ENSMOV
TOWARDS BETTER ENERGY EFFICIENCY POLICIES

Summary of Policy-Oriented Publications

Report D6.2

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Abstract

This document acts as a reference document for policy makers wishing to understand the policy issues addressed in ENSMOV publications, providing short summaries of each and links to the policy-oriented reports. It is divided into two parts – first ENSMOV policy briefs, then other ENSMOV policy-oriented publications. The policy briefs are reproduced in full in the Annex to this report.

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1 | Policy Briefs

1.1 The future of Article 7

As we entered the last phased of the ENSMOV project in September 2022, the European Parliament, Council of the EU and the European Commission entered into trilogue negotiations for a revised EED. This policy brief compares the positions of the three EU institutions and describes what Member States could already do to prepare for the implementation of the new provisions. As we reach the end of the ENSMOV project, the negotiations are only just tackling Article 7. As the brief indicates: expect increased ambition, a greater focus on tackling energy poverty and limits on the ability to claim savings from fossil fuel combustion technologies. The brief is reproduced in full at Annex 1

1.2 Article 7 and energy poverty alleviation

This policy brief, produced with the H2020 SocialWatt project, provides an overview of the proposed energy poverty ringfence in the EU Commission's proposed 2021 recast of the EED, and explains how the shares are calculated for each Member State. It then focuses on the policy measure that contributes the most to the aggregate achievement of Member States' obligations, EEOSs. The briefing shares lessons from countries where EEOSs are used to alleviate energy poverty. The target audience is national public authorities, energy and social policy experts and advocates. The brief is reproduced in full at Annex 2. A shorter policy brief with H2020 SocialWatt on the same topic preceded the publication of the EU Commission's proposals for the EED recast. This is reproduced in full at Annex 3.

1.3 The potential role of energy efficiency auctions in the energy transition

This policy brief draws upon an ENSMOV workshop held in September 2021 featuring presentations from Switzerland, Portugal, Denmark and Greece. It presents experience on the implementation of energy efficiency auctions, assessing their key design features and considers their role in meeting policy objectives in the period to 2030. The brief also compares auctions with EEOSs and is reproduced in full at Annex 4.

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2 | Other Policy-Oriented Publications

2.1 Policy recommendations for the implementation of the EED energy savings obligation – energy efficiency policy for a Fit for 55 world

The ENSMOV project concluded with the publication of 12 policy recommendations that flow from the likely shape of a revised EED. Aligned with achieving the goals of the Fit for 55 Package, REPowerEU and the EU Save Energy plan, the recommendations provide Member States with pointers for the adaptation of their policy frameworks.

Delivering higher levels of ambition

1. Plan ahead to ensure policy measures deliver more ambition as soon as possible
2. Ramp up action in the buildings sector, focusing on the worst performing buildings, to deliver EED and EPBD requirements
3. Work with transport ministries to explore potential for energy savings in the transport sector
4. Leverage energy audits and energy management systems to access more industrial energy efficiency
5. Provide as much policy predictability as possible for the energy efficiency supply chain
6. Ensure energy efficiency obligation scheme (EEOS) buy-out prices are set high enough to encourage energy efficiency actions, and funds are used for energy efficiency projects
7. Adapt verification and control regimes to ensure delivery as ambition scales up

Pivoting away from fossil fuel combustion technologies

8. Support the efficient electrification of heat to deliver lots of energy savings
9. Rebalance taxes and levies, and ensure tariffs support heat electrification policy measures

Alleviating energy poverty through energy efficiency policy measures

10. Require EEOS obligated parties to meet a sub-target to ensure that energy efficiency actions are delivered amongst energy poor households
11. Involve partners in the design of energy efficiency policy measures aimed at energy poor households

12. Recycle revenues from carbon pricing to fund the upfront costs of renovating the homes of households in energy poverty

2.2 Snapshot of EEOSs in Europe

This snapshot, prepared at the end of 2019, presented an overview of the EEOSs in Europe. All the schemes are reported to the Article 7 of the EED for the obligation period 2014-2020. It shows that there are various ways that can be used to specify an obligation, its scope, how the targets can be achieved by the obligated parties, how energy savings can be monitored, how verification and controls are made. At the time of writing, 16 EEOS were in place in Europe.

2.3 Snapshot of alternative measures in Europe

This snapshot, prepared at the end of 2019, presents an overview of the policy mixes used by different European countries, reporting to Article 7 for the obligation period 2014-2020, focusing on "alternative measures". While Article 7(a) EED states that Member States can use EEOSs to meet their energy saving obligaitons, Article 7(b) EED states that they can opt for alternative (or complementary) measures and mechanisms (regulation / standards, taxation schemes, energy efficiency funds, and more). The description of each country includes a focus on one policy measure, an overview of the policy mix, cost and benefits of the measures and interviews with national experts, offering direct feedback about recent changes and lessons learned.

2.4 Cost-effectiveness and financial aspects of EEOSs

This workshop background document provides useful information for policy makers on the influence of policy design on the cost-effectiveness of EEOSs, including buy-out mechanisms, the stringency of MRV requirements and multiplication factors that impact obligations. It provides information on the costs and their structures across 13 EEOS case studies.

2.5 State Aid and Article 7 of the Energy Efficiency Directive

This review provides an overview on how State aid is defined and how it affects energy efficiency policy measure implementation. Cases from partner countries are presented and discussed. These include

aid from regional government, national and international aid, and EU funding (mainly ESIF-European structural and investment funds, since they are co-managed by the Member State and the European Commission).

Annex 1 - The future of Article 7

EU

Policy Brief

The future of Article 7: Status of negotiations

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ENSMOV Project

ENSMOV is an EU-funded project aiming to support public authorities and key stakeholders in 14 Member States represented by its consortium (Austria, Belgium, Bulgaria, Croatia, France, Germany, Greece, Hungary, Italy, Lithuania, Netherlands, Poland, Romania and the UK- and beyond addressing all 28 MS and accession countries) to monitor, revise, improve and complement the design and implementation of their national energy efficiency policies by developing resources on practical and strategic issues arising from the Article 7 EED. ENSMOV follows on from two other very influential projects that have helped to shape Member State policies to address Article 7 requirements of the EED – IEE ENSPOL (www.enspol.eu) and H2020 MULTEE (https://multee.eu/).

ENSMOV has the following strategic objectives that will deliver impacts beyond the duration of the project: a) To ensure that energy efficiency policies do not only promise, but also realize a major, long term contribution to the energy, environmental, economic and security goals of the EU and MS under the Energy Union; and b) To sustain an active platform and community for knowledge exchange of best practices in policy development and implementation of Article 7 EED policies, strengthening cooperation and improving the dialogue between national policymakers and stakeholders across the EU beyond the project period.

Introduction

Since 2014, Article 7 of the Energy Efficiency Directive (EED) has required EU Member States to achieve energy savings as a result of national energy efficiency policy measures. In 2021, the European Commission proposed a revision of the EED in the context of increased climate ambition. In this proposal, Art. 7 becomes Art. 8 and its impact is increased.

The EU legislators, the European Parliament and the Council of the EU, are currently discussing these proposals (informal trilogue process). This policy brief compares the positions of the three EU institutions and describes what Member States could already do to prepare for the implementation of the new provisions.

Overview

The Commission proposes the following changes from 2024:

An increase in the annual energy savings rate from 0.8% to 1.5% for all Member States.

The introduction of a delivery gap mechanism in case a Member State does not achieve the amount of cumulative energy savings at the end of an obligation period.

The reinforcement of energy poverty provisions including a definition of priority groups and the introduction of a

mandatory share of energy savings to be achieved among these groups.

The exclusion of fossil fuel-related energy savings from the obligation

Clarifications on additionality including in relation to the EU ETS Directive.

The strengthening of requirements related to **taxation measures.**

The strengthening of requirements related to **eligibility**

Increase of annual savings rate

Position by the three institutions

The Commission proposal increases the annual energy savings rate from 2024 onwards, **from 0.8% to 1.5%**. This increase includes Cyprus and Malta, who since 2021 have been allowed to achieve fewer savings than other Member States (0.24%) [Art.8(1)].

The Council position takes on board the idea of an increase but makes it gradual: **1.1% in 2024-2025, 1.3% in 2026-2027, and 1.5% in 2028-2030**. It maintains a lower rate for Cyprus and Malta (0.45 % from 2024) [Art.8(1)].

The Parliament position increases the annual savings rate from 2024 onwards, from 0.8% to **2%**, including for Cyprus and Malta [Art.8(1)].

The Commission proposal maintains the 1.5% savings rate **after 2030**, for 10-year periods, deleting the requirement for a review. The Council and the Parliament accepts this modification, but to a level of 1.1% for the Council and 2% for the Parliament [Art.8(1)].

Impact on implementation

It seems likely that Member States will have to **increase the impact of current energy efficiency policies or introduce new policies** to comply with an increased energy savings obligation.

Member States will need to **recalculate their cumulative energy savings requirement** for the 2021-2030 period, considering the increased rate after 2023. The baseline upon which they will calculate the savings would remain the same as the one used for the current period (most recent three-year period prior to 2019).

The Commission recently listed an increase in the energy savings obligation as a **key measure to deal with the current energy crisis.**[1] As many Member States are reinforcing energy savings measures to help energy users overcome the increases in energy prices, they will likely investigate ways to account for these efforts as part of their energy savings obligations. In doing so, they need to carefully **assess the impact of price increases** on consumer behaviour, in line with the materiality and additionality provisions in the EED.

Delivery gap mechanism

Position by the three institutions

The Commission's proposal introduces a delivery gap mechanism. Where a Member State has not achieved the required cumulative energy savings by the end of an obligation period, it shall **achieve the outstanding savings by the end of the following period**, on top of its obligation for this period [Art.8(13)].

The Council and the Parliament accept this amendment. The Council adds that where a Member State has achieved cumulative energy savings above the required level by the end of a period, it shall be entitled to **carry a maximum of 10% of such surplus** into the following obligation period without having the target commitment being increased [Art.8(13)].

Impact on implementation

If it is introduced, a carryover of surplus savings would mean that a Member State can do less in the next period. It would therefore benefit from a **proper evaluation** of the energy savings stemming from the period where the surplus was achieved, to confirm the validity of these savings. Such an evaluation would also be crucial in case a Member State is not reaching its target. In that case, it would also be important that the evaluation assesses the reasons why policies have not delivered enough savings. Member States can build on existing evaluation practice.[2]

Energy poverty

Position by the three institutions

The Commission's proposal requires Member States to implement policy measures as a priority among several groups. These groups are people affected by energy poverty,

[1] European Commission. (2022, 18 May). *EU 'Save Energy'*.

[2] https://ensmov.eu/recording-dealing-with-additionality-in-the-context-of-article-7-eed-experiences-about-monitoring-and-energy-savings-calculations/. See also: https://epatee.eu.

vulnerable customers and, where applicable, people living in social housing. The Commission also proposes that a **minimum share of the cumulative energy savings** is achieved among these groups. If accepted, this share shall at least equal the proportion of households in energy poverty as assessed in National Energy and Climate Plans. For those Member States that had not notified this information, the Commission proposes a methodology to calculate the mandatory share [Art.8(3)].

The Commission also proposes that Member States shall also ensure that policy measures have **no adverse effect** on those priority groups [Art.8(3)]. They shall also determine distributional effects of taxation and equivalent measures on priority groups and show the effects of mitigation measures implemented [Annex V(4)(e)].

