MEPS on the energy efficiency and price of US washing machines. They found that efficiency increased and prices decreased in a way that was beneficial to all consumers, but especially those with lower incomes or renters. Low-income consumers were not priced out of the market but rather benefited particularly.

The author has not found any ex-post analysis on the distributive effects of ecodesign (that is EU) regulations. However Kesselring (2025) examined evidence for the effect of EU energy labels on the market for washing machines. She found that manufacturers had responded to changes in the energy label by making more energy efficient models, increasing price competition, and preventing green premia for models with higher energy classes, which could disadvantage lower income consumers.

Effect of regulation coverage

Another aspect of the effect of regulations is the coverage of the regulations: if regulations result in cheaper appliance use (over their lifetime) and are applied to products which are more widely used by higher than lower income consumers their effect can be regressive, reducing energy justice. Recent studies have looked at two cases where there are significant differences in product usage and MEPS coverage in the US.

Foster Porter et al (2022) looked at the case of MEPS for laundry equipment. They found that commercial washing machines and tumble dryers used in launderettes or in multi-family laundries (in apartment buildings), (termed vended machines) are much more likely to be used by low income households (based on a national US Government energy use survey data[16]). They assert that the owners of these machines are unlikely to voluntarily buy more efficient models, the well known landlord/tenant split incentive, so that MEPS are needed to increase energy efficiency. However there is a disparity in MEPS coverage and ambition for in-dwelling (owned by single household) and vended machines, namely, in 2022:

- In-dwelling clothes washer MEPS had been in place for 35 years, while MEPS for vended washers for only 15 years.
- MEPS for in-dwelling top-load[17] washers were more stringent than for vended.
- Many high capacity front-load clothes washers used in laundrettes remained unregulated.
- In-dwelling tumble dryers MEPS had been in place for 35 years, while there were no MEPS for the larger dryers used in laundrettes

Foster Porter et al found that these disparities had disadvantaged low income families and made recommendations on how this could be addressed.

The situation for these product groups is similar in the EU. Residential washing machines and tumble dryers have had ecodesign requirements and energy labels since 2010 (with energy labels since 1996), whereas

[15] Based on ex-ante projections
[16] 2015 Residential Energy Consumption Survey (RECS).
[17] The most common type in the US, with more than 70% of both residential and commercial sales

commercial machines are not yet regulated. A preparatory study for the latter was undertaken in 2013 but as there were no test standards it was not possible to develop regulations. Test standards are now in place and a preparatory study for industrial and commercial laundry appliances is underway[18] and regulations are expected under the ESPR. In the meantime it seems likely that users of commercial machines in the EU, likely those on lower incomes, are being disadvantaged by this situation. There does not appear to be comparable data to that found in the US on the usage of vended washer and dryers by income, so it is not clear if the effect is more or less than in the US.

Another US paper considered the effect of different levels of ambition for different air conditioner (AC) and heating types (collectively HVAC, Heating Ventilation and Air Conditioning) (Foster Porter et al 2024). In the US there are structural differences in the housing market with low income families more likely to rent than to own their own home and more low-income renters living in multi-family and manufactured homes. The type of AC fitted largely varies by the building type with window or wall AC more common in multi-family or manufactured homes and central AC with heat pumps more common in single family homes. Similarly, electric resistance zonal heating and electric resistance furnaces (boilers) are more common in multi-family or manufactured homes and gas fired furnaces more common in single family homes. Again there were disparities in MEPS coverage and ambition for these AC and heating types, namely, in 2024:

- There were no MEPS for electric resistance zonal heating
- The MEPS for electric resistance furnaces, more common in manufactured homes, had last been updated 30 years previously.
- MEPS for window and wall ACs had been developed five to ten years later (1992 and 1997) than for central AC
- MEPS for central AC and gas furnaces were introduced in 1987 and have been regularly updated since.

The paper found that this situation has disadvantaged low income households by increasing their energy bills and affecting their health, as they often cannot afford to heat or cool their homes adequately.

Comparing the situation in the EU: there are multiple regulations for HVAC products[19], namely:

- Air conditioners (domestic scale) and comfort fans
- Local (room) space heaters (gas and electric)
- Solid fuel local space heaters (fossil fuel and biomass)
- Solid fuel boilers
- Space heaters (gas- and oil-fired boilers, electric resistance boilers and electric or gas-fired hydronic heat pumps)

although there is somewhat greater grouping of products that provide the same service than in the US. The prevalence of heating and cooling types varies considerably across EU by country and region due to differences in climate, infrastructure and custom. This variation may be greater than that caused by income and so the distributive effects may be weaker. Also the track record in reviewing and updating regulations in the EU, while far from exemplary (see for example European Court of Auditors 2020) is generally better than in the US, so the situation where one HVAC technology is updated far more often than others has not arisen to the same extent. Having said that, an assessment of the stringency of ecodesign regulations for HVAC technologies used by different income groups would be interesting and may uncover negative distributional effects.

Altogether the evidence suggests that the use of different products bv different sections of society should be considered when setting EU priorities for action, that is when drawing up Working Plans, and when assessing the need for the review of regulations.

