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Final Report

Climate policy that cuts costs

International policy comparison

Energy Saving Trust and Green Alliance
June 2023

Energy Saving Trust is an independent organisation dedicated to promoting energy efficiency, low carbon transport and sustainable energy use. We aim to address the climate emergency and deliver the wider benefits of clean energy in the just transition to net zero. We empower people to make better choices, generate insight to inform policy direction, deliver transformative programmes for governments and support businesses with strategy, research and assurance – enabling everyone to play their part in building a sustainable future in the United Kingdom and internationally.

Green Alliance is an independent think tank and charity focused on ambitious leadership for the environment. Since 1979, it has been working with the most influential leaders in business, NGOs and politics to accelerate political action and create transformative policy for a green and prosperous UK.

This research was commissioned by the Climate Change Committee.

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Executive summary

In 2020, countries worldwide implemented stimulus packages to support their economies in response to the Covid-19 pandemic. Increases in gas prices driven by demand from the pandemic recovery were followed by sharp increases in wholesale gas prices following Russia's invasion of Ukraine. This has led to rapid, new developments in energy policy making across the world.

Though wholesale gas prices have fallen back since their autumn 2022 peak, prices are still high. With ongoing uncertainty,[1] there is an unprecedented need and opportunity for policies that can deliver against all three traditional concerns of energy policy: cost, security and decarbonisation. Lower energy costs and decarbonisation, with the changing economics of the energy system, can both now be achieved through deployment of energy efficiency, demand flexibility and decentralised renewable energy. Energy security has been improved by the resulting reduced dependence on imported natural gas.

1 Drop in power price predictions up to 2030 but prices to remain above pre-pandemic levels for next decade, Cornwall Insight, 2023

The UK has been strongly affected by the energy price crisis because of its dependence on natural gas for heating, electricity generation and industrial processes. The UK Government has taken steps to reduce energy bills directly for consumers and businesses through energy price caps and guarantees. These measures are vital, but they do not drive decarbonisation. Other policies introduced do aim to reduce bills and cut carbon. They also deliver increased energy security. For example:

- The *It All Adds Up* campaign to encourage simple energy saving measures.
- The planned Great British Insulation Scheme to support energy efficiency in low to middle income households.
- The £2 bus fare pilot in England.

Nonetheless, many policy gaps remain.

The focus of this study

Over 100 policies have been reviewed from around the world for this study. These policies have been introduced or significantly extended since the Covid crisis and they deliver both lower bills for consumers and/or businesses, as well as decarbonisation. These were considered in terms of their relevance to the UK, their impact and their innovation. The remit was policies that are already taking effect. So even though many significant and exciting planned policies were identified, they were not reviewed. The focus was on international policies that most directly impacted large numbers of consumers and businesses, rather than those relating to large-scale energy generation or specialised sectors such as agriculture.

In parallel with international policy analysis, Climate Change Committee analysis and other evidence was reviewed for gaps in current UK climate policy areas where additional policy action could deliver lower bills, decarbonisation and energy security. Policies for energy demand in the UK are substantially devolved: the analysis and recommendations focus on the UK Government rather than devolved government policy making.

Bringing together the UK gaps analysis and the international policy review, 12 international policies were identified for detailed assessment. These cover a range of different policy mechanisms and provide relevant learnings for UK policy makers across four main areas:

- home energy
- business energy
- behaviour change
- access to technology for low-income households.

Though some gaps were identified in policies relating to large-scale energy generation, international policy examples in this area were not assessed, noting a focus on consumer/business facing policies.

As well as 12 individual policy measures, Energy Saving Trust and Green Alliance reviewed the very large-scale packages being deployed in the US (Inflation Reduction Act) and the EU (European Green Deal and RE Power EU initiatives).

Summary of the 12 international policies

Energy Saving Trust and Green Alliance assessed 12 policies in detail. These are summarised in the table below.

Policy		Impact	Relevance to UK
Home Energy			
	**MaPrimeRénov'**: comprehensive support and financial assistance programme for homeowners.	Delivered 670,000 renovated homes in 2022, including the installation of 156,000 heat pumps.	Large-scale, wrap-around retrofit scheme.
	**Greener Homes Initiative**: homeowner grants and loans for energy evaluations, energy efficiency and climate resiliency.	Between May 2021 and Feb 2023, the initiative had 288,000 applications, and most are still going through the process. There have been 46,000 grants issued.	Long-term retrofit scheme.
	**One stop shop**: support for home retrofit with national one stop shop network. Part of an €8bn long-term investment commitment to retrofit.	Currently scaling up delivery: 1,400 applications and 680 deep home retrofits in the first year.	Long-term national scheme aiming for deep retrofit.
Behaviour change			
	**Sobriété Énergétique**: campaign to reduce energy use across French economy.	Final gas and electricity consumption between Aug 2022 and April 2023 was running 12% lower than 2018/19 baseline.	Comprehensive behavioural strategy to lower energy use.
	**Reduce your use**: Irish behaviour change campaign covering energy use both at home and when using transport.	Reached 99% of Republic of Ireland adult population.	Behaviour change campaign.

Business Energy			
	**Benchmarking and Building Performance Standards**: long-term energy/carbon performance standards for commercial buildings.	Benchmarking programmes have seen an estimated 3-8% reduction in energy use over a two- to four- year period.[2]	Business certainty through long-term policy signals.
	**Strategic Energy Management programmes**: build companies' energy/carbon management capacity and systems.	Participant companies in British Columbia saved 110GWh in electricity use in 2019/20.[3]	Helps businesses to cut energy use.
	**Mandatory decarbonisation measures**: Netherlands obligation to take cost effective decarbonisation measures for larger businesses.	Extension to programme will save 3.2 million tonnes of CO_2 by 2030.	Ensures installation of cost-effective decarbonisation measures.
	**SME Support schemes**: Ireland (and also Scotland) encourages SMEs to undergo energy audits.	1,685 Irish businesses completed an audit over two years. Average savings of £50,000 per business identified through audits in Scotland.	Targets SMEs specifically.
Access to technology choices for low-income households			
	**Public transport subsidies**: incentivise more efficient transport choices.	Increased public transport use (eg, 44% increase in rail passengers in Spain), but less evidence of significant modal shift from private cars.	Promotes modal shift and increases mobility for lower-income households.
	**California clean vehicles grants and financing:** this includes targeted support to help low-income households adopt EVs.	35% of clean vehicle grants to low-income consumers, saving households $375 per year.	Targets low-income households.
	**New York State Inclusive Community Solar Adder**: access to community solar energy for low-income households.	Cuts electricity bills for subscribers by an average of 10%.	Targets low-income households.

2 Evaluation of U.S. Building Energy Benchmarking and Transparency Programs: Attributes, Impacts,and Best Practices, Mims Frick et al, Lawrence Berkeley National Laboratory, 2017

3 In programme delivered by the utility BC Hydro; saving figure reported by Consortium for Energy Efficiency, 2022 and confirmed for this study by BC Hydro.

Recommendations for UK Government policy

The UK Government recently published a major package of measures under the title 'Powering Up Britain'. While these plans clearly lay out the UK's ambitions in a number of areas some key gaps remain. We recommend that there should be UK Government policies to address each of the four macro policy gaps identified.

The design of the schemes should be informed by these case studies. These shouldn't be direct replicas. National differences in culture and political, regulatory and market arrangements are key considerations for any 'policy transfer'.

Some of these international policy examples have been deployed rapidly through trial and error, while others are based on extensive research and policy iteration over several years, having been scaled up in the recent crisis. However, expediency is sometimes needed. These examples from other countries show that policies can be implemented rapidly before being expanded and iterated over time to improve outcomes.

Home energy – a national home energy retrofit scheme for England

There's no overarching national programme in England supporting all homeowners to act on energy efficiency and heat decarbonisation.

The three examples of major national retrofit programmes looked at in this study – in France, Ireland, and Canada – are all ambitious, joined up national programmes that have been launched or extended significantly in the period of the Covid/energy crisis and with a focus on owner-occupier households. The UK Government has struggled with such comprehensive home energy efficiency programmes, with the 2012-15 Green Deal failing to achieve market uptake and the 2020/21 Green Homes Grant having major supply-side challenges.

Canada and France are both achieving high uptake from homeowners (close to 670,000 households in France benefitting from the MaPrimeRénov' programme in 2022). The Irish scheme is in its early stages, but the scheme design (particularly noting cultural similarities) and government long-term investment commitment is highly relevant for the UK.

RECOMMENDATION: the UK Government should launch a new publicly funded retrofit scheme for England

Key success factors are long-term funding and frameworks providing certainty for consumers and supply chains; a clear and comprehensive customer journey; and integration with impartial energy advice. Tiered support for homeowners with different income levels ensures both equity and the additional market weight of higher income householders benefiting from the scheme. A systematic approach to supporting local supply chains and private finance makes sure there's capacity to deliver. Promoting a whole-building approach to delivering retrofit is a feature of all the programmes we looked at. In France and Canada, this includes whole-building support for upgrading blocks of flats – a notable UK policy gap. All these programmes focus on, and integrate, funding for heat pump installation alongside energy efficiency measures.

Best practice examples

MaPrimeRénov' – France

- MaPrimeRénov' offers joined up support for owner occupiers to act on a range of energy saving measures with online tools, assessments, retrofit management support and lists of accredited installers.
- Additional incentives are offered for whole-house retrofits and tackling the least efficient homes. Support is tiered for different income levels and house types, and there are specific provisions for blocks of flats.
- Very large-scale programme: in 2022 nearly 670,000 homes were renovated under the programme. Heating measures are the most popular, with 156,000 air source heat pumps installed. There were 66,000 whole-house renovation projects, and 69% of these benefited households in the lowest income group.

One stop shop – Ireland

- Ireland has launched a major programme for home retrofit, aiming to bring homes to a good Energy Performance Certificate (EPC) level ('B2' – 75-100 kwh/m^2). The government has committed to investing €8bn in home retrofit until 2030. Most of the fund (€5bn) will come from carbon taxes.
- A key element of the owner-occupier support is a national programme of one stop shops. These are independent centres which can build supply chains, leverage finance and provide relevant advice.
- The programme is scaling up: it's received 1,400 applications up until March 2023. Approximately 680 deep home retrofits have been completed, with 98% installing a heat pump as part of the works.

Greener Homes Initiative – Canada

- A funding package offering grants and loans for homeowners for retrofit. The scheme has seen high uptake. Funding has been allocated for seven years and 288,000 households have applied for funding.
- As an additional response to the energy price crisis, an upfront heat pump incentive was introduced that can be used alongside the retrofit funding.
- Home energy assessments – which go significantly beyond the UK EPC – are a key part of the process, and they're subsidised. The programme also aims to create jobs by building a retrofit assessor industry.
- Climate change adaptation measures (eg home flood protection) are funded.

Behaviour change: a national behaviour change campaign

Behaviour change is an integral part of meeting the UK's net zero targets. The CCC has estimated that over 60% of the emissions reductions needed by 2050 will involve some societal or consumer behaviour change.[4]

At present, the UK Government has no plans to introduce a comprehensive behaviour change campaign, but based on this analysis, it should do. Many countries across Europe introduced behaviour change campaigns in response to the gas shortages they faced after the invasion of Ukraine by Russia.

RECOMMENDATION: the UK Government should run a comprehensive behaviour change campaign focused on reducing energy demand

This campaign would be centred on the UK Government's target of a 15% energy demand reduction by 2030. It should target businesses and households. A programme focused on national energy demand can frame both messaging on "quick win" energy bill saving actions, and wider and longer-term actions achieving carbon reductions and promoting energy security. This would engage people with different priorities – eg, those who may be less responsive to net zero focused messages. A programme like this would need to reach as many people as possible, and the public sector and large companies should lead in promoting it. Aligning such a campaign with other policies enables consumers and businesses to turn intent into action.

Best practice examples

Sobriété Énergétique – France

- A very large-scale programme mobilising all sectors of society towards a 10% energy saving target by 2024.
- It provides guidance on short- and long-term energy saving actions for citizens and businesses. It encourages businesses to take a leadership role.
- Energy saving measures for different sectors were identified through sectoral working groups that brought together leaders and stakeholders from across society.

Reduce your use campaign – Ireland

- A key part of Ireland's response to the most acute phase of the energy price crisis in 2022.
- The campaign focused on home energy use as well as transport choices (a wider focus than the equivalent UK campaign).
- Care taken to design messaging sympathetically. Offered guidance and reassurance at a time when there was widespread negative sentiment surrounding energy issues. The campaign reached 99% of the Irish adult population.

4 Progress in reducing emissions 2022 Report to Parliament, Climate Change Committee, 2022

Business Energy: a UK strategy to promote business energy efficiency

There's little co-ordinated UK national level policy to support to guide businesses through the most effective and rapid efficiency and decarbonisation pathway. This is particularly true for smaller businesses and commercial businesses, as well as energy intensive companies.

RECOMMENDATION: the UK Government should create a comprehensive and coherent strategy to help businesses – particularly SMEs – decarbonise and cut costs

The UK Government needs to provide clear long-term decarbonisation frameworks: this is key to reducing businesses' investment costs. Research shows that management culture and practices substantially determine how companies respond to low carbon opportunities. Policies need to help businesses embed energy and carbon management at the heart of decision making. For SMEs, help is needed with identifying these opportunities through audits and peer learning. Government is planning a pilot SME energy advice service – this will need ongoing investment and scale. For larger energy users, requiring action on the cost-effective energy saving opportunities, for example following Energy Savings Opportunity Scheme (ESOS) audits, ensures full adoption of mature decarbonisation technologies.

Best practice examples

Building performance standards – US (city and state policies)

- Mandatory frameworks for long-term stepped reductions in existing larger buildings (commercial, public, industrial, apartment buildings) measured energy/carbon performance towards 2050 net zero or equivalent targets – providing business certainty.
- Build on existing mandatory benchmarking programmes for larger buildings to report measured energy/carbon performance (there's no equivalent mandatory programme in the UK for commercial buildings).
- Building performance standards policies are currently in place in seven localities, including New York City, and three states. Thirty-three jurisdictions are committed to introducing the policies – covering 25% of US buildings.

Best practice examples

Strategic energy management programmes – Canada

- Helps businesses to make energy management a key aspect of their operations, with the aim to change current culture and practice. Incentives and grants can be conditional on participation in strategic energy management programmes.
- For large businesses, programmes include public support for dedicated energy managers and energy management teams. In 2021, Efficiency Canada reported large increases in the number of energy managers in post for large businesses.
- For smaller and medium sized businesses, participation in peer learning with other similar businesses is offered. This is a proven effective approach delivering energy savings, but hasn't been a feature of UK Government programmes.

Mandatory cost-effective decarbonisation measures – Netherlands

- Stricter requirement on energy intensive businesses to implement energy savings and renewable/electrification measures with a payback period of up to five years.
- This enhanced energy saving obligation is expected to save 3.2 million tonnes of CO_2 by 2030. This is from a government spend of €75.5 million on supervision, support, and enforcement.[5]

Support for SME decarbonisation audits – Ireland (and Scotland)

- Audits are a proven, effective tool to help SMEs identify where they can cut energy, carbon and costs.
- Under the Irish scheme, SMEs can apply for a voucher of €2,000 towards the cost of an energy audit from a list of registered energy auditors. Similarly, the Scottish Government's Business Energy Scotland programme[6] provides SMEs with free audits as a core part of an SME support programme.

5 Sustainable development and policy, Industrial Policy, Tweede Kamer der Staten-Generaal, 2022

6 Administered by Energy Saving Trust.

Increased access to low carbon technology choices for low-income households (transport and renewable energy generation)

Both low carbon transport and decentralised renewables are technologies where early adopters have tended to be wealthier with greater access to capital. Approaches to ensuring equitable access to transport and renewable technologies are also relevant considering the whole set of new, low carbon technologies (covering products, flexibility services etc) that households will adopt as part of the transition.

RECOMMENDATION: the UK Government should design schemes that provide more access to low carbon technologies for low-income households

The policies we have looked at suggest that, in terms of transport choices, the UK Government should:

- support access to EVs for low-income households through increased grants
- scrappage programmes or low-cost leasing systems including secondhand vehicles
- partner with private sector providers to increase the reach of government backed schemes
- make public transport the natural choice for low-income households who live in cities where EV subsidies may have less impact.

To deliver US-style community benefits from off site or community renewables to low-income households may require retail and wholesale market reforms. The UK Government should consider other areas where its policy development can help to deliver other low carbon benefits to low-income consumers. For example there may be further considerations around low carbon heating, home energy storage and flexible smart-enabled technologies where the UK Government could drive more equitable technology adoption.

Best practice examples

Solar Adder – New York State, US

- Community solar power is an established concept in the US. Panels are installed at an off-site location. Consumers can subscribe to receive a “share” of the energy generated.
- The Solar Adder requires developers to achieve a high proportion of participation by subscribers from low- and mid-income (LMI) households.
- The first round of funding resulted in 333MW of projects agreeing to dedicate at least 20% of their capacity. This will also provide guaranteed savings expected to benefit over 33,000 customers, and most will see a 10% reduction on their energy bills.
- Though market arrangements in Great Britain and Northern Ireland are different from New York, the Solar Adder shows how the benefits of low-cost renewables can be accessed by low-income households.

Best practice examples

Clean Vehicle Rebates and related programme – California, US

- The Clean Vehicle Rebate Project provides grants of $1,000 – $7,500 towards the purchase of new EVs. Higher amounts are only available to lower income or disadvantaged households. A separate scrappage programme is also directed towards lower income and disadvantaged communities.
- Since 2010, over 500,000 rebates totalling $1.2 billion have been delivered through the Clean Vehicle Rebate. These have saved an estimated 6.7 million tonnes of CO_2e.
- The UK is slightly behind California in electric vehicle uptake, but the incoming Zero Emission Vehicle Mandate will help to address this. Without financial support targeting lower income households, the UK risks trapping some consumers in transport poverty or with older, more polluting vehicles.

1. Introduction

In 2020, countries worldwide implemented stimulus packages to support their economies in response to the Covid-19 pandemic. Many of these packages aimed to cut costs for households and businesses while others sought to reduce carbon emissions through economic stimulus. Some packages looked to areas where both lower energy costs and lower carbon could be achieved. These measures continued into 2021, as the pandemic's economic impacts persisted.

Moreover, as the global recovery from the pandemic began in 2021, gas prices on global markets increased, primarily due to increased demand from Asian industries. This, in turn, led to higher than usual wholesale gas prices in Europe.

In 2022, wholesale gas prices rose even further following Russia's invasion of Ukraine, resulting in unprecedented levels of household energy bills and transport costs. This particularly affected economies like the UK, which rely heavily on natural gas for home heating, electricity generation, and industrial processes. This creates a need, and an opportunity, for policies that align lowering emissions with lowering energy bills for businesses and households. As Figure shows below, although wholesale gas prices have come down in the UK from the severe price spikes seen in 2022, prices are still significantly higher than in 2021. Households have been shielded from the worst impacts of the price spikes, but energy prices are still twice as high as they were in Spring 2021.

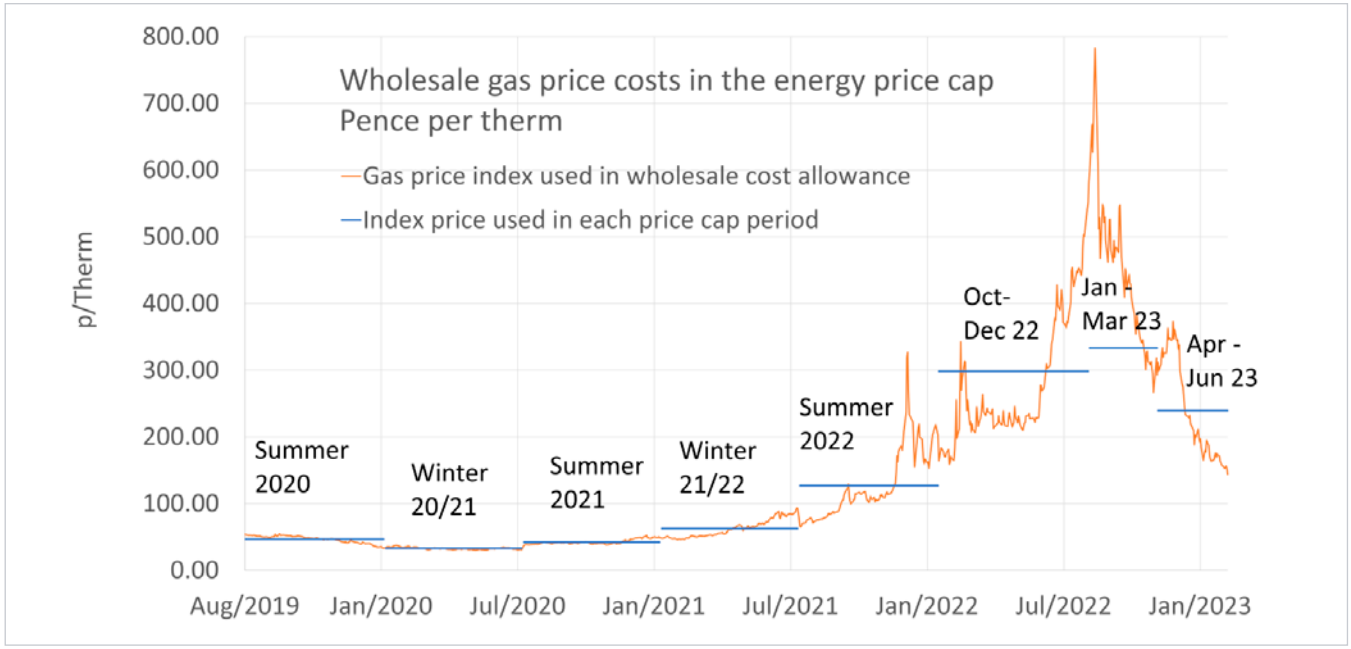


Figure 1.1: GB Gas forward wholesale prices and price cap index, Ofgem 2023[7].

7 GB Gas Forward wholesale prices and price cap index, Ofgem 2023

The political imperative around energy security has driven the need to cut costs since the invasion of Ukraine. Governments across Europe have individually sought to reduce their dependence on Russian natural gas and oil, despite the impact this has had on energy costs, with the EU taking co-ordinating actions including setting a voluntary target for member states to reduce their natural gas consumption by 15%. (See Section 2.2).[8]

The Climate Change Committee's (CCC) 2022 *Progress Report* identified UK policies that could limit energy costs in the current crisis while reducing emissions. These policies should be achievable "within a timescale that will help people cope with current very high prices."[9] The policies included moving energy levies from electricity bills onto public spending, and a sustained push for energy efficiency improvements and electrification in buildings – driven by a much greater roll out of energy advice and support for retrofit supply chains. On the energy supply side, deployment of onshore wind and solar photovoltaic were identified as relatively quick wins.

As well as its actions to offer energy price caps and guarantees, which are vital but do not drive decarbonisation, the UK Government has taken some of these steps. It temporarily removed some levies from electricity bills (and intends to make further progress towards 'rebalancing' electricity and gas costs); launched a campaign to encourage simple energy saving measures; is planning the Great British Insulation Scheme to support energy efficiency in low to middle income households and has offered some targeted support to businesses. Wider measures have included the £2 bus fare pilot in England, which is helping to reduce the cost of living and potentially helping to drive carbon-saving modal shift away from cars, though the impact is not yet known.

Despite these steps, many gaps remain. For example, there is still no large-scale programme for household energy efficiency support, open to the majority of households.

There is a great deal the UK can learn from the experiences and policies implemented in Europe and elsewhere around the world. This report therefore focuses on identifying relevant policies that achieve both decarbonisation goals and lower energy costs, and that have been introduced or significantly developed in this period of unprecedented high energy costs.

Many of the policies researched in this project will continue to be relevant once this present-day energy price shock has subsided and the UK ramps up efforts to decarbonise its energy and transport systems, heat supply and building stock. By understanding the types of policies that have been implemented in other jurisdictions, the UK can learn from best practice and improve policy making going forwards in a way that works for consumers and businesses.

For this report, we have spoken to many organisations from around the world and are very grateful for their time and input. However, unless directly stated otherwise, the views in this report are those of the report authors (Energy Saving Trust and Green Alliance), and any errors should be solely attributed to the report authors.

1.1 Context

The energy crisis and how it has impacted the energy trilemma

Policy makers have traditionally referred to the *energy trilemma* to describe the policy trade-offs between the three pillars of energy security, affordability, and decarbonisation. At the heart of the trilemma concept is the acknowledgement that, in the past, policy makers have not often found it possible to address all three pillars simultaneously.

Although wholesale prices, and expectations of ongoing, very high consumer bills, have diminished somewhat since the start of this study, prices are set to remain higher than pre-2021 levels for the foreseeable future, with gas still a major component of the UK energy mix.[10] Energy costs for households and businesses will continue to be a political priority in the UK for the medium term.

8 Council formally adops 15% gas demand reduction target, European Council, 2023

9 2022 Progress Report to Parliament, 29 June 2022, Climate Change Committee (CCC), Page 15.

10 Three scenarios for gas prices in Europe, Economist Intelligence Unit, 2023

The steep increase in fossil energy prices has challenged the conventional assumptions within the trilemma (Figure 1.2):

- Energy security is now primarily framed by the UK's exposure to global fossil fuel markets, and Russian oil and gas in particular. Diversified gas supplies from other sources, including any increased domestic supply, are still traded at global prices which means a high global price is translated into high prices in domestic gas wholesale markets.
- Affordability is even more acute. With the price of gas largely determining the price of electricity, energy costs are a major influence on the cost of living. Energy bills in the UK remain at least twice as high as they were in Spring 2021 despite UK and devolved governments having stepped in (principally though the Energy Price Guarantee) to shield households and businesses from the worst impacts of increased costs. An estimated 6.7million UK homes are in fuel poverty.[11]
- There is a more urgent need to address the climate crisis. The Intergovernmental Panel on Climate Change warned recently that there is limited time to prevent global warming to 1.5°C and extreme weather is being increasingly frequently experienced across the world, not least with unprecedented extreme heat events setting record temperatures in the UK last summer.

This change in circumstances has also recalibrated the economics of the trilemma, principally through rising energy costs and the falling costs of renewables. The central concerns for energy policy makers remain the same three pillars. Rather than necessarily requiring trade-offs as they have in the past the three pillars can now, in many circumstances, be considered to be well aligned. Policies that address affordability through reduced demand or cheaper, cleaner energy sources, are likely to enhance energy security and accelerate the transition away from fossil fuels, thus reducing emissions.