The Council and the Parliament agree with the mandatory share proposal. The Council adds **"financially weak households"** to the priority groups, while the Parliament adds **"low-income households"**. The Parliament proposes a **change in the methodology** that Member States would use to calculate the mandatory share if their NECP does not include enough information [Art.8(3)].

The Council proposes that Member States might estimate the energy savings of priority groups based on engineering estimates **using standardised occupancy and thermal comfort conditions or parameters**, such as parameters defined in national building regulations. The way comfort is considered for buildings actions should be reported together with the explanations about their methodology [Annex V(1)(d)].

Impact on implementation

Member States will likely need to notify and report on the impact of their policies on priority groups and achieve a minimum share of energy savings among these groups. If nothing is in place yet, a first step would be to **identify the priority groups** considering national circumstances and to **calculate the mandatory share** of energy savings. **Assessing the distributional impacts of the existing policy mix** is another important step to implement the "do not harm" principle proposed by the Commission.

These provisions might require Member States **to redesign some of their policies**. Amongst Member States with Energy Efficiency Obligation Schemes, France and Ireland have experience of implementing minimum shares for priority groups.[3]

[3] ENSMOV & SocialWatt. (2021). *The Energy Efficiency Directive energy savings obligation and energy poverty alleviation.* https://ensmov.eu/policy-guide-the-eed-energy-savings-obligation-and-energy-poverty-alleviation

Exclusion of fossil fuel-related savings

Position by the three institutions

The Commission proposes that policy measures and energy savings regarding the use of **direct combustion of fossil fuel technologies should not be permitted** to fulfil the energy savings obligation **as from 1 January 2024** [Annex V(2)(g), (h) & (k)].

Both the Council and Parliament propose to **introduce more flexibility related to this ban**. The Council proposes a derogation for energy intense enterprises in the industry sector. This derogation would apply during the 2024-2030 period under strict conditions. The Parliament proposes to postpone the fossil fuel exclusion to mid 2028, except for the residential sector where it would apply from 2024 [Annex V(2)(g) & (ga)]. The Parliament however caps the use of fossil-fuel related savings between 2024 and 2028 (1/4 of the obligation) [Annex V(2)(g)].

The Council [Annex V(2)(h)] and the Parliament [Annex V(2)(ga)] propose that for policy measures promoting combinations of technologies, the share of energy savings related to the fossil fuel combustion technology is not eligible.

Impact on implementation

Regardless of the starting date and possible derogations, Member States will likely need to phase out individual actions involving the placement of a fossil-fuel equipment. Member States can prepare the implementation by **reviewing all policies** and identifying these individual actions. They can start developing plans on how to replace them. For example, individual actions involving the placement of a gas condensing boiler can be phased out while the Member State accelerates efforts to deploy electricity-based heat pumps.

Additionality

Position by the three institutions

The Commission's proposal **clarifies several points related to additionality**. Measures promoting energy efficiency improvements in the public sector (Art. 5 and Art. 6 of the new EED) [Annex V(2)(c)] and measures taken pursuant to Regulation (EU) 2018/842 (effort sharing) [Annex V(2)(d)] may be eligible. The Commission also specifies that Member States cannot count reduced energy use in sectors, including the transport and building sector, that would have occurred in any event as a result of emission trading pursuant to the EU ETS Directive [Annex V(2)(e)]. Member States must provide evidence, including calculation methodologies, that where there is an overlap in the impact of energy or carbon taxation measures or emission trading according to the EU ETS Directive, there is no double counting of energy savings [Annex V(4)(f)]. They must also provide evidence, their assumptions and their calculation methodology to show additionality to the Union´s new vehicle CO_2 requirements and product requirements [Annex V(2)(f)].

The Parliament does not modify these provisions, while the Council introduces some changes. The Council position states that Member States would be allowed to count energy savings that would have occurred in any event as a result of emission trading (EU ETS and national ETSs) provided that they have implemented complementary policy measures (EEOSs or alternative measures) [Annex V(2)(e)]. The Council also proposes that Member States should provide "justification"

rather than “evidence” to show additionality to the Union´s new vehicle CO_2 requirements [Annex V(2)(f)].

Impact on implementation

Member States will likely need to further **increase the transparency** related to the implementation of the additionality principle. For example, it would be interesting for Member States to share practice on how they consider the new vehicle CO_2 requirements in transport measures. The amendments related to the ETS reinforce the need for Member States to consider the **impact of prices on free ridership** in their programmes.

Taxation

Position by the three institutions

The Commission proposal **reinforces the requirements related to taxation measures**. When reporting a taxation measure, Member States shall demonstrate how they have ensured the **effectiveness of the price signal**, such as the tax rate and the visibility over time, in the design of the measure. Where there is a **decrease in the tax rate**, Member States shall justify how the taxation measures still result in new energy savings [Art.10(4)].

The proposal makes the use of **short-run price elasticities the default option**. These elasticities shall represent the responsiveness of energy demand to price changes and shall be estimated based on **recent and representative official data sources** which are applicable for the Member State, and, where applicable, based on accompanying studies from an independent institute. If a different price elasticity is used, Member States shall explain how energy efficiency improvements due to the **implementation of other Union legislation** have been included in the baseline used to estimate the energy savings, or how they have avoided a double counting of energy savings from other Union legislation [Annex V(4)(b) & (d)].

The Council does not amend these provisions. The Parliament reinforces the requirement to use short run elasticities [Annex V(4)(d)]. They shall be end-user segment specific, including income classes, company types and size [Annex V(4)(b)]. Credit shall be given only for energy savings from taxation measures and parafiscal levies designed with the purpose to generate energy savings according to the definition in Article 2, point 7 [Annex V(4)(aa)].

Impact on implementation

Member States can already review the implementation of tax policies in line with these new requirements.

Eligibility

Position by the three institutions

The Commission proposes that Member States shall demonstrate that they have implemented the policy measure **for the purpose of fulfilling the energy savings obligation and achieving end-use energy savings.** They shall provide evidence and their documentation that the energy savings are caused by a policy measure, including voluntary agreements [Annex V(2)(a)]. They shall also demonstrate that policy measures are eligible and appropriate to ensure the achievement of the required amount of cumulative end-use energy savings by the end of each obligation period [Art.8(14)(c)].

The Parliament does not modify these provisions. The Council amends this proposal, stating that Member States shall demonstrate that one of the objectives of the policy, whether new or existing is the achievement of end-use energy savings [Annex V(2)(a)].

Impact on implementation

Member States can already review the implementation of policies in line with these new requirements.

Other provisions

Position by the three institutions

The Commission also proposes several clarifications:

- Member States may designate **transmission system operators** as obligated parties [Art.9(2)].
- The ambient heat captured by **solar thermal technologies** can be excluded from their end-use energy consumption [Annex V(2)(j)].

The Commission also introduces some other requirements:

- Member States shall demonstrate how energy savings achieved **contribute to achieving their national energy efficiency contribution** pursuant to Art. 4 [Art.8(14)(b)].
- Regarding alternative measures, Member States shall report on the **measurement, control and verification systems** put in place, including but not limited to methods used, issues identified and how they were addressed [Art.10(3)].
- Member States shall notify how energy savings will be phased over the obligation period [Annex V(5)(b)].

The Council and the Parliament positions do not modify the meaning of these provisions.

Impact on implementation

Member States can already consider these new options and requirements.

References

European Commission. (2021, 14 July). *Proposal for a Directive of the European Parliament and of the Council on energy efficiency (recast).*

Council of the European Union. (2022, 27 June). *Outcome of proceedings. Proposal for a Directive of the European Parliament and of the Council on energy efficiency (recast).*

European Parliament. (2022, 13 July). *Compromise amendments.*

Annex 2 – Article 7 and energy poverty alleviation

EU

Policy Guide

The Energy Efficiency Directive Energy Savings Obligation and Energy Poverty Alleviation

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ENSMOV Project

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ENSMOV has the following strategic objectives that will deliver impacts beyond the duration of the project: a) To ensure that energy efficiency policies do not only promise, but also realize a major, long term contribution to the energy, environmental, economic and security goals of the EU and Member States under the Energy Union; and b) To sustain an active platform and community for knowledge exchange of best practices in policy development and implementation of EED ESO policies, strengthening cooperation and improving the dialogue between national policymakers and stakeholders across the EU beyond the project period.

SocialWatt project

SocialWatt is an EU-funded project that aims to develop and provide utilities and energy suppliers with appropriate tools for effectively engaging with their customers and working together towards alleviating energy poverty.

SocialWatt seeks to enable utilities, energy companies and obligated parties under the energy savings obligation (ESO) of the Energy Efficiency Directive across Europe to develop, adopt, test and spread innovative energy poverty schemes.

In particular, SocialWatt contributes to the following three main pillars:

- Supporting utilities and energy suppliers to contribute to the fight against energy poverty through the use of decision-support tools.
- Bridging the gap between energy companies and social services by promoting collaboration and implementing knowledge transfer and capacity building activities that focus on the development of schemes that invest in renewable energy sources/energy efficiency and alleviate energy poverty.
- Implementing and replicating innovative schemes to alleviate energy poverty.Introduction

The energy savings obligation (ESO) in the Energy Efficiency Directive (EED) requires EU Member States to achieve energy savings through national policy measures. The ESO is Article 7 of the current EED and Article 8 of the proposed recast Directive, published in July 2021. The ESO is the most significant energy efficiency measure in the European policy package, contributing around 50% of the overall EED energy efficiency target.

The EU Commission's proposed recast of the EED introduces a requirement for a share of the energy savings to be achieved among energy poor households.

This policy brief provides an overview of the new requirement and explains how the shares are calculated for each Member State. It then focusses on the policy measure that contributes the most to the aggregate achievement of the ESO target, the Energy Efficiency Obligation Schemes (EEOSs), which contribute 35% of savings (EU Commission, 2020). The briefing shares lessons from countries where EEOSs are used to alleviate energy poverty. The target audience is national public authorities, energy and social policy experts and advocates.

Energy poverty in Europe

Energy poverty is broadly understood as the inability of households to maintain adequate levels of energy services at an affordable cost.

The European Commission estimates that between 50 million and 125 million European citizens are unable to afford proper thermal comfort indoors (EPEE, 2009), but the effects of COVID and the recent gas price spikes will have increased these numbers.

> The EED proposal introduces the first European definition of 'energy poverty' - "a household's lack of access to essential energy services that underpin a decent standard of living and health, including adequate warmth, cooling, lighting, and energy to power appliances, in the relevant national context, existing social policy and other relevant policies."

To date, the majority of policies used by Member States to address energy poverty are measures to increase income or subsidise the energy bill (SocialWatt, 2019 and STEP, 2019). However, reducing energy use long term, through targeted energy efficiency measures is the most sustainable long-term solution to energy poverty. Targeting the energy saving measures triggered by the ESO in the EED could therefore be an effective method to address energy poverty.

The Energy Savings Obligation and Energy Poverty

The EU Commission's proposal for a recast of the EED requires that:

Member States shall achieve a share of the required amount of cumulative end-use energy savings ***among people affected by energy poverty, vulnerable customers and, where applicable, people living in social housing****.*

It sets out that the share of energy savings shall be at least equal to (see Annexe 1):

- the proportion of households in energy poverty as assessed in the National Energy and Climate Plan (NECP)
- or, where the NECP does not present these figures, the average of three indicators is used:
    - Inability to keep home adequately warm
    - Arrears on utility bills
    - Share of expenditure on energy in households' total consumption.