Recognitional justice

Recognitional justice is the least straightforward aspect of energy justice. Van Uffelen (2022) defines it as concerned with the adequate recognition of all actors through love, law, and status order. It is most obviously relevant where there are large scale energy transitions, for example the phase out of coal use (Tarasova 2024). No literature was found exploring recognitional justice in MEPS or energy labels. Two examples of research

[18] https://ecodesign-commlaundryappliances.eu/

[19] https://energy-efficient-products.ec.europa.eu/product-list_en

into recognitional justice in energy efficiency policy are considered here to explore its relevance to MEPS and labels.

Snell et al (2018) examined how distributional, procedural and recognition justice were conceived, implemented and operationalised within (home) building energy efficiency policies across the UK. They found that far greater attention needs to be paid to issues of recognition justice – notably not only the way that households engage with energy, but also the way that energy efficiency schemes engage with households. Specific issues were:

- The use of passport benefits, income thresholds, demographic characteristics, tenure, or property characteristics as eligibility criteria all, by their nature, excluded some households that were in need, or were so complex that households excluded themselves.
- The importance of recognising and treating the households' needs holistically. In part, this is to ensure that energy efficiency interventions had their intended impact - for example – if a new heating system was installed but the household could not afford to use it, this would negate its benefits.
- Being able to recognise, understand, and respond to households' needs. Even where household needs were acknowledged, these could often be lost in the long supply chains associated with the UK's (then) current energy efficiency market, and whilst the organisation providing the initial eligibility checks might have been aware of a households' needs, the installers entering the home were not.

Guilbert (2024) looked at the justice of the energy sufficiency campaign in Geneva during the energy crisis in the winter of 2022–23. She found that some of the measures and recommendations were unjust: important discrepancies occurred between low- and high-income groups, tenants and owners, inhabitants of houses and apartments. These included a misrecognition of some residents' vulnerabilities, their limited agency and a lack of acknowledgment of differentiated responsibilities. This meant that both the measures were less effective and some residents were marginalised, leaving them feeling anxious, disregarded, powerless, belittled and hence excluded from collective sufficiency efforts.

It is easy to see how the learnings from these studies could be applied to build in recognitional justice into some types of product policy - information campaigns and policies offering incentives or grants to householders who buy more efficient appliances. The transfer to EU ecodesign and energy labels is less obvious, but one way to do this might be to require the MEErP to include specific consideration of whether disadvantaged or culturally diverse groups (e.g. disabled, elderly, Roma) use appliances differently to the 'average' and take this into account in setting performance requirements. A more radical step would be to regulate the sale of second-hand appliances. The ecodesign and energy labels only apply to new products. It is thought that lower income households, who are often also diverse households, often buy second-hand products (Boardman 2025) which are cheaper but whose energy efficiency is not regulated. These are likely to be inefficient – (for example Evans & Hulme (2015) measured the energy use of cold appliances which were due to be recycled. Of the 22 appliances for which manufacturer's data on consumption when new was available 18 used more energy, one was the same and three used less.) Thus the section of the population least able to afford high energy bills are most likely to buy inefficient appliances with no policy protection. In this respect ecodesign and energy labels could be considered to fall short on recognitional justice.

Conclusions

This paper has considered the EU MEPS and energy labels through the lens of procedural, distribution and recognitional justice using the available literature informed by the author's personal experience. This is an under researched area and evidence is limited. Nevertheless it is possible to draw some conclusions:

- It is very difficult for consumers to have a say in developing new ecodesign and energy labels regulations. EU NGOs, ANEC and BEUC, do have a role in the process and receive public funding to support it, but they are at several removes from consumers themselves as they act for national consumer associations. There are challenges to the NGOs' effective involvement (the highly technical nature of the regulations and the large number of regulations). The Commission and Member States[20] could make consumer involvement easier, by publicising the preparatory studies and requiring the study consultants to actively seek consumer feedback. The introduction of the new framework, ESPR, offers an opportunity to consider how the process could be improved to give consumers a greater voice.

[20] It is not known whether some Member States already engage with consumers or their representatives on this.

- The distributional impact of the regulations is addressed in a limited way; to be adopted measures should minimise life cycle cost and so should not cause disbenefit to any consumer. Further ex-post studies of the effect of MEPS on specific products in other jurisdictions have found that they do not increase purchase prices, which is the most obvious concern, as this would disadvantage low income consumers. This is encouraging but similar research is needed to check that this is also the case in the EU and for more products. Only one study explicitly examined the distributive effect of MEPS and one of energy labels. Both found no negative effect but more research is necessary to ensure that this is generally true. Also there is an additional consideration – in the US products which have the same function but used by consumers with different incomes[21] are regulated differently, resulting in lower efficiency products being used by low income consumers. The US cases have some similarities in the EU and these need to be explored to identify to what extent this is penalising low income EU consumers. Also, this aspect needs to be considered when deciding which products are priorities for regulation.
- The recognitional justice of MEPS and energy labels has not been explored in the literature. This omission needs to be addressed.
  Applying the findings from energy efficiency more generally suggests, at the least, considering whether and how disadvantaged groups use appliances differently from the average and ensuring that this is accounted for when setting ecodesign requirements. A more radical approach would be to start regulating the energy performance of second hand goods which are likely less efficient and more often bought by low income consumers.

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