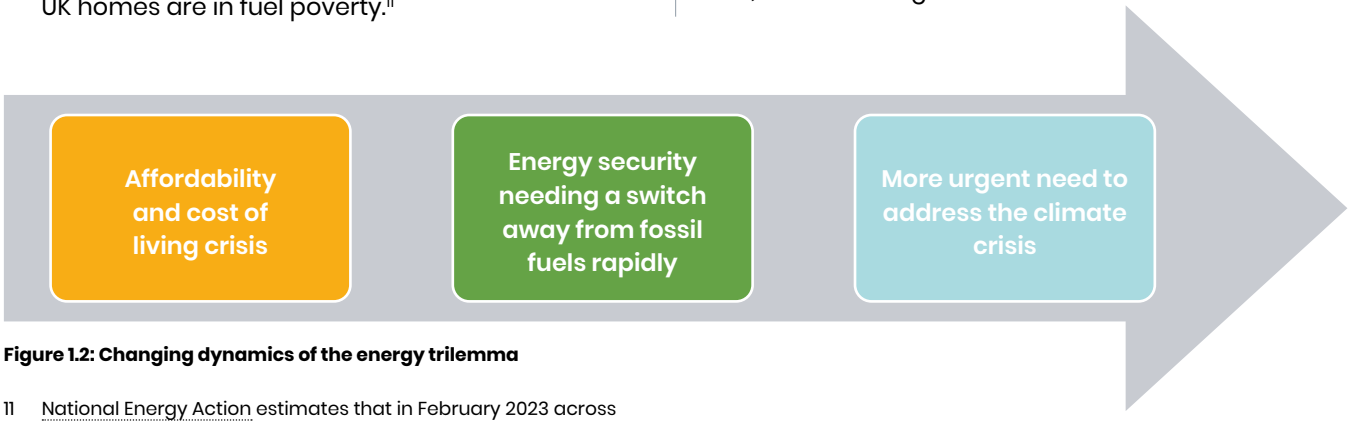


Figure 1.2: Changing dynamics of the energy trilemma

11 National Energy Action estimates that in February 2023 across the whole of the UK, 6.7 million households are currently in fuel poverty, unable to heat and power their homes sufficient for their own comfort and well-being.

1.2 Policy Gap Analysis

The UK has published a host of ambitions and strategies that have aimed to address emissions, from Boris Johnson's *Ten Point Plan* to the *Heat and Buildings Strategy, the Net Zero Strategy, Energy Security Strategy* and *Net Zero Review*. On 30 March 2023 the UK Government published a major package of measures under the title 'Powering Up Britain'. Whilst these plans clearly lay out UK ambitions in a number of areas, especially around increasing energy supply, key gaps remain.

Strategic Policy Framework

Historically, the UK Government has tended to favour energy-supply based solutions to climate mitigation over more politically challenging demand-side solutions. For example, low carbon power sources and technologies like hydrogen and carbon capture feature prominently in the *Ten Point Plan*. This approach, typified by the Contracts for Difference scheme, has successfully helped bring down the cost of new generating capacity and created a new UK centre of expertise from the growth in offshore wind. However, addressing climate change will require a broad suite of tools and there has long been concern about the lack of attention paid to demand reduction. Despite consensus amongst academics, civil society, and much of the public that this would be the most effective response to the war in Ukraine and increased gas prices, the Government's stance has been slow to change. The UK Government has been willing to make a huge investment in intervening in gas and electricity markets to bring down costs, but not to consider a similar scale of investment in reducing demand.

More recently, the UK's strong position on clean growth has begun to look less secure. The Inflation Reduction Act (IRA) in the US, and the EU's response to it (see Section 2.2 below), highlight the UK's lack of an industrial strategy, and particularly a net zero linked one. The resulting competition for investment and, at least in the short term, components for clean technologies, has increased the risk of slow delivery already identified by the CCC last summer. UK consumers could also lose out by comparison, as IRA brings down costs for US consumers through, for instance, a large-scale commitment to subsidies for heat pumps.

The EU's response is still being finalised but now appears to be mainly focused on removing regulatory barriers to supply of clean technologies. Given the proximity of the EU and ease of trade with the UK, its response may have a greater impact, even if the measures are not as generous as those in the US.

Powering Up Britain[12] did provide more detail than previous climate strategies, but much of the UK's climate ambition still lacks detailed implemented policies and could be better connected to the rest of government strategy. Stability and clear sectoral transition plans are urgently needed to give certainty to the market, supply chains, and consumers. The UK Government has delayed its green industrial strategy until the autumn.[13]

Heat and buildings

Homes

Addressing energy use in buildings is a vital part of the transition to net zero. The vast majority of the buildings that people will live in in 2050 already exist. The UK has the oldest housing stock in Europe,[14] and almost 18 million homes are rated EPC D or worse. Retrofit can cut energy use, reduce emissions and costs, and also improve energy security. The average energy cost saving from retrofitting a home that is EPC D rated or worse so that it reaches an EPC C standard is over £500 per year at Spring 2023 Energy Price Guarantee levels.[15] The UK is yet to introduce a comprehensive nationwide strategy or delivery plan to roll out retrofit measures at scale – both insulation and heat decarbonisation – and has seen limited action to engage the public in information campaigns around insulation or energy usage. Current government funding schemes have focussed on social housing, fuel poor households and off gas grid homes. There are notable omissions from government policy in this sector, including a strategy for addressing all owner occupier homes and private rented homes; key to this is policy that supports an accessible customer journey from awareness to clear and comprehensive impartial advice. Other omissions include the installation of retrofit measures; long-term funding and commitments to indicate to both the public and businesses what the future looks like; skills development for heat pump installations and hard-to-insulate homes. Minimum Energy Efficiency Standards require homes in the private rented sector to be EPC-E level or better in England, but proposals to increase these standards have stalled despite a consultation on these proposals in 2020, and there are no equivalent requirements for owner occupier homes.

With the exception of the long-running, fuel-poverty focused Energy Company Obligation (ECO) programme, previous attempts to improve energy efficiency at scale have been sparse in England, in large part due to market uncertainty from short-term focussed policy. After 2013, the year David Cameron promised to "cut the green crap", the number of homes having lofts insulated dropped by 92%, and rates have not recovered in the decade since. The Green Deal, and subsequent Green Homes Grant, both failed to deliver, the latter suffering from governance issues and being in place for too short a length of time to allow the market to respond. Home retrofit is seen as a difficult policy to crack in the UK, largely because of the failure of past schemes, however lessons from abroad show that it need not be.

Insulation

Despite recent recognition that accelerating the roll out of insulation measures will deliver energy security immediately, there has only been a small increase in short term funding, with the £6 billion of additional support for energy efficiency promised last year not due for delivery until after the next election. The recent rebranding of ECO+ to the Great British Insulation scheme, as part of Powering Up Britain, was a rebrand in name only with no new money and no change to the existing intended policy framework or scheme focus.

Heating decarbonisation

The limited long-term government policy on rolling out heat pumps has caused the UK to fall behind European counterparts on upskilling boiler installers, installation rates, and domestic manufacturing.

12 Powering up Britain, Department for Energy and Net Zero, 2023

13 A global clean tech race is underway - why does the UK seem to be sitting on the sidelines?, Business Green, 2023

14 The cost of poor housing in the European Union, BRE

15 The Energy Efficiency Investment Imperative, EEIG, 2022

Recent commitments to a clean heat market mechanism and recommitment to phasing out gas boilers by 2035 (though not yet a legislated target) sends positive signals to the industry about the direction of travel.

A planned extension to the Boiler Upgrade Scheme will assist with some market movement away from gas boilers,[16] but delivery so far has been slow with only around 8,000 grants delivered in the first year, out of a total of around 50,000 heat pump installations in 2022. This is still far short of the target to reach 600,000 installations a year by 2028, announced in the Ten Point Plan.[17] Regulations will also drive adoption. EU eco design regulations contain proposals to raise the minimum performance standard for heating systems[18] and there is expected to be a consultation on similar measures in the UK. Germany has just (April 2023) announced that from 2024 new heating systems must run on 65% renewable energy, effectively banning fossil fuel only boilers.[19]

Heat pumps could have lower lifetime costs than gas boilers in most homes,[20] but the UK Government is only slowly rebalancing levies to remove distortions on electricity costs, and the lack of both trusted and verified installers, and of readily available impartial advice services to provide assurance and post installation support, has held the market back.

Public and commercial buildings

Similar issues apply for commercial buildings, particularly in the SME sector (see below). Minimum energy efficiency standards apply to the least efficient rented commercial buildings, and the Government has indicated it intends to extend these to a higher minimum of 'B' performance standard. The Boiler Upgrade Scheme, supporting heat pump installations, is open to SMEs but has had virtually no uptake from businesses. There remain significant challenges related to awareness, a clear customer journey, access to finance and supply chain readiness.

For public sector buildings, the Public Sector Decarbonisation Fund was extended again in March 2023, with £409 million to support a few hundred projects to reduce emissions through energy efficiency and upgrades to heating systems. A total of almost 1000 projects have been supported through this fund so far, but further funding will be needed, as this is only a proportion of the thousands of public buildings in need of support.

Decarbonising commercial and industrial sectors

Reducing costs is also a key concern in commercial and industrial sectors where higher energy prices since the invasion of Ukraine have forced the temporary, or permanent, closure of some industrial plants in the UK, including a fertiliser manufacturer in Cheshire.[21] UK steel manufacturers have also sought financial support from the Government. This is exacerbating some of the gaps already noted by the CCC, particularly around the price differential between gas and electricity, and industry concerns around the relative competitiveness of UK electricity prices. The UK Government has put in place temporary support through the Energy Bill Relief Scheme and its successor, the more limited Energy Bills Discount Scheme, but these do not promote decarbonisation. The Government has promised longer term action on electricity levies and network charges for some energy intensive industries, including through the British Industry Supercharger scheme, but it should also consider action on wholesale costs in energy intensive sectors. Climate Change Agreements, which reward energy efficiency measures, currently apply to some companies in energy intensive sectors,[22] and the recently extended Industrial Energy Transformation Fund provides support for large capital investment in lower carbon equipment. The £6 billion promised for energy efficiency in the next parliament technically includes business energy efficiency but is likely to focus more on domestic energy efficiency. Subsidised covid recovery loans and some fiscal incentives are available for business investments which can be used for energy efficiency measures. The Energy Saving Opportunity Scheme (ESOS) provides for assessments of large businesses' energy use and could be expanded to drive greater cost and emissions savings action.

16 Shapps sets out plans to drive multi billion pound investment in energy revolution, Department of Energy and Net Zero, 2023

17 The Ten Point Plan for a Green Industrial Revolution, HM Government, 2020

18 Ecodesign for sustainable products, European Commission, 2022

19 German government adopts fossil boiler ban, starting 2024, ECEEE, 2023

20 Analysis: Running costs of heat pumps versus gas boilers, Regulatory Assistance Project, 2022

21 CF Fertilisers UK Announces Proposals to Restructure Operations to Enable Continued Supply of Fertiliser, Carbon Dioxide and Other Industrial Products to Customers in the UK, CF Fertilisers UK Limited, 2022

22 Government response to the consultation on 'Climate Change Agreements: proposal for scheme extension and views on reforms for any future scheme', HM Government, 2020

There is little national level policy to support businesses – particularly smaller and non-energy-intensive businesses – to be guided through the most effective and rapid efficiency and decarbonisation pathway in their local context, though government in April 2023 launched a new energy efficiency website with information for companies. Previous work by Energy Saving Trust for the CCC showed how SMEs would benefit from a joined-up support framework with dedicated experts providing guidance on regulations and financial support.[23] The UK Government is looking to pilot SME support and is undertaking a tender process.

Decarbonisation in Transport

Electrification (Electric Vehicles)

The phase out of the sale of petrol and diesel cars, which will be supported by the Zero Emissions Vehicle (ZEV) mandate, is the most significant policy in terms of emission reductions in the transport sector. The roll out at scale of Electric Vehicles (EVs) and ensuring producers of EVs take responsibility for scaling up their supply, should bring the cost of first- and second-hand EVs down, meaning more affordable options will become available. While EVs remain largely untaxed,[24] they will be cheaper to run than petrol and diesel vehicles. Until the Government decides how to replace lost fuel duty, it is unclear what the long-term costs of EV ownership might be. The rapid roll out of EVs contributes to energy security as it directly reduces reliance on fossil fuels. The final consultation on the ZEV mandate was released on the Government's Energy Security Day, indicating that the Department for Transport (DfT) also views this policy as being linked to improved energy security. The ZEV Mandate is expected to be legislated for by the 1st of January 2024, which is in line with the Government's original intentions set out in the Net Zero Strategy.

To further accelerate the transition to EVs, and to ensure those on lower incomes and vulnerable groups are not left behind, grants or low interest loans for second hand EVs could be explored and this is being trialled in Scotland.

Relatedly, the failure of EV manufacturers to solidify their operations in the UK is putting the supply chain for UK-made EVs at risk. Carmakers in the US receive a high level of subsidy if elements are manufactured or assembled in the US. Replicating the same level of subsidies would cost the UK over £60 billion by 2030,[25] so non-financial incentives may need to be developed to attract private investment. The initial step must be to develop an industrial battery strategy that sets a direction for the automotive sector, the critical raw materials supply chain, and gigafactory/battery producers, and starts to pull investment towards UK soil. The UK Infrastructure Bank can also play a role in bridging the public-private funding gap through de-risking investment opportunities.

Modal shift

It was recently revealed that the Government is cutting back on £200 million – £380 million of active travel funding despite this making up 2% of expected emissions abatement by 2035, similar in scale to modal shift towards public transport, which – at least in terms of buses – is also under threat of funding cuts. These instabilities exacerbate an already limited budget for this policy area. Failure to fund alternatives to car use increases reliance on imported fossil fuels and increases costs for lower income households without access to cars, as well as putting the road transport sector at risk of being offtrack to meet its decarbonisation targets on the path to net zero.

Despite some debate about options for reducing transport's reliance on fossil fuel around the time of Ukraine's invasion, including for instance, lowering speed limits, this opportunity was missed. There is currently no comprehensive strategy to encourage modal shift in the UK.

Electricity System

The rapid decarbonisation of large parts of the UK's energy supply is a success story of UK energy policy. However, progress so far still leaves significant challenges in place to achieve the UK Government's aim of a fully decarbonised electricity system by 2035. The renewable energy industry fears that the IRA is pulling investment in projects and component manufacturing away from the UK, impacting the future delivery of low-cost homegrown power. This risk of lost investment, alongside inflation squeezing developer margins, and lengthy delays to planning approval and grid connection, increases the likelihood of a slower transition towards a decarbonised renewables-focussed grid. This hinders progress on all three areas of the trilemma.

23 How can policy better support SMEs in the pathway to Net Zero? Energy Saving Trust, 2022

24 Introduction of Vehicle Excise Duty for zero emission cars, vans and motorcycles from 2025, HMRC, 2022

25 The cost of implementing the IRA's electric vehicle policies in the UK, Green Alliance, March 2023

Despite minor concessions, it remains very difficult for developers to build onshore wind, which is the cheapest source of electricity. This is preventing lower cost electricity becoming available to households and businesses. There were expectations that the updated Net Zero Strategy would include changes to the planning system to allow for the development of onshore wind, however what was announced was a consultation on planning policy to provide local authorities with more flexibility to respond to local views. There are also planning barriers to rooftop solar. In particular, the UK Government's Net Zero Review called for a solar "rooftop revolution" with potential to deliver up to 70GW of capacity by 2035.

The Government's major reforms of energy market design (the Review of Electricity Markets or REMA) have the potential to drive faster buildout of cheap renewable power or demand side flexibility. Both of these areas could lower costs if the reforms are successful in splitting the cost of renewable generation from gas. However, REMA could also do the opposite if there are design flaws. Care and caution are required, but despite renewed ambition to delink the cost of electricity from gas in the recent Powering Up Britain strategy, the review is nevertheless progressing very slowly, and not at all with the urgency required in response to the conditions of the energy crisis the UK now faces.

The slow pace of major reforms to the electricity system means that local scale or micro generation presents an opportunity for fast action to cut costs and emissions. Schemes to promote community level renewable projects exist in Wales and Scotland, but a UK-wide drive to incentivise wider roll out, and especially providing access to low-income consumers, could have significant impact. In the EU the revised Renewable Energy Directive (2018/2001/EU)[x] aims to strengthen the role of renewables self-consumers and renewable energy communities. EU countries should therefore ensure that they can participate in available support schemes, on equal footing with large participants.

Public Engagement and Behaviour Change

Many of the policy gaps outlined above relate to technological change, but previous CCC research showed that only a minority of the emissions reductions needed in the UK will come from technology alone.[26] The Behavioural Insights Team (BIT) argue that many of these seemingly technological changes will also depend on social transitions. Their 2023 report showed that nine out of ten people in the UK want to make more sustainable choices, but for many people practical, cultural, and economic barriers remain.[27]

There are many areas where consumers, businesses and society as a whole can be helped to accelerate the transition, and often helping to align cost savings with emission savings is an effective route towards this. But even when these drivers are aligned, people still need help. The BIT report recommends a Green Homes One Stop Shop, market incentives for retrofits, cost reductions for zero emission vehicles, and stronger public transport subsidies.

Macro policy gaps

Given the sectoral gaps described in the previous section, this report can be viewed through the lens of the following macroscopic policy gaps in the UK:

- **Home energy retrofit**. The UK Government has a target of reducing energy use in homes and businesses by 15% by 2030 and has established an Energy Efficiency Taskforce to help deliver this but does not yet have a delivery plan.
- **Behaviour changes** through policy incentives, advice, and information services. Some devolved nations have championed this area, but a UK-wide approach is needed.
- **Business decarbonisation policies** enabling cost and emissions reductions in SMEs, commercial and industrial sectors could also see positive results for the Levelling Up agenda.
- **Policies for low-income households**, which include cutting the costs of low carbon transport, and increasing access to low-cost renewable energy, are also needed to help share the benefits of low carbon technologies across income groups.

Recommendations for UK Government policy

In Section 3 we discuss in detail how the learnings from the international policies analysed for this project can address the UK's macro policy gaps. Four recommendations are made for UK Government policy which are summarised in Table 1.1.

26 Net Zero – The UK's contribution to stopping global warming, Climate Change Committee, 2019

27 How to build a Net Zero society, Behavioural Insights Team, 2023

Table 1.1: Recommendations for UK Government policy

Recommendation	International case studies
A national home energy retrofit scheme for England. A new publicly funded, long-term funded, scheme to deliver retrofit at scale to all levels in income, and to all tenure types.	MaPrimeRénov' – France (2.9) One Stop Shop – Ireland (2.10) Greener Homes – Canada (2.11)
A UK national behaviour change campaign. This campaign should have a specific aim of reducing energy use and costs, which will help meet the Government's 15% energy reduction target by 2030.	Sobriété énergétique – France (2.12) Reduce your use – Ireland (2.13)
A UK strategy to promote business decarbonisation. A comprehensive and coherent strategy to help businesses – particularly SMEs – lower energy use and cut costs.	Strategic Energy Management programmes – Canada (2.5) Benchmarking and Building Performance standards- US (2.6) SME energy audits – Ireland (2.7) Mandatory decarbonisation measures – Netherlands (2.8)
Increased access to low carbon technology choices for low-income households. UK Government should design schemes that provide low-income households with more access to low carbon technologies to spread the benefits from the energy transition.	EV scrappage and EV subsidies for low-income households – California US (2.3) Public transport fare subsidies – Spain, Germany, Austria (2.4) Low-income access to community solar – New York State US (2.14)

Devolved Nations

Some policy gaps are present at a UK level but are being addressed more urgently by the devolved nations where many relevant responsibilities, particularly around heat and transport, are devolved. Onshore wind has enjoyed much greater support in the devolved nations.

Of the devolved nations, Northern Ireland has the most to do to address these gaps. Having published its Energy Strategy and recently passed legally binding climate targets for the first time, Northern Ireland faces challenges to progress this agenda any further without the Northern Ireland Executive in place to deliver it.

The Welsh Government have set out ambitious policies in several climate-related areas, including an overarching transport strategy and an overall net zero electricity target for 2035, supported by four Local Area Energy Plans. The Welsh Government has long supported low-income and fuel poor households with free and impartial advice and free energy efficiency measures through the Warm Homes Programme.

The Scottish Government has also addressed gaps around buildings, transport, and behaviour change. The Warm Homes Scotland programme, Home Energy Scotland Service and Let's Do Net Zero awareness campaign are all flagship policies that have helped accelerate progress towards Scotland's 2045 Net Zero target.

1.3 Methodology

The project undertook research to identify and understand policies other countries have implemented that lower household and business costs, and also have emissions reduction potential. These insights were used to develop recommendations for policies that would be appropriate for the UK.

The research involved three key Tasks:

- **Task 1**: Conduct research and stakeholder discussions to identify relevant international policies (from 2020 onwards) that are within project scope
- **Task 2**: An in-depth evaluation of 12 policies (discussed in Section 2)
- **Task 3**: Identify potential learnings for the UK from the evaluated policies, and gaps where appropriate policy has not been introduced in the UK: this analysis is presented in Sections 1.1 – 1.3 of this report and informs the concluding section

Task 1: Initial identification of policies

The aim of this task was to identify a list of policies implemented by non-UK countries which were either developed or significantly scaled up in the period since 2020, addressing the impacts of the current energy crisis on households, business costs and resulting economic impacts.

The Focus was on EU countries as well as countries in other parts of the world who are members of the International Energy Agency (New Zealand, Australia, Mexico, US, Canada, Japan, South Korea).[28] These were thought likely to offer valuable policy learnings because they are broadly similar to the UK in having developed economies, modern energy systems and democratic governments.

Three approaches were used by Energy Saving Trust to identifying relevant policies in these countries (see Appendix 1 for more detail):

- Energy Saving Trust has an extensive programme of international work was carried out and focused on sharing and developing best practice for decarbonisation policies in homes and transport. Energy Saving Trust looked at its own, and its partners', earlier work to find relevant policies, for example from work carried out with other energy agencies through the European Energy Network (EnR) network.
- Interviews were conducted with relevant international organisations. These included the Regulatory Assistance Project, Efficiency Canada, the American Council for an Energy Efficient Economy, Transport and Environment, Rocky Mountain Institute, Consumers International, The European Consumers Organisation (BEUC), Energy Consumers Australia.
- A systematic online literature search was completed (see Appendix 2 for details of this).

28 Turkey, though an International Energy Agency (IEA) member country, was excluded from the study due to political, economic and energy system differences.

A long list of over 100 policies were identified for which, as far as possible, a common set of data points were captured (as much as possible), looking at the scope and impact of the policies, key contacts, and information resources.

Based on the long list of 100+ policies, a medium list of around 30 policies of interest was prepared. These were selected based on likely relevance for more detailed assessment considering innovation and relevance to a particular UK policy gap.

A RAG (Red-Amber-Green) rating was used to score the policies on the medium list, to help the CCC decide which to include for detailed evaluation in Task 2. The criteria were:

- Relevance of policy for UK context.
- How innovative the policy is and/or to what extent it addresses a UK policy gap in a way that is adaptable to the UK?
- Likely availability of impact data (ex-ante), and wider access to information about the policy (eg, is the available information in a language the review team did not have fluency in or could not convert reliably with machine translation).
- Likely availability of impact data (ex post).
- Representativeness of policies across multiple countries and/or whether it covers a policy area otherwise missing from the study.
- Extent to which it is part of an important wider policy package (considering the financial scale and number of different policy areas covered under the framework)?

The Task 1 medium list – excluding the policies taken forward for evaluation – can be found in Appendix 3 and provides useful information on a range of international policies.

Two large scale policy packages were considered separately from the detailed policy analysis: the EU's RE Power EU initiative, linked to its Green Deal policy package, and the United States Inflation Reduction Act (Section 2).

2. Detailed evaluation of international policies

2.1 Methodology

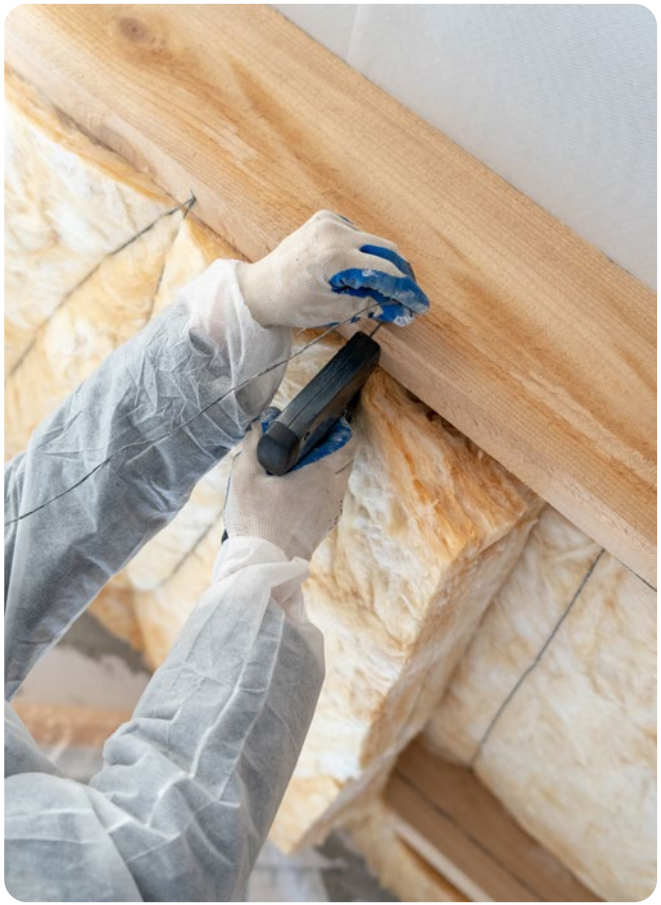
Task 2, the central component of this study, involved an in-depth assessment of policies, which are described in detail below in the subsections which follow.

To carry out this evaluation Energy Saving Trust and Green Alliance:

- Reviewed available official information on the policies as well as commentary from third party sources.
- Interviewed relevant officials or experts involved in the delivery of the policy. *It is important to note that the information presented on the policies should not be understood as the views of the interviewees unless this is directly stated. Any errors are the fault of the report authors, not the interviewees.*
- Gathered and analysed quantitative data as far as possible on the impacts of the policy: delivered energy and carbon savings at household and programme/policy level; energy bill savings. Because these were newer policies the report authors relied on a mixture of ex-ante and ex-post assessments, and in some cases relevant quantitative data was not available.
- Used a qualitative assessment matrix to consider aspects of the policy under headings of effectiveness, efficiency, equity, institutional effectiveness and innovation.[29] This qualitative analysis, for each policy, is included at Appendix 1. The 12 policies and a brief summary of the rationale for including them in this evaluation is included in Table 2.1. The table also lists the interviews conducted for each policy with relevant officials/experts.

