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MAKE CLEAN HEAT ACCESSIBLE TO ALL – METHODOLOGY ANNEX

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This document sets out the method used to estimate the future costs of the social and environmental policies levied on energy bills, and how these costs affect the running cost of electric heating.

The objective was to estimate the future cost of the social and environmental levies and understand what heat pump user's cost savings would be from rebalancing the levies would support heat decarbonisation, and how much this would cost in revenue foregone.

The period examined was 2023/24 to 2034/35. However, the focus of this analysis is limited to the period leading to the end of the 2020s.

Levy schemes and methods for estimating future costs

The analysis estimated the future cost of seven main policies levied on both electric and gas bills. Table 1 (next page) provides an overview of the schemes examined.

Forecasts were made by inputting forecasted data into the existing methodologies to calculate levy costs. UK government and National Grid ESO forecasts were the main data sources.

Future costs for the schemes were estimated by following Ofgem's price cap methodology for wholesale or policy costs – as relevant – as closely as possible.

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Table 1. Key facts for schemes evaluated.

Scheme	Fuel	Rate	Method
Renewables Obligation (RO)	Electricity	Per unit	Ofgem policy cost allowance.[1]
Feed-in Tariff (FiT)	Electricity	Per unit	
Energy Company Obligation (ECO)	Both	Per unit	
Great British Insulation Scheme (GBIS)	Both	Per unit	
Warm Homes Discount (WHD)	Both	Standing charge	
Green Gas Levy (GGL)	Gas	Standing charge	
Contracts for Difference (CfD)	Electricity	Per unit	Ofgem wholesale cost allowance.[2]

Key assumptions

Key assumptions used to forecast the cost of the levies are outlined in Table 2.

Table 2. Key assumptions used for the analysis

Assumption	Approach
The future price of electricity and gas	Relevant for estimating the cost of CfDs and, to estimate how heating costs will change, the future price cap. Based on the Department for Energy Security and Net Zero (DESNZ) reference scenario.[3] The reference or central scenario assumes costs will decrease substantially by 2025/26, then decrease more slowly.

[1] Ofgem, 27 February 2023, **Default tariff cap level: 1 April 2023 to 30 June 2023 Annex 4**

[2] Ofgem, 27 February 2023, **Default tariff cap level: 1 April 2023 to 30 June 2023 Annex 2**

[3] DESNZ, 17 May 2023, **Energy and emissions projections: 2021 to 2040 Annex M**

Assumption	Approach
The energy consumption of a medium-sized home	British Gas consumption estimate for a 2-3 bed home heated by a gas boiler.[4] To estimate how much electricity a heat pump would need to heat the same home to the same level, the overall gas demand for heating was multiplied by 0.9 to reflect the heating inefficiency of a gas boiler.[5] This heating demand was then divided by the co-efficient of performance of a heat pump (2.8) to reach the electricity demand of a heat pump for this house size.[6]
Scheme futures	For RO and FiT, it is assumed that all generation operates on 20-year contracts, and that contracts will expire at the same rate that they came online. Therefore, RO contracts begin to expire in 2026/27 and FiT contracts in 2034/35.
	For CfD, the Low Carbon Contract Company's estimate for existing contract's generation is used to forecast future generation.[7] This only accounts for generation on existing contracts, therefore, we forecast generation from new contracts by assuming all additional offshore generation according to National Grid ESO's Future Energy Scenario's Consumer Transformation Scenario will have a CfD.[8]
	ECO has operated under multiple iterations for a decade, and it a pillar of the UK's drive to improve energy efficiency and eliminate fuel poverty. ECO4 will be reviewed in coming years; given the supplier obligation is almost three decades old, it is expected to be continued. Therefore, we assume the scheme continues throughout the period and continues to levy £1bn a year from electricity and gas bills.
	GBIS will run for only three years, until mid-2026.[9] Because it is a time-limited programme and there is no plan for a replacement, we assume it is not renewed.
	WHD provides fuel-poor homes with a rebate on their energy bills. With no existing plans to introduce a social tariff that provides more consistent and comprehensive support to fuel poor households, we assume WHD stays in place for the entire duration of the analysis.
	GGL is a new scheme, which levies a small cost as a standing charge on gas bills. We assume this cost stays on bills for the entire duration of the analysis.