The EED would therefore require Member States to calculate their national 'ringfence' of the energy savings and to target these energy savings to a target group of households.

As currently drafted, NECPs do not provide a suitable source of data to define the ringfence. More than half NECPs do not currently assess the level of energy poverty in the country. Of those that do, the vast majority adopt more than one indicator. This is in line with best practice as the complex issue of energy poverty is best evaluated using a range of indicators. These different data sets point to different experiences or dimensions of energy poverty so should not be averaged to create one number (Bouzarovski et al. 2020).

In the absence of relevant energy poverty numbers in the NECPs, the three indicators identified in the Directive are to be used. The average of these indicators produce a range of ringfences from a low of 2.6% for Sweden to a high of 22.9% in Bulgaria. The Annexe provides more information on the indicators, the national data for each indicator and the calculated ringfences for each Member State.

The Directive defines the target group to benefit from the ringfenced savings quite broadly as *people affected by energy poverty, vulnerable customers and, where applicable, people living in social housing*. This leaves considerable scope for Member States to define which individuals and groups will be targeted. Member States will do this through setting eligibility criteria for support within EEOSs and alternative measures. It also allows countries that have not formally defined energy poverty to identify a nationally suitable target group.

Experience delivering energy poverty alleviation through EEOS

Six Member States plus the UK already make or made provision in the past for energy poor households within their EEOS (ENSMOV, 2020).

The majority use uplifts to the value of energy savings when they are achieved in energy poor households to incentivise delivery within this group. A saving in an energy poor household is worth between 10% and 100% more than in another household or sector (see table below).

Summary of the use of uplifts

Country	Uplift (energy savings x)
Austria	1.5 (households affected by energy poverty)
Croatia	1.2 (vulnerable households) 1.1 (geographical areas with development needs) Can be applied in combination for a maximum of 1.3
Cyprus	1.5 (energy poor households)
Greece	1.4 (actions tackling energy poverty)
France	2 (very low-income households*) White Certificates are also available for accompanying programmes that help to identify households in need of support, based on the level of expenditure incurred.

* from 2022 the uplift will no longer apply because the ringfence will apply to the very low-income group.

A smaller number of countries guarantee a minimum level of savings achieved in energy poor households through use of a ringfence.

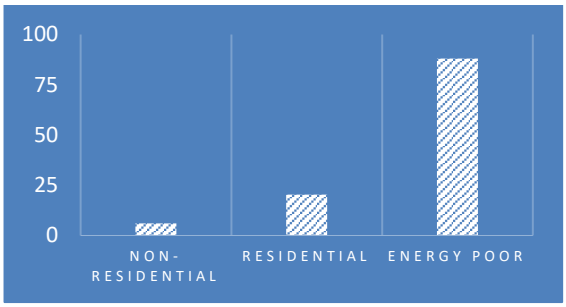
Evidence from the countries relying only on uplifts illustrates that these are insufficient to guarantee desired policy outcomes. In Austria, the uplift was in place between 2015 and 2020. Only 0.66% of savings have been achieved in the target energy poor group (Austrian Energy Agency, 2020).

Experience from the SocialWatt project also reveals that savings in energy poor households, even with uplifts, cannot compete on a cost effectiveness basis with savings in the rest of the residential sector, or the commercial and industrial sectors (SocialWatt, 2021). This is due to the higher cost to obligated parties of achieving savings in energy poor households, as the households themselves cannot contribute in a significant way to the cost of the measures. It is also due to the higher cost of administration of energy poverty programmes, as obligated parties must find and check the eligibility of households and these households may need higher levels of engagement and support.

By way of illustration, the buyout price for energy savings in the energy poverty sector within the Irish EEOS is 15 times higher than that for savings in the non-residential sector,

and over four times higher than savings in the wider residential sector.

Buyout prices in the Irish EEOS (Euro cents/KWh)



The buyout price is set by the Irish government and reflects the costs to the government of delivering energy savings in each sector through alternative measures (ENSMOV 2020).

To guarantee EEOSs prioritise savings for energy poor households three countries - Ireland, France and the UK - ringfence a proportion of the total savings target that must be delivered within target household groups.

Summary of use of ringfences

Country	Ringfence
Ireland	5%
France	25% of white certificates. Not equivalent to 25% of the savings target as savings to alleviate energy poverty are subject to uplifts.
UK	100% 15% of this for rural areas

Perhaps most striking, the UK EEOS is now entirely dedicated to energy poverty alleviation. This follows over 25 years of evolution during which all schemes contained either a mandatory or indicative ringfence. The scheme was refocused entirely on energy poor households, alongside a significant reduction of the overall target, as part of a policy push to reduce green levies on energy bills and to address the negative distributional impacts of the levy (UK HoC Library, 2020). The negative distributional impacts of the EEOS result from the fact that EEOS energy savings are paid for by all energy bill payers via a levy on energy bills. This increases bills disproportionately for low-income households (Sunderland et al., 2020).

The Irish EEOS employs a combination of ringfences in recognition of the cost differentials of savings in different sectors. 20% of the savings must be delivered in the residential sector and a further 5% in energy poor households.

The scheme in France employs a combination of a ringfence to guarantee minimum delivery and uplifts to further direct activity towards specific actions and households.

Targeting energy poor households

Schemes that prioritise energy poor households through an uplift or ringfence define which households are eligible in different ways.

In France households are defined on income status alone. From 2022, only households in the bottom 25% of the income distribution will be eligible for measures qualifying for the very low income ringfence.

In Ireland households are eligible if they are in receipt of specific types of social welfare payments or if they live in areas designated for regeneration.

The UK also primarily uses access to social security benefits as a proxy to identify eligible households. In addition, an area-based ringfence aims to ensure a share of savings are achieved in eligible households in rural areas.

Ireland, France and the UK all have national definitions of energy poverty but not all Member States have such official definitions. This does not prevent prioritisation of eligible groups within the EEOS. For example, in Croatia and Greece, the national definition of 'vulnerable' households is used within the EEOS (SocialWatt, 2021). National definitions have been established due to the Electricity Markets Directive and the Natural Gas Directive that require Member States to define 'vulnerable customers' for the purpose of providing special protections within electricity and gas markets. Most commonly, the definition of vulnerable is based on income status or health status. Socio-economic group or income level, access to or receipt of social or health benefits, disability registration and health conditions that require the use of electricity dependent equipment are common proxies. Age is a further proxy less frequently used (Insight-e, 2015).

Even when national definitions of energy poverty are in place, for practical reasons proxies are almost universally used to define eligibility for energy poverty schemes. Proxies commonly used include:

- "Passport benefits", usually income-based for which a household or individual's low-income status has already been assessed, or based on health or disability. These include for example income support, state retirement pension, disability benefits, carers allowance.
- Age: households with very young children, pregnant mothers or older age members
- Poor energy efficiency rating of the home: as defined by the Energy Performance Certificate
- Location: deprived areas

When proxies are used to define eligibility, the group defined as eligible will always be an imperfect match with the energy poor group under the national definition.

Undertaking a full assessment of energy poverty status in line with a national definition

- which can require information on income, energy cost, efficiency of the home and energy need - is very often impossible due to lack of data. Making such an assessment also places too great an administrative burden on programme deliverers. Seeking the multiple sources of verified data is also often considered too intrusive to be carried out 'on the doorstep' or over-burdensome for applicants, creating barriers to the uptake of measures offered.

The SocialWatt project has developed a decision support tool, the SocialWatt Analyser, to help utilities assess energy poverty within their customer base, using a variety of energy poverty definitions (SocialWatt, 2021a). Using this tool the project has found that utility data, particularly on actual energy consumption, can contribute to better understanding and targeting of energy poverty. However, the lack of accurate date on household income data and dwelling conditions hinders accurate household level assessment (SocialWatt, 2020).

Measures and delivery

The mature EEOSs in the UK, Ireland and France have delivered mainly insulation and heating measures to energy poor households (Ofgem, 2021; ENSMOV, 2020; Ministère de la Transition écologique 2021a).

In Ireland and the UK heating controls and fossil gas boilers dominate the heating measures. In France, 51% of the White Certificates from heating measures result from fossil boiler replacements, 42% from heat pumps and 9% from biomass boilers.

Measures in all three of these EEOS have largely been delivered as single measures rather than in combination or to form a 'whole house' retrofit. EEOSs, by fundamental design, seek to deliver the most cost-effective energy savings. This leads to a prioritisation of the most cost-effective single interventions (IEA, 2017).

Energy savings measures in the residential sector are often credited with energy saving impact on an ex-ante rather than ex-post basis due to the high cost of performing ex-post evaluation of actual energy saved through relatively small interventions.

Typically lists of eligible measures are allocated a 'deemed' energy saving figure based on the characteristics of the measure and the type of home within which it is installed. This drive to seek the most cost-effective measures and the deemed approach contribute to the tendency of EEOS to deliver single measures rather than more complex whole house retrofits.

This approach is out of step with the level of support needed by energy poor households. Households in energy poverty often require a combination of insulation measures, insulation and heating/cooling measures, more efficient energy using products and advice to bring them out of energy poverty and to remove the risk of them falling back into energy poverty as household situations or energy prices change.

To address this the UK has experimented with different designs of the EEOS, including incentivising concentrated delivery in smaller geographical areas and introducing uplifts for when more than one measure is installed in a single home (Citizens Advice Scotland, 2016). Ireland is also currently redesigning the EEOS to move away from the single measures approach.

Proposals for the design of the next phase of the scheme (2021-2030) require that interventions will need to bring the home up to a high level of energy efficiency - a standard of B2 or better - as defined using the national Energy Performance Certificate the Building Energy Rating (DECC, 2021) for energy savings to count towards the energy poverty ringfence. Responding to the challenge of delivering suitable level of support for energy poor households, partners within the SocialWatt

project have devised energy poverty action plans that contain a range of measures. These include one-to-one advice, energy audits, white appliance replacements, energy efficiency and heating measures (SocialWatt, 2021).

Partnerships and integrated support

Effective support for energy poor households requires a combination of energy saving measures, partners working together and funding from the EEOS and elsewhere.

SocialWatt partners have formed strategic partnerships to identify and engage with energy poor households, and to deliver schemes. In particular, SocialWatt utilities and energy companies have formed partnerships with local authorities, social services, NGOs and social housing providers to engage energy poor households. These organisations have existing relationships with households and provide a trusted intermediary through which energy savings support can be offered, integrated with established services. Local partners can also be an added source of referrals and passporting of eligibility. Further partnerships with technology providers and retailers support the installation or distribution of measures.

SocialWatt partners have found the design of financing suitable for energy poor households more challenging. The project has explored different financing mechanisms, such as on-bill financing, but the take up of measures has been slow. Therefore, it is important to recognise that for some low-income households taking on any debt is not appropriate. Furthermore, energy poor households are often rationing energy so do not have sufficient energy bill savings from efficiency measures to cover repayments. Energy poor households therefore require very high levels of subsidy to take up measures. For expensive whole house retrofits or multiple measures this can constitute significant up-front investment from the utility.

Experience from France illustrates the value in combining different strands of national and local support to overcome this challenge. The uplift incentive within the EEOS and the combination of EEOS delivery with other national and local funding streams has been effective in ensuring that a significant proportion of savings are delivered amongst the very low-income group. To August 2021 in the current phase of the EEOS (2018-2021) around one third of the energy savings have been delivered in low-income households (Ministère de la Transition écologique, 2021b). This equates to around 50% of the White Certificates, exceeding the 25% ringfence (Ministère de la Transition écologique, 2021a).