The US Inflation Reduction Rate (IRA) is not discussed in detail in this report, as its provisions are only just beginning to be implemented and, as a large-scale policy package, it is less suitable for the detailed analysis of policy implementation undertaken in this study. However, a brief summary of IRA is included in Section 2.2. Similarly, the EU's RE PowerEU initiative – the bloc's direct response to the gas price crisis resulting from the Ukraine War, and which builds on the Green Deal programme – is summarised as a large-scale policy package, in the same section.

These are new or extended policies – the authors are aware through conversations that much greater data about the impact of these policies will be available in a relatively short period of time (as short as 6-12 months' time some cases). A valuable area of future research would be to revisit these policies in light of the richer data available and draw out further insight.



29 Adapted from UKERC/IRENA 2014.

Table 2.1: The 12 policies considered in Task 2

Transport

Task 2 Policy and interviewee
Zero emission vehicle package – California, US (2.3). *Interviewee*: California Air Resources Board.
Principal rationale for inclusion
While EV grants have been a feature of UK policy making, the support for low-income groups in the Californian policy is particularly innovative and there is detailed evaluation data.

Task 2 Policy and interviewee
Public Transport fare reduction policies – Spain, Germany, Austria (covers multiple types of transport) (2.4). *Interviewee*: Urban Transport Group, Barcelona metropolitan government, and Barcelona metropolitan transport authority.
Principal rationale for inclusion
The introduction and effectiveness of these policies in promoting modal shift has been a focus of considerable policy interest in the UK and internationally over the last two years. Review of this policy from three countries where it has been introduced at scale is felt likely to provide a useful insight for UK policy makers.

Table 2.1: The 12 policies considered in Task 2

Commercial and Industrial Use

Task 2 Policy and interviewee
Canada Strategic Energy Management programmes, delivered at provincial level (2.5). *Interviewee*: BC Hydro (regulated utility, implementing programme at provincial level) and Efficiency Canada (NGO).
Principal rationale for inclusion
The focus of these policies on developing "in house" energy management capacity in energy intensive business – coupled with CPD, peer learning, and incentives for achieved energy reduction – is clearly innovative for the UK, but well established in Canada.

Task 2 Policy and interviewee
Benchmarking and minimum standards based on operational performance for commercial, public, and multi-family buildings – US (2.6). *Interviewee*: Institute for Market Transformation (NGO with formal role supporting Presidential Coalition for Building Performance Standards).
Principal rationale for inclusion
The widespread roll out of operational energy and GHG benchmarking programmes for larger buildings in the US is of interest to the UK where such programmes are only just being introduced, on a voluntary basis. Many US jurisdictions – supported by a presidential decree in 2021 – are now moving to long-term mandatory energy or GHG energy saving targets supported by city and state-level frameworks.

Table 2.1: The 12 policies considered in Task 2

Commercial and Industrial Use

Task 2 Policy and interviewee	Task 2 Policy and interviewee
SME audits – Ireland and Scotland. (2.7). Informed by insight from Sustainable Energy Authority Ireland (from presentation/discussion delivered under LEAP4SME project).	**Mandatory Measures as part of a wider policy package for energy intensive companies – Netherlands (2.8).** *Interviewee*: Ministry of Economics and Climate, Netherlands.
Principal rationale for inclusion	**Principal rationale for inclusion**
Support for SME decarbonisation is a significant current policy gap (see 2022 Energy Saving Trust report for CCC).[30] There are a number of European countries where subsidised audits are provided to help SMEs identify low carbon and bill saving opportunities. A distinctive element of this analysis is that Scotland is being considered, where audits are in place (UK devolved experience in any other policies is not being considered).	Requires action on cost-effective measures by larger energy using businesses. This is an approach that has been considered by UK Government, but not yet taken forward.

30 op. cit. 23

Table 2.1: The 12 policies considered in Task 2

Home Energy Efficiency/Low Carbon Heat

Task 2 Policy and interviewee
MaPrimeRénov' – France (2.9). *Interviewees*: Researchers from École des Ponts ParisTec and the think tank IDDRI.
Principal rationale for inclusion
Comprehensive support for home energy efficiency is a policy gap in England (particularly for the owner occupier sector). MaPrimeRénov' is a significant, large scale policy package, enabling different funding streams, providing variable levels of support for homeowners at different income levels, types of ownership and support for different types of homes.

Task 2 Policy and interviewee
One stop shop/National Retrofit Plan Ireland (2.10). *Interviewee*: Sustainable Energy Authority of Ireland.
Principal rationale for inclusion
The design of retrofit advice and support programmes is currently a policy concern for UK Government (noting for example current Department for Energy Security and Net Zero (DESNZ) programme to pilot advice at regional level). The Ireland programme provides insights on a delivery model in a country with many similarities to the UK and particularly involves an innovative framework for national government to work with advice bodies to deliver support, including developing private finance.

Task 2 Policy and interviewee
Canadian Greener Homes Programme (2.11). *Interviewee*: Natural Resources Canada (federal implementing agency).
Principal rationale for inclusion
The Canadian Greener Homes Programme is notable for its long-term support framework (7 years funding) which has been a major policy gap in the UK. A further dimension of interest is the focus on developing a strong and sustainable energy assessor industry.

Table 2.1: The 12 policies considered in Task 2

Behaviour Change Programme

Task 2 Policy and interviewee	Task 2 Policy and interviewee
Sobriété Énergétique – France (2.12). *Interviewees*: Researchers from École des Ponts ParisTec and the think tank IDDRI.	**Reduce your use – Ireland (2.13).** Information gathered through email contact with the Department of the Environment, Climate and Communications.
Principal rationale for inclusion	**Principal rationale for inclusion**
Behavioural programmes are often implemented as one-offs with limited assessments of effectiveness/impacts. Sobriété Énergétique is distinctive in its large scale, long-term, high-profile approach, promoting voluntary action across all sectors of society, targeting a specific national energy reduction target.	The key interesting element of this policy is its strong focus on the energy crisis context. Messaging was closely developed to respond and reflect public sentiment through the crisis. Advice covered a range of energy use opportunities, including transport and home energy. Though quantitative impact data is very limited, the Irish Government are using the programme learnings to gather insight on how best to measure impact from these initiatives.

Table 2.1: The 12 policies considered in Task 2

Micro-generation

Task 2 Policy and interviewee
New York Inclusive Community Solar Adder – US (2.14). *Interviewee*: New York State Energy Research and Development Authority (NYSERDA).
Principal rationale for inclusion
Support for community energy generation has been a UK policy gap in recent years (after a boom in community energy through the period of the Solar PV Feed in Tariff). The community energy models in New York State are interesting in allowing much easier access to low-cost solar energy for low- and mid-income households.

2.2 Two Major Policy Packages – the US Inflation Reduction Act and the EU RE Power EU initiative and Green Deal

US Inflation Reduction Act

The Inflation Reduction Act (IRA) of 2022 is a significant piece of climate legislation in the US offering funding, programmes, and incentives to accelerate the transition to a clean energy economy.

The IRA was signed into law by President Biden in August 2022. It contains an estimated $369 billion[31] in investments intended to lower energy costs for households and small businesses, accelerate private investment in clean energy deployment, and strengthen US domestic supply chains. Analysis by the Rhodium Group found that the package cuts net GHG emissions to 32-42% below 2005 levels by 2030 and that household bills will be up to $112 a year lower in 2030 because of the policy.[32]

The World Economic Forum cites a report from the University of Massachusetts that predicts "over a 10-year period, the IRA will generate an average of about 912,000 jobs per year through combined annual public and private investments at $98 billion."[33]

The Act aims to spur investment in green technology in the US, delivered through a mix of tax incentives, grants, and loan guarantees. Clean electricity is the largest area of benefit, then clean transportation and EVs. It offers new access to tax credits as well as grants and incentives to reduce air pollution, with an emphasis on reaching disadvantaged populations and communities with environmental justice concerns.

The incentives are being deployed on a long-term basis and are substantial. Subsidies for broad environmental policy are uncapped. For example, energy efficiency and heat pump grants, worth up to $14,000 are available for a decade to any qualifying household. This provides an important long-term signal that investors, businesses, and households, and especially supply chains, can respond to, and is significantly longer term in nature than similar policies currently in place in the UK (eg, Boiler Upgrade Scheme).

It is too early to be able to assess the impacts of IRA extensively. Some tax credits are already in place but have only been in place relatively recently, since the start of 2023. Funds which are to be deployed need to be distributed to states and cities, so will take longer to start to deliver and for the impact to be felt. However, supply chains have already responded to the incentive package in anticipation. Ford has already announced plans to reduce the size of its operations in Europe and the UK, with more emphasis on its business in the US as a result.[34]

Despite the ambition of the IRA it is important to note that significant further decarbonisation policy making will be needed in the US for the country to meet its medium term GHG reduction ambition of 50-52% by 2030, against 2005 levels.[35] In particular, although there are buildings focused actions, there remains significant further measures needed for this sector – IRA measures are expected to reduce emissions from buildings by only 5-6%.[36]

EU Green Deal & the RE Power EU initiative

The driving force behind climate policy action in the EU is the EU Green Deal. It sets out the EU's ambition of having no net emissions of greenhouses gases (GHG) by 2050. This ambition was written into European Climate Law in 2021 and all EU Member States have agreed to the legally binding targets to get to net zero. The EU Green Deal provides a common, long-term goal that all EU countries are now working towards and sets the parameters for transition, aiming to ensure equity and cost-effectiveness. To help ensure that EU countries are on track to meet the 2050 targets, the EU also introduced the Fit for 55 policy package, which covers climate, energy, transport, and taxation, and commits to reducing GHG emissions by 55% by 2030, compared to 1990 levels.

31 Some measures are uncapped therefore figures are an estimate of total spend.

32 US decarbonization priorities in the wake of the inflation reduction act, Rhodium Group, 2023

33 Job Creation Estimates Through Proposed Inflation Reduction Act, Political Economy Research Institute, August 2022 cited in World Economic Forum, November 22

34 EV transition: Ford to axe 3,800 jobs in Europe, create 2,500 in America, Edie, 2023

35 US decarbonization priorities in the wake of the inflation reduction act, Rhodium Group, 2023

36 Crossing The Emissions Gap Between Inflation Reduction Act And 2030 NDC Is Worth 4 Million Jobs, Forbes, 2023

To deliver the EU Green Deal, EU countries are taking action in the transport, industry, renewable energy, buildings, agriculture and waste sectors. The European Commission has adopted proposals to reduce emissions in the transport sector, by encouraging the use of cleaner vehicles, sustainable fuels in aviation and shipping, and setting tougher standards on emissions from road vehicles. Some of these targets have been approved while others are still in discussion The greening of industry will take place through increased electrification and reliance on renewable energy and the EU Emissions Trading System. To shift the energy system away from fossil fuels, the Commission are proposing to increase the share of renewables in the energy mix and a shift to using low carbon gases.

The EU Directives that dictate what EU Members states need to deliver on renewable energy, energy efficiency and the built environment, were existing policy frameworks that have been, or are in the process of being, strengthened in light of the increased climate targets and the energy crisis. The Energy Efficiency Directive aims to reduce energy consumption across the EU and the Energy Performance of Buildings Directive sets out that all new buildings should be zero-emissions by 2030 and all existing buildings should be zero-emissions by 2050.

After the energy crisis resulting from the invasion of Ukraine, the European Commission proposed the RE Power EU plan and the European Gas Demand Reduction plan, which outline ambitions to diversify the EU's energy supply, reduce reliance on imported gas from Russia and accelerate action on energy efficiency and renewable energy. The plan includes short term measures such as new energy partnerships and roll out of new renewable energy projects and communication campaigns on behavioural changes to reduce energy use. To accelerate the roll-out of renewable energy generation, the European Commission has made a recommendation to its Member States to speed up the grant-permitting procedures for renewable energy projects. The recent Net Zero Industry Act has also been proposed to promote the scale-up and manufacturing of clean technologies to support the accelerated deployment of renewables. In the plan the European Commission also proposes a higher final energy reduction target of 40% (currently 36%); a 42.5% primary energy reduction target (currently 39%) and a target of 45% of energy from renewable sources by 2030 (currently 40%). These changes however are being negotiated and as such, have not yet become binding targets. EU Member States have been advised to use the existing Recovery and Resilience Facility (RRF) funding, which was set up to mitigate the economic impacts of the COVID-19 pandemic, to fund RE Power EU objectives.

More recently still, and in response to IRA, the European Commission has put forward a new Net Zero Industry Act. This still has to be approved by member states and the European Parliament but is intended to support manufacturing of low carbon technologies and their deployment through a range of measures including: streamlined permitting procedures to allow more rapid deployment; regulatory sandboxes which trial different approaches from policymakers; skills programmes; and measures for increasing demand through the private and public sector.

International case studies

2.3 Clean vehicles grants and financing – US, California

Context and key features

An array of policies and funding programmes have existed in California since 2010 to encourage take up of cleaner vehicles. The goal is to help drive consumer adoption, with the original funding aimed at the mass market, and over time evolving to have a stronger equity focus, providing targeted support to low-income households.

The origins of this policy date to 2010 but it remains relevant to this study given the significant boosts to funding and programme activity in 2021 and 2022 under the *California Comeback Plan*.

The California Comeback Plan is the state's largest ever economic recovery package, with a total of $100 billion focussed on post-pandemic recovery and addressing social issues laid bare by the pandemic. The Plan also lays out spending on tackling climate change and improving resilience to climate impacts, which includes programmes to increase EV uptake and reach lower income households.

Relevant programmes include the Clean Vehicle Rebate Project, the Clean Air Vehicle Assistance Program, the Clean Fuel Reward (currently suspended due to lack of funds), Clean Cars 4 All, and Financing Assistance for Low-Income Consumers. Programmes are overseen by the California Air Resources Board (an agency of the state government). This report focusses on the Clean Vehicle Rebate Project in particular as the largest of the above, but other programmes may also be of interest where they include scrappage schemes, support towards clean fuel costs, and more holistic incentives to encourage car sharing, bike sharing etc.

Scrappage schemes

California Air Resources Board administers several projects with scrappage schemes for older, more polluting vehicles, such as Clean Cars 4 All. Clean Cars 4 All has been running in a handful of districts across California since 2015, with others added in 2019 and 2020, and a 2022 proposal to expand the programme to the entire state was granted. The programme is directed almost exclusively towards lower income and disadvantaged communities. This means that all lower income or disadvantaged Californians can now access grants in the region of $7000 to scrap their old vehicle and replace it with a new Zero Emission Vehicle or other mobility option such as an e-bike or public transport travel card. The piloting of the scheme in certain districts first has helped to enhance the model before it is rolled out to the entire state.

Detailed description of policy

Originally motivated by the need to bring down carbon emissions from transport and provide access to clean transportation for everyone, the Clean Vehicle Rebate Project was introduced in 2010 and has been topped up and continued sporadically since then, with significant boosts to funding in 2021 and 2022 under the *California Comeback Plan*. Most funding comes from the cap and trade (carbon pricing) programme, with additional funds from air quality improvement programmes and from pay-outs from the Volkswagen emissions scandal.

The Clean Vehicle Rebate Project provides grants of between $1,000 and $7,500 towards the purchase of new EVs, plug-in hybrids, and hydrogen fuel cell vehicles (these make up around 2% of grants). Grants for hybrids will gradually be phased out. $1,000 is available to anyone, and higher amounts are available only to lower income consumers. Grants are not available for higher priced, larger or specialist vehicles.

Consumers have to complete an application form to access grants or rebates and can stack incentives across multiple projects. Up to ~$19,000 can be made available to those who qualify as low-income households, with efforts underway to streamline the application and income verification processes.

The programmes have experienced several challenges. A major difficulty has been the lack of a predictable, continuous funding stream. This has resulted in some periods where waiting lists for grants have become unmanageable, or grants have been stopped altogether. There was also a need to engage a third party to administer the grants, which took time to set up and become operational, extending the time between the beginning of a programme and the first delivery of grants. Finally, outreach to lower income communities has been a challenge, but the California Air Resources Board have had greater success when partnering with local community organisations who have strong roots and networks in the communities, hosting test drive events, and sometimes by working through car dealerships.

Impacts

Over 500,000 rebates have been disseminated through the Clean Vehicle Rebate Project, totalling $1.2 billion, since 2010. 33% of this went to lower income consumers, with this being the explicit goal from 2016 onwards.

In 2021 alone, the Clean Vehicle Rebate Project gave out over $100 million through almost 50,000 rebates, with 35% of rebates going to low-income households (39% in monetary terms). A similar number of rebates and total value were supplied in 2022 but more detailed data has not yet been published. The grants awarded in 2021 are estimated to have saved 310,000 tonnes of CO_2e (average cost $350/tonne). California Air Resources Board estimate that $54 million has been, or will be, saved in energy costs as a result of the grants given out in 2021 (average $1,100 per rebate), or 30 million gallons of fuel. This conservative estimate assumes that households will benefit from savings for three years, but most will continue to benefit from cheaper running costs for much longer than this. Over the lifetime of the project (since 2010), carbon savings are estimated to be 6.7 million tonnes of CO_2e (data comes from the project website[37]).

37 Rebate Statistics, Clean Vehicle Rebate Project, 2023

California has around 13 million households, meaning approximately 0.4% of households were supported to purchase cleaner vehicles in 2021.

Applicability to the UK

The UK needs to accelerate the phase out of fossil fuel use in transport, which is the highest emitting sector of the economy. Transport emissions contributed 26% of UK emissions in 2021 and the majority of this comes from road transport.

EV uptake in the UK started later than in California (2016 vs 2010) but has accelerated quickly and the proportion of battery EV sales in both the UK and California in 2022 was around 17%. However, this means that the total share of EVs on UK roads is less than in California, and 83% of new cars in 2022 were still fossil fuelled.

Similarly, to California, the UK Government has committed to banning the sales of new petrol and diesel cars by 2030 and all non-zero emission vehicles by 2035. California has already introduced a zero-emission vehicle mandate on vehicles sales, and the UK is expected to introduce a similar mandate from 2024 onwards. This will go a long way to bringing down road transport emissions, but it may take a decade or more for second hand EVs to enter the market in large numbers.

Therefore, there is a risk that low-income households will be left behind in the EV transition, trapped in transport poverty or with older, more polluting vehicles.[38]

This risks exacerbating mobility and health inequalities, but will also delay transport emissions reductions. Support must be made available for these consumers to also be able to access the cost benefits of cleaner vehicles. Engaging low-income consumers with any new support programme can be challenging, and the California experience shows the importance of partnering with trusted organisations who have strong roots and networks in these communities.

California Air Resources Board's shift from promoting mass market uptake towards funding for lower income households is an important angle that is being overlooked in the UK's transition towards cleaner vehicles. The UK Government has offered financial support for clean vehicles through its Plug-in grant, though the scheme was gradually scaled back until it was wound up in June 2022. There was no ambition in these grants to target low-income households.

Some UK local authorities already have scrappage schemes and grants for cleaner vehicles, in conjunction with Clean Air Zones, although these usually also fund cleaner internal combustion engine vehicles rather than only zero emission vehicles. Expanding or adapting scrappage schemes to phase out fossil fuelled cars could be explored but concerns around resource efficiency must also be addressed through efforts to reduce the need for private vehicles. A trial scrappage scheme in Scotland is targeting low-income households, and like some local authority scrappage schemes, also offers other mobility options such as public transport passes or active travel.

38 Green Uplift: How a net zero economy can reduce fuel and transport poverty, Green Alliance, 2022

2.4 Public transport subsidies – Spain, Germany, and Austria

Context and key features of the policy

To combat rising living costs, inflation, and fears of an overdependence on imported Russian energy, several countries around Europe tried to incentivise more efficient transport choices by further subsidising public transport costs. Spain, Germany, and Austria are examples of countries where fare caps or discounts were implemented.

Detailed description of policy

In September 2022 Spain introduced a scheme for free local and middle-distance train passes for frequent travellers, designed to help cope with inflation. A small deposit (€10-20) is paid but this is returned if the traveller completes the required number of journeys by the end of a specified period. The ticket works for all train travel within a given zone (eg a 30-mile radius of Madrid, or Barcelona).

Discounted metro and bus fares were also introduced (30% discounts), in agreement with local authorities who funded the operators to reduce fares. Local authorities then seek repayment of these funds from national government.

Additionally, Spain offered discounts on fuel prices at the petrol station, and payments to bus fleet operators (€950/vehicle). There were also extensions of youth rail tickets (the cut off was raised from 25 to 30 years old). All of the above was designed to combat the rising cost of energy in the wake of Russia's invasion of Ukraine, but in the context of several policies introduced over the last three years which aimed to encourage a shift towards public transport to bring down emissions and air pollution and improve mobility and accessibility.

In December 2022 the free frequent traveller pass was extended in Spain for 2023, and the discount schemes via local authorities were also extended until July 2023, although these discounts were extended to 50% with the remaining funding having to be provided by local authority budgets themselves.

Germany trialled a monthly €9 ticket for unlimited local train travel in the summer of 2022. Recently, an expanded scheme has been announced where unlimited local trains and buses can be used for a monthly subscription of €49.

In late 2021 in Austria, the Government introduced a nationwide climate ticket – "KlimaTicket" – offering nearly unlimited public transport use across the country, at a cost of around €1,100 for a full year. Austria has a target to reduce private car use by 16% by 2040.

Fare caps and discounts tend to be popular at first glance, but there are challenges, and there is opposition. Local transport providers in Spain and elsewhere have expressed concerns about central governments setting fares.[39] This restricts operators' ability to plan and make investments for future capacity and growth (eg, electrification and expansion projects), if the Government is not also supporting these activities through separate funding streams. The Barcelona metropolitan transport authority claims that fare caps without increased payments for expansion have meant they have missed out on buying eight additional metro trains. A counter example exists in Victoria, Australia, where the regional government is capping/reducing fares and investing in expanded services.[40]

There is also a risk that when discounts are ended (when energy costs return to more acceptable levels), consumers will view this as a huge spike in public transport costs, which may drive away passengers and lead to a modal shift away from public transport.

Impacts

There is limited impact data available, especially in Spain, with these policies being implemented so recently, and modal shift sometimes taking some time to occur. The cost of the Spanish fare discounts, borne mostly by the state, is in the region of €70 million for the final quarter of 2022 (approx. €280 million/year).

There was a 44% increase in rail passengers recorded in Spain for January 2023 compared to January 2022 (33% increase across all modes). It is likely that this trend is part of a continuing post-pandemic rebound, but there are exceptions. Barcelona's metro and bus passenger numbers showed a record high in February 2023, higher than in 2019.[41]

39 From our interview with the transport director in Barcelona and in conversation with the director of EMTA (European Metropolitan Transport Authorities).

40 Countdown To Cheaper Regional Fares For Victorians, Premier of Victoria, 2023

41 New record for validations on the Barcelona metro that records the best month of February in history, Transports Metropolitans de Barcelona, 2023

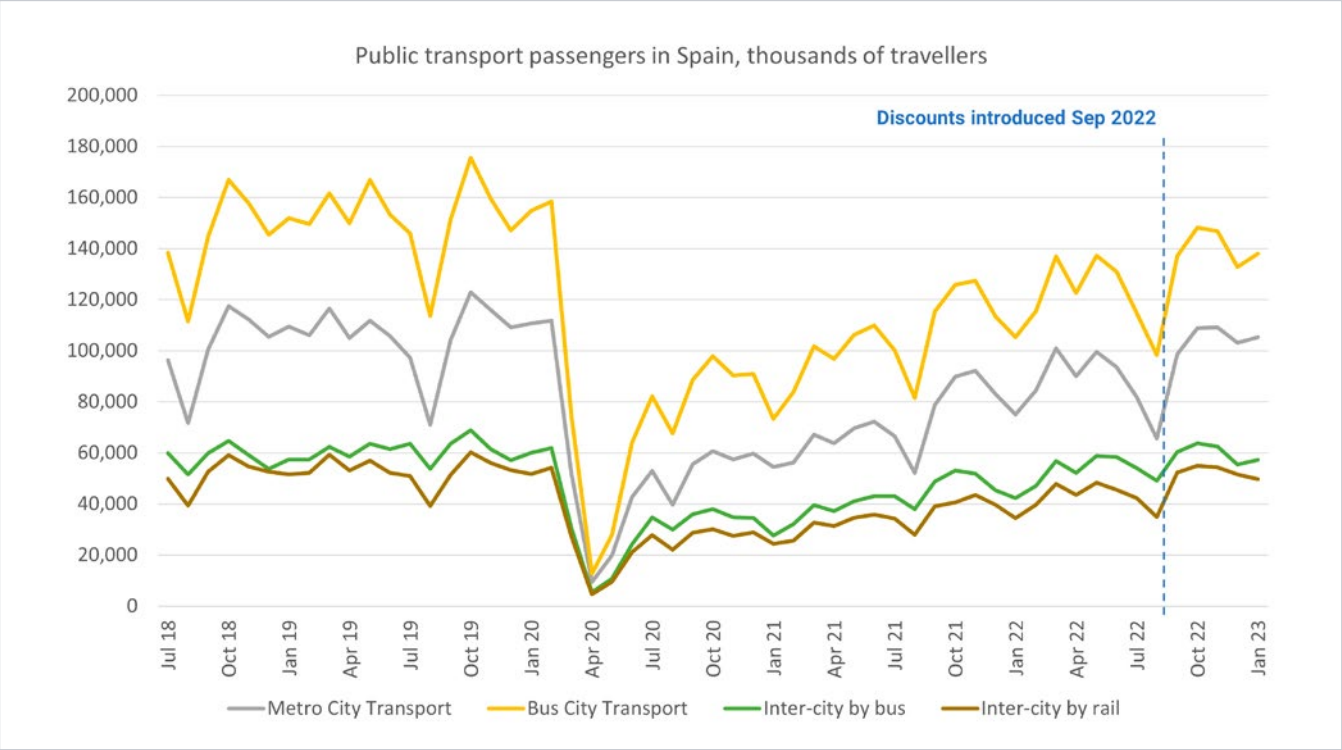


Figure 2.1: Spanish national statistics agency passenger statistics[42]

Researchers found no significant change in air pollution as a result of the increased public transport passenger numbers.[43] Although not a direct proxy, this suggests the subsidies have not been enormously effective at reducing private car use. Contacts at the Barcelona metropolitan transport authority said that the sale of automotive fuel was 13% lower for November 2022–January 2023 compared to the 2019–2020 equivalent, though again this could be an extended effect of behaviour change as a result of the COVID-19 pandemic.