[4] British Gas, 2023, **What's the average gas and electricity bill in Great Britain?**

[5] British Gas, 2023, **How efficient is my gas boiler?**

[6] UK government, October 2021, **Future support for low carbon heat: Boiler upgrade scheme**

[7] LCCC, 3 May 2022, **CfD Forecast Generation and Avoided GHG**

[8] National Grid ESO, 2023, **FES Documents**

[9] Ofgem, 2023, **Great British Insulation Scheme**

Assumption	Approach
The number of heat pumps in the UK	Estimated using National Grid's FES Consumer Transformation.[10] However, this FES scenario assumes a much higher level of heat pump uptake than is currently being achieved. Therefore, a discount of 50%, increasing by 5% every other year, was applied to the trajectory. This means heat pump uptake is aligned with 2022 heat pump installations, and predicted installations for 2023.[11] This trajectory still meets the UK's target to install 600,000 heat pumps in 2028.[12]
The number of direct electric heating units in the UK	Estimated using the existing number, and the number predicted to be in use by 2035 according to the National Grid ESO FES.[13] FES does not include an annual trajectory for direct electric units, so this analysis assumed a linear decline in the number of units in the UK.
Inflation	To 2027, annual inflation was aligned with the Office for Budget Responsibility's five-year forecast.[14] Past 2027, the analysis assumed inflation would be 2%.
Discount rate	According to the UK government Green Book for Intergenerational wealth transfers and social discounting, future investments should be discounted by 3.5% for 0-to-30-year long timescales.[15] Future costs were divided by 1.035 and multiplied by a square root corresponding to the number of years in the future the cost is situated in.
Running cost after smart tariff	The Octopus Cost Homes tariff could save a heat pump user around 13% of energy costs.[16]
Gas standing charge	The standing charges were taken from Ofgem historic data. Future standing charges were assumed to rise in line with inflation.

Levy discount calculations

Once the costs of the different levies were forecast, the cost per unit of electricity used for electric heating was multiplied by the amount of energy a heat pump and direct electric system typically use to heat a medium-sized house

[10] National Grid ESO, 2023, **FES Documents**

[11] Nesta, 8 August 2023, **How the UK compares to the rest of Europe on heat pump uptake**

[12] UK government, 1 September 2023, **Energy Security Bill factsheet: Low-carbon heat scheme**

[13] National Grid ESO, 2023, **FES Documents**

[14] OBR, 2023, **Economic and Fiscal Outlook**

[15] UK government, 18 April 2022, **Intergenerational wealth transfers and social discounting**

[16] Octopus, 2023, **Introducing Cosy Octopus**

with 2 to 3 bedrooms. This was around 3.5 MWh for a heat pump, and 9.9 MWh for a direct electric system.

To estimate the total revenue foregone if the levies were exempted or discounted on homes with electric heating systems, the number of electrically heated homes (heat pumps + direct electric systems) was multiplied by the total cost of future policy costs levied on those energy bills. Although direct electric systems use over three times the amount of electricity as heat pumps, the proposed levy discount is kept at 3.5 MWh to focus the incentive on heat pump uptake. This calculation is set out in Table 3 below.

Table 3. Calculation steps

Step	Explanation
Per MWh cost of the levies	This was calculated using the assumptions, method and evidence outlined in Table 1 and Table 2. The levies which were included in calculating the exemption or clean heat discount were RO, FiT, ECO and GBIS. The CfDs were not included because these costs are not technically a policy cost and have the potential to pay back to consumers.
Levies for heat pump users in a mid-sized home	The total electricity used for heating a mid-sized home with a heat pump was multiplied by the cost per MWh of each of the levies included in the analysis to produce the total cost levies place on heat pump running costs. Direct electric homes use significantly more electricity, but the same level of exempt electricity is assumed. As an additional step for heat pump running costs, the potential savings (13%) from using a flexible tariff were applied after this calculation.
Revenue foregone if exemption is implemented	To estimate the total revenue foregone by implementing the policy, the additional levy cost per heat pump for RO, FiT, ECO and GBIS were multiplied by the number of heat pumps in active in the UK. The same calculation was made for direct electric, and the two values summed to estimate the full policy cost.

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