France has also seen a convergence of the cost to obligated parties of White Certificates generated in the energy poor group and other sectors. This means that utilities are no longer disincentivised on price from supporting these households. This is in part due to the contribution of complementary schemes, making it easier for utilities to identify energy poor households and less costly to deliver measures. It is also due to the cost of White

Certificates in other sectors rising as a result of a higher target, reduced energy savings values for some measures and a reduced low-cost energy savings potential.

Conclusion

The complexity of delivering energy savings measures for energy poor households – the need for multiple different measures, the necessary partnerships and referral networks and the need to combine multiple funding sources – means developing schemes takes time. Short regulatory periods and frequent policy changes are a barrier to effective delivery. In addition, a more complete offer of support for each household can be provided when EEOS are combined with other national and local funding and finance. Therefore, national policymakers should not rely entirely on EEOS support to address energy poverty but put into place a wider enabling framework.

Annexe 1

Art 8(3) as proposed states:

Member States shall achieve a share of the required amount of cumulative end-use energy savings among people affected by energy poverty, vulnerable customers and, where applicable, people living in social housing. This share shall at least equal the proportion of households in energy poverty as assessed in their National Energy and Climate Plan (NECP) established in accordance with Article 3(3)(d) of the Governance Regulation 2018/1999. If a Member State had not notified the share of households in energy poverty as assessed in their National Energy and Climate Plan, the share of the required amount of cumulative end-use energy savings among people affected by energy poverty vulnerable customers and, where applicable, people living in social housing, shall at least equal the arithmetic average share of the following indicators for the year 2019 or, if not available for 2019, for the linear extrapolation of their values for the last three years that are available:

a) Inability to keep home adequately warm (Eurostat, SILC [ilc_mdes01]);

b) Arrears on utility bills (Eurostat, SILC, [ilc_mdes07]); and

c) Structure of consumption expenditure by income quintile and COICOP consumption purpose (Eurostat, HBS, [hbs_str_t223], data for [CP045] Electricity, gas and other fuels).

The table below presents the data for each indicator and Member State as well as the average of the three indicators as per the methodology to calculate the ringfence.

	Inability to keep home adequately warm	Arrears on utility bills	Share of expenditure on elec, gas and other fuels	Average of three indicators	NECP**
Indicator	ilc_mdes01	ilc_mdes07	hbs_str_t223		
unit	% pop	% pop	% pop	% pop	% pop
year	2019	2019	2019 extrapolated	2019	

Bulgaria	30.1	27.6	11.5	**22.9**	
Greece	17.9	32.5	7.4	**18.9**	Unable to keep home warm: 23% (2017)
Lithuania	26.7	7.5	8.9	**14.4**	EPOV indicators: Unable to keep home warm: 27.9% (2018) Disproportionate expenditure (2M): 17.1 % (2016) Hidden EP: 14.9 % (2016)
Cyprus	21	10.4	4.1	**11.8**	Proxy of the share of the population being in the "vulnerable customers" category due to criteria (a) and (b) in the scope of EP as defined in Ministerial Order: 2.62% (year not mentioned)
Romania	9.3	13.7	10.1	**11.3**	Bill arrears: 14.4% (2018) Unable to keep home warm: 9.6% (2018)
Croatia	6.6	14.8	9.9	**10.2**	
Portugal	18.9	4.3	7.9	**10**	
Slovakia	7.8	8.4	11.2	**9.5**	
Hungary	5.4	10.2	11.2	**8.9**	spending more than 25% of income on

					energy expenses: 9.8% (2016)
Latvia	8	8.7	12.0	**8.9**	Unable to keep home warm: 9.8% (2017)
Slovenia	2.3	11.2	9.4	**7.4**	
Italy	11.1	4.5	5.6*	**7.1***	National indicator: share of households either with high energy expenditure OR in deprivation: 8.6% (2016)
Poland	4.2	5.8	10.7	**6.8**	
Estonia	2.5	7.2	12.1	**6.7**	
Ireland	4.9	8.9	6.0	**6.4**	
France	6.2	7.8	4.2	**6.2**	national indicators (and observatory) Kind of low-income high cost: 11.6% of the population Perception of cold: 15% of the population (both for 2017)
Spain	7.5	6.5	4.9	**6.1**	The four main EPOV indicators (all 2017): Disproportionate expenditure (2M): 17.3% Hidden EP: 11.5%

					Unable to keep home warm: 8% Bill arrears: 7.4%
Czechia	2.8	1.8	14.0	**5.8**	Reference to the four main EPOV indicators (all 2016) Unable to keep home warm: 4.7% Bill arrears: 2.4% Disproportionate expenditure (2M): 10.7% Hidden EP: 8.4%
Malta	7.8	6.5	3.6	**5.8**	Unable to keep home warm: 6.6% (2017)
Denmark	2.8	3.6	8.0	**4.8**	SILC survey. Indicator about unable to keep home warm: 3% (2018)
Belgium	3.9	4.1	6.2	**4.5**	3 indicators Hidden EP: 4.3% Subjective EP: 4.9% Measured: 14.5% (all 2017)
Finland	1.8	7.8	3.6	**4.4**	
Germany	2.5	2.2	6.9	**3.8**	
Netherlands	3	1.5	5.3	**3.1**	

Austria	1.8	2.4	5.0	**3**	3.2% households (2013-14)
Luxembourg	2.4	2.4	4.0	**3**	
Sweden	1.9	2.3	3.9	**2.6**	

Source: all data from Eurostat.

* Data not available for 2010 and 2015 for the share of expenditure indicator. Data from single year 2005 has been used. Linear extrapolation to 2019 is not possible.

** In most NECPs, data are presented as a proxy, but are not necessarily endorsed as an official measure of energy poverty. As pointed above, there are overall only two Member States (Austria and Italy) that gave a single official indicator. Other Member States provided official indicators, usually reflecting different dimensions of energy poverty, and without stating an overall figure for the energy poverty rate in the country.

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Annex 3 – Policy brief on energy poverty (pre-Fit for 55 Package)

Alleviating energy poverty through Article 7 of the Energy Efficiency Directive

Recommendations

- **The European Commission should revise Article 7 of the Energy Efficiency Directive (EED) to require member states to assess the distributional equity of their policies. A minimum ringfence of energy savings delivered through Energy Efficiency Obligation Schemes (EEOSs), and/or specifically designed alternative policy measures, should be introduced for addressing distributional inequities.** Who pays for, and who benefits from, the promoted energy savings must be assessed and measures to level inequities adopted.
- **The European Commission should ensure that Member States, in implementing their Article 7 policies, should implement in full the existing requirement to take into account the need to alleviate energy poverty.** For example, for cross-cutting EEOS a ringfence of a proportion of the savings to be delivered in energy poor households is more effective than administrative uplifts in savings values to guarantee benefits are delivered.
- **The Commission should consider methods to align climate and social goals through Article 7 and the wider energy and climate package.** In particular, synergies between Article 7 and carbon pricing and minimum energy performance standards should be explored. Article 7 can deliver the multiple benefits of energy savings and EEOS can overcome market barriers specific to low-income or energy poor households.[4] The re-design of Article 7 offers a key opportunity to offset the mounting burdens created by other policies like carbon pricing.
- **The Commission must assess the impact of the entire European legislative portfolio on**

[4] Santini, M. and Thomas, S. (2020) Article 7 of the Energy Efficiency Directive 3.0: How to maximise the energy efficiency opportunity for climate neutrality. https://www.raponline.org/knowledge-center/article-7-energy-efficiency-directive-3-0-how-maximise-energy-efficiency-opportunity-climate-neutrality/

households of different income levels (distributional impact assessment) and take steps at European level to mitigate negative impacts. Each element of the portfolio should be assessed individually and in combination. Measures must be taken within policies or through additional policies to mitigate burdens on low-income, vulnerable or energy poor households. All opportunities to deliver guaranteed energy savings and associated multiple benefits for priority households must be prioritised and brought forward in time.[5]

Context

In its Recommendation on Energy Poverty released in October, the European Commission reported that nearly 34 million Europeans are unable to afford to keep their homes adequately warm (2018).[6] When other aspects of energy poverty are considered, most significantly the inability to keep the home adequately cool, this figure can be as high as 125 million – one in four European households.[7] The Commission also recognises that the trend of rising energy costs as a proportion of income will continue in the next decade before the full benefits of the clean energy transition materialise.[8]

In response, the European Green Deal commits that the energy transition must be "fair and inclusive" and the Renovation Wave strategy names energy poverty and tackling the worst performing buildings as one of three priority areas. The Commission's ambition to address energy poverty and deliver a fair transition is clear. The task before us is to deliver on that ambition. Opportunities must be sought across the entire European framework, in particular making use of the legislative revisions in 2021.

[5] Sunderland, L., Jahn, A., Hogan, M., Rosenow, J. and Cowart, R. (2020, May). Equity in the energy transition: Who pays and who benefits?. Brussels, Belgium: Regulatory Assistance Project. https://www.raponline.org/knowledge-center/equity-in-energy-transition-who-pays-who-benefits/

[6] European Commission (2020a) Recommendation on energy poverty https://ec.europa.eu/energy/sites/ener/files/recommendation_on_energy_poverty_c2020_9600.pdf

[7] Friends of the Earth Europe (2018) Warm Homes not the climate infographic. http://www.foeeurope.org/Energy-poverty-time-now-100118

[8] European Commission (2020b) Staff working document: EU guidance on energy poverty. https://ec.europa.eu/energy/sites/ener/files/swd_on_the_recommendation_on_energy_poverty_swd2020960.pdf

The EED is one of the key pieces of existing legislation that provides an opportunity to deliver energy saving measures to alleviate energy poverty. Article 7 (2018) of the EED states:

> *In designing policy measures to fulfil their obligations to achieve energy savings, Member States shall take into account the need to alleviate energy poverty in accordance with criteria established by them, taking into consideration their available practices in the field, by requiring, to the extent appropriate, a share of energy efficiency measures under their national energy efficiency obligation schemes, alternative policy measures, or programmes or measures financed under an Energy Efficiency National Fund, to be implemented as a priority among vulnerable households, including those affected by energy poverty and, where appropriate, in social housing.*[9]

Although this provision clearly identifies the role of Article 7 in alleviating energy poverty, the requirement to implement savings or measures in priority households is reliant on criteria that most Member States have not yet fully established. Member States are required to assess the number of households in energy poverty and take relevant action as part of their National Energy and Climate Plans. However, the Commission's analysis of the final plans found that just transition and energy poverty aspects were "largely addressed" by only six members states and "partially addressed" by a further nine, leaving 12 countries that have not addressed these considerations.[10]

Energy poverty in Article 7 and EEOS: learning from the ENSMOV project

Despite the requirement in Article 7, a 2019 review by the ENSMOV project of the 16 EEOS implemented by member states in full or partial delivery of their Article 7 obligations showed that only six and the UK make any provision for energy poverty.[11] Provision is made through use of a ringfence

[9] Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L2002&from=EN

[10] European Commission (2020b)

[11] Broc, J-S., Stańczyk, W., and Reidlinger, B. (2020) Snapshot of Energy Efficiency Obligation Schemes in Europe (as of end 2019). ENSMOV Horizon 2020 project. https://ensmov.eu/snapshot-of-energy-efficiency-obligation-schemes-in-europe-as-of-end-2019/. It should be noted that most member states use a combination of EEOS and alternative measures and it is possible that energy poverty is tackled through complementary measures.

of part of the energy savings target to be delivered in energy poor or vulnerable households (France, Ireland, UK) or an administrative uplift to the value of the savings made in target households (Austria, Croatia, Cyprus, Greece).