Data from Germany does suggest some success in taking people out of cars. The 3-month scheme in Germany with €9 monthly rail tickets apparently saved 1.8 million tonnes of CO_2e as 10% of journeys were taken by people who would otherwise have used their car.[44,45,46]

Austria's KlimaTicket saw 130,000 subscribers in the first two months (1.4% of the Austrian population), with 50–85% of survey respondents indicating that they have started to replace some car journeys with public transport, and 5% indicating they may give up their car entirely.[47] This suggests that perhaps the fare subsidy has been more effective at modal shift in Austria and Germany than in Spain, although it is difficult to compare and there may be many factors affecting this.

Surveys tend to suggest that much of the growth in journeys made on public transport as a result of subsidies are trips that were previously made on foot or bicycle, or were not made at all.[48] Nevertheless, with cheap rail travel enticing some people to take holidays domestically, this has likely reduced air travel passenger numbers within and between some countries.[49]

It is possible that over a longer timescale, public transport use would increase further as a result of capped or reduced fares, with behaviour changes taking time to bed in.

Researchers at the Spanish think tank Esade are analysing whether the Spanish public transport subsidies have induced a measurable reduction in car use and expect to have preliminary results later in 2023.

42 Passenger transport statistics, National Institute of Statistics, Spain, 2023

43 Preliminary results of the impact of mass discounts on public transport on air quality, Nada es gratis, 2022

44 Final report of the nationwide market research on the 9-Euro-Ticket, VDV, 2022

45 Germany's €9 train tickets scheme saved 1.8m tons of CO2 emissions, The Guardian, 2022

46 Free public transit is not a climate policy, Bloomberg, 2022

47 High potential for climate ticket among car owners, OTS, 2022

48 Germany's almost-free rail travel experiment hasn't displaced cars, Energy Monitor, 2022

49 How did Germany's €9 train scheme affect road traffic?, HERE, 2022

Applicability to the UK

A targeted strategy is needed to achieve equitable modal shift away from private car use and towards public transport, cycling and walking in the UK. However, there is a difference in context between the UK and other European countries with regards to public transport funding and subsidy. In the UK, public transport delivery is generally structured as a profit-making venture, whereas in Europe it is more often delivered as a public good.

In the UK, outside of London where buses are deregulated, this is apparent in the lack of opportunities for local authorities to raise revenue for public transport, resulting in higher fares than in other countries. The Welsh Government is attempting to address issues around bus regulation and service delivery through a franchising model that is still in development.

There is also a lack of long-term funding and investment for local public transport. Transport authorities and operators may be resistant to radical fare initiatives, as they are managing overall budgets for their organisations and need to prepare for long-term maintenance or growth in services.

Fares alone do not necessarily promote a significant modal shift, as capacity and service levels also play a crucial role. UK experts suggest there is a need for simple, integrated, and cheap fares for all modes of transport to push people out of cars.[50] The UK's recent £2 bus fare cap will be valuable to rural travellers where single fares can be in the region of £5-10, but are less likely to be impactful in cities where fares are already comparable to the cap (evidence from Greater Manchester suggests a very slight modal shift but that most of the benefits of capped fares have been for existing bus passengers). However, rural bus services are inadequate, and this will also be a major factor affecting uptake and modal shift with or without the fare cap.

Nevertheless, reduced public transport fares do cut costs for some consumers and improve access to lower carbon mobility, especially for lower income households. Fare caps and discounts are likely to be a component in any successful modal shift strategy, but these policies alone are unlikely to be effective.

50 From an interview with Jonathan Bray, Urban Transport Group.

2.5 Strategic Energy Management programmes – Canada

Context and key features of the policy

Canadian strategic energy management programmes promote best practice in energy management for industry and commerce, supporting companies to assign the responsibilities and implement a plan to make energy management a key aspect of their business.

These programmes are principally delivered in Canada by the regulated utilities at provincial level (similar programmes are in place in the US but Canada is the focus for this study), with a recent significant increase in funding support from federal government.[51]

The Canadian Government's budget for 2023 aimed to take forward a plan to "build Canada's clean economy—one that is good for workers, good for business, good for the environment, and which makes life more affordable for Canadians from coast-to-coast-to-coast".[52] The budget announced a major extension of support for industrial energy management, as part of a new Green Industrial Facilities and Manufacturing Program (GIFMP). The Minister for Environment and Climate Change stated that, "[The GIFMP program] will help businesses lower their costs and remain competitive, while providing good job opportunities for clean tech workers."[53]

Programme measures to promote strategic energy management (SEM)

SEM programmes use a range of tools to encourage adoption of effective energy management in businesses. These include: support for the salary of energy managers; support for adoption of ISO50001 or related standards; help with energy assessments and subsidised consultancy; and professional development programmes for energy managers. Grants may be provided for installation of energy monitoring and information systems and technology.

Participation in SEM programmes may then be linked to Incentives for delivered energy savings and/or capital funding for improvements to energy efficiency.

Detailed description of policy

In 2022 the Canadian Federal Government allocated $20 million in the "Green Industrial Facilities and Manufacturing Program"[54] – a significant scale up of support for energy management in industry. This is allocated not directly to businesses but to a range of actors delivering SEM support programmes including: provincial and territorial governments; utilities; NGOs and industry associations. Funding under this stream is provided for activities that include training for energy managers; support for energy manager salaries in recipient businesses; energy assessments and audits; energy management systems; behaviour and organisational change projects in line with SEM principles; and capital investments.[55]

A second track of the programme to be launched in 2023 will cover direct support industrial facilities to adopt energy management systems.[56] A programme run in 2022, but currently closed, provided support for adoption of ISO50001 in commercial and institutional buildings.[57]

BC Hydro SEM programme[58]

BC Hydro is the regulated utility providing electricity across most of British Columbia. The description of their SEM programme below focuses on industrial energy management support, but similar programmes are run for commercial customers and for local authorities (to support management of their own facilities and systems).

51 We are grateful for access to an (at the time of writing) unpublished report from Efficiency Canada and an interview with that organisation.

52 Federal Budget 2023, Chapter 3, Government of Canada, 2023

53 Minister Wilkinson Announces New Program to Support Decarbonization of Industrial Facilities and Manufacturing..., Government of Canada, 2023

54 Ibid.

55 Adapted from Energy Efficiency Solutions track, Government of Canada

56 Ibid.

57 Financial assistance for ISO 50001 in commercial and institutional buildings Government of Canada

58 Commercial energy manager, BC Hydro

Integrated Energy Manager Program (IEM) – for large energy users

For businesses with over 20 GWh energy use per year, BC Hydro can fund 75%[59] (up to $105,000 per year) of an Energy Manager's salary. Funding/support is provided for CPD activities and to carry out the assessment of energy management in the business.

The Energy Manager and their organisation agrees to meet certain commitments including:

- Meeting annual targets for conservation and low carbon electrification activities and projects
- Setting clear goals and reporting regularly to senior management and stakeholders

For businesses that are not yet ready to employ a dedicated energy manager there is also an Associate Program which provides access to training, networking, financial incentives, and the assessment.

Cohort Program – for small to medium energy users

In this fully funded, two-year program, an energy expert leads a group of about 12 industrial customers to learn together using coaching and group workshops. Participants learn both about "quick win" energy improvements and the process of continuous energy performance.

BC Hydro provide training, technical services, and assessments at no cost to participants

The cohort program is open to businesses using between 4 and 20 gigawatt-hours of electricity per year. The program may also be deployed strategically by BC Hydro with smaller businesses – for example in communities where the grid is constrained, to help reduce demand.

Note smaller energy users are also offered support in energy management by BC Hydro. This is not considered in this section as is broadly similar to our description of Irish and Scottish SME Energy Audits Programmes, covered elsewhere in this report.

Carbon Reduction in the context to BC Hydro's SEM program

British Columbia has almost totally (98%) decarbonised electricity grid with generation from hydro-electric power. To the extent that Strategic Energy Management focuses on reducing electricity demand, the programme therefore does not have a direct effect in reducing carbon emissions (as it would if deployed in the UK). However, for firms reducing carbon emissions the programme is still important. Participants in the SEM Program are supported to take advantage of other BC Hydro support for fuel-switching away from fossil fuels. Further, as companies move away from fossil fuels and electricity demand increases, it becomes correspondingly important to manage electricity use effectively.

At system level the programme also supports decarbonisation. For example, a cohort programme (see above) might be deployed to help manage demand in areas of high grid demand and to enable flexibility – reducing the need for grid reinforcement.

Ontario – Key Features of Programme

The Ontario independent Electricity System Operator's SEM Program offers cohort learning similar to that described for BC Hydro above and targets companies using 3 GWh or more of electricity per year. Of particular interest in Ontario is the linking of financial incentives for delivered energy savings: SEM programme participants can receive incentives of $0.02/kWh of electricity savings for implementing eligible measures of up to $100,000 in any 12-month period.[60]

Impacts

There is strong growth in the energy management sector in Canada, which could be linked to these policies: Efficiency Canada report that, "In 2021, the number of energy managers per 100 large businesses increased in all but one province. This included multiple provinces with double digit increases."[61]

The US organisation Consortium for Energy Efficiency (CEE) has led promotion of SEM policies and gathered data on delivered energy savings of these programmes in 2019-20, considering programmes across the US and Canada. Across 14 State and Provincial Level programmes in the two countries, CEE report that 1,779 businesses benefited from SEM programmes, covering a range of activities.[62]

59 Based on information from BC Hydro interview.

60 Strategic Energy Manager Program, SaveOnEnergy.ca (Independent Electricity System Operator)

61 2022 Canadian Energy Efficiency Scorecard: Provinces and Territories, Gaede et al, Efficiency Canada, 2022

62 SEM Program Summary, 2019-2020 Consortium for Energy Efficiency 2022

Focusing specifically on BC Hydro, 67 British Columbia companies participated in the SEM program in 2019-20. The largest energy savings were achieved from the large-business-focused program, with 97 GWh of savings achieved. 13 GWh of electricity was saved from the medium-sized-business focused Cohort program.[63] These averages to 2.8 GWh savings for the large businesses, and 0.4GWh for the medium-smaller businesses participating in the Cohort program.[64]

Applicability to the UK

Although there is the ESOS (Energy Saving Opportunity Scheme) programme, which requires four yearly audits of large business energy performance, SECR (Streamlined Energy and Carbon Reporting) obligation on larger companies for annual carbon and energy reporting, and Climate Change Agreements for businesses in energy intensive sectors, **the UK could have significantly stronger policies to promote organisational change in energy management culture, behaviour, and practice**. Research undertaken by Department for Business, Energy and Industrial Strategy (BEIS) for its 2021 *Strengthening ESOS* consultation found that "many [companies] perceived ESOS as purely a compliance activity" with limited energy savings actions attributed to the programme.[65] A government Climate Change Agreement (CCA) evaluation found that companies were more likely to take action on energy efficiency as a result of CCAs where companies "had a culture of complying with targets; had strong board-level engagement with energy; had keen energy managers."[66]

The government's planned strengthening of ESOS will encourage (but not mandate) more systematic approaches to energy management, for example through requiring ESOS audits to meet the ISO50002/ EN16247 standard. The Canadian SEM programmes show how wider, systematic support can be provided.

The use of cohort programmes is also significant as a tool for promoting good energy management practice in small to medium sized businesses. International evidence has long shown the value (in delivered cost effective energy savings) of peer-learning in this area.[67] As discussed elsewhere in this report, there is a significant policy gap around support for SME energy efficiency in England: cohort learning could be an important and cost-effective policy tool.

The linkage of SEM to other incentives could also be a policy consideration, for example, a focus on SEM could be more strongly integrated in the CCA programme. The Industrial Energy Transformation Fund (IETF) has recently been extended, providing very significant funding for feasibility studies and capital investment in low carbon industrial equipment. SEM type support could be linked to IETF or future programmes as a condition or parallel policy action.

63 Data based on information provided by BC Hydro to CEE for their *Program Summary* (see citation above) though note some revisions following further input from BC Hydro to our team.

64 Ibid. (CEE reviewed with BC Hydro)

65 Strengthening the Energy Savings Opportunity Scheme (ESOS): Consultation on Opions, UK Government, 2021, Page 12

66 Evaluation of the second Climate Change Agreements scheme, UK Government, 2020,. Page 9

67 Peer networks were identified as achieving internal returns through energy efficiency investment: with an average of 30% IRR across 30 pilot networks in the early 2010s. See. Learning energy efficiency networks for companies – saving potentials, realization, and dissemination, Koewener et al., ECEEE, 2014

2.6 Benchmarking and Building Performance Standards for larger existing buildings (commercial, public, and multi-occupancy residential) – US

Context and key features of the policy

In January 2022 President Biden launched the National Building Performance Standards (BPS) Coalition which "comprises a nation-wide group of state and local governments that have committed to inclusively design and implement equitable building performance standards."[68]

The NGO ACEEE (American Council for an Energy-Efficient Economy) estimated in 2020 that to retrofit 80% of US commercial buildings by 2050 requires a two-fold increase in annual retrofit rates. BPS and underpinning benchmarking policies will play an important role in driving decarbonisation and reducing bills in existing buildings.[69]

BPS policies set long-term standards for improvements to the energy and/or carbon performance of existing larger buildings towards 2050 net zero or equivalent target. BPS policies usually build from benchmarking and transparency policies, which require building owners to regularly measure and report on operational (ie., measured, rather than modelled, as with a UK EPC) energy or carbon performance against a benchmark standard for that type of building. Benchmarking policies have been in place in many US cities and states for several years. BPS and benchmarking policies are applied to larger buildings – commercial, industrial, public, and often apartment buildings (as whole buildings).

In the US these policies are usually taken forward at city or state level. Benchmarking policies are well established across many jurisdictions. BPS policies are in place in seven localities and three states, and 33 jurisdictions are committed to introducing the policies as members of the Presidential Coalition. These 33 jurisdictions cover "about a quarter of the buildings in the US."[70]

Detailed description of policy

National policy Framework

The federal Environmental Protection Agency (EPA) provides support and underpinning resources, notably the ENERGY STAR Portfolio Manager tool which is used for standard setting and data management. The Department of Energy also offers several funding programmes for state and local governments to support their policy implementation in this area. NGOs (such as the Institute for Market Transformation – IMT – who were interviewed for this report), and labour organisations (unions) are also active in providing support for these policies.[71] IMT has a formal role supporting the Presidential Coalition.

Benchmarking

Benchmarking policies are usually described as having three elements: the benchmarking (measurement), reporting (to government), and transparency (of the standard achieved for tenants, property market). The benchmarking process involves comparing a building's energy efficiency or carbon performance to that of a reference building with similar functions (determined by business use) using a baseline set principally by national survey data. Benchmarking policies are usually delivered alongside other programmes to promote higher performance of buildings.[72]

Building Performance Standards Policies

BPS policies involve setting a trajectory for a phased reduction of operational energy/GHGs towards a long-term target date. BPS policies may also allow other routes to compliance (eg, achieving all cost-effective improvements, undertaking deep retrofit etc).

Some examples of BPS policies[73]

St Louis target for buildings over 50,000 square feet (4,600m^2) is based on energy use intensity; the policy requires standard setting based on a four-year compliance cycle from 2021 (so first four-year cycle ends in 2025 and companies are working towards this). The standard for each four-year target is based on the 65th percentile of energy performance of that property type, so that at least 65% of buildings see an improvement in energy use intensity. Non-compliant companies will be fined.

68 About the National BPS Coalition, National BPS Coalition

69 Mandatory Building Performance Standards: A key policy for achieving climate goals, Nadel and Hinge, ACEEE 2020

70 About the National BPS Coalition, National BPS Coalition

71 Ibid.

72 Benchmarking and Building Performance Standards Policy Toolkit, United States Environmental Protection Agency

73 Information on Maryland and the city of St Louis, Missouri are based on data provided in IMT's 2022 review of BPS policies: Comparison of U.S. Building Performance Standards, IMT, 2022

Maryland is an example where the legislative framework allows the BPS policy to be based on reduction of GHG emissions and an energy-based metric. Applying to buildings over 35,000 square feet, there are two compliance cycles: in 2030 and 2040 – by 2030, buildings will have to achieve a 20% reduction in onsite GHG emissions against 2025 levels, and by 2040, buildings will need to meet net zero direct GHG emissions.

New York City is the most high-profile example: their Local Law 97 is putting in place carbon caps for buildings over 25,000 sq. feet (2,300m^2) – the law applies to 60% of New York's building area. Carbon caps are applied over five-year compliance periods towards 2050: 2024-29, 2030-34, 2035-39, 2040-49. Different caps have been set for different building types, working towards net zero by 2050. Compliance routes can include purchasing renewable energy credits.[74]

Key considerations for policy design

- IMT told Energy Saving Trust that building owners prefer BPS designs that provide certainty over the timing and energy use reduction required of buildings. They prefer to be evaluated on the basis of actual energy use rather than on the basis of (UK EPC style) asset ratings.
- These are policies for larger buildings – IMT told Energy Saving Trust that because of the effort involved (for the public authority) in administering a BPS programme and (for the building owner) reporting on performance data, it is not viable for smaller buildings.
- The approach relies (in both the US and Canada) on the ENERGY STAR Portfolio Manager tool which provides the benchmarking and the technology for reporting the data – with increasing levels of automation.
- Specific legislation and regulation have been passed to allow the relevant data sharing from the energy supplier (see information on this on EPA site)[75] – this is especially important for multi-tenanted buildings.
- Targets for BPS may be set using GHG, energy (particularly site energy use intensity), a combination, or other metrics (eg, air quality and water).[76] This can depend on wider policy frameworks: what does the state/city have the right to legislate for?
- Buildings can apply for exemptions where improvements are difficult.[77]
- Support for low-income apartment owners in multi-occupancy blocks may be required.

Impacts

Benchmarking policies have been in place globally for several years and several impact evaluations have been completed.

In terms of direct data on building performance based on benchmarking data, one recent US example is from Montgomery County in Maryland where data produced by the county shows that buildings that have been consistently covered by benchmarking policies from 2016-2021 saw a 17% improvement in energy performance (3.5% year on year), delivering an average $12,000 (£9,600) reduction in energy bills.[78]

An academic analysis by Meng *et al* (2017) compared buildings in New York with benchmarks to those without. This showed – inter alia – that "disclosure of both energy use and Energy Star together can be credited with a 6% reduction in building energy use intensity (EUI) three years later and a 14% reduction in EUI four years later."[79] A 2017 Berkeley Lab report identified that "most of the studies reviewed indicate 3% to 8% reductions in gross energy consumption or energy use intensity over a two – to four -year period of benchmarking and transparency policy implementation."[80] In terms of wider benefits, research in Chicago found that the policy is associated with a "6.7% decrease in vacancy among energy efficient buildings" which could translate into higher lettable value.[81]

74 What is Local Law 97? Urban Green

75 Data Access: A Fundamental Element for Benchmarking and Building Performance Standards, United States Environmental Protection Agency

76 See Building Performance Standards: Overview for State and Local Decision Makers, United States Environmental Protection Agency

77 Ibid. "Existing BPS policies consider factors such as financial hardship, capacity constraints, building usage, occupancy rates, major renovations, the condition of a property, and change of ownership for determining exemptions and accommodations".

78 Montgomery County 2021 Energy Benchmarking Report, Data Montgomery (Government of Montgomery County, Maryland)

79 Estimating energy savings from benchmarking policies in New York City, *Energy*, Vol 133, Meng et al. 2017 P415-423

80 Evaluation of U.S. Building Energy Benchmarking and Transparency Programs: Attributes, Impacts, and Best Practices, Mims Frick et al., Lawrence Berkeley National Laboratory, 2017

81 Impact of energy benchmarking and disclosure policy on office buildings, *Journal of Cleaner Production*, Shang et al., Vol 250, 2020

In an academic review focusing on the widely cited Australian experience of benchmarking policies, Mallaburn *et al* (citing RAP and Energy Action evidence) identify that operational benchmarking can have positive supply chain benefits: "Having to focus on actual performance means that specialists such as engineers, contractors and facilities managers need to upskill..."[82]

Mallaburn *et al* also identify that the Australian experience is that lower performing buildings see the greatest improvements; this effect may be unlikely in programmes that are not mandatory.

For BPS policies, as these are generally new in the US, ex-post impact assessment data is not available. However, ex-ante assessments of the scale of impacts have been made. ACEEE estimate that – looking to 2050 – these policies (assuming they impact 67% of the commercial building stock) would drive a 30% reduction in commercial buildings' carbon emissions and deliver a 65.6 million tonnes CO_2 savings by 2050.[83]

A source of measured impact data for BPS policies is available from beyond the US. ACEEE report on mandatory building performance standards policies that have been in place in Tokyo for very large buildings since 2010 (the policy is applied to facilities based on energy consumption: typically regulated buildings are 20-30,000m^2 in size),[84] and as well as a cap, includes an emissions trading route to compliance. In Tokyo, a 27% reduction in emissions was achieved between 2010 and 2017.[85]

Applicability to the UK

In England and Wales, Display Energy Certificates, which benchmark operational energy use, are required only for public sector buildings which are open to the public. There are also voluntary operational benchmarking schemes, notably the Australian-developed NABERS programme, but there is no regulated framework for benchmarking operational energy performance for commercial buildings.

Operational benchmarking is an important corollary to the EPC system in place in the UK (the modelled, asset-based rating required at point of sale/rental): UK Government state that "In large and complex buildings in particular, the evidence is showing that there is almost no correlation between a building's EPC score and its actual energy and carbon performance in practice."[86] The government consulted on a mandatory UK operational benchmarking framework for over 1000m^2 office premises, modelled on the NABERS programme but no decision has been taken.[87]

Mandatory operational performance standards for larger buildings have not been introduced in the UK. Minimum Energy Efficiency standards (MEES) – based on EPC asset ratings – apply to rented properties, however they apply to properties, not buildings, and there is no long-term trajectory for MEES standards. The BPS policies are based on providing a long-term framework for carbon reduction towards net zero (or equivalent target).

A key challenge in the UK context is the necessary data sharing for multi-tenanted buildings. This may be easier in the US context where for each area there is a single electricity supplier (and often a single gas supplier), and specific legislation and regulations have been developed to allow anonymised data aggregation. Addressing this challenge will need to be a consideration for UK policy makers.

82 Australian non-domestic buildings policy as an international exemplar, Mallaburn et al., *Building and Cities* 2(1), 2021, p318-335

83 Mandatory Building Performance Standards: A key policy for achieving climate goals, Nadel and Hinge, ACEEE, 2020

84 Ibid.

85 op. cit., 83. citing data from Tokyo Municipal Government, 2019

86 Introducing a Performance-Based Policy Framework in large Commercial and Industrial Buildings in England and Wales, UK Government, 2021, P12

87 Ibid.

2.7 SME Support schemes – Ireland (and Scotland)

Context and key features of the policy

This review considers Scotland and Ireland: The Support Scheme for Energy Audits in Ireland and the Business Energy Scotland programme. These have demonstrated best practice when it comes to offering advice to businesses on how to reduce their energy use and encourage them to complete energy audits. Business Energy Scotland launched in April 2022, although it existed in its previous iteration, the Energy Efficiency Business Support Service, for several years.

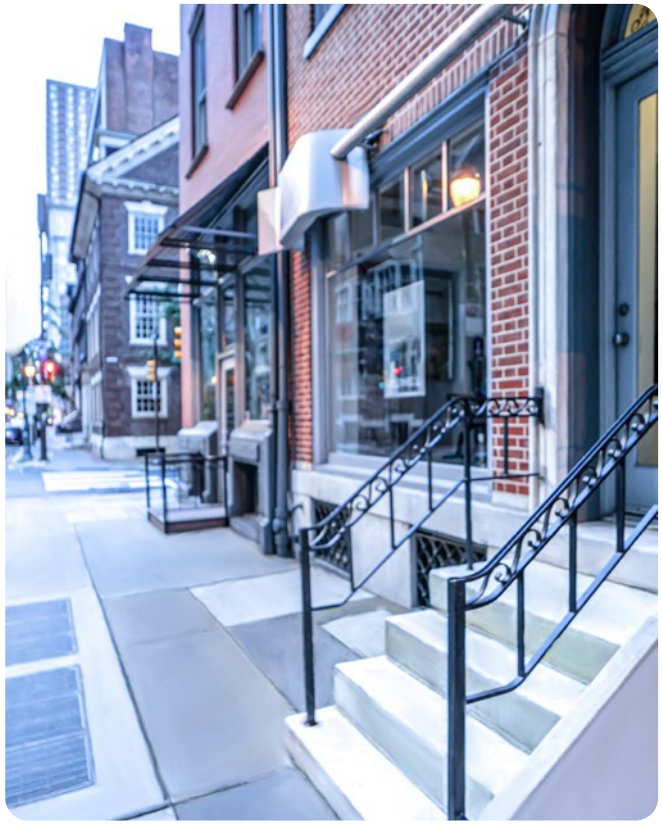
Countries in the EU were required to introduce mandatory energy audit schemes for large businesses, as part of the EU's Energy Efficiency Directive, and to develop programmes to encourage SMEs to undergo energy audits. As a result, some European countries have programmes to help SMEs undertake these audits. In the UK, the ESOS mandatory audit scheme applies to large businesses; however, currently in the UK, Scotland supports SMEs to undertake audits as part of its Business Energy Scotland service, while England does not at national level. In November 2022, in context of the energy crisis, the Scottish Government published the Emergency Budget Review, in which it announced the expansion of the Business Energy Service and an increase in the financing support on offer.[88]

88 Improving Energy Advice for Businesses, Scottish Government, 2022

Detailed description of policy

The Support Scheme for Energy Audits incentivises businesses to complete an energy audit by offering a subsidy in the form of a voucher to offset the cost. Business Energy Scotland is a support service which includes free energy assessments, alongside advice and financing. Both Irish and Scottish schemes are good examples of how to get businesses engaged on energy efficiency and help them understand what steps they need to take to reduce their energy and carbon emissions. The SME sector varies greatly, with businesses having very different energy efficiency needs and all are at different stages of decarbonisation, making it difficult to offer general advice to all businesses through national awareness campaigns. Support schemes which help businesses access information and guidance, that is specific to them, on how to be more energy efficient is an important step towards taking action.

Business Energy Scotland is funded by Scottish Government and managed by Energy Saving Trust. It helps SMEs overcome some known barriers that they face in trying to decarbonise, by giving access to specialist knowledge from technical experts, support with drafting a business case to justify investments, offering financing options (through an interest free loan between £1,000 and £100,000), and by providing a dedicated advisor to support them throughout the process. The dedicated advisor guides them through the process of installing the efficiency upgrades and keeps them motivated. The service acts as a central point of contact to businesses in the whole of Scotland and receives stable, long-term government funding.