The costs of EEOS are most often passed on to energy users through energy bills. Energy saving programmes paid for through energy bills are more regressive than those paid for through income taxation. EEOS can also sometimes result in cross-subsidising between sectors. The added cost burden on energy bills creates a higher cost burden for low-income households than those on higher incomes.[12] It is therefore essential that a fair proportion of the benefits are delivered to energy poor households. Otherwise, the EEOS can result in higher a risk of energy poverty and an increased need for support in energy bill payment for vulnerable households.

ENSMOV gap analysis recognised energy poverty as an area for greater attention. Amongst public officials surveyed in 2019, the topic "ensuring equity/tackling distributive effects (e.g., reducing energy poverty)" did not rank amongst the top ten priority issues for policy (re)design and implementation. Other issues, related to cost-effectiveness and ensuring compliance with the technical requirements around additionality, materiality and monitoring, reporting and verification systems dominated.13 As new policy measures mature, and the rules associated with the Article 7 energy savings obligation get established, attention should turn towards ensuring that policy measures, both EEOSs and alternative measures, enable those in energy poverty to access support.

Qualitative responses to the ENSMOV survey also noted the relatively high cost of delivering energy savings to energy poor households.[14] Programme costs (costs to utilities or public budgets) will almost always be higher for the delivery of measures to those in energy poverty, given their limited ability to invest their own funds in projects. Administrative costs are also likely to be higher owing to the need

[12] Sunderland, L., et al. (2020)

[13] Reidlinger, B, Pickl, N. and Praher, C., (2019), Stakeholder Needs Assessments for the Implementation of Article 7 Energy Efficiency Directive (EED), ENSMOV Horizon 2020 project, https://ensmov.eu/report-on-article-7-implementation-needs-from-stakeholders-consultations/

[14] Ibid.

to identify households that qualify for targeted support. Energy poor households often live in the least energy efficient dwellings that therefore require stronger interventions to reach high energy performance. In addition, the energy savings from projects targeted to energy poor households are likely to be smaller for the same intervention if a metered rather than deemed savings approach is used. If energy poor households are underheating their energy inefficient homes, a large proportion of the benefits of energy efficiency actions may be taken in the form of increased comfort. Actions in low-income households can, however, bring other multiple benefits for example in reduced health costs.

Utility perspectives on delivering energy poverty support: learning from the SocialWatt project

The SocialWatt project has found that utility data, particularly data on actual energy consumption of their customers, can contribute to better understanding and targeting of energy poverty. Utilities can play a key role in delivering vital support to vulnerable and energy poor households. Through a well-targeted EEOS or other utility support, energy efficiency measures can be introduced alongside existing social protection measures.

However, targeting energy savings in energy poor households increases costs to utilities**.** The SocialWatt project has reconfirmed the ENSMOV survey findings that energy savings in the residential sector are usually more expensive than in commercial and industrial sectors. Programmes to deliver energy savings in low-income or energy poor households are even less cost effective, when taking a narrow scope of cost-benefit analysis. Therefore, without special provision, utilities find it difficult to prioritise savings programmes that deliver benefits to low-income households within the EEOS structure.[15]

Uplifts do not guarantee provision. Ringfences are more effective to target support. Where uplifts exist, there is mixed evidence on their effectiveness to address the cost imbalance.[16] Uplifts need to

[15] Sunderland, L., et. al. (2020) Evaluation of schemes to tackle energy poverty. SocialWatt H2020 project. https://socialwatt.eu/en/newsandevents/evaluation

[16] Ibid.

be set at a level sufficient to redress the balance, but this level is highly dependent on the nature of the project, the local context and time. The uplift may need to change in response to the availability of projects and savings. A ringfence around a proportion of the savings target that must be delivered in energy poor households can be more effective to guarantee support. The leading example of this approach in the UK EEOS which, since 2018, is 100% dedicated to energy savings in the homes of energy poor. The French EEOS uses a combination of ringfence and uplift, dedicating 25% of the savings target to low-income households and including an uplift for provision to very low-income households.[17]

ENSMOV (Enhancing the implementation and Monitoring and Verification practices of Energy Saving Policies under Article 7 of the Energy Efficiency Directive (EED) is a project designed to support public authorities and key stakeholders in EU Member States and accession countries to monitor, revise, improve and complement the design and implementation of their national energy efficiency policies be developing resources on practical and strategic issues arising from Article 7 of the EED.

SocialWatt aims to enable obligated parties under Article 7 of the Energy Efficiency Directive across Europe to develop, adopt, test and spread innovative schemes to alleviate energy poverty. The appropriate tools developed within the framework of SocialWatt aim to help utilities and energy suppliers effectively identify energy poor households, as well as develop and monitor schemes that focus on increasing the energy efficiency of these houses.

[17] Sunderland, L., et. al. (2019) Report on the status quo of energy poverty and its mitigation in the EU. SocialWatt H2020 project. https://socialwatt.eu/library/publications

Annex 4 – Energy Efficiency Auctions

EU

Policy Brief

The role of energy efficiency auctions in the energy transition

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ENSMOV

TOWARDS BETTER ENERGY EFFICIENCY POLICIES

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ENSMOV Project

ENSMOV is an EU-funded project aiming to support public authorities and key stakeholders in 14 Member States represented by its consortium (Austria, Belgium, Bulgaria, Croatia, France, Germany, Greece, Hungary, Italy, Lithuania, Netherlands, Poland, Romania and the UK- and beyond addressing all 28 MS and accession countries) to monitor, revise, improve and complement the design and implementation of their national energy efficiency policies by developing resources on practical and strategic issues arising from the Article 7 EED. ENSMOV follows on from two other very influential projects that have helped to shape Member State policies to address Article 7 requirements of the EED – IEE ENSPOL (www.enspol.eu) and H2020 MULTEE (https://multee.eu/).

ENSMOV has the following strategic objectives that will deliver impacts beyond the duration of the project: a) To ensure that energy efficiency policies do not only promise, but also realize a major, long term contribution to the energy, environmental, economic and security goals of the EU and MS under the Energy Union; and b) To sustain an active platform and community for knowledge exchange of best practices in policy development and implementation of Article 7 EED policies, strengthening cooperation and improving the dialogue between national policymakers and stakeholders across the EU beyond the project period.

Introduction

Energy efficiency auctions are not a common part of energy efficiency policy frameworks. Subsidy programmes such as grants or tax rebates that offer a financial contribution towards investment costs, and energy efficiency obligation schemes (EEOS) that require utilities to deliver energy saving targets, have been much more popular. In Europe, Switzerland and Portugal are the only countries with long-running auction or tender programmes. However, in 2021, Germany introduced an auction (having piloted auctions since 2016) and Denmark replaced its EEOS with an auction. In addition, Greece, Italy, Turkey and the United Kingdom have all expressed an interest in developing auction mechanisms for energy efficiency.

In this brief we draw upon research and a a workshop held in September 2021 featuring presentations from Switzerland, Portugal, Denmark and Greece (ENSMOV, 2021). We present experiences in countries that have employed energy efficiency auctions, assessing their key design features and considering their role in meeting policy objectives in the period to 2030. We also compare them with EEOS.

Defining energy efficiency auctions

An energy efficiency auction is a mechanism for the allocation of (public) funds to energy efficiency projects and programmes. Potential projects or programmes must bid for funds, with the probability of success depending on the relative cost-effectiveness of their bids: this is usually defined as the subsidy required to deliver a unit of the desired policy objective (most commonly energy savings). All the case study auctions described in this brief are one-shot, sealed-bid, discriminatory auctions (Klemperer, 2004), in that bids are submitted once, are not visible to other bidders and, if successful, receive their bid, i.e. the auctions "pay-as -bid", as opposed to "pay-as-clear" auctions in which a uniform price is paid to all winning bidders.

Energy efficiency auction case studies

Switzerland

The Prokilowatt scheme in Switzerland has been running since 2010. Prokilowatt is funded by a levy on electricity consumption and pays for electricity savings. More than 20 of the most common end-use technologies are eligible for funding.

Two separate auctions are available: one for large projects in industrial enterprises, and another for programmes that aggregate smaller projects at the level of small businesses and households. The auction for programmes was put in place to ensure that funds would be available for smaller projects outside the industrial sector that would otherwise be unable to bear the costs of bidding individually.

Bids are ineligible if the expected payback period is less than four years.[18] The programme subsidises up to 30% of investment costs. Subsidies are paid "as bid" after the project has been implemented and once the costs and savings have been verified by the programme administrator through an audit process. There is no penalty regime as such, but subsidies are reduced if either the savings or the costs are lower than expected in the applicant's bid. If the payback period is deemed to be less than four years during the verification process, no subsidy is provided. Winning bidders have one year in which to implement their projects.The payback criterion is just one element of policy design aimed at ensuring the additionality of the scheme – i.e. ensuring that, as far as possible, public funding is used to support actions that would not have taken place without the policy measure. The scheme also requires that projects support the best available technologies (as defined by the programme administrator), that the energy efficiency actions are not required by law, and that the actions have not already been undertaken before the award of funding.

[18] The payback criterion means that bids are ineligible if the cost of the energy efficiency investment is outweighed by the quantity of the electricity saved, multiplied by the price of electricity, before the end of the fourth year following the energy efficiency action.

The full budget is only allocated in auction rounds in which bids worth at least 120% of the budget are received (Radgen, 2016). In 2022, a variation on the 120% rule is being implemented through week-long auction rounds in which projects compete against each other, plus 15 "virtual projects" stemming from the previous round. Following this competition, only 85% of all bids are awarded funding (BfE, 2021).

By 2020, the scheme had supported more than 700 projects and programmes. Seventy-five per cent of the savings were made through the installation of more efficient lighting, motor systems, cooling systems, pumps, circulating pumps and ventilation systems. The scheme has disbursed or reserved EUR 270 million in subsidies at an average rate of 2.6 cents per kilowatt-hour (kWh) of electricity saved (Bisang, 2021). The average price of electricity was around 20 cents per kWh in the residential sector and 16 cents in the business sector in December 2021 (Global Petrol Prices.com, 2022). Average funding rates were around 20% of investment costs during the 2014-2017 period and fell to as low as 13% in 2018, meaning that the subsidies are leveraging between 5 and 7.5 times their amount in private investment (Radgen et al., 2018). The observed combination of average subsidy per kWh and leverage rate (of between 1:5 and 1:7.5), in conjunction with the minimum payback criterion, suggests that the scheme has been successful in supporting energy efficiency actions that would not have been taken without it and that are cost-effective from a societal perspective, while avoiding over-subsidisation.

Germany

The current German auction scheme began as

a pilot in 2019 and was expanded into a full scheme with a five-year lifespan in 2021, funded through the federal budget. It is a technology-neutral funding competition that is open to all energy saving concepts. It supports up to 60% of investment costs and offers a maximum of EUR 10 million per project, in absolute terms, while payback (without funding) must be longer than four years (Bundesanzeiger, 2021). There is no maximum subsidy rate per kWh; projects are only supported, however, if their subsidy rate is cost-effective relative to other bids and still in the available budget. Subsidy rates are calculated in terms of euros per tonne of carbon dioxide (CO2) saved and are paid "as bid." Winning bidders have 36 months in which to complete their projects.