The Support Scheme for Energy Audits is delivered by Sustainable Energy Authority Ireland and is funded by national government. Under the scheme, SMEs can apply for a voucher of €2,000 towards the cost of an energy audit from a list of registered energy auditors: the list is managed by Sustainable Energy Authority Ireland. Businesses then arrange for an energy audit themselves and can claim the value of the voucher after the audit has been completed.

Impacts

Business Energy Scotland is in its first year of operation, so impact data is limited, but in its previous iteration, Energy Efficiency Business Support Service, the scheme helped SMEs identify typical savings of about £50,000 per business, over the lifetime of the measures installed, which equals energy savings of 24% on average per business.[89] To date the support service has made over 1 million tonnes of CO_2e savings and achieved £200 million savings for Scottish businesses overall.

Between July 2021 and January 2023, the Irish Support Scheme for Energy audits issued 1,685 vouchers, meaning 1,685 businesses completed an audit during that period. The scheme is not currently monitoring which recommendations the business then go on to complete, however, having a good quality audit report with clear recommendations is known to encourage businesses to take action, so one can assume that more measures were installed as a result of the scheme, than would have been otherwise.[90]

Applicability to England

There is no nationally supported service in England dedicated to providing specialist advice to SMEs to help them improve energy efficiency and finance energy upgrades. Some support services exist in England, but they tend to be short-term and available only in localised areas.

Undertaking an energy audit helps businesses see the cost benefits and positive environmental impact of investing in energy upgrades. The Government has, though, issued a tender for a pilot programme to explore delivery of an Energy Advice Service for SMEs that will offer "subsidised assessments and small-scale grants."

The energy audit programmes in Scotland and Ireland use two contrasting approaches to providing audits. In Ireland, vouchers are given towards the cost of an auditor hired by the company. In Scotland, the company is provided with an audit as part of the wider Business Energy Scotland support service. The Irish approach may help ensure companies value the audits because they pay for them, even if helped by a grant – addressing the widely remarked-on problem of companies seeing audits as desk exercises and leaving the completed reports on a shelf. On the other hand, the Scottish approach may help reduce drop out and ensure companies take action by providing the audit as an integral part of a joined-up service.

Audits should not be delivered as standalone policies. Wider support to engage businesses with the energy saving opportunity (before the audit) as well as help with financing action (after the audit) are also key. The launch of a new Energy Efficiency for Business website is a significant step being taken by UK Government in April 2023. BEIS consulted in 2019 on a funding programme for SME energy efficiency but this was not taken forward and there is no dedicated national programme of grants or loans (as in Scotland) for SME energy efficiency (subsidised "Recovery loans" are available for smaller businesses for any business purpose). SMEs can apply for heat pump funding through the UK Government Boiler Upgrade Scheme but almost none have done so – highlighting the need for grants to work alongside audits and advice.[91] Peer support where businesses learn about energy management from each other (see Canadian Strategic Energy Management policies above) is also an important tool that could be deployed nationally in the UK.

89 Business Energy Scotland, March 2023

90 How energy audits promote SMEs' energy efficiency investment, European Investment Bank, 2019.

91 0.4% – 35 grants – from the Boiler Upgrade Scheme have gone to non-domestic premises as of Feb 23. Boiler Upgrade Scheme statistics, Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy, March 2023.

2.8 Mandatory decarbonisation measures – Netherlands

Context and key features of the policy

The Environmental Protection Act in the Netherlands already requires companies with an annual energy consumption exceeding 50,000 kWh or 25,000m^3 gas to implement energy savings measures with a payback period of up to 5 years.[92] These companies must report on the measures taken every four years. The Dutch government began to extend this obligation in 2019 and accelerated and expanded this further as a response to the energy crisis.[93] From July 2023 the scheme is being extended in a number of ways.

Firstly, the scheme is being revised to include not just energy saving measures but also measures for the production of sustainable energy and electrification measures with a payback period of five years or less.[94]

Secondly, companies participating in the EU Emissions Trading System (ETS) were exempt from this obligation. The strengthened obligation will require the most energy-intensive companies, including those participating in the ETS and large greenhouse growers (significant energy users in the Netherlands), to conduct a mandatory energy study every four years and implement efficiency measures with a payback period of five years or less.[95] Any company using over 10 million kWh or 170,000m^3 of gas must conduct this "energy saving study". Any energy saving measures identified in the audit must be implemented, or at a minimum have a plan developed for their implementation in the near future.

The enhanced Dutch scheme is additionally of interest because they outlined a list of recognised measures split by sector, which can be used to identify where savings can be made and paid back within 5 years. The government is updating the list to include renewable energy/electrification measures and to take account of the latest higher energy prices, meaning more measures will achieve the repayment period threshold.

92 Energy Saving Notification Obligation, Netherlands Enterprise Agency, 2020

93 Dutch climate and energy ministerial statement, 2022, see page 2

94 Obligation to investigate energy savings from 2023, Netherlands Enterprise Agency, 2022

95 What is the energy saving obligation? Netherlands Enterprise Agency, 2022

The new measures are related to the European Energy Efficiency Directive (EED) but are more activity specific and include CO_2-saving measures whereas the EED is focused only on energy-saving measures.[96]

Supervision and enforcement of the energy saving obligation will be carried out by the relevant environmental service on behalf of the specific province or municipality. Enhanced supervision and compliance activities are planned, with €76 million earmarked for the period 2019-2026 to assist monitoring and verification spot checks.[97]

Impacts

There is a prediction that this stricter energy saving obligation could save 3.2 million tonnes of CO_2 by 2030, from a government spend of €76 million on supervision, support, and enforcement. This equates to €22.50/tonne CO_2, assuming any private investment made by the company is paid back in full via energy savings. Accurate data collection may prove challenging because it is not known exactly how many companies/sites use more energy than the threshold. Transmissions operators/distribution system operators (DSOs) have access to the consumption data, but this is not available to the municipalities who are enforcing the policy.

Applicability to the UK

Industrial activities remain a significant and stubborn source of the UK's GHG (20% of UK emissions). Energy efficiency has been a historic focus but there is scope for further impact, especially as more efficient technologies mature, and as renewable energy measures become increasingly cost-effective.

The UK has a scheme which was initiated under the European EED (ESOS).[98] The threshold for compliance is on turnover, or number of employees, rather than energy use. Companies required to take part in the ESOS must complete an energy audit every four years, but there is no requirement to implement any energy saving measures. Similarly, UK companies must qualitatively report their efforts to implement energy efficiency measures as part of their annual company reports (via the Streamlined Energy and Carbon Reporting duties), but there is no obligation to implement measures. Climate Change Agreements incentivise action on energy efficiency in energy intensive sectors, but do not require it.

The Dutch scheme's focus on companies with a higher energy use, and the requirement to implement recommended energy or carbon saving measures suggests the potential to be more impactful than the UK ESOS.

The UK Government has considered expanding and tightening the requirements of the existing ESOS scheme, which suggests a willingness to use this type of policy to drive faster change. However, the response to the Government's consultation indicates that it won't bring in requirements of the same strength as those in the Netherlands in the short term.

Any update to the existing ESOS scheme in the UK should be in line with a wider strategy to bring down emissions from businesses, ensuring that there are incentives alongside mandates and there is sufficient support for businesses to make the right decisions.

96 Dutch climate and energy ministerial statement, 2022. See also a summary by Linklaters, 2022

97 Information about ESOS is available on gov.uk

98 Strengthening the Energy Savings Opportunity Scheme (ESOS): government response, Department for Business, Energy & Industrial Strategy, 28 July 2022

2.9 MaPrimeRénov'- France

Context and key features of the policy

MaPrimeRénov' is a one-stop-shop and financial assistance programme[99] to support private homeowners who wish to undertake renovation work to improve the energy efficiency of their home. The scheme works to maximise uptake of key efficiency measures through funding and to simplify the customer journey by providing end-to-end support. It is a scheme open to owner occupiers in all income groups, to landlords, and also supports groups of flat owners looking to improve their block together (in France, flat owners co-own their building).[100]

The MaPrimeRénov' programme of financial assistance is now considered alongside wider support for home renovation programmes under the overall heading of France Rénov'.[101]

The residential and tertiary sector accounts for around 18% of GHG emissions.[102] The improved efficiency of buildings owing to works carried out using the MaPrimeRénov' premium is key in accelerating France towards its target of a 40% cut in demand required by 2050 for carbon neutrality.[103]

In terms of the energy crisis, reduced demand through improved efficiency will contribute towards reducing France's heavy reliance on imported fossil fuels.[104] MaPrimeRénov' is identified as a key delivery mechanism for the Sobriété Énergétique plan (see section 2.12) – the French national plan to reduce energy demand and energy bills in response to the war in Ukraine and resulting energy crisis. As part of France's resilience plan, an additional funding incentive of €1,000 was made available in 2022/23 where households undertook certain measures that were specifically linked to mitigating the impact of the energy crisis (eg, those running on renewable energy).

MaPrimeRénov' was a new programme in 2020 that built on previous initiatives:[105] the long-standing Energy Transition Tax Credit (CITE) and the "Living Better Agility" aid from the National Agency for Housing (ANAH).[106] The programme was formally extended in January 2022 with a target of one million grants for that year.[107] The French Government confirmed a further €2.5 billion for the scheme in 2023[108] via the Ministry of Energy Transition,[109] including greater capacity for advice provision.[110] Further context for the funding of the programme is the National Recovery and Resilience Plan which references €5.8 billion[111] for retrofit for public and private buildings. There is no official end date for the MaPrimeRénov' programme, it is expected that this scheme will continue for 10 years, though the budget is renewed year on year.

Key features of interest

- The scheme has seen very large-scale uptake.
- A strong focus on support through the customer journey, providing upfront quotes, energy audits, a directory of local installers, access to local advisors, free consultations with advisors as well as access to a 'renovation guide' and an online account[112] to streamline the process.
- Funding support for a wide range of retrofit measures promoting whole house/multiple measures, particularly for those on the lowest incomes.
- The policy is designed to interact with a significant number of other policies by allowing overlap in aid to householders, for example funding from the white certificate scheme[113] (energy supplier obligation programme).

99 Distributed by the ANAH France Rénov' service.

100 A consumer guide to the process is available, note figures for the scheme have since been updated but the application process remains unchanged.

101 The housing renovation service for all.

102 Bilan environnemental de la France Édition 2021, Ministère de la Transition écologique, 17 March 2022.

103 Rapport annuel 2022: Dépasser les constats, mettre en œuvre les solutions, Haut Conseil pour le Climat.

104 Ibid.

105 Order of 14 January 2020 on the energy transition premium, Légifrance.

106 The premium was available from January 2020 for the lowest income households and then from January 2021 for those in higher income bands.

107 MaPrimeRénov' 2022 : le Gouvernement vise le million de primes, L'Énergie Tout Compris.

108 Minister of Ecological Transition and Territorial Cohesion, Christophe Béchu justifies the extra funding: "in order to take into account inflation and promote overall renovations, Aides à la rénovation énergétique des logements en 2023 : des évolutions au 1er trimestre afin d'accroître le soutien aux rénovations les plus performantes, Ministries of Ecological Transition and Territorial Cohesion, 22 December 2022.

109 Plan de Sobriété énergétique, Une mobilisation générale, 6 October 2022 ; see also French eco-renovation grants increase as price of materials rises, 10 January 2023.

110 Funding available through the scheme increased from February 1st 2023 to take account of inflation and to encourage more comprehensive retrofits, French eco-renovation grants increase as price of materials rises, The Connexion, January 2023

111 Plan national de relance et de resilience 2021, French Government.

112 As part of MaPrimeRénov Copropriété, Agence nationale de l'habitat (Anah).

113 White Certificate Scheme & Obligation, Policies, IEA, 29 March 2022.

- There is detailed, tiered financial support for different incomes, building types and ownership.[114]
- Detailed specific support to enable retrofit of blocks of flats at whole building level.
- Additional funding incentive for action linked to the energy crisis and increasing energy security by moving away from fossil fuels at pace.[115]
- Promotion of whole building action: bonuses are available for those who undertake multiple measures.
- Actions funded through MaPrimeRénov' are promoted through the large scale Sobriété Énergétique awareness and engagement programme. (See section 2.12).

Detailed Description of Policy

To support the financing offer, MaPrimeRénov' is a free, independent public service and its one-stop-shop design provides:

- An online hub which acts as the single point of entry for customers. Consumer accounts streamline the customer journey by providing an automated process flow.
- A financial aid simulator also provides customers with an upfront and personalised estimation of their specific grant allocation before they proceed to application.
- A directory of certified installers in the customers' local area.
- Customers with access to local advisors via a search tool.

The French government has introduced the role of *Mon Accompagnateur Rénov'*[116] (My Renovation Guide), providing consumers with personalised support to guide them through the journey, such as home visits, property diagnosis for bespoke advice, recommending the right technical solutions, advice on installer selection, support with administrative procedures, identification of financing options and post-installation advice. This guide is currently optional but will be mandatory from September 2023.[117]

For consumers to benefit from the scheme, they must get quotes from Recognized Guarantor of the Environment (RGE) professionals, choose a professional, create an online account and make the request before starting any work.

Funding detail

There are four household income ceilings which, along with the number of people within a household, determine an applicant's eligibility for varying financial support.[118,119] These four profiles, categorised by colour (Bleu, Jaune, Violet and Rose) show the finance, measures, packages and bonuses the applicants are entitled to.[120] These ceilings begin with the very modest (ie, lowest income) household, to modest, intermediate, and high-income households. For both individual and multiple measures, funding available is dependent on both the household income and the measures being installed.

Income ceilings vary for those living inside Paris and those living outside of Paris in other regions. This can be expected as incomes are often higher in Capital cities, along with an increased cost of living.

114 op. cit. 112.

115 This additional element is linked to France's economic and social resilience plan.

116 The aim is that over time, all French Rénov public advisors will become Accompagnateurs Rénov'. In addition, advisors from the private sector will also be able to go through the process of achieving Accompagnateur Rénov' status, providing wider benefits of upskilling.

117 MaPrimeRénov' évolue en 2023 : budget, plafonds, forfaits... Ce qui change cette année,, RTL, 02 January 2023.

118 Premium amounts as per Annex 1 of the decree of 14 January 2020 on the energy transition premium, Arrêté du 14 janvier 2020 relatif à la prime de transition énergétique, Légifrance.

119 MaPrimeRénov and other financial aid, France Rénov'

120 Le guide des aides MaPrimeRénov', French Government, May 2022.

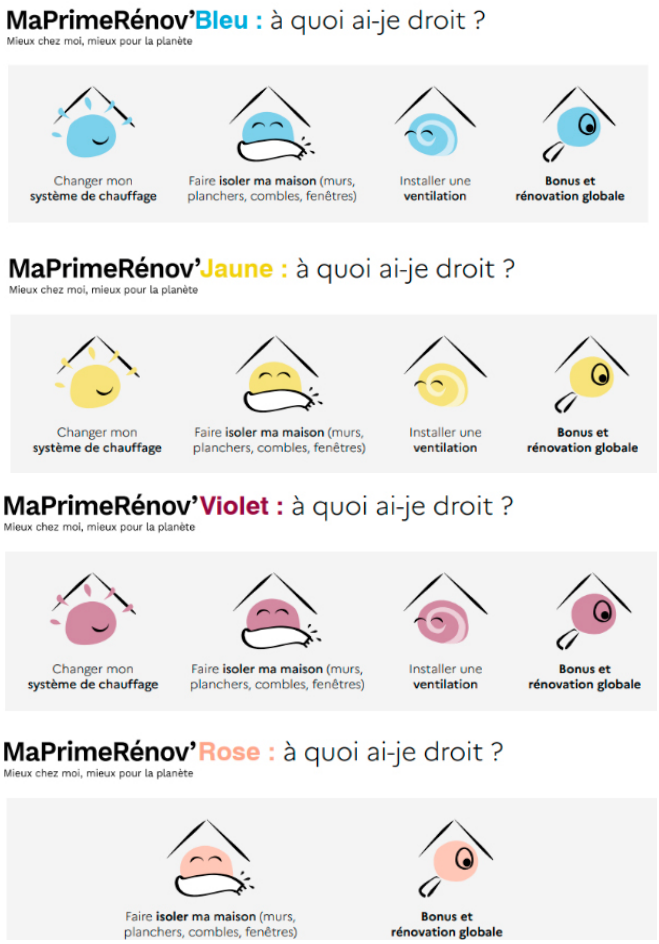


Figure 2.2: The four profiles of MaPrimeRénov'[121]

For multiple measure/whole house renovations the blue and yellow (lower income) groups are eligible for works under MaPrimeRénov' Sérénité sub programme which provides greater financial support. Purple and red income groups who apply are eligible for these works under the Global Renovation Package which leverages greater private finance.

PLAFONDS DE RESSOURCES POUR LES AUTRES RÉGIONS AU 1ER JANVIER 2023

NOMBRE DE PERSONNES COMPOSANT LE MÉNAGE	MÉNAGES AUX REVENUS TRÈS MODESTES	MÉNAGES AUX REVENUS MODESTES	MÉNAGES AUX REVENUS INTERMÉDIAIRES	MÉNAGES AUX REVENUS SUPÉRIEURS
1	16 229 €	20 805 €	29 148 €	supérieur à 29 148 €
2	23 734 €	30 427 €	42 848 €	supérieur à 42 848 €
3	28 545 €	36 591 €	51 592 €	supérieur à 51 592 €
4	33 346 €	42 748 €	60 336 €	supérieur à 60 336 €
5	38 168 €	48 930 €	69 081 €	supérieur à 69 081 €
par personne supplémentaire	+ 4 813 €	+ 6 165 €	+ 8 744 €	+ 8 744 €

Figure 2.3: Resource ceilings for renovation works outside of Paris[122]

A single person household with an income of €16,229[123] or below would be categorised in the very modest household bracket (blue) which would make them eligible for €1,200 for connection to a heating and/or cooling network. For the same work, a modest income household would receive €800, an intermediate household would be eligible for €400, and a high-income household would not be eligible for support for these works (though for other measures, support for high income households is available).

Within certain limits, MaPrimeRénov' can be combined with other financial support, for those on the lowest income this can enable coverage of between 90-100% of the work[124] when using Energy Saving Certificates and local aid.[125] If multiple funding streams are used to finance energy saving measures, the amount available via MaPrimeRénov' is capped.

121 Ibid.

122 Note that these ceilings are different for those living within and beyond the capital. Those noted above are figures for outside of Paris.

123 Rénovation Energétique,Les aides financières en 2023, France Rénov', French Government, February 2023.

124 op. cit. 120. Page 14

125 For the same works, MaPrimeRenov can be combined with; individual and collective Energy Savings Certificates (CEE), aid from the Department (households with lower incomes), the zero-rate eco-loan, VAT at a reduced rate of 5.5% and with local support aid. The premium cannot be combined with MaPrimeRénov Serenite (Serenite is reserved for households in energy poverty), nor with aid from the Department for those with the very lowest incomes. 18 choses à savoir sur MaPrimeRénov' 2023, Juliet. S, Monexpert, 14 April 2023.

For individual works, measures available include:

- Connection to a heating and/or cooling network
- Thermodynamic water heater
- Air/water heat pumps
- Geothermal or solar-thermal heat pumps
- Individual solar water heaters
- Combined solar systems
- Thermal part of water PVT equipment
- Pellet stove and cooker
- Manually fed wood-fired boiler
- Automatic feed wood boiler
- Closed heath and log or pellet insert
- External wall insulation, interior wall insulation, insulation of roof slopes/ attic ceilings, insulation of flat roofs, insulation of glazed walls to replace single glazing.
- Ventilation double flux
- Oil tank removal

The programme includes bonuses for work carried out in individual properties, covering different types of measure and extent of works to encourage efficient renovations:

Energy audit bonus

Available to all but the highest income group, to pay for an audit.

Thermal sieve status bonus

€1,500 available for changing from an energy rating of F or G to E or higher, available to all income groups.

Low-consumption building bonus

€1,500 available when a property reaches Energy rating A or B after measures are installed.

Project management assistance bonus

Provides extra financial support (€150) for project management.

The programme is now aiming to promote multiple measures/whole house renovations. Whole house renovations reached 10% of the renovations funded (66,000) in 2022,[126,127] 95% of these "global renovations" were in households in the two lowest income brackets.[128] Further, as of 1 January 2023, the installation of a very high energy performance gas boiler is no longer an available measure. Further changes made to the scheme for 2023[129] included increased financial ceilings in recognition of the rise in costs due to inflation.[130]

For work carried out collectively (in common areas in collective housing ie, flats) additional and different support measures (in the *MaPrimeRénov' Condominium* sub-programme) are available, recognising the requirement for collaboration between flat owners to deliver retrofit of a block. This includes additional support for project management, as these projects are more complex, and additional support for low-income flat owners to pay their share of works.

126 "Pour 2023, l'objectif est de favoriser les rénovations les plus performantes et d'accentuer le soutien aux ménages modestes.", MaPrimeRénov' évolue: les nouveautés en 2023, Directorate of Legal and Administrative Information (Prime Minister), 6 February 2023; MaPrimeRénov'; l'Anah souhaite pousser les rénovations globales, TotalEnergies, 27 January 2023.

127 op. cit. 120 Page 14

128 MaPrimeRénov, Bilan 2022, Anah, January 2023.

129 MaPrimeRénov' évolue: les nouveautés en 2023, Directorate of Legal and Administrative Information (Prime Minister), 6 February 2023.

130 Funding available for MaprimeRenov' Sérénité increased from €30,000 to €35,000 January 2023.: op. cit. 128. Page 8

Impacts

MaPrimeRénov' is very popular. Between January and December 2022 nearly 670,000[131] renovations of dwellings were carried out.

As of February 2023, approximately one million households, primarily low-income, have received funding from the scheme since 2020, most often for heating systems (70%), insulation (21%) and ventilation (4%).[132]

Despite the additional support[133] for multiple measures, the majority of the work carried out through MaPrimeRénov' in 2021 was for single measures (86%),[134] involving one-off work such as replacing a heating system or insulating windows. As described above, changes have been made to the programme to encourage more whole building action/multiple measures with around 10% of dwellings treated having whole building renovations in 2022.

In 2022, Anah identified the top three works funded by the premium were for low carbon heating: installation of air source heat pumps (156,004); installation of pellet stoves (148,765); Installation of individual solar water heaters (64,711).[135]

Anah also identified that 93,450 jobs were created as a result of the scheme in 2022.[136]

Applicability to the UK

The key point of interest for MaPrimeRénov' is its very high uptake and successful delivery, combined with a comprehensive joined up offer for private homeowners at all income levels. England does not have such a programme, and this is a significant policy gap. MaPrimeRénov' has many features that could provide learnings for a future government funded national retrofit programme benefiting all private householders. These include:

- Focus on the customer journey with a range of support and calculation tools provided online, as well as support for energy audits and project management of works. No English funding programme in recent years has had this kind of comprehensive end-to-end support.
- The successful roll out of heat pumps through the programme – between January and December 2022 MaPrimeRénov' supported 156,004 airs to water heat pump installations – this is 2.8 times the total number of such heat pumps installed in 2021[137] in the UK. While this reflects the more developed heat pump market in France, the detailed support provided through MaPrimeRénov' shows how an owner-occupier focused programme can successfully promote these measures, within a wider retrofit programme.
- The requirement for use of accredited installers within a private sector, consumer facing scheme covering this range of measures and with very large-scale uptake. This was a challenge in the delivery of the owner-occupier Green Home Grants programme because of relatively low numbers of accredited installers.[138] It is important to make it worthwhile for installers to gain the necessary accreditation. In France this is made simpler because installers can use the same accreditation as for the French energy supplier obligation, White Certificate (ECO equivalent) programme.[139]
- There is tiered financial support from low to high income households (a UK policy gap) – ensuring both equity and the additional market value of higher income householders who benefit from the scheme.
- Support for multiple measures/whole building works has been put in place. While this has been a challenge for the programme, the programme has been adapted and is evolving to promote more whole building action: this is a key focus.
- A specific sub programme exists for blocks of flats to undertake whole building/common areas measures – eg, insulation across the whole block. There is no provision made in UK retrofit programmes for private freeholders (owners or co-owners of blocks) to assess their building, apply for funding for, or manage whole block/common areas retrofit measures.
- Different funding levels for Paris as compared to the rest of the country, reflecting higher living costs in the capital. London has traditionally benefited from lower levels of uptake of UK ECO funding, in part due to additional costs and difficulties of works in the capital.

131 Agence Nationale de L'Habitat, 2023: Bilan 2022 (report on MaPrimeRenov for year 2022)

132 Ibid.

133 op. cit. 129

134 Le déploiement par l'anah du dispositif maprimerénov': premiers enseignements (French Court of Auditors) Page 13

135 op. cit. 128

136 Ibid.

137 Energy Security Bill factsheet: Low-carbon heat scheme, Department for Business, Energy & Industrial Strategy (BEIS) and the Department for Energy Security & Net Zero (DESNZ), UK Government.

138 Green Homes Grant Voucher Scheme Session 2021-22 8 September 2021 HC 302, National Audit Office, BEIS, UK Government.

139 Measures implemented from France's Energy Renovation Plan for Buildings 2021 (Plan de rénovation énergétique des bâtiments) include €30 million to be paid for the initial and continuing training of 65,000 building professionals. April 2021, Ministries Ecology Energy Territories, French Government.

2.10 One Stop Shop Service within the National Retrofit Plan – Ireland

Context and key features of the policy

The One Stop Shop Service was launched nationwide in Ireland in February 2022 and sits within an overarching framework of support for home energy grants, managed by Sustainable Energy Authority Ireland on behalf of the Irish government. Though the programme has built on earlier retrofit support policies and programmes within the National Retrofit Plan, the increased funding towards the initiative at this time was linked by Irish Government to the energy price crisis and the need to cut bills for households.

The One Stop Shop Service is underpinned by the National Retrofit Plan in Ireland which is a national-level, long-term funding commitment by the Irish government to help the country reach its 2030 climate goals. The scheme, which offers grants and end to end support, is an ambitious large-scale plan which aims to upgrade at least 500,000 homes to a BER B2 rating or above – which equates to 1 in 3 homes in Ireland – and has a specific target for renewable heating, with an aim to install 400,000 heat pumps in existing homes by 2030. The Irish government has made an investment commitment of €8 billion in residential retrofit until 2030 in order to meet this target, with most (€5 billion) of the funding to come from carbon tax receipts.[140]

140 The use of carbon tax funds, Irish Department for Public Expenditure and Reform, 2023

To support building renovations in the domestic sector, the Irish government funds a set of support services aimed at the able-to-pay and vulnerable consumers. There are three separate services on offer, the One Stop Shop Service, Individual Grants and Fully Funded measures. The One Stop Shop Service and the Individual Grants are open to all, and the Fully Funded measures are only available to those on qualifying benefits. Whereas individual grants aim to support the installation of single energy efficiency measures, the One Stop Shop Service encourages a whole-house approach to renovation and provides support from the start to end of a project. It includes an energy assessment, provides financial support through grants, undertakes project management of the renovation, contracting the work and conducting a follow up assessment to measure the improvement in the building's energy rating/performance.