The competition followed a previous pilot programme (STEP up!) which ran from 2016 to 2019 and built lessons learned from each bidding round into improved scheme design (Langreder et al., 2019). Despite incremental improvements throughout the pilot process, the scheme failed to deliver any competition in any of its six calls.

Building on this experience, the new pilot competition began with a relatively small budget. In the first call in 2019, the budget was oversubscribed by requests for funding, with EUR 15 million worth of bids against a budget of EUR 7 million. In the event, only 8 out of 34 projects could be funded. Winning bids requested subsidy rates of between EUR 190 and EUR 390 per tonne of CO2 saved. After 11 calls between April 2019 and September 2021, in November 2021 the budget was raised to EUR 15 million per round for the period to 2026 (BWK, 2021).

Denmark

The most recent auction scheme to launch has been in Denmark, run in-house by the Danish Energy Agency. Beginning in late 2020, it (partly) replaces an EEOS which ended in 2020. The auction scheme will run until at least 2029. The auction is financed through public funds, with a budget of EUR 464 million, and is designed to deliver approximately 60% of Denmark's current EED energy savings obligation. The scheme aims at achieving EED-compliant energy savings among all business end uses and energy carriers, with all sectors eligible except for road transportation, shipping and information technology. Four or five web-based auctions are envisaged each year, with each auction round lasting three weeks from the opening of the bidding window to the announcement of successful bids (Broberg, 2021).

Bids are only accepted for individual projects from energy end-using enterprises (not from intermediaries) and are subject to a price cap of 1 cent per kWh saved per year. This compares with average prices of electricity of 29 cents per kWh in the household sector and 7 cents per kWh in the non-household sector in the first half of 2021 (Eurostat, 2021). Energy savings are calculated using meter data before and after project completion, accounting for the expected lifetimes of the equipment installed and the EED requirement that savings be additional to EU law such as ecodesign.[19] Winning bidders have 27 months to complete their energy efficiency projects, with payments being made "as bid" upon satisfactory completion. No penalty regime is in place, but if projects do not realise their anticipated energy savings, subsidies are reduced in proportion to the savings achieved. Winning bidders must provide status reports every six months so that allocated funds can be redeployed if projects have not proceeded as initially anticipated.

[19] This is done by ensuring that energy savings are not calculated simply by comparing energy consumption before and after the energy efficiency action; instead, the impact of ecodesign on the market for energy-using products and equipment is taken into account when calculating the counterfactual against which metered energy consumption is compared.

The scheme launched during the COVID pandemic. The Danish Energy Agency believes that this has made potential bidders less willing to make investments, including in energy efficiency, and they are therefore less likely to participate in the first few auctions. Only around 50% of the budget allocated to auctions in 2020 and 2021 was actually awarded to winning bids, reflecting the socioeconomic conditions at the time. With fewer bids than budgeted for, competition was limited, and bids were typically clustered at or close to the price cap (Broberg, 2021).

Portugal

The Portuguese Plan for Promoting Efficiency on Energy End-use (PPEC) is a tender scheme. It shares some of the characteristics of an auction, in that funds are disbursed according to the quality of bids received, but the criteria are not limited to the subsidy per unit of energy saved.

The PPEC scheme began in 2007 and has evolved over seven periods, with the current period running across 2021 and 2022 with a budget of EUR 23 million. Bidders are known as "promoters," as the energy savings cannot be achieved on their own energy use. Bids can come from electricity and gas utilities, consumer organisations, energy agencies, municipal associations, business associations, research centres and educational institutions.

The scheme is segmented into six separate funding pots. This is to ensure participation across different types of bidders and interventions among a diverse set of end users. Three different end-user segments cover the installation of energy-efficient equipment ("tangible measures") in households, industry and agriculture, and services and commerce. A separate pot is reserved for information provision and energy audits ("intangible measures"). In addition, two further pots, one for tangible and another for intangible measures, are reserved for non-utility bidders.

To be accepted into the tender evaluation, bids for tangible measures must first satisfy two positive tests: that they save primary energy and that they have a positive net present value – i.e. that the benefits to society outweigh the costs to society (including avoided greenhouse gas emissions). Tangible measures are then evaluated by the Portuguese Energy Regulator (ERSE) according to a cost-benefit analysis and the level of investment in equipment in the total cost (a criterion designed to prioritise measures with relatively low administration costs). ERSE evaluates intangible measures

according to their ability to overcome market barriers; the quality of presentation[20]; and equity, innovation and ease of implementation criteria. Separately, the Portuguese government's General Directorate of Energy and Geology (DGEG) evaluates all the bids according to their compatibility with government policy objectives. DGEG criteria include geographic coverage, alignment with national energy policy, support for the development and implementation of energy efficiency, the diversity of promoters, and coordination with other policy instruments. The scores of ERSE and DGEG are combined; bids are ranked; and bids are accepted until the funding pots have been exhausted.

The scheme has evolved over time, with tenders now run on a biennial basis to allow promoters to focus on the delivery of projects and learn lessons from one round before bidding in another. Funding is limited to 95% of costs and EUR 400,000 for intangible measures and 75% of cost and EUR 800,000 for tangible measures. Subsidies are paid "as bid"; the average subsidy paid for energy savings across tangible measures in the 2017-2018 period was 1.4 cents per kWh (Sousa, 2021). This compares with average prices of electricity of 21 cents per kWh in the household sector and 10 cents per kWh in the non-household sector in 2018 (Eurostat, 2021).

[20] The "quality of the presentation" criterion is evaluated by assessing the existence, clarity, objectivity and justification of the information included in the application. Applications with insufficient quality are those that, for example, do not describe the process of implementing the measure clearly, do not justify the values and assumptions presented, are not coherent, or include systematic errors. A such this could be thought of as a proxy for the extent to which one can trust the information presented and the subsequent implementation of the measure.

Countries considering auctions

Greece

In 2019, the Greek government announced, through its National Energy and Climate Plan, its intention to design and implement energy efficiency auctions to facilitate the achievement of Greece's energy efficiency targets (Hellenic Republic, 2019). The introduction of auctions aims to improve the cost-effectiveness of the Greek energy efficiency policy portfolio, putting in place a permanent structure for implementing energy efficiency actions more generally. Until now, Greece has initiated both EEOS and alternative measures to fulfil its energy savings obligations. Nevertheless, the various programmes within the framework of the alternative measures are designed individually without common rules and objectives, and this has led to the implementation of energy efficiency interventions with different levels of cost-effectiveness. Alongside the Greek EEOS, the initiation of energy efficiency auctions aims to foster the development of energy efficiency services through both market-based mechanisms (Tourkolias, 2021).

A special committee was established in 2020 through a ministerial decision (ΥΠΕΝ/ΔΔΕΠΕΑ/42625/279), tasked with proposing the regulatory framework for conducting the energy efficiency auction in Greece. The main responsibilities of the committee consist of:

- Mapping the barriers and limitations for the development of the regulatory framework;
- Determining the type and characteristics of the auctions to be held;
- Identifying eligible participants;
- Developing the measurement and verification procedures;
- Preparing the legislative framework; and
- Monitoring and assessing the initial rounds of the energy efficiency auctions when they take place.

The committee has proposed a seven-step procedure for the effective conduct of energy efficiency auctions in Greece.

The development of the legislative framework started with the adoption of Law 4843/2021 (FEK 193/A/20-10-2021), which harmonises the national context with the EED. A ministerial decision will be adopted specifying the various design elements of the scheme. The Renewable Energy Sources

Operator and Guarantees of Origin (DAPEEP SA) was appointed as the responsible authority for the coordination of the scheme, while the Centre for Renewable Energy Sources will carry out the control and verification activities.

At this point, cost-effectiveness is the only award criterion. The most cost-effective bids will be supported with a predefined percentage of public aid until the available public budget is exhausted. Successful bids may receive some advance payment.

The energy efficiency auction will aim to minimise administrative cost and bureaucracy, while ensuring transparency and fair competition to achieve the most cost-effective interventions. Although the initial focus of the auctions will be on the delivery of final energy savings, the potential for switching to primary energy savings as the delivery metric will be considered in order to facilitate a level playing field with renewable energy sources (Tourkolias, 2021). The planned provision aims to promote further market penetration for renewable electricity production, mainly photovoltaic (PV) systems. The rationale for this would be that the costs per kWh of bids will be improved considerably, which will allow the implementation of less cost-effective energy efficiency interventions, such as building envelope improvements. PV installations would be ineligible on their own – they would need to be combined with energy efficiency actions generating final energy savings. It should be noted that all renewable energy technologies for heating and cooling will be eligible since they lead to final energy savings (mainly heat pumps).

The first pilot programme will focus on enterprises in the tertiary and industrial sectors and has a planned public budget of EUR 30 million. The preparation of the secondary regulatory framework was due to be finalised in mid-2022, and the initiation of the pilot energy efficiency auction is expected by the end of 2022.

Italy

In Italy, discussions over adopting an energy efficiency auction scheme began some years ago, mainly in relation to the difficulties faced by the white certificate mechanism in 2017-2018 (Di Santo et al., 2019). Since auctions have been used for renewable energy sources since 2012, the introduction of a similar measure for energy efficiency could benefit from this experience and know-how regarding procedures. However, energy efficiency projects are more complex to deal with than renewable energy projects, both in terms of their measurement and verification, and of the variety of actions that can generate energy savings. Thus the evaluation of the opportunity to move forward with an auction

scheme has taken some time, during which feedback has been gathered from auction schemes adopted in other countries. With the ministerial decree "D.M. 21 maggio 2021" setting new rules for the white certificate scheme, the basis for an auction scheme was finally introduced. The decree states that the auction scheme will be adopted because of the need to obtain savings in addition to the ones produced by white certificates, to comply with 2030 targets. The operational rules of the policy will be defined and launched in 2022 with a dedicated decree.

The main points defined so far are:

- The scheme will work as a "pay as bid" auction and will aim to incentivise and promote energy savings.
- Bids will be based on the economic value per saved tonne of oil equivalent (expressed as final energy consumption).
- The economic value of the accepted bids will be granted for a period depending on the type of energy efficiency projects, and the yearly incentive will thus be equal to the product of the economic value (per tonne of oil equivalent) awarded during the auction and the eligible additional yearly energy savings, delivered for the defined lifetime duration.
- The economic value set as the basis of the auction will consider the price trend of white certificates on the spot market and the specificities of the technology or type of project awarded, as well as the positive environmental externalities generated.
- The types of eligible energy efficiency measures will be defined in the coming decree. In principle there are no restrictions in terms of sectors and types of intervention.
- Access to the auctions will be granted to companies and public bodies that make investments in energy efficiency.

- Incurred costs will be covered through electricity and gas tariff components.[21]

Although the scheme is being introduced through the same decree that sets the rules for white certificates, the savings generated from the auctions will not be related to the white certificate obligation and will not be traded on the same market. This has been one of the points most discussed by stakeholders, with some asking for the two schemes to be linked to ensure liquidity for the white certificate spot market. This is a reasonable idea in cases where the energy efficiency measures admitted to the auctions are also eligible for white certificates, even if it would introduce some complexity in the management of the two schemes. On the other hand, many stakeholders have proposed using the auction scheme for energy efficiency measures that cannot be effectively promoted through the white certificate scheme. In these cases, the white certificate scheme would not suffer from competition from the auction scheme. It is possible that the hammer price in the auction (the highest accepted bid) might be linked to the price in the white certificate programme. This, and many other issues, will be defined in the decree to come.