The One Stop Shop Service is coordinated by Sustainable Energy Authority Ireland, the grants offered through the service are funded by the Irish government and the renovation works are delivered by private companies.

The One Stop Shop Service has been designed to encourage whole-house retrofits and one of the scheme requirements is that the works bring the building up to a B2 on Ireland's Building Energy Rating, meaning the property's energy consumption must be between 75 and 100kWh per m^2 per year. The service is open to homeowners and private landlords and is not means-tested. The grants offered through the One Stop Shop Service cover part of the cost of the installed measures and the rest of the cost is covered by the property owners themselves. The scheme supports a variety of insulation measures, including grants for external wall insulation between €3,000 and €8,000, as well as heating controls, solar PV and up to €6,500 for heat pump systems. The scheme also incentivises deeper home renovations by offering a €2,000 bonus to those who reach a B2 rating with a heat pump. It also offers grants for air-to-air heat pump systems; a technology that is not supported through UK schemes.

Sustainable Energy Authority Ireland monitor the scheme and collect data on the improvements made to each property. The scheme requires that each property has a Building Energy Rating assessment before and after the works and the One Stop Shop providers inform the Sustainable Energy Authority of Ireland (SEAI) of the measures that were installed at each property. The carbon and energy savings are calculated based on deemed savings per measure installed and dwelling type.

The One Stop Shop model

The One Stop Shop Service requires that renovation work be delivered by 'registered private operators' who manage the complete process from the initial assessment, the delivery of the work through to the final reassessment. These operators are known as One Stop Shop providers and are independent, private companies, who must register with SEAI before they can participate in the scheme. The registration process requires a series of checks on the financial standing and governance of the company. Observations on the scheme so far are that the process of registration has been lengthy because companies are checked against many criteria, to

prove that they are a mature company with the ability to take on the associated financial risk, have the capacity to deliver, and provide good quality customer service to their clients. This one stop shop model is new to Ireland and was not seen until the scheme was launched, making this a new market. Once registered, the One Stop Shop providers drive the promotion of their services and engage clients directly. The providers enter into a contract directly with their customers and claim the grant funding on their clients' behalf, once the work is completed and the follow up assessment has demonstrated the required improvement in the building's energy performance rating. The grant value is deducted from the cost of works upfront, and property owners are required to pay the outstanding cost. By March 2023, the list of One Stop Shop providers, managed by SEAI, had twelve companies who provide services nationally or regionally.

One Stop Shop providers are independent companies which are not controlled by SEAI or the Irish Government and are also independent from each other. Some offer additional financing, through finance partners, such as credit unions. For example, CU Greener Homes is a partnership between credit unions, an energy supplier, and a retrofit company, and has been set up to offer low-interest loans.

Figure 2.4: Before and after photo of 1960's home in Dublin that underwent a complete home energy upgrade under the SEAI One Stop Shop Service. Upgrade measures included external wall insulation, floor and attic insulation, triple glazed windows, and heat pump installation. The project was completed by KORE Retrofit, a registered One Stop Shop provider under the scheme. (Copyright: KORE Retrofit, 2023)

Despite the relatively generous grants, there is still a financing gap, with customers needing to fund considerable sums themselves. Grants through the One Stop Shop Service were initially set to cover approximately 50% of the cost of measures (up to 80% for some measures), but with recent cost increases of services and materials, this percentage has dropped. The average cost to date of a private home retrofit has been €60,000. The average cost to homeowners is €36,000 and the average grant size per home is €23,000, meaning homeowners need to fund more than half of the renovation costs themselves. This leaves a significant financing gap for private homeowners, but there is an opportunity for national government to support the development of low-cost financing options that can be used to overcome the barrier of high upfront costs.

Some of the One Stop Shop providers have struggled to cope with demand during the first year of the scheme, this has been attributed to the lengthy One Stop Shop Provider registration process, meaning providers are registering at a slower pace, leaving the few that have successfully registered with long waiting lists.

Aside from streamlining the registration process, the learnings that can be taken from this case study are that there are opportunities for national government to support the supply chain if setting up similar schemes. Firstly, by signalling stability, by putting in place long-term national policies, like the National Retrofit Plan that give confidence to the supply chain to invest in expanding their operations. And secondly through education, awareness raising and support for the supply chain while the scheme is in the early stages of implementation. A systematic approach to readying the supply chain at the national level can help reduce bottlenecks and avoid long waiting times.

Impacts

The programme is aiming for 500,000 retrofits, achieving a 1.45 million tonne reduction in emissions if this target is achieved, with a typical emission saving per home of 2.9 tonnes.

In its first year of operation the programme received 1,400 applications up until March 2023. Approximately 680 deep home retrofits have been completed, with 98% of those installing a heat pump as part of the works. Based on measures installed to date, the average investment made by households has been €36,000, in addition to €23,000 received as a grant.

Observations of the scheme so far have been that while there is a good level of demand for the service, the completion of retrofits has been slower than hoped. In part this is due to some of the registered One Stop Shop providers not being able to cope with demand, with customers who apply for the scheme having to wait until providers become available. As such, the long-term framework of the programme should help to increase uptake over time, as the one stop shop process "beds in" and the wider supply chain responds to the new market signal. The One Stop Shop provider registration process was new and there are opportunities to learn from the first few months of the scheme to streamline it. Funding allocated from Irish retrofit programmes increased steadily and rapidly through 2022, from €19 million in Quarter 1 to €62 million in Quarter 4.[141]

Applicability to the UK

- This policy has a customer-centric approach and helps people overcome common barriers to making homes more energy efficient.
- This policy encourages deep retrofit of homes and helps people understand what they need to do to improve the overall energy performance of their home and provides grants to support people to take action.
- The whole house approach to promoting energy efficiency – with a strong focus on reaching an overall BER/energy performance target.
- The development of a new market for private one stop shop providers – independent of, but working in partnership with, and overseen by, government. These providers are able to leverage private finance and innovate in programme delivery.

The significant barriers facing home energy upgrades in the UK are knowing what measures are needed, finding suitable contractors to conduct the work, and being able to fund the improvements. The One Stop Shop Service in Ireland has several innovative features which show how a nationally coordinated scheme can help address these barriers.

The One Stop Shop provider manages the entire retrofit process on behalf of homeowners. In the UK, Home Energy Scotland offers energy saving advice and guidance on available grants and financial support but stops short of providing overall management of the renovation process. Under the One Stop Shop Service, homeowners are helped to overcome the knowledge gap of how to make their home more energy efficient and the administrative burden of a home retrofit is reduced.

The One Stop Shop Service is an example of how governments can create an enabling environment for retrofit providers. The model was newly designed for Ireland and demonstrates how a market can be developed, where it does not already exist, within which new service offerings can develop.

141 Statistics for National Home Retrofit Programmes, Sustainable Energy Authority Ireland, April 2023

2.11 Greener Homes Initiative – Canada

Context and key features of the policy

The Canada Greener Homes Initiative is a federal level programme in Canada which aims to "help homeowners save money, create new jobs across Canada for energy advisors and fight climate change."[142]

It provides federal funded grants and a loan for home energy evaluations and energy efficiency/ climate resiliency retrofits. The programme is notable for the Government's long-term funding commitment; the focus on the customer journey; detailed assessment and evaluation of homes before and after improvement. A further distinct aspect of the programme is the support provided to develop the retrofit assessor industry in Canada.

The programme has been extended with a specific sub-programme covering heat pumps in oil heated homes as a direct response to the energy crisis. Funding of approximately $2.6 billion (£1.92 billion) has been allocated for the Greener Homes Grant, $4.4 billion for the loan and $250 million for the oil to heat pump programme.

Detailed description of policy

Launched in May 2021, the Canada Greener Homes Grant (CGHG) offers $125 (£74) to $5,000 (£2,975) for eligible retrofits, and up to $600 toward the total costs of pre- and post-retrofit EnerGuide (home assessment methodology) evaluations.[143] Grant payments are made at the end of the process (Figure 2.5).[144]

A representative for Natural Resources Canada (NRCan) noted "a huge volume of registrations at the beginning of the programme and through the first summer". They noted that since then, new applications have steadied at an average of 250 applications per day. The representative reflected that overall interest in this programme had risen sharply (not unrelated to the energy price crisis).

Eligible measures for CGHG

- Up to $5,000 for space and water heating, renewable energy (solar PV), home insulation, windows, and doors
- Up to $1,000 for air-sealing
- Up to $50 for a smart thermostat*
- Up to $2,625 for resiliency measures*

* Must be combined with another measure.

Home Loan Programme

Designed to help 170,000 homeowners complete larger and more expensive retrofits as recommended by their energy advisor, the Canada Greener Homes Loan offers an unsecured personal loan on approved credit. The loan was launched eight months after the launch of the Canada Greener Homes Grant (CGHG), and as of 6 September 2022, more than 3,200 homeowners had applied for a loan.[145]

Greener Homes Loan

- $4.4 billion in interest-free financing
- Up to $40,000 ($5,000 minimum) with a 10-year repayment term
- Applicants must be eligible for and apply for the CGHG or equivalent provincial programme, with additional eligibility criteria for apartment buildings.

Targeted support

Introduced in November 2022 as part of the Greener Homes Initiative, the Oil to Heat Pump Affordability Program (OHPA) helps low-to-median-income Canadian households that are currently heating their homes with oil to transition to electric heat pumps.

Homeowners can receive up to $10,000 ($5,000 from OHPA, combined with up to $5,000 from the CGHG) toward the purchase and installation of a new heat pump and associated eligible measures related to its installation.[146] Unlike the wider Greener Homes Programme, the OHPA programme does not require pre- and post-retrofit energy evaluations to access and receive funding because it is targeted at households that require upfront capital to purchase a heat pump and undertake ancillary measures such as installing a back-up system, for example, baseboard heaters.[147]

142 Canada Greener Homes Grant, Natural Resources Canada

143 Based on 27/03/2023 exchange rate.

144 Homeowners can be reimbursed up to $600 for the expenses of the energy audits, as long as the homeowner undertakes at least one recommended retrofit.

145 Canada Greener Homes Initiative 2022 Quarterly Update, Natural Resources Canada

146 Necessary and related electrical and mechanical upgrades to the home; safe removal of oil tank; installation of a back-up electric heating system; switching over other oil-using household systems, such as a hot water heater.

147 The future of home heating: Hybrid home heating systems offer energy savings and reduce GHG emissions, Natural Resources Canada

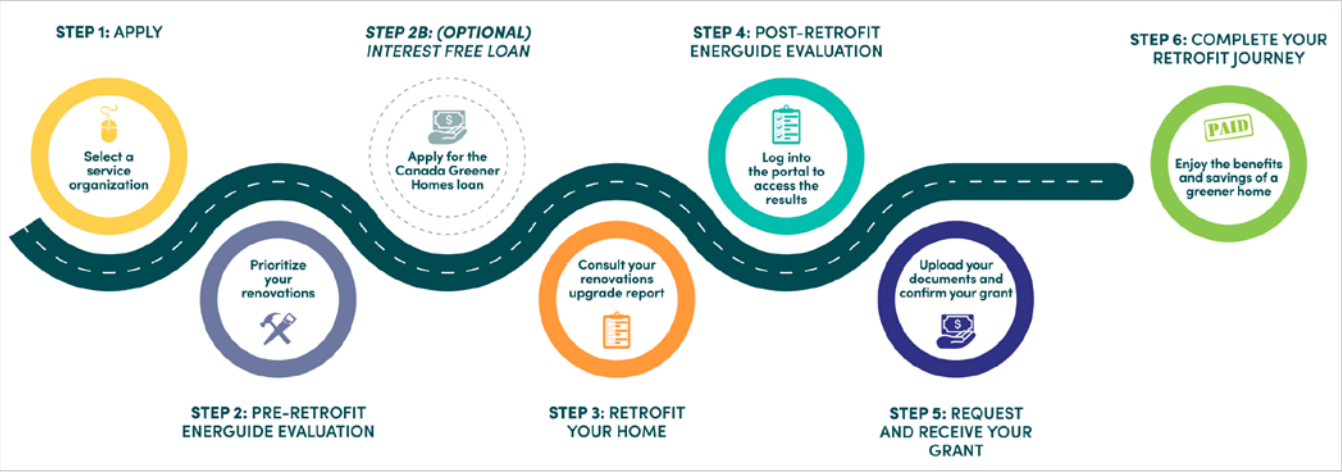


Figure 2.5: Customer journey for Greener Homes[148]

Low-rise apartment buildings

Greener Homes uses a specific assessment approach for apartment buildings, supporting planning for retrofit as whole buildings. For multi-unit residential buildings (MURBs) with three or fewer storeys, "a single pre- and post-retrofit EnerGuide evaluation must be performed on the entire structure"[149] (note there is no equivalent blocks of flat assessment process in the UK). For MURBs with multiple homeowners, up to four individual homeowners within the MURB can apply for grants of up to $5,000 each based on a multiplier factor to account for larger areas to insulate or renovate when comparing an MURB to a single dwelling. The maximum grant amount that a MURB can receive is $20,000.[150]

Climate change and resiliency measures

The inclusion of resiliency measures[151] in the scheme is also a notable feature. Though beneficiaries must install at least one energy efficiency measure to avail of grant funding, they can also install several listed resiliency measures to help protect the home against natural disasters, including those that are likely to become more frequent with climate change (hurricanes, flooding, fires, and power outages). For example, these measures include roofing membranes and basement sealing.

Assessment and developing an assessment industry

Energy advisors are a core feature of the CGHG. To ensure retrofits improve a home's energy efficiency and homeowners know about their retrofit options, an energy advisor must conduct a pre-retrofit and post-retrofit EnerGuide home energy evaluation. A NRCan representative explained that the scheme – including access to grants and an interest-free loan – is "predicated on evaluation."

The scheme is planned to recruit, train and mentor up to 2,000 new energy advisor jobs, through a $10 million funding commitment.[152]

The Canadian Government has explicitly discussed this element of the policy as part of the response to current economic problems: the development of the assessment industry is creating "good middle-class jobs. In Nova Scotia (and there may be other provincial examples) the *Black, Indigenous, People of Colour (BIPOC) and Mi'kmaq Energy Training Pilot*, which was launched in 2021, trains people from under-represented groups to become energy advisors and clean energy tradespeople.[153]

148 Canada Greener Homes Grant, How the grant process works, Natural Resources Canada

149 Multi-Unit Residential Buildings (MURBs), Natural Resources Canada

150 Ibid.

151 Resiliency measures to protect your home, Natural Resources Canada

152 Making Home Heating More Affordable for Canadians While Fighting Climate Change, Natural Resources Canada, 2022

153 Province Invests in Energy Efficiency, Low-carbon Economy, Nova Scotia, 2022

Delivery and scheme history

The picture of retrofit support programmes in Canada is complicated; this federal initiative is designed to work alongside programmes run by provincial governments and by regulated utilities at provincial level.[154] Lower-level municipalities may also offer grants for solar panels,[155] for example. An Efficiency Canada representative discussed a recent example of combined funding from federal, provincial and utility programs, the Home Efficiency Rebate Plus programme, a partnership creating a streamlined path to accessing rebates for Ontario residents between CGHG, the Government of Ontario and Enbridge Gas.

With funding through to 2027, a NRCan representative described the programme as an "evergreen piece of work." They noted that the programme continues to learn and evolve, with the grant list reviewed annually as new technology emerges. The length of the current programme is also considered to support build-up of the supply chain, with the Government looking to re-capitalise and/or modify the programme after seven years and/or once the funding has run out.

Impacts

In the first seven months of the CGHG, applications were received for over 25% of its intended 700,000 grants. As of 13 February 2023, over 288,000 CGHG applications had been received through the national portal and provincial and territorial delivery partners, with $178 million in grants issued to 46,000 homeowners, and the rest of the applications being at various stages of the homeowner journey.[156]

The apparent discrepancy in applications and issued grants could be due to payments being made following completion of works, including submission of pre- and post- evaluations and final receipts by the homeowner[157] (this may indicate a challenge for the applicants who need to have available funds for remaining costs and/or are encouraged to apply for the Greener Homes Loan).

Because of the newness of the programme, most data are available on the basis of planned impacts. The programme is anticipated to benefit 925,000 households for both grants and loans. The aim is to achieve 1.5 million tonnes in emissions reductions – this would amount to around 1.6 tonnes per household beneficiary.

While energy bills savings will vary between measures and provinces, an individual household energy bill savings from the OHPA grant is estimated to be $3,100 (£1,850) lower as a result of the installation.

The development of the energy advisor industry is a significant element of the programme. The NRCan representative noted that the number of energy advisors prior to the initiative was around 948, compared to over 1,600 energy advisors now in place – this increase of over 600 advisors can be at least partially attributed to the initiative.

Applicability to the UK

The long-term certainty of the scheme, planned to run to 2028, is greater than UK level retrofit schemes. The detailed focus on the customer journey is also important as is the option to combine grants and loans through a single programme.

Pre and post assessment/evaluation requirements go significantly beyond requirements in UK programmes. The Canadian assessment methodology is detailed: it costs around 3 times[158] as much as a UK EPC and involves a more complex assessment, for example a blower door test to check air tightness. The development and use of a specific whole building methodology for assessing blocks of flats is also important – there is currently no equivalent methodology for whole building action on blocks of flats in the UK.

Greener Homes has a strong focus on training and qualification of energy assessors to support the development of an assessment industry: the UK has few policies that integrate training and jobs with green initiatives.

The Inclusion of resilience (climate change adaptation) measures in the programme could be a consideration for future UK programmes.

154 The CGHG is co-delivered in three provinces through existing programmes at the provincial level, with beneficiaries able to access federal and provincial funding simultaneously.

155 Solar Incentives and Rebates in Canada, Solacity

156 Canadians Can Now Pre-Register for the Oil to Heat Pump Affordability Program to Lower Heating Costs and Reduce Pollution, Natural Resources Canada, 2023

157 op. cit. 148

158 Based on the Canadian Energuide assessment costing C$350-600 (£259 – £444), based on review of Canadian websites and available subsidy from Greener Homes Canada program and a UK EPC £60-120 (source: Money Saving Expert).

2.12 Sobriété Énergétique – France[159]

Context and key features of the policy

This large-scale package of policies is part of a wider French Energy Strategy which intends to promote lower energy consumption, to cope with the risk of gas shortages resulting from the war in Ukraine[160] and to help avoid blackouts through winter 2022-23,[161] considering a reduction of nuclear electricity production in France.[162]

The **French Energy Strategy** is based on four pillars:

- Energy sobriety – consuming less.
- Energy efficiency – consuming differently.
- Acceleration of renewables.
- Revival of the French nuclear industry.

The package extends across sectors of French society providing guidance to all actors to encourage them to take personal responsibility for their energy use in a collective way. It acts to direct and raise awareness of all current schemes and support available to people, communities,businesses and local authorities to reduce energy demand, reduce bills and reach French climate goals. It is key to note that the package consists mostly of (though not entirely) voluntary ambitions, rather than mandatory regulations.

In reducing energy demand, an aim of the policy is to reduce carbon emissions. At its launch in June/July 2022, the Prime Minister described it as a "first step" towards achieving the 40% cut in demand by 2050 recommended by climate experts for the country to become carbon neutral. The full plan was announced on 14 July 2022, by President Emmanuel Macron;[163] "Sobriety is a simple concept chosen savings rather than imposed cuts."[164]

The policy is seen to be a success based on achieved reductions in energy demand in France since its introduction. On 4 April 2023, Minister for the Energy Transition, Agnes Pannier-Runacher announced that she is currently working on 'Act 2' of the sobriety plan.[165] She acknowledged significant energy savings over the winter, stating that savings made by the French in the winter 2022-23 were equivalent to seven nuclear reactors.[166]

Detailed description of policy

The plan detail was formally presented on 6 October 2022. The key aim of the package is to reduce consumption by 10% by 2024 (compared to 2019), with the Government stating that 50 TWh of savings are achievable if all measures in the programme are achieved.

The plan is far-reaching: the Sobriety Plan provides operational roadmaps for what are described as the major players in daily life; state public administrations, local authorities, businesses, and French people to adopt so that energy saving can be implemented successfully.

The Energy Sobriety Decree[167] details mandatory elements of the policy package: for example, stating that illuminated advertisements and signs must be turned off between 1:00am-6:00am and provides for fines applicable for those who fail to comply. However, most of the measures are not binding and rely on reputational regulation[168] where, although voluntary commitments, companies and organisations feel obliged to deliver against policies in the interest of public perception and transparent scrutiny.

159 Plan de sobriété énergétique, Une mobilisation générale. 6 October 2022, French Government.

160 Ibid., "The war in Ukraine is upsetting the international order and we have not finished measuring the consequences." (English translation, original on Page 4).

161 op. cit. 159, "...By acting together, we can avoid shortages, cuts and limit the economic impact of the almost total stoppage of gas deliveries by Russia." (English translation, original on Page 4).

162 Nuclear power plants generated 68% of France's electricity in 2021, 23 January 2023 , EIA.

163 Je réponds aux questions de Caroline Roux et Anne-Claire Coudray. Emmanuel Macron YouTube Channel, YouTube.

164 op. cit. 159

165 Plan de sobriété énergétique, acte 2 : Agnès Pannier-Runacher et Clément Beaune présentent la charte pour mieux réguler la publicité lumineuse dans les gares, stations et aéroports, 27 March 2023, French Government.

166 Minister of Energy Transition, Agnès Pannier-Runacher provided an update on Twitter: "Nouveau point d'étape du plan de sobriété énergétique avec les entreprises du CAC 40 et du SBF 120. Les économies d'énergie réalisées cet hiver montrent que notre méthode fonctionne. Il faut maintenant tenir le cap et pérenniser les mesures en allant plus loin encore.", 4 April 2023.

167 Decree No. 2022-1294 of 5 October 2022, amending provisions of the Environmental Code relating to the rules for extinguishing illuminated advertisements and illuminated signs, Legifrance.

168 A UK Regulators Network Consumer Working Group discussion paper, Philip Cullum, July 2014, UK Regulators Network (UKRN).

Measures are being promoted via changes to guidelines; providing financial incentives such as bonuses (see MaPrimeRénov' case study above), through media encouragement and charters for businesses. The measures recommended are wide-ranging, varying greatly by the nine sectors targeted. The plan includes measures for households, businesses, industries, and the public sector, supported by a major communication campaign to raise awareness to encourage people and organisations to take personal responsibility in reducing demand.

Development of measures

Nine sectoral working groups were launched to mobilise different sectors. These groups focused on building fabric and heating, private companies, public establishments and large commercial areas, industry, housing, transport, digital and telecommunications, sports, and local authorities.

These working groups utilised the main players in each sector, experts, associations[169] and trade unions, as well as energy specialists developing tailor-made sobriety action plans for each sector. Each group was able to come up with simple, operational measures, applicable in the very short term. The working groups resulted in the Sobriety plan of 15 key measures[170] to avoid winter blackouts whilst also preparing for long-term savings.

On 4 April 2023, Minister for the Energy Transition, Agnes Pannier-Runacher announced that she is currently working on 'Act 2' of the sobriety plan.[171]

The minster stated that they would be observing innovative ideas which have been developed locally in the view that they might be rolled out at scale so that the energy savings made over winter last.

Key measures by sector

The 15 key measures finalised by the nine sectoral working groups were:

Sobriety in buildings

Tertiary and residential buildings contribute nearly 45% of the final energy consumed in France and generate 20% of direct GHG emissions. To reduce energy consumption, the actors mobilised by the Government are committed to several measures:[172]

1. Temperature caps mean that 19°C is the max heating temperature used for living, teaching, offices, or spaces open to the public when occupied. Likewise, air conditioning in these spaces is only able to be switched on above 26°C.
2. Postpone the start and end of the heating period by 15 days.
3. Reduce the use of domestic hot water in offices.

169 Les associations en France, 6 January 2005, Associations, France.

170 Each action plan includes quantified energy consumption reduction measures. For each measure, support is provided as much as possible (advice, financial aid, information commitment from professionals, etc.)

171 op. cit. 165

172 op. cit. 159

Support for households

Implementation of a sobriety bonus to promote energy savings and lower bills.

As part of the voluntary measures taken by businesses under the Sobriety Plan, energy companies introduced energy saving incentives for their customers.

TotalEnergies offered a bonus ranging from €30 to €120 for households heating with electricity that reduce their consumption by at least 5%. To calculate the bonus due to each customer, the company compares usage between November 2021 and March 2022 with their usage during November 2022 and March 2023. As a result, beneficiaries must have been with TotalEngergies since at least November 2021 and must have a Linky (smart) meter, approximately three million households are eligible for the scheme. A reduction of 5% results in a €30 bonus, while 6% will give €36. Customers who achieve a 20% cut will receive the full €120.

Between October 2022 and April 2023 **Engie** customers are encouraged to cut their usage by a certain level of saving in comparison to the amount they consumed on the same day over the three preceding weeks. Each time the goal is achieved customers are awarded a bonus of between €5 and €10.

Households that control their energy consumption will be able to receive a bonus on their gas and electricity bills, with several energy companies committing to making this offer.[173,174]

Promotion of actions under the 'MaPrimeRénov' (see above) programme for switching to a heat pump or a heat network.

Informing the French public about the electricity weather forecast (EcoWatt signal) in partnership with RTE (Réseau de Transport d'Electricité), through TV and Radio media. EcoWatt[175] is a four-day forecast for electricity use across France. With three levels of electricity use, the service offers an alert when supply is strained (third level) urging users to cut their demand.

Sobriety in mobility

The transport sector represents 32% of France's final energy consumption and 30% of GHG emissions.[176]

1. Promotion of carpooling[177] with a bonus for any new car-pooler who registers on the platform.[178,179]

Reducing energy use in the public sector

1. Decrease heating from 19°C to 18°C and enabling staggered working hours on days with high usage on the electrical system (when EcoWatt signal is red).
2. Encourage teleworking to reduce fuel.[180]
3. Limit speed to 110 km/h on the motorway for public officials using their service vehicle for non-emergency business trips.

Sobriety for local authorities

1. Reduce electricity consumption linked to public lighting.
2. Reduce the heating of sports premises, gymnasiums, swimming pools.
3. Reduce the number of heated square meters by grouping public services in the most suitable premises, even if it means using them over longer time slots.

Sobriety for businesses

1. *Les entreprises s'engage* platform lists companies that have made 15 commitments and are supported in their deployment.[181]

Sobriety in sport

1. Almost half (43%) of the sports sector's energy consumption comes from heating whereas lighting accounts for 18% of sports energy consumption.[182]

Reduce lighting periods before and after matches by 50% for competitions taking place during the day and more than 30% for evening matches.[183]

173 French electricity firms offer bonuses for cutting back this winter, 29 September 2022, The Local France

174 French energy firms offer up to €120 discount to those who cut usage, 29 September 2022, The Connexion.

175 Ecowatt, votre météo de l'électricité pour une consommation responsible, écowatt.

176 op. cit. 159

177 "A carpooling trip saves 6 kgCO² on average", Everyday carpooling, Ministries of Ecology, Energy & Territories, French Government.

178 This works out to approximately €100 per person.

179 op. cit. 177. "70% of commuting trips are made with individual vehicles and it is estimated that only 3% share daily."

180 Measuring real savings in heating through closed state service buildings.

181 Les entreprises engagées pour la sobriété énergétique, French Republic.

182 op. cit. 159

183 op. cit. 159

Communications campaign

Eco-gestures for individuals involve:

1. Set the heating to a maximum of 19°C.
2. Setting the water heater to 55 °C and reducing shower time*.
3. Turning devices on standby off.
4. Shifting the use of electrical appliances to off-peak periods**.
5. Installation of a connected thermostat (heating regulation system) in all homes.

** They make it possible to achieve a 15% to 20% reduction in energy consumption related to domestic hot water. In the same way, by installing a thermodynamic water heater or an individual solar water heater (CESI), individuals can reduce their bill in the long-term. For example, a solar water heater can cover up to 80% of your hot water needs, depending on the sunshine in the region. These schemes are eligible for energy renovation aid.*

*** This measure "will save between 1 and 2.5 GW per day, or the production of between 1 and 2.5 nuclear reactors" according to Thierry Sudret, Director of Operations and Systems at Enedis. There is no impact to fear on household comfort.*

The Sobriety plan and sector specific measures have been supported by a major communication campaign[184] through which private individuals are advised to practice "eco gestures", from reducing shower time to switching off household appliances when they are on standby. The campaign, *Every action counts* started on 10 October 2022,[185] promoting five eco-gestures specifically, giving people an opportunity to act and mobilise together, rather than just receiving information.[186] This campaign included a 30-second television spot, as well as five complementary short films presenting each of the gestures. The campaign was also deployed: on the radio, in the press and on social networks and ran until February 2023.

In terms of eligibility, this package is largely applicable to all as it covers sectors across society and has guidance for businesses, individuals, local authorities, and others in how to implement the developed measures.

Measures Common to all sectors:

The Sobriété Package includes commitments applicable to all sectors[187] some of which include:

- Heating and air conditioning
- Maintaining buildings at adequate temperatures
- Install smart devices to better manage energy

Building Automation and Control Systems (BACS) enable smarter building management to reduce energy waste by up to 20%.[188] The French Government intend to consult on extending the obligation to install a BACS to all tertiary buildings with heating or cooling unit of more than 70kW before 2027.

Insulate and ensure equipment maintenance: "Insulate water networks (water and heating pipes) in all buildings to avoid heat loss as up to 20% of heat can be lost in this way.[189] The energy savings certificates framework provides financial assistance to support this approach."[190]

Promote active mobility and public transport. Signpost to the existing sustainable mobility package[191] to support carpooling and cycling. Up to €700 annually (tax free) can be combined with an €800 reimbursement for public transport.[192] A further example is to develop public transport and the use of bicycles, through payment by employers of the public transport package or public bicycle service until the end of 2023. Between 50% and 75% will be exempt from tax and contributions for employees.[193] On 20 September 2022, the Prime Minister announced[194] €250 million from 2023 to strengthen and accelerate the bicycle plan.

184 Pour économiser l'énergie, on agit, on réduit, French Government.

185 Que prévoit le plan de sobriété énergétique pour les ménages?, 7 October 2022, Directorate of Legal and Administrative Information (Prime Minister).

186 Pour économiser l'énergie, on agit, on réduit, French Government; Plan de sobriété : quelles mesures pour les particuliers? Juliette. S, October 2022

187 This list is not exhaustive of the measures recommended.

188 Funding for BACS acquisition has been doubled to promote installation, with an additional 150% to improve the current system for 2023, equating to €46,000 of support for a 5000m2 building to obtain a BACS system.

189 This will become mandatory in 2025 for all buildings during a boiler change.

190 op. cit. 158 ; Financial support for the isolation of water networks in buildings finances approximately €25 per meter of network for the tertiary sector and €30 per meter of network for the residential sector, see Energy saving certificates (EEC).

191 Sustainable mobility package France, 21 June 2021, Policies, IEA.

192 French government presents updated plan to encourage carpooling, 14 December 2022, Le Monde.

193 op. Cit. 159

194 op. Cit. 159

Impacts

While the Sobriety Plan is assisting people in accessing existing support programmes and information,[195] there is limited impact data available due to the voluntary nature of the majority of the package and the fact it is an overarching framework rather than a single policy action (so, for example, renovation measures are promoted and reported under the MaPrimeRénov' programme). However, the French Government has projected savings for many of the measures covered in the plan. There are also some practical case examples showing the savings made by locales or companies.

Furthermore, the French Government is providing weekly monitoring[196] of French energy consumption as part of the Energy Sobriety Plan communications. "Based on this data and the weather, it is possible to measure whether the necessary savings have been achieved."[197] The data is published by the Ministry of Energy Transition and compares weather corrected cumulative energy use from August 2022[198] up to the current week, against a 2018/19 baseline level. As of 16 April 2023, the cumulative running total for consumption since 1 August 2022, compared to 2018/19, for:

- Electricity has reduced by 7.8% to 328.4 TWh (non-weather corrected data unavailable)
- Natural gas has reduced by 16.4% to 307.4 TWh (18.5% reduction without weather correction)[199]
- Combined electricity and natural gas have reduced by 12% to 605.4 TWh (weather corrected)

The increase in the cost of energy itself will have had an impact on the use of energy amongst other factors impacting demand. For approximate comparison, and noting that many factors influence energy demand, the UK Government estimates that annual final consumption of gas (not weather corrected) in the UK in 2022 fell by 9.9% against 2018 levels.[200]

Final electricity consumption (not weather corrected) in the UK is estimated to have decreased 9.0% from the year 2018 to the year 2022.[201] However, in comparing France and the UK, it is important to note that British electricity customers faced much more significant electricity price rises – over twice as high at peak for domestic customers – as a result of the energy price crisis in 2022. Gas prices were much more closely aligned in France and GB in 2022.[202] But France also uses less natural gas than Britain overall.[203]

The significant levels of energy savings being achieved in France therefore point positively to the impacts of the French mobilisation around energy saving in part as a result of the Sobriety Plan.

Applicability to the UK

The policy is of interest to the UK as a very large-scale national campaign to reduce energy demand, aiming to mobilise all sectors of society, and working towards a national energy demand reduction target of 10% by 2024.

Recently UK Government has run campaigns for householders[204] and businesses[205] focused on cutting energy bills, in response to the energy crisis. There has also been extensive discussion and analysis (not least by the CCC) of the need for national net zero focused behaviour change campaigns. The French experience suggests a national energy demand reduction programme could be effective.

Mobilising society around a national energy saving target enables the public to see how they can benefit from bills reduction, while also helping deliver energy security and decarbonisation – all of which are now high political priorities. The UK Government has a frequently referenced (by policy makers) national energy saving target of 15% by 2030. This target is, for example, central to the remit of the new Energy Efficiency Taskforce which Department for Energy Security and Net Zero (DESNZ) have established.[206] This could become a society-wide target.

195 Vattenfall Energy Savings Barometer Q1/2023, Vattenfall.

196 Suivi hebdomadaire de la consommation énergétique de la France (Weekly monitoring of France energy consumption), Ministries of Ecology, Energy & Territories, French Government.

197 Ibid.

198 Ibid.

199 Tableau de bord de la consummation de gaz en France pour la période 2022-2023, GRTgaz.

200 Natural gas supply and consumption, National Statistics Energy Trends, Table 4.1, 30 March 2023, Department for Energy Security & Net Zero (DESNZ) Table 4.1

201 Supply and consumption of electricity, National Statistics Energy Trends, Table 5.2, 30 March 2023, DESNZ.

202 Household Energy Price Index (HEPI), monthly update, HEPI.

203 Consumption of natural gas in EU countries, ResearchGate.

204 Small changes mean energy advice campaign adds up to big savings, 17 December 2022, BEIS and the Rt Hon Grant Shapps MP.

205 Government launches campaign to help businesses drive down energy bills, 1 April 2023, DESNZ, Amanda Solloway MP and Lord Callanan.

206 Government announces team of leading experts to boost energy efficiency, 16 March 2023, DESNZ and Lord Callanan.

Such a target can provide a framework for both short and long-term communications about behaviour change. In the immediate energy crisis context Sobriété Énergétique has promoted short term actions that are very similar to those in the UK's bill saving focused campaigns. But these are framed within and alongside messages about longer term steps and actions (such as renovation) to achieve longer term reductions in energy demand.

The central feature of the French initiative is the way the package of polices are coordinated and integrated across society,[207] mobilising businesses, public sector and third sector organisations to provide leadership for the public. Mobilising the private sector can reduce costs of a campaign to government, but also lever actions that only businesses can take – such as the additional energy saving incentives that have been introduced by some French energy suppliers.

Large businesses can also provide leadership for SMEs, alongside government. The Les Entreprises S'engage Platform for French businesses has some similarities with the SME Climate Hub in the UK.[208] For example, it includes information on how companies committed to energy sobriety reduce their consumption and associated environmental impacts – a form of best practice sharing among [online] community members.

Online platforms can "nurture ambitious narratives of positive change."[209] The accessible, weekly presentation of French final energy consumption since the Sobriety Plan began enables everyone to see progress. UK energy consumption data is not readily accessible by the public but could be a central feature of a platform that can share success stories about reducing bills, reducing emissions, and supporting UK clean energy generation.

207 op. cit. 28

208 Committed businesses, SME Climate Hub.

209 Behaviour change, public engagement and Net Zero: A report for the Committee on Climate Change, Dr Richard Carmichael, October 2019, Imperial College London.

2.13 Reduce Your Use campaign – Ireland

Context and key features of the policy

Reduce Your Use was an Irish energy saving information campaign delivered in 2022 explicitly in the context of the energy crisis. It is of interest particularly because of the careful design of the messaging, considering public sentiment – aiming to motivate people to take energy saving steps while considering the worries people had through the crisis. It covered a range of energy saving measures, including transport, and had near total reach across the population. Though impact evaluation data in terms of delivered energy and carbon savings were not monitored, the policy has spurred the Irish Government to begin considering in more detail how such data can be gathered for future programmes.

Detailed description of policy

Reduce Your Use was a national information campaign in Ireland, led by an inter-departmental government communications taskforce, including the Department for Environment, Climate and Communications, aimed at driving energy reduction in the country. It was developed in the context of the National Energy Security Framework, published in April 2022. The framework outlined the Government's response to its energy security needs, in light of the war in Ukraine. Reduce Your Use was an online, radio and print campaign which covered ways of reducing energy use from heating, appliances, travel (modal choice) and driving.

The campaign was motivated by a need to communicate with the public on the topic of energy security and offer guidance and reassurance at a time when there was a lot of negative sentiment surrounding energy issues. There was a growing concern over the increased cost of living and there had been public backlash against advice on reducing energy that was not sympathetic to the difficulties people were facing. After the pandemic, there was also weariness among the public about making sacrifices for the common good. Therefore, one of the main aims of the campaign was to reassure the public and reduce feelings of worry, and at the same time raise awareness of how reducing energy use would help people alleviate the financial impact of rising costs and contribute to the country's energy security. The campaign was careful to raise awareness about ways of reducing energy, but only where it was safe for people to do so: encouraging people to stay warm and maintain a healthy and safe home environment.

Reduce Your Use campaign booklets (2023)[210]

The campaign produced an information booklet, which was widely distributed, with information on why it is important to save energy where possible and explaining actions people can take that would lead to immediate savings. It covered tips on setting heating temperatures in the home; signposting to help on offer for home insulation; information on which home appliances use most electricity; and tips on how to use them more efficiently. The guide also included transport advice: how to reduce fuel consumption while using private cars through smart driving, but also encouraging replacing car journeys with other low carbon options where possible. Thus it covered carpooling, smart driving (avoiding idling, keeping tyres inflated) and encouraging walking, cycling and use of public transport where feasible.

Aside from the booklet, the campaign website offered clear signposting to help that was on offer, depending on people's needs (Figure 2.6).

Figure 2.6: Government of Ireland, Reduce Your Use campaign website (2023) Signposting to available support[211]

210 Reduce Your Use information booklet, SEAI, 2022 and Stay warm and well booklet, Government of Ireland, 2022

211 Reduce your use, Government of Ireland, 2022

Impacts

The campaign performed well against benchmarks for similar campaigns. 99% of adults in the country would have been exposed to the messaging[212] and the majority of households received the 'Reduce Your Use' information booklet at their address.

Isolating the impact of an awareness raising camping on energy use behaviour and being able to attribute energy savings to specific messages is difficult to do because of the large number of other variables. And in this case, the impact on people's behaviour and energy reduction was not monitored, however, the responsible government department have plans to create a methodology to track the long-term impact of awareness and information campaigns on behaviour.

Applicability to the UK

Across Europe, the energy price crisis – particularly through the winter of 2022 – made government communications with citizens about energy saving actions an urgent priority. The lessons from these campaigns can provide insight for design of future initiatives which may be longer running campaigns to promote behaviour change around energy use in the context of decarbonisation as well as bills reduction.

The UK Government winter 2022 "It All Adds Up"[213] consumer campaign is one such example which promoted simple home energy saving tips. "Reduce Your Use" in Ireland presented similar advice but went further than the UK Government programme in promoting action on transport measures as well as home energy saving tips.

An interesting aspect of the Irish campaign was the design of the messaging. The campaign was delivered at a challenging time for government communications due to negative sentiments about energy costs, therefore one of the key considerations was that it needed to convey empathy at a time when many people had financial worries. The campaign was careful to raise awareness about ways of reducing energy, but only where it was safe for people to do so. This is a difficult balance to strike, but the campaign was successful in communicating what help was on offer and alleviating worry. Messaging was tested before being released widely and was tracked, so that it could be adjusted according to the public sentiment at the time.

Finally, the experience of the Irish campaign, which seemed to be effective has heightened the Irish government's awareness of the need for evaluations to enable long-term tracking of the impacts of future campaigns. This is equally vital in the UK context. The launch of "It All Adds Up," despite being a small campaign (£18 million) was politically controversial with former Prime Minister Liz Truss having rejected the plans for the campaign. Attribution of results – specific behaviour change actions – to broad awareness campaigns is challenging. However, the development of effective evaluation approaches based on clear theories of change and robust data collection are key to being able to demonstrate the importance of these policies to politicians and other stakeholders.

212 99.9% is the estimated cumulative reach based on the channels and investment against an all-adult Republic of Ireland audience. Source: Department of the Environment, Climate and Communications, Government of Ireland (2023).

213 Small changes mean energy advice campaign adds up to big savings, Department for Business, Energy & Industrial Strategy, December 2022

2.14 New York Inclusive Community Solar Adder – US

Context and key features of the policy

The US has not seen energy supply directly impacted by the Russian invasion of Ukraine to the same extent as Europe. Exposure to global gas markets means that there have been price increases in the USA as well – varying from state to state depending on their exposure to gas prices.[214] These cost increases have increased the appetite to find ways to lower costs for households and increased the attractiveness of renewables especially solar.

Community solar power is an established concept in the US. Solar plants selling energy into the grid generate "net metering credits." Panels are installed at an offsite location and then consumers can subscribe to receive a "share" of the energy generated. Subscribers to community solar schemes can access these credits and count them against their electricity bills. This typically involves a discount of between 5-20% and therefore a bill saving. Subsequent rounds of funding are aiming at a deeper discount.

New York and Maine currently account for 72% of community solar projects being developed in the US. New York alone added 50% of nationwide community solar capacity in Quarter 2 2022.[215] But such schemes are not limited to New York, community solar is gaining ground in states such as Minnesota, Massachusetts, and Illinois, which in 2021 had enough community solar to power about 44,000 homes, up from 17,000 homes in 2020. Ten states with community solar program caps have also set minimum carve-outs for low-to-moderate income subscribers.

Community energy schemes in New York state (including New York City), have a number of key incentives. Community solar projects can often qualify for incentives that are not available for other commercial installations. Community solar power can also qualify for higher feed-in tariffs in New York, under the Value of Distributed Energy Resources (VDER) scheme. And in New York City there is a large market for community solar power, because many residential and commercial users lack roof space for their own renewables.

The New York Inclusive Community Solar Adder (ICSA) is one of the three main strategies in New York's Solar Energy Equity Framework. These have been put in place in response to the New York State Climate Act that requires that at least 35%, with a goal of 40%, of clean energy investments are directed to benefit disadvantaged communities. It allows anyone to benefit from a community solar power project, even if they cannot put panels on a rooftop. This scheme builds on top of the existing New York-Sun scheme (which provides finance and incentives to deploying solar) with additional funding provided in May 2020 including a budget carve-out for the Solar Energy Equity Framework.[216]

The ICSA works by providing a subsidy incentive to solar developers who in return have achieve a high proportion of participation by subscribers from to low- and mid-income (LMI) households who cannot have rooftop solar themselves (eg, because they live in flats) and select non-profit and public facilities located within and serving disadvantaged communities.

The New York Solar Adder scheme is unique in that it provides the benefits of decreased costs and increased access to both individual households and affordable housing providers. The design of the programme was shaped largely by public input, following the presentation of the initial design in September 2020.

214 New Hampshire and Hawaii and Illinois saw the biggest increases of 40% and 38% and 32% respectively - Electricity bills may continue to shock you even as overall inflation eases. Here's why, USA Today, 2023

215 Solar Market Insight Report 2022 Q3, SEAI, 2023

216 NYSERDA website

To benefit from the programme households, need to sign up to one of the scheme providers online or though in person sales (marketing activities are closely monitored as a consumer protection issue.) Subscribers can then access the discount rate which will always be a saving and sign up can be on a monthly pay as you go basis. Eligible residential subscribers are defined as:

- Residential electric utility customers (eg, homeowners, renters, residents of multifamily buildings) that can verify their income.
- Sub-metered residents with documented direct savings pass-through from a Community Distributed Generation subscription on a master-metered account.
- A residential subscriber in a disadvantaged community.
- A residential subscriber who does not live in a disadvantaged community if they have a documented household income less than 80% of the Area Median Income or 80% of the State Median Income, whichever is higher.

Impacts

In the Order Expanding NY-Sun Program dated 14 April 2022, the Public Service Commission noted that, "the ICSA has been demonstrably successful in fostering community solar projects serving low-income customers.[217]

The first round of the ICSA has provided $46.4 million in incentives which is expected to benefit 33,720 customers (eg, households, affordable housing providers and other facilities serving such communities).

The first round of funding resulted in 333.7 MW of projects agreeing to dedicate at least 20% of their capacity and provide guaranteed savings to eligible subscribers. Unfortunately, it is too early to have access to detailed information about the detailed household benefits (precise levels of cost saving) or distributional impact.

Benefits for subscribing households vary from provider to provider. Full data is not yet available btu NYSERDA estimated that the majority of benefits would be around 10% (and certainly between 5-20%). If replicable in Great Britain this would equate to a saving of £115.60 on an average dual fuel bill at April 2023 Energy Price Guarantee levels.

An additional benefit for qualifying buildings (eg facilities serving communities) that cannot deploy their own rooftop renewables is that community solar arrangements can help buildings avoid a significant building emissions penalty which is due to be introduced in 2024 (Local Law 97 of 2019,[218] or LL97 – for more information see 2.6).

Applicability to the UK

Key areas for potential impact in the UK:

- Reducing electricity costs for low- and medium-income households, particularly where these homes are unable to install rooftop solar themselves.
- Rapid decarbonisation of the electricity system and rapid switch away from fossil fuels – providing an additional incentive to install solar.

There are already community solar photovoltaic energy schemes across the UK. These are established for a variety of different reasons; many are currently deployed without subsidy as solar is very competitive and one of the lowest cost forms of electricity generation. Planning and grid connections tend to be more significant constraints on the deployment of solar than cost. However, there is still a great deal of untapped potential deployment both in domestic and non-domestic buildings. Payback on rooftop solar has reduced by over half as energy costs have increased and the cost of solar photovoltaic panels has continued to decrease.

Targeting of support to low-income households was much more typical of UK community energy projects in the past, during the Feed in Tariff period. It was common for community energy projects to have a Community Benefit Fund which often (but not always) was geared towards supporting low-income members of communities through a range of actions that included fuel poverty advice or energy efficiency measures.

The other approach some groups in the UK have taken is to make the threshold for owning shares in a community energy project very low (£50) and to prioritise local shareholders so that lower income, local people benefit more than usual. For example, Repowering London has adopted this model.

217 PSC approves NYSERDA's expansion of the distributed solar (NY-Sun) program in New York to at least 10 GW-DC by 2030; New program will take effect June 1, 2022, Power Advisory, 2022

218 The law will apply to buildings larger than 25,000 sq. ft. and the penalty is $268 per metric tonne of CO2 -equivalent over the limit set.

Sharing of community benefits from community energy schemes has been a focus of policy from both Welsh and Scottish Governments. The percentage share of benefit going to eligible subscribers in the ICSA is similar to the expectations set out by Welsh and Scottish Governments around targets for shared ownership. The Welsh Government has an expectation that all new energy projects will have an element of local ownership[219] and have published guidance. In Scotland, there is also a target for overall local/shared ownership, but this is voluntary rather than a core requirement. There is an increasing push for projects participating in the Contracts for Difference scheme to demonstrate an element of local benefit.

The key difference with the New York ICSA approach is that it goes further in systematically providing an incentive for solar providers to consistently participate at scale, and by providing a mechanism that allows much easier access to lower cost solar energy for low- and mid-income households. The precise mechanism (net metering credits) is specific to the New York state regulatory framework and is not directly replicable in the UK. There are schemes in the UK commercially that have used use a shareholder/co-operative model.

219 Local ownership of energy generation in Wales – benefitting Wales today and for future generations, Welsh Government, 2020

Summary table of policies

Key to ratings:

Very suitable to the UK **Moderately suitable to the UK** **Some suitability to the UK**

Policy	Sector	Notes	Cost impact	Potential carbon impact in the UK	Applicability to the UK
California ZEV grants (2.3)	Transport	Funding targeted towards low-income households or disadvantaged communities. Co-benefits include increased mobility and reduced air pollution.	High (~£100 million to reach ~50,000 households), requires households/ businesses to also contribute, but results in savings for consumers.	Surface transport emissions are the largest sector in the UK. Government is not currently incentivising lower income households to transition towards clean vehicles, increasing their risk of being stranded with older, more polluting cars. A similar scheme in the UK could enable a more rapid shift away from ICE vehicles and ensure no one is left behind.	Rebates and scrappage schemes already exist in some UK cities and regions. Administration and cultural challenges are likely to be similar.
Spain, (Austria and Germany) - Public transport fare caps (2.4)	Transport	Fare caps alone may not drive significant modal shift without investment in networks and reliability. Co-benefits include increased mobility for lower income citizens.	High (eg, ~£250million in Spain). Additional spending needed to improve networks and reliability. Significant savings for consumers.	Potential impact is unclear, but in isolation, fare caps are unlikely to have significant emissions impact. Nevertheless, affordable public transport does cut living costs for some, enable greater mobility, and may be a necessary component of driving modal shift alongside other policies.	£2 single bus fares trial demonstrates government willingness to implement similar policies, but funding models for public transport in the UK are fundamentally different to those in Europe.

Policy	Sector	Notes	Cost impact	Potential carbon impact in the UK	Applicability to the UK
Canada – Strategic Energy Management programmes (2.5)	Industry/ commerce	Focuses on changing practices in business	Costs could be high for government. Likely to lead to rapid cost-effective energy savings for businesses.	Potential impacts may be limited as a standalone programme, but as a component of wider policies supporting industry could lead to longer term change.	Potentially highly applicable to the UK, could be readily linked to existing policy mechanisms.
US – Benchmarking and BPS (2.6)	Buildings – non-domestic and blocks of flats	Two linked policies	Likely to be cost effective as a regulatory policy. Reduces cost to businesses as provides long-term certainty over targets and standards. UK Government consultation on a mandatory benchmarking scheme for >1,000m^2 offices identified a cost of compliance per building in the first four years of £4,100–£7,500 per business, and a positive benefit-cost ratio of the policy of 1.48.	Significant potential carbon benefits over the long-term, towards 2050.	Likely to be an essential component for higher retrofit rates. Challenge of energy data sharing in multi-tenanted buildings would need to be overcome.
Ireland – (and Scotland) Support for SME energy efficiency and audits (2.7)	Commercial (SMEs)	The Scotland and Ireland SME support schemes offer energy efficiency help to a sector that has largely been overlooked in the UK.	The cost of the voucher scheme, which offers €2,000 per business, is lower than a wrap-around support service like Business Energy Scotland. Businesses who implement measures would achieve year on year cost savings.	The Ireland voucher scheme does not deliver direct carbon savings, however SMEs who receive a good quality audit are more likely to go on to invest in energy upgrades. Business Energy Scotland is in its first year of operation, so limited data is available, but in its previous iteration (Energy Efficiency Business Support Service) the scheme helped reduce energy use by 24% per SME.	Policies offering direct support to SMEs, through subsidised energy audits and wrap-around support services, would address a current gap in the UK, which currently does not offer any direct support to SMEs to help them decarbonise.