Turkey

The Turkish National Energy Efficiency Action Plan (NEEAP) 2017-2023 envisages a mechanism involving annual auctions based on the cost per tonne oil equivalent of anticipated energy savings, to support projects developed by end users to improve energy efficiency. Sectors eligible to bid include the manufacturing industry, commercial and service buildings, transport and agriculture. Separate auctions are planned for different sectors to ensure fair competition. Support would be allocated

[21] The fact that the costs of the scheme are covered by electricity and gas tariffs does not necessarily mean that eligible projects are limited to savings from these energy sources. Thus, there is the possibility that other fuel savings will also be paid for through electricity and gas tariffs. However, the vast majority of projects generate electricity or gas savings. To introduce tariff components for other fuels, which are not regulated by the energy authority, would be complex and not justified by the amounts of money involved.

within the budget in ascending order of projects ranked by unit cost per tonne oil equivalent. The auctions are intended to encourage bidders to produce creative, innovative, cost-effective project proposals (Republic of Turkey, 2018).

The legislative framework and technical infrastructure were expected to be developed between 2018 and 2020, with the first auctions to be held in 2021. The NEEAP also envisaged the development of an EEOS. However, at the time of writing there are no regulations for either the scheme or the auctions. Part of the delay may be related to uncertainty over the funding source for the auction. The NEEAP refers to the budget being provided from the development of a "national financing mechanism for energy efficiency." This financing mechanism has also yet to be developed, but it could rely on the setting-up of the EEOS. If energy companies' obligations are not satisfied, the NEEAP suggests that penalties could be a source of finance for the national energy efficiency fund, which in turn could support the auctions.

United Kingdom

The UK government announced in its Net Zero Strategy that it will consult on a scheme to help small and medium-sized enterprises overcome barriers to energy efficiency take-up and meet regulatory standards on buildings performance (HM Government, 2021). This announcement follows a call for evidence in 2019 in which the Department for Business, Energy and Industrial Strategy (BEIS) asked respondents for their views on different options for a support scheme for small and medium-sized enterprises, including an energy efficiency auction or competitive tendering scheme, and an EEOS. Answers to questions related to the pros and cons, programme design, and funding of auctions were summarised in 2020 (BEIS, 2020).

Some respondents thought that auctions could be more flexible and technology neutral than EEOSs and could encourage innovation (not relying on preapproved lists), allowing better value for money. Those in favour of auctions also felt that they could boost the energy efficiency market more than an EEOS could. Conversely, other respondents highlighted the potential for peaks and troughs dependent on the size and frequency of the auctions, the potential for large market players to dominate, and the likelihood that the additional risks to participants could keep prices artificially high.

With respect to auction design, some respondents recommended targeting auctions at those with the greatest need for support by using minimum payback periods, as in the Swiss auction. Some respondents preferred open (technology-neutral) auctions, while others preferred combinations of

closed and open auctions to ensure a range of measures are funded. The importance of linking payment to robust measurement and verification regimes was noted, while the risk of low take-up was also raised, with calls to follow the Swiss example of ensuring competition by not always allocating budgeted funds to bidders (see above).

When it came to funding, on equity grounds most respondents preferred public funds to be drawn from general taxation, as opposed to a levy on energy consumption. As for the level of funding, many respondents advocated a set level of co-funding by small and medium-sized enterprises, ranging from 40% to 70%. Some suggested that the level of co-funding should be bid for, as in the Swiss and German models.

At the time of writing, we await a proposal from the government on how an energy efficiency scheme for small and medium-sized enterprises could be designed.

The UK earlier piloted an energy efficiency auction between 2015 and 2018. The scheme was different in that it focused only on the delivery of winter peak electricity capacity savings, in an attempt to allow energy efficiency resources to provide “negawatts” and thereby avoid the need for more expensive supply-side resources, procured through a capacity market. Projects needed to have at least a two-year payback to qualify for the auction and be able to deliver avoided capacity in the following winter season. A minimum project size of 100 kW was required for the first phase, reduced to 50 kW for the second phase to allow for a greater diversity of projects. The scheme awarded only GBP 6 million (EUR 7 million) to 31 projects across its two phases, with almost all projects being LED lighting installations. While the evaluation of the scheme suggested that it had provided value for money, the relatively low number of participants and high rate of drop-out between registration of interest, application submission and bidding suggested that the costs and constraints of the scheme were off-putting to potential bidders. Indeed, the limited time available to formulate a new project for application (that would satisfy the additionality criteria for the scheme), the complexity of the application process and the requirements around certainty of delivery were all deemed to be factors limiting participation (BEIS, 2019). These factors should be closely considered in the design of any new scheme

Analysis

Many of the design issues policymakers face are the same across auctions and other policy measures. For example, the source of funding, the calculation method for energy savings, whether to have minimum payback periods, and the design of monitoring and verification regimes are important aspects of any energy efficiency support measure. On the other hand, the mechanism for establishing subsidy rates is a central and particular aspect of auction design that deserves some attention.

Mechanisms for establishing subsidy rates

The subsidy rate paid to winning bidders can be established in different ways: "pay-as-clear" or "pay-as-bid". In "pay-as-clear" auctions, all successful participants receive the subsidy rate bid by the last accepted or first rejected bidder. This method should elicit true bids (actual willingness to accept a subsidy rate) from all bidders, avoiding strategic bidding behaviour and leading to economically efficient outcomes (Oren, 2010). This is because an overly high bid would risk being unsuccessful, whereas true bids will benefit from economic rents (OABC in figure 1): the difference between bidders' willingness to accept a subsidy (OBC) and the subsidy rate that clears the auction (A) (see Figure 1). Capacity markets, such as those run in the US by PJM[22] and the New England Independent System Operator, use this method, with demand-side resources, including energy efficiency, able to bid for the provision of electricity capacity alongside supply-side alternatives (Liu, 2017).

EEOSs with competing utilities that can trade compliance, particularly those with white certificate programmes in which the market cost of energy savings to obligated parties is visible, should yield similar outcomes to "pay-as-clear" auctions in which a given quantity of energy savings must be procured. In these schemes, utilities should pass on the clearing price of achieving their obligations to

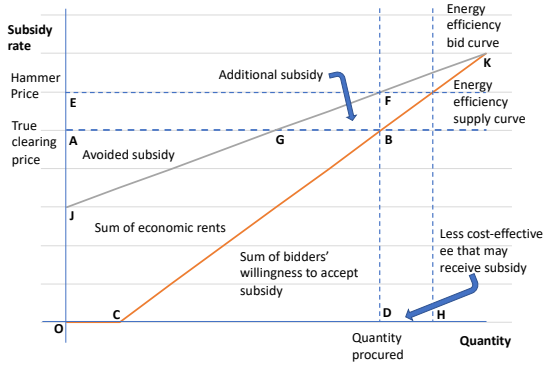
[22] PJM is a regional transmission organisation that coordinates the movement of wholesale electricity in all or parts of 13 US states and the District of Columbia. Originally, PJM was a shortened term for the Pennsylvania – New Jersey – Maryland Interconnection, however this no longer applies, even though the term PJM has remained.

bill-payers, as any economic rents have an associated opportunity cost – the opportunity to sell energy savings to other utilities at the market price.

The subsidy rates in the energy efficiency auctions assessed in this brief all use the "pay-as-bid" method, meaning that each successful bid receives its offer. At least in one-off or pilot auctions, this method reduces the risk that, with limited participation, a steep supply curve of bids results in a price at or close to the price cap being paid to all winning bidders, protecting the value for money of using public funds. However, in the long run, with repeated auctions, this method risks strategic behaviour by bidders, potentially leading to an elevation and flattening of the supply curve of energy efficiency bids. Having observed previous auction rounds, bidders willing to accept a subsidy lower than the expected hammer price would be expected to increase the subsidy rates demanded. In this scenario, the energy efficiency bid curve (JGFK) would deviate from the energy efficiency supply curve (OCBK) (see Figure 2).

Figure 1: Stylised representation of a "pay-as-clear" auction

Figure 2: Stylised representation of a "pay-as-bid" auction compared to a "pay-as-clear" auction



Policymakers choosing between a "pay-as-bid" auction and a "pay-as-clear" auction must trade off the expected benefits from subsidy discrimination (paying lower subsidy rates to bidders willing to accept a lower subsidy). (AGJ), which enable a subsidy budget to procure a greater quantity of energy savings, against the expected costs of subsidy rate inflation across all bids (BFG), which reduces the quantity of energy savings that can be procured (see Figure 2).

In addition, policymakers with broader economic efficiency concerns should consider the likelihood that, for a given quantity of procured energy savings, some less cost-effective actions, with a willingness to accept subsidy between the true clearing price and the hammer price (in the range DH), will receive support, while other more cost-effective actions may not, if their strategic bids are above the hammer price. Such an outcome would not represent an efficient allocation of resources and could outweigh the narrower net benefits from subsidy discrimination, should these exist.

Efforts to ensure competition among bidders in a "pay-as-bid" auction can also have negative consequences. In Switzerland – where bidders know that even if an auction round is undersubscribed (the sum of subsidies bid for is less than the budget) not all the bids will be accepted – this appears to have led to a reduced level of participation. Following Switzerland's introduction of the "120% rule" (whereby budget rationing is applied if bids add up to less than 120% of the budget) in 2013, the supply of bids declined continuously from 180% of budget to just 60% by 2018. This dynamic effect is predicted in the auction-theoretic literature, which shows that, with endogenous rationing (i.e. with the budget rationed depending on the volume of bids) in a series of auctions with participation costs, the highest-cost bidders will choose to withdraw their participation. With each succeeding auction, as

participation wanes, hammer prices will decline and more bidders will withdraw in a vicious circle of non-participation (Hanke et al., 2020).

In Denmark, where no such endogenous rationing provision exists, auctions in 2021 were also undersubscribed – but this is thought to be related to the prevailing economic conditions (see section on Denmark above). With relatively little participation, bids were tightly clustered just below the price cap, as predicted in a "pay-as-bid" auction. However, theory would predict that, with a return to more normal economic conditions post-COVID, these relatively high prices should attract more potential energy efficiency bids and boost participation in future auctions.

Comparison between auctions and energy efficiency obligation schemes[23]

Both auctions and EEOSs offer the potential to deliver energy savings at relatively low cost to taxpayers or bill-payers, owing to their market-based aspects. Auctions can enable price discovery (as discussed above), while obligation schemes often require competing utilities to deliver energy savings, providing an incentive to minimise their programme costs (Rosenow et al., 2019). Where EEOSs have a liquid secondary market, such as in the Italian white certificate programme (where over 50% of certificates are routinely traded on the spot market), the marginal cost to obligate parties can also be discovered. As a voluntary measure, auctions may be more politically acceptable, as participation is not legally

[23] A separate point of comparison between EEOSs and auctions (and grant programmes) relates to their treatment under state aid rules. Financial aid paid by obligated parties to businesses undertaking energy efficiency projects does not fall under state aid rules, but similar payments from Member State funding programmes to businesses may qualify as state aid, where the receiver is at an advantage compared to other competitors, competition could be influenced and trade between Member States affected. This could affect the design of auctions (and grant programmes) that might wish to fund projects over the de minimis amount of EUR 200,000 and pay subsidies amounting to more than 30% of investments (the percentage rises to 40% for medium-sized enterprises and 50% for small businesses).

binding. On the other hand, auctions have less certainty over their energy savings outcomes. Potential bidders may choose not to participate. An EEOS, as a regulatory measure, forces obligated parties to participate and enables a fixed goal to be achieved, subject to any buyout provisions that may enable obligated parties to pay a fee in lieu of directly making savings.