Policy	Sector	Notes	Cost impact	Potential carbon impact in the UK	Applicability to the UK
Netherlands - mandatory decarbonisation measures (2.8)	Industry	An extension and strengthening of existing schemes related to the European Energy Efficiency Directive	Low (~£67 million over 7 years for support and enforcement). Additional spending by companies will be recouped within a 5-year period, with savings thereafter, plus additional savings from reduced ETS costs.	Unknown. Depends on how energy efficiency measures can make further emissions savings, and where the threshold for compliance is set. Industrial emissions still a significant fraction of UK economy.	A similar but weaker UK scheme (ESOS) exists as a legacy of EU membership, enforced by The Environment Agency. Government is already considering expanding the remit and requirements of ESOS.
MaPrimeRénov' – France (2.9)	Buildings	Home Retrofit one-stop-shop supporting the whole consumer journey including tiered finance for different household incomes.	High (€2.5 billion for the scheme for 2023) but does leverage private finance from those with greater household income. Consumer contribution is on a sliding scale.	Heat from buildings represents around 20% of the UKs carbon emissions. With more than 28.6 million homes of which more than half are energy inefficient, a one-stop-shop of this scale has the potential for significant reductions in carbon emissions. Though carbon savings are not listed in the policy package and focus is on reducing demand, we know the significant potential carbon and bill savings of efficiency measures.	A one-stop-shop service exists in Scotland's Home Energy Scotland; however, Wales and England do not have a nationwide scheme. Installation figures have plummeted since 2012 for the UK which has the oldest homes in Europe so there is urgency for such a programme. The MaPrimeRénov' scheme applies to all incomes, multi-occupancy buildings and shared-ownership homes.

Policy	Sector	Notes	Cost impact	Potential carbon impact in the UK	Applicability to the UK
Ireland - One Stop Shop Service within the National Retrofit Plan (2.10)	Buildings	Limited impact data because this scheme is in its first year of operation. Policy addresses many barriers faced in the UK with home retrofit.	High: Irish Government has committed €8bn to home retrofit to 2030, mostly funded from carbon taxes. Leverages private investment; householders cover ~50% of the renovations and publicly funded grants cover part of the costs. The average per household renovation cost has been ~€60,000.	Has potential to deliver good savings. The policy estimates that each home that receives a deep retrofit would save 2.9 tonnes CO_2. Carbon saving data is based on modelling, not ex-post data.	UK policies have struggled to incentivise deep home retrofits among the able-to-pay. OSS offers technical support needed for deep renovation projects, alongside grants. Housing stock in UK and Ireland is similar. Common cultural challenges.
Canada - Greener Homes Programme (2.11)	Buildings -homes	Joined up retrofit support programme.	Major long-term investment programme by government so requires large scale government expenditure. Measures supported deliver significant bill savings to households. Mix of grant and loan support to allow flexible financing. Limited additional support for low-income households.	Has potential to deliver significant carbon savings, with high uptake levels signalling good progress towards achieving annual carbon saving target (1.5 million tonnes in emissions reduction annually by 2027).	Many of the approaches taken in the Canadian programme could be adapted for a UK national retrofit programme.

Policy	Sector	Notes	Cost impact	Potential carbon impact in the UK	Applicability to the UK
France - Sobriété énergétique – (2.12)	Buildings and Behaviour change	Large -scale package of policies as part of the wider National Energy Strategy, launched to mitigate gas shortages resulting from the war in Ukraine and avoid blackouts through winter 2022/23. Includes a nationwide behaviour change campaign for individuals.	Requires households and businesses to contribute but the package is largely about using energy differently through altering behaviour.	The package of policies has the potential to deliver significant carbon savings through reduced demand (50TWh annually). Carbon savings for individual measures are not available. The majority of measures in the package are not mandatory and use other mobilisation methods such as public perception to gain traction. Published energy consumption figures each week show energy demand has fallen significantly since the package was introduced (equal to 7 nuclear reactors over winter 2022/23).	The UK Government ran a smaller awareness campaign during winter 2022/23 in response to the energy crisis, however it did not signpost to take further action in reducing demand. Its impact is yet to be analysed. The UK does not have a consistent nationwide package of measures to guide sectors across society in reducing their demand. The package and behaviour campaign complement the financial support provided through other French schemes in a joined-up way not seen in the UK.

Policy	Sector	Notes	Cost impact	Potential carbon impact in the UK	Applicability to the UK
Ireland - Reduce Your Use – (2.13)	Behaviour change	National-level behaviour change campaign, launched in response to increased energy costs and concerns over energy security.	The cost of the campaign is unknown, but likely to be comparable to the cost of similar sized campaigns. The cost savings achieved by the public will vary, depending on actions taken, but will be low (or indirect) compared to direct support programmes for installing energy saving measures.	Potential carbon savings of behaviour change campaigns are difficult to estimate. Small behaviour changes on an individual level would lead to modest savings, but on a national scale would be significant.	A smaller campaign on energy use behaviour was launched in the UK in response to the energy crisis, but not with the same reach. The campaign in Ireland gave advice on a broader set of topics including transport and showed close attention to public sentiment.
US New York State - Inclusive Solar Community Adder (2.14)	Community Energy	Part of a wider package of "Community Solar" policies aimed at increasing solar capacity and cutting consumer costs.	Delivers electricity bills savings to consumers of 5-20% (majority saving expected to be 10% in the first round of ICSA).	Low, the ICSA is explicitly intended to promote equity through an additional incentive, wider package incentivises solar capacity.	Provides a vision of how renewables, even if located away from demand, can bring direct benefits to low-income households. Regulatory mechanics may mean programme design to achieve similar outcomces may need to be quite different in UK.

3. **Recommendations for UK Government policy**

The major policy gaps that currently exist in the UK were outlined in Section 1. The energy crisis has exacerbated these gaps and highlighted the need for climate policies that will help cut costs as well as carbon emissions.

This report deliberately looked at policies that have been introduced or significantly extended or modified since the COVID-19 pandemic began in 2020. The majority of the European policies addressed have been explicitly linked to the energy crisis resulting from the war in Ukraine. The aims of the North American policies are more often presented as addressing economic challenges since the pandemic – jobs and growth as well as helping households and businesses with high energy prices.

The policies for discussion have been grouped under the four macroscopic policy areas that were identified in Section 1:

- Home energy retrofit
- Behaviour change
- Business energy savings
- Low-income households

Having studied the examples it is proposed that each of the macroscopic policy gaps above need to be met with a specific UK scheme, the design of which can be informed by the case studies. It is not recommended that the UK Government looks to implement any of the 12 policies addressed in this report by means of direct replicas. National differences, culture, laws, and regulatory arrangements will be important considerations for any 'policy transfer'.

Some of the international policy examples discussed in this report have been deployed rapidly through trial and error, while others are based on extensive research and policy iteration over several years. While it is always beneficial to collect as much evidence and impact data as possible before implementing new policies, there are times when expediency is required. The climate emergency and the European energy crisis together demonstrate the need for the policy gaps outlined above to be filled urgently.

The examples from other countries show that policies can be implemented rapidly before being expanded and iterated over time to improve outcomes. The low emission vehicle subsidies in California offer a good example of a policy that first started over a decade ago, and was refined and improved over time, with a funding boost provided in 2021, as part of California's *Comeback Plan* following the COVID-19 pandemic.

Adjustments to the eligibility criteria, and improved outreach programmes, have been added after learning along the way what works well and where impact can be amplified.

3.1 Home Energy Retrofit – a national home energy retrofit scheme

The lack of a comprehensive national retrofit scheme in England is a key policy gap, particularly affecting the owner occupier and private rented sectors.

RECOMMENDATION: A national home energy retrofit scheme for England

The UK Government should launch a new publicly funded retrofit scheme for England:

- This should provide long-term funding and policy commitment to provide certainty and allow households and the supply chain to respond.
- It should co-ordinate and enhance delivery of existing schemes (eg, ECO, Home Upgrade Grant).
- It should be supported by a national one stop shop advice service that is integrated with a delivery at local level.
- The scheme should be inclusive across income levels, providing incentives to higher income households as well as higher incentives to low-income households.
- The UK Government should take a systemic approach to building local capacity and leveraging private finance.
- The scheme should enable multiple measures and have a focus on multiple occupancy buildings.
- The UK Government should look to futureproof retrofit by including climate adaptation measures.

It is recommended that the UK Government designs a scheme drawing on key features from international examples.

International policies considered:

- MaPrimeRénov' – France
- One Stop Shop – Ireland
- Greener Homes – Canada

What works and what the UK Government should consider

Currently in England there are significant programmes addressing low-income households (most notably ECO) and for social housing, and the Government has announced the Great British Insulation Scheme (formerly ECO+) targeting a wider group of homes, with basic energy efficiency measures. There is no overarching national programme supporting all homeowners to take action on energy efficiency, however.

The three examples of major national retrofit programmes looked at in this study – in France, Ireland, and Canada – all provide examples of such a joined up national programme. The French scheme, which has been in place longest and has been refined and developed through the period considered shows very high take-up numbers. Similarly, the Canadian scheme introduced in 2021 is also reporting high demand. The Irish scheme is in its early stages, but the scheme design (particularly noting cultural similarities) is highly relevant for the UK. However, it is too early to be able to consistently assess granular data about the relative performance of different approaches.

The key features that UK Government should consider for a national retrofit scheme are:

- **High levels of participation**: The Canadian and French schemes show high levels of uptake: in 2022 there were almost 700,000 home renovations in France (156,000 of these for heat pumps and 64,700 for solar hot water systems). In Canada, almost 300,000 applications have been received for a programme launched in 2021.
- **Long-term provision and policy overlap**. A long running criticism of UK Government retrofit funding programmes is that they have been based on year-by-year funding which militates against market development on both supply and demand side. The Canadian scheme is notable in setting a funding envelope planned for seven years, and the Irish Government has made an €8 billion investment commitment to 2030. All schemes have put structures and systems in place designed for the long-term. This enables homeowners to plan and respond in an appropriate way, whilst also giving confidence and certainty to the supply chain that it can invest and train skilled workers. Integration with existing support schemes is important and, in the UK, integration will be needed with schemes like ECO, Home Upgrade Grant and the Great British Insulation Scheme. The French programme is notable because the funding can be integrated with the French ECO-equivalent programme – the White Certificate Scheme and Obligation.[220] French installers advertise their services across both the White Certificate programme and the Renov programme.

220 Solar energy installations are soaring, but we need to make sure all households can reap the benefits, Resolution Foundation, 2022

- **A clear and comprehensive customer journey and integration with energy advice**. Each of these schemes has considered the customer journey and sought to make this clear and simple wherever possible. The provision of personalised expert advice (delivered in different ways across these schemes) ensures that households install the right measures for them and can be confident in the benefit these will deliver. The French scheme includes a directory of local installers and access to local advisors, and a 'renovation guide'. The scheme website streamlines the customer journey and handles the grant application and financial flow all in one place.
- **Tiered support for different level of incomes, including wealthier homes**. The availability of increased support for households on lower incomes means that benefits will be spread more equitably across society. While the UK Government has focussed on fuel poor households through ECO and its predecessor schemes, the challenge in the Energy Crisis is that so many mid income households now face difficulties with high bills. Meanwhile, providing support to homes on higher incomes also helps to reduce system-wide costs and support supply chains. The French MaPrimeRénov programme with its tiered support for different income levels shows a very sophisticated example of how support can be provided to support all homes to take action. An important consideration is the trade-off between maximising support for low-income groups and mobilising the supply chain and delivering system level benefits which will come from support for all levels of income. In France there is also a tiered incentive structure to stimulate swifter action (which will have more impact during the energy crisis), and Ireland has an additional bonus for heat pump installation.
- **A systematic approach to building local capacity and private financing options**. Building capacity at a local level and unlocking private financing are both crucially important. Households that are on higher incomes need attractive financing options as many will not have ready access to capital. The Irish example is particularly important here – with its focus on developing independent one stop shops which can also lever in local financing.
- **Climate adaptation measures as part of retrofit support**. An interesting and unique feature of the Canadian scheme is the focus on resilience measures within the package of retrofit measures funded. This will become more important to the UK as we experience more frequent impacts of climate change, such as extreme heat and more intense winter storms. Retrofit work presents a good opportunity to consider resilience improvements at the same time, with potential to lower future retrofit costs.
- **Promoting multiple measures/whole building approach**. The French, Irish and Canadian schemes all aim to encourage whole building retrofit, rather than a measure-by-measure approach. In Ireland, customers receive a top up incentive to bring their home to a good EPC standard (B2 level) and in Canada, the focus on a robust whole building assessment aims to achieve the same outcome. Nonetheless, across all retrofit programmes it seems the challenge of encouraging households to undertake not just single measures, but a deeper retrofit remains significant – this seems to be a common international challenge for retrofit scheme design.
- **Blocks of flats**. The Canadian and French schemes include specific approaches to retrofitting apartment buildings. These have been traditionally challenging for UK retrofit schemes. Approaches include a specific whole building energy performance evaluation methodology for apartment buildings and financing support that is designed to work at whole building level, rather than just being structured around offers for individual flats.

3.2 Behaviour Change – a national behaviour change campaign

Behaviour change is an integral part of meeting the UK's net zero targets. The CCC has estimated that over 60% of the emissions reductions needed by 2050 will involve some societal or consumer behaviour change. There have been repeated calls for a national net zero campaign. However, with the energy crisis, communicating with households and businesses about how to achieve rapid savings on energy bills has become a high priority.

Countries across Europe introduced behaviour change campaigns to improve security of supply in response to the gas shortages they faced after the invasion of Ukraine by Russia. Scotland has been running its own campaign *Lets do Net Zero* since summer 2021.

RECOMMENDATION: a national behaviour change campaign to reduce energy usage

The UK Government should launch a comprehensive national behaviour change campaign with a specific aim of reducing energy use and costs:

- Structure a national campaign around a target for reducing energy use overall – this approach can frame both short term energy bill saving messages and wider/longer term carbon saving actions.
- Contribute to reaching the UK Government's 15% energy reduction target by 2030.
- Achieve high levels of reach across all sections of society.
- Promote leadership from public sector and leading UK companies.
- Integrate the campaign with existing policy and delivery programmes across the UK.
- Ensure evaluation is considered from the outset.

International policies considered:

- Sobriété Énergétique – France (2.12)
- Reduce your use – Ireland (2.13)

What works and what the UK Government should consider

Behaviour change is vital to meeting the UK's net zero targets but is can also be difficult to achieve. The policies put in place in France and Ireland (and also elsewhere in Europe such as Germany and Finland) during winter 2022/23 in response to the energy crisis offer some vital insights to achieving success. France set a target of 10% reduction in energy use and is currently reporting a 12% combined gas and electricity reduction against a 2018/19 baseline level.

The UK Government has run a campaign on households' energy costs over winter 2022/23 to encourage households to carry out a suite of actions and behaviours that would help cut their energy costs, including messaging to lower boiler flow temperature to increase the efficiency of gas use. It has recently launched an information website for smaller companies on energy efficiency, prioritising "quick win" energy saving measures.

The Irish scheme for households was in some ways similar to the UK campaign but was notable for its focus on a range of measures, including transport-focused behaviours, alongside home energy. The programme paid close attention to the design of messaging, responding to public sentiment throughout the crisis. The French Sobriété Énergétique plan is a far more wide-ranging initiative – a campaign to mobilise all sectors of society in working towards a national energy demand reduction target, based around voluntary agreements with businesses and behaviour change by French citizens.

Key features from the international policies studied in this report which the UK Government should consider for a national behaviour change campaign are:

- **Put reducing energy demand at the centre**. Following the French example, a behaviour change campaign focused on engaging households and businesses with a national energy demand reduction target could offer significant benefits. The UK Government has a national energy saving target of 15% by 2030, but this is little known outside policy circles. Instead, that target could at the centre of a wide public behaviour change campaign with progress towards the target monitored and reported on.
- **Achieve high levels of reach**. Both schemes looked at have successfully reached across the public. To increase the chances of success, Ireland's scheme was designed to be sympathetic to public sentiment around energy use. An energy demand reduction focused campaign – as in France – could achieve wide engagement. An energy demand focus has the benefit of enabling framing, under a single set of headline messages, both information on "quick win" energy bill saving actions, and wider and longer-term actions that achieve significant carbon reductions. Energy security is also promoted by a reduction in energy demand. Though messaging would need to be tested, a campaign framed around a national energy demand reduction target could have good reach to people across society who have different values and priorities.
- **Comprehensive scope**. While an energy demand focused campaign can cover short term, individual energy saving actions, it can also provide a long-term framework for mobilising society: the evidence is clear that achieving the significant large-scale change in the way the UK uses energy will require collective action under a common purpose. The French scheme is comprehensive, having a broad scope of advice covering areas from household energy use to transport. Scotland's Lets do Net Zero campaign is similarly wide ranging in scope – though does not follow the energy demand reduction framing of the French approach.
- **Public and business leadership**. France's Sobriété Énergétique saw significant actions fall on public bodies, and this has been a common theme of many European behaviour change campaigns. Actions by public sector and industry can have significant effects and model behaviours more generally, helping to reduce the perception that domestic consumers are acting on their own and destigmatise actions. Using reputational regulation, as France has with businesses, can offer a lighter touch and sometimes faster route to driving action than prescriptive regulation. In France, businesses are encouraged go further and add their own measures to those already set out by the Government.
- **Complimentary to existing policy landscape**. The behaviour change campaigns looked at are integrated with the existing policy landscape, for example by building close ties to the national retrofit programmes.
- **Consider evaluation from the start**. Evaluating behaviour change can be challenging due to the complexity of demonstrating clear causal pathways. The UK Government can address this by articulating a clear theory of change and ensuring it has identified the key data metrics it needs to collect from the start of the policy.

3.3 Business decarbonisation policies – a UK strategy to promote business decarbonisation

Despite the recent launch of a new government Energy Efficiency for Business website by UK Government, there is a significant policy gap when it comes to helping SMEs decarbonise. Previous work by Energy Saving Trust for the CCC showed how small and medium enterprises (SMEs) – like consumers – would benefit from a joined-up support framework with dedicated experts providing guidance on regulations and financial support. Government's planned piloting of an SME energy advice support service is an important step towards this, but will need long term investment and scale. For larger businesses, there are requirements for assessing and reporting on energy use and carbon emissions, but there is a need to prompt faster action.

RECOMMENDATION: A UK strategy to promote business decarbonisation

The UK Government should create a comprehensive and coherent strategy to help businesses – particularly SMEs – lower energy use and cut costs:

- The UK Government should introduce policies that help prompt further action from businesses in a proportionate way, such as benchmarking and regulating for action where measures are cost-effective.
- The UK Government should look to build capacity and support businesses to understand the actions they need to take to decarbonise, particularly reaching SMEs and commercial businesses beyond the large and energy intensive sectors covered by ESOS and Climate Change Agreements.
- Provide long-term certainty – policy frameworks should enable businesses to see the standards they will need to be working towards to decarbonise, including interim targets along the way to meet net zero in 2050.
- The UK's government's overall strategy should have a keen focus on SMEs, supporting these with publicly funded energy audits, impartial advice, and convening/co-ordinating peer support networks.

International policies addressed in this report provide both incentives to prompt faster action, and clear and long-term regulation to drive change. They can provide long-term confidence, a key factor that will lower longer term business costs.

International policies considered:

- Strategic Energy Management programmes – Canada
- Benchmarking and Building Performance standards – US
- SME energy audits – Ireland
- Mandatory decarbonisation measures – Netherlands

What works and what the UK Government should consider

At present, policies that help – particularly smaller – businesses have been introduced by the UK Government in a piecemeal way. It is recommended that the UK Government should introduce a coordinated strategy for helping businesses, and in particular SMEs, to reduce carbon emissions and lower costs, providing long-term certainty around what is required to decarbonise, including interim targets along the way, to reach net zero by 2050.

Key features for this strategy that have been identified from the international policies studied in this report and that the UK Government should consider for a business energy reduction strategy are:

- **Regulatory proportionality**. Businesses respond better to some types of regulatory design than others, and therefore getting the approach right will help drive faster action. The benchmarking approach in the US may be more suitable for businesses than a Minimum Energy Efficiency standards approach. A mandatory approach may be needed where progress is sluggish, and these case studies suggest that mandatory performance standards for buildings can be introduced in a way that works for businesses.
- **Building capacity**. Several of the schemes looked at aim to build capacity in business and beyond to understand the measures and actions needed to take action. The availability of this capacity helps to cut costs and burdens on businesses themselves whilst helping governments achieve faster action on climate and promote skills development.
- **Information and peer support for SMEs**. SMEs face similar information asymmetry to households and therefore are faced with a steep learning curve of complex issues to address. The provision of audits, providing tailored impartial information and peer learning platforms can help to cut through the complexity and help SMEs to adopt the right strategies with greater confidence.

3.4 Increased access to low carbon technology choices for low income households (transport and renewable energy generation)

Several of the policies addressed in this report have been designed to systemically support consumers on lower incomes who otherwise would not benefit from the low carbon technologies that are driving the net zero transition. Both transport and rooftop renewables are technologies where first movers have tended to be wealthier with more access to capital. This trend is driven both by the upfront capital needed for EVs and rooftop solar, but also the availability of roof spaces and driveways that facilitate take up.

RECOMMENDATION: UK Government should design schemes that provide more access to low carbon technologies for low-income households

The UK Government should identify areas where more support can be provided to low-income households to benefit from the energy transition:

For transport:

- Support access to EVs for low-income households through increased grants or a low-cost leasing system including second hand vehicles.
- Partner with private sector providers to increase the reach of government backed schemes.
- Make public transport the natural mode of transport, especially in cities.

For low carbon technologies in the home:

- Ensure that the wholesale and retail market reforms in GB and Northern Ireland can deliver US style community benefits from off site or community renewables to low-income households who can't install renewables themselves.
- Partner with private sector providers to increase the reach of government backed schemes.

International policies considered:

- EV scrappage and EV subsidies for low-income households – California US
- Public transport fare subsidies – Spain, Germany, Austria
- Low-income access to community solar – New York State US

What works and what the UK Government should consider

The UK Government should consider where its policy development can help to convey additional benefits to low-income consumers, particularly in areas such as transport and renewables where wealthier homes have tended to benefit first.[221] Beyond the areas looked at in this report, there may be further considerations around low carbon heating (for example a larger heat pump grant for low-income homes), home storage (increasing access to home battery technology) and flexible smart-enabled technologies (eg, smart appliances like fridges or washing machines) where the UK Government could drive more equitable technology adoption. These approaches could link to areas where increased flexibility or lower demand on the gird help to address constraints or weak connections.

Key features from the international policies looked at for policies which benefit low-income households by design are:

- **Looking beyond traditional areas of low-income support**. In utilities policy, government support has traditionally focussed on lowering home energy demand (insulation, more efficient boilers) and bill support (for example via social tariffs, or targeted measures such as the Warm Homes Discount) to reduce costs for low-income households. Increasingly, access to low carbon technologies will also benefit lower income consumers, and critically, could help cut costs. For transport policies, it is important that low-income households are not left in transport poverty as a result of the transition and facing higher costs as a result.
- **Promote reduced public transport fares for low-income households**. For many people in cities, EV's may not be advantageous because of practical issues – for example, lack of off-street parking. There is also a need to ensure there is adequate public transport in rural areas. Encouraging modal shift will also help cut emissions. It is essential to have access to public transport as an alternative to using EVs and reduced public transport fares would cut costs for lower income households.
- **Designing policies inclusively to explicitly convey additional benefits to low-income households**. An important aspect of a just transition to a low carbon economy is the ability of people from all parts of society to be able to benefit from new technologies. The key features of all the policies grouped here is that the policy design has been explicitly shaped to benefit low-income consumers as an explicit outcome. This recognises that even where these are market driven programmes, regulatory design can deliver benefits to a much wider group than first movers (who tend to be wealthier). This also recognises that the market alone, without any regulatory intervention, will not deliver these benefits quickly. In addition to the two policies looked at here, France has announced an intention to provide access to low-cost EV leasing from 2024. And the EU has a focus on Local Energy Communities including a requirement in the Renewable Energy Directive for member states to support the sale of locally produced energy to local consumers.
- **Recognise that market intervention to benefit low-income groups does not have to be burdensome** – the interventions here, driven by design or by incentive, remain a low burden on business and are administratively light touch. Both the US schemes looked at in this report used the expertise and reach of the commercial companies involved to improve the outreach to low-income consumers through incentives or targets.

221 The revised Renewable energy directive (2018/2001/EU) aims to strengthen the role of renewables self-consumers and renewable energy communities. EU countries should therefore ensure that they can participate in available support schemes, on equal footing with large participants.

APPENDICIES

APPENDIX 1: **Task 2 Qualitative Analysis**

Strength of effect scale:

Weak **Medium** **Strong**

California clean vehicles grants and financing		
Effectiveness	**Notes**	**Strength of Effect**
Achieves significant carbon reduction.	Carbon emissions are the primary focus & only zero emission vehicles are eligible.	
Focus on short term reduction of energy bills for households/businesses.	Running costs are immediately lowered, but upfront costs can be significant.	
Long-term policy framework providing market certainty.	The scheme has been running for over a decade, but funding is variable and uncertain year to year.	
Scale (in terms of numbers of households/ businesses impacted).	50,000 rebates issued in 2021, covering about 0.4% of the California population.	
Achieves other non-energy/carbon objectives.	Improved air quality and mobility access for disadvantaged communities.	
Delivers Jobs and growth.	No data or narrative focus on jobs but improved mobility will have second order effect.	
Effective monitoring, evaluation.	Yes, extensive evaluation programme.	

Efficiency	Notes	Strength of Effect
Minimal upfront economic burden on households/business.	Significant upfront costs (but scrappage schemes reduce this).	
Levers private finance/minimises required public expenditure.	Requires householder investment, does not have specific provisions for building the private finance market. Involves significant government investment.	
Does not involve onerous regulation.	No, this is a grant scheme, not regulatory.	
Equity	**Notes**	**Strength of Effect**
Addresses low-income consumers, smaller or struggling SMEs.	Increasing focus on lower income households with uplifted grants.	
Institutional Effectiveness	**Notes**	**Strength of Effect**
Policy learnings are shared and evidence of learning through the programme.	Scheme has evolved over time with improved outcomes as a result of learnings.	
Innovation	**Notes**	**Strength of Effect**
Extent to which the programme is globally innovative.	Similar to other schemes but with new focus on lower income or disadvantaged communities.	

Public transport subsidies in Spain, Germany, and Austria		
Effectiveness	**Notes**	**Strength of Effect**
Achieves significant carbon reduction.	Not clear if modal shift is significant in all areas. Some savings claimed in Germany and Austria.	
Focus on short term reduction of energy bills for households/businesses.	Costs immediately lowered for regular commuters.	
Long-term policy framework providing market certainty.	Concerns from transport providers about what will happen to funding streams and passenger numbers if fare caps are removed.	
Scale (in terms of numbers of households/ businesses impacted).	Popularity higher than expected in Germany and Austria, but impact on car users is mixed.	
Achieves other non-energy/carbon objectives.	Improved air quality and mobility access for lower income households.	
Delivers jobs and growth.	No data or narrative focus on jobs but improved mobility will have second order effect.	