Depending on their design, both auctions and EEOSs can lead to economic rents (supernormal profits) for low-cost energy efficiency providers. With obligation schemes, such as the French and Italian white certificate schemes, shocks such as sudden increases in obligated parties' targets or the withdrawal of certificates from the market (as was the case when fraud was discovered in the Italian market) can lead to very high prices, extra profits for energy efficiency service companies, and an increase in the global costs passed through to bill-payers (Di Santo, 2019).[24] This is analogous to the situation in a pay-as-clear auction with low liquidity and a steep energy efficiency supply curve (Figure 1). To avoid this type of outcome, policymakers need to address either the supply or the demand for energy savings within the scheme.

On the supply side, policymakers can take steps to increase liquidity in the production of eligible energy savings – for example, by focusing effort on complementary policy measures that help to bring potential energy efficiency projects to the attention of bidders or obligated parties. Examples of this can be found in the French white certificate programme, where organisations are issued with white certificates based on their expenditure on supporting measures (Ministère de la Transition écologique, 2021a), and in the UK EEOS, where local authorities are encouraged to work with obligated parties to help find energy-poor households targeted through the scheme (Sunderland, 2021). In the short run, emergency supply-side measures can also be put in place. In Italy, after the sudden removal of

[24] In theory, the same issues will also apply in any EEOS that obligates competing energy retail companies and allows horizontal trading between obligated parties. However, without a spot market for white certificate trading, the marginal cost of complying with the obligation is not so visible, meaning that the opportunity cost of holding on to excess compliance (which should be passed on to consumers by profit-maximising businesses) cannot be calculated so accurately.

fraudulent certificates from the market[25], both a EUR 250 cap on the reimbursement component for distributors and "virtual" certificates with no correspondence to real energy savings were introduced to dampen white certificate prices (Di Santo, 2019).[26]

On the demand side, policymakers can place limits on the costs per unit of energy savings borne by taxpayers or bill-payers which, if triggered, would reduce the demand for energy savings. This is common practice in both auctions and EEOSs. Auctions often have maximum subsidy prices, while some obligation schemes have buyout prices, at which obligated parties can choose to pay a fee per unit of energy savings, rather than delivering energy savings or purchasing them from other parties. In many schemes, these fees are paid into a fund that, in theory, may then be used for an energy efficiency auction, as is the case in Turkey (see above). However, in most cases the use of buy-out prices has tended to be quite low, as the prices have been set at levels that encourage the obligated parties to undertake energy efficiency measures at lower cost. For EEOSs with short (e.g. annual) compliance periods, banking and borrowing between periods can also act as a flexibility option to avoid excessive price swings. In Ireland, obligated parties in the 2014-2020 EEOS phase had to achieve at least 60% of their obligation each year (except the final year of the phase) before being able to access the buyout price, with underachievement being added to their obligation in the following year

[25] In 2017 around 1.3 million annual certificates were withdrawn as a result of uncovered frauds and of extended thorough checks, creating an undersupply for that year and the ones to follow, making it impossible for distributors to reach their minimum targets for the next few years.

[26] The cap served to keep certificate prices under control. The other transitional measure was introduced as an alternative to the white certificate scheme's target reduction, with the assumption it would be possible to take measures to stimulate the supply in the following years. Obligated parties unable to purchase enough certificates in the market to cover their targets have the option to buy virtual certificates at a price higher than their reimbursement. These virtual certificates can be substituted with "real" certificates in the two years following their purchase, in order to recover the economic loss.

(Strategic Energy Authority of Ireland, 2014). Auctions do not have this flexibility option, as regulators have no ongoing relationship with their participants.[27]

Empirically speaking, EEOSs overshadow energy efficiency auctions in terms of their number and size. Of the USD 11.5 billion invested globally as a result of EEOSs and auctions in 2015, 98% was channelled through EEOSs, and the EEOSs were responsible for a similarly large share of energy savings (IEA, 2017). Since then the number and volume of investments of both types have increased, but EEOS still dominate. It remains difficult to compare the relative cost-effectiveness of the two types of instruments, given the small number of auctions and the variations between jurisdictions in terms of their energy efficiency potential, eligibility criteria and fuel, sector and end-user coverage. Notwithstanding these caveats, the IEA noted that the Portuguese tender scheme and Swiss auction had cost-effectiveness scores (average cent subsidy/kWh) within the range exhibited by EEOSs (IEA, 2017).

The much larger size of most of the existing EEOSs (in Denmark, France, Luxembourg and Poland they aimed to deliver the Member State's entire EED energy savings obligation) compared to auctions raises the question of whether auctions are capable of delivering the significant amount of energy savings required in the coming years. Only in Denmark has a Member State switched from an EEOS to a set of alternative measures, including an auction set to deliver 60% of its EED energy savings obligation. It

[27] Both auctions and EEOSs can be segmented to achieve energy savings among priority sectors or recipients or through particular technologies. This reduces the overall cost-effectiveness of achieving energy savings (on narrow economic grounds, not accounting for any non-market impacts), but could increase the energy savings delivered per unit of subsidy, if the economic rents associated with the programme as a whole were reduced by more than the impact of the increased costs of delivering to separate market segments. The French, Irish and UK EEOSs have (or had) sub targets for delivery among energy-poor households, while the Swiss auction and Portuguese tender also segment their programmes.

will be interesting to see how the Danish auction progresses over the coming years, and whether it is able to encourage sufficient bids.

Potential role for auctions in the energy transition

The EU's net 55% emissions reduction target by 2030 and net zero target by 2050 require an increase in the rate of emissions reduction and, in turn, the rate of energy savings (EU Commission, 2020). The Fit for 55 Package translates this raised ambition into higher energy efficiency targets and an increase in the rate of energy savings required from national policy measures, with the EED Article 7 (now Article 8) proposed to increase from 0.8% of final energy consumption saved per year to 1.5% from 2024 (EU Commission, 2021). At the same time, the increases in public (or bill-payer) spending implied by these more stringent requirements will likely put more pressure on governments to ensure that subsidies are spent on cost-effective energy efficiency actions and that subsidy programmes provide value for money to taxpayers and bill-payers. Other European countries, such as the UK, have different legislative frameworks but face the same need to ramp up action and deliver value for money (HM Government, 2021). Finally, although energy and carbon pricing developments – such as the proposed extension of emissions trading to direct emissions from buildings and road transport (EU Commission, 2021a) and the proposed rebalancing of energy taxes (EU Commission, 2021b) – will make energy saving more financially attractive, the increased level of energy savings ambition in the Fit for 55 Package will mean that less cost-effective energy savings will need to be taken up in order to meet climate and energy targets (Chan et al., 2021).

An increased focus on value for money would suggest that market-based instruments, such as EEOSs and auctions, are likely to grow in importance, continuing a trend observed over the last 15 years (Rosenow et al., 2019). However, the need to achieve more ambitious quantity-based energy savings targets, through the EED energy savings obligation, would suggest that obligation schemes, rather than auctions, may have a bigger role to play, at least over the period to 2030. While it is difficult to draw firm conclusions on the effectiveness of auctions in delivering on targets – given the small sample, the early and COVID-affected stage of the Danish auction, the relatively small size of the German auctions and the different legislative environment in Switzerland – evidence from all these countries shows that auction budgets have not always been exhausted. Crucially, as voluntary measures, auctions cannot guarantee participation, making the delivery of energy savings targets less secure. Theoretically, a government could guarantee to meet its own volume constraint, by auctioning subsidies with unlimited price constraints, i.e. obligating itself. This approach has never been tried. A half-way house involves the auctioning of the obligation to achieve a set volume of energy savings. This approach has been taken in Vermont, US, where the state ran a competition to be the energy efficiency utility, with associated energy savings obligations (IEA, 2017).

EEOSs, as regulatory measures, offer the possibility of guaranteeing energy saving outcomes, although, as we have seen, mechanisms to avoid costs to obligated parties (passed through to bill-payers) such as buyout prices can act to reduce energy savings if triggered. Although this might suggest that EEOSs are set to expand in number and size, this development would likely add more costs to energy bills. This could prove to be politically unsustainable, given the sensitivity of energy bills to exogenous shocks, particularly during the heating season (e.g. from the weather or geopolitics), and the regressivity of funding the achievement of policy goals through energy bills rather than through general taxation. In France, which has an overarching EEOS with white certificates covering all fuels, the programme is sufficiently ambitious to deliver on France's existing EED energy savings obligation. The additional subsidy costs associated with meeting the proposed increase in ambition of the EED could potentially be split between bill-payers and taxpayers through a combination of a more ambitious energy efficiency obligation target, aligned with the EED, and support for subsidy measures that would reduce the costs to obligated parties of meeting the target. This approach has been used previously in France, where tax rebates were available to end users alongside subsidies from the white certificate programme for some energy efficiency investments (IEA, 2017), while only the savings from the EEOS were reported to the European Commission to comply with the EED.

In a system in which the EEOS is the dominant policy instrument used to deliver energy savings, auctions could be used as a way of allocating complementary subsidies. This is already the case in some parts of the US, where capacity mechanisms in New England and the Midwest run by regional electricity system operators (PJM) allow energy efficiency actions to compete with supply-side options. The energy efficiency actions are also eligible to be counted towards utilities' energy saving targets (Liu, 2017).

Beyond 2030, progress on end-use electrification and decarbonisation is likely to create new policy objectives for energy efficiency. High-cost decarbonisation actions (including energy efficiency) in industry sectors may be inappropriate to fund through EEOSs; bill-payer-funded obligation schemes have tended to operate on the premise that everyone pays, and everyone has the opportunity to benefit. In this context, auctions could become a tool for governments to discover participants' willingness to accept subsidy in sectors in which costs are difficult to assess in advance. Meanwhile, if space heating (and cooling) moves to electricity through the widespread adoption of heat pumps, this will put new pressures on electricity grids, particularly at peak times during winter. In this context, EEOSs might be better focused on delivering energy efficiency solutions that reduce the overall costs of providing a reliable electricity grid. In California, US and Ontario, Canada, the obligations on energy

utilities have already moved towards a focus on peak electricity consumption, given that states' climatic conditions and reliance on electrically powered cooling (Rosenow et al., 2020).

Conclusion

The increasing interest in Europe in auctions as a way of allocating energy efficiency subsidies raises questions about policy design and their place in the energy and climate policy mix. All the energy efficiency-only auctions use the pay-as-bid method, in an attempt to support more energy efficiency projects than would be the case under a standard subsidy scheme, in which a set subsidy rate is provided. This approach risks strategic behaviour by bidders, and the extent to which this undermines the achievement of policy objectives is unclear. The approaches taken in Switzerland to bolster competition should moderate these impacts. However, more evidence is needed, through effective policy evaluation by experts in the auction field.

The voluntary nature of auctions makes them attractive to policymakers wishing to avoid placing regulatory burdens on businesses, as with EEOSs. However, this makes auctions vulnerable to nonparticipation, which in turn could put the achievement of urgent energy and climate objectives at risk. The advantages of regulation through EEOSs, as quantity-based instruments, would appear to make them more likely to be favoured over the period to 2030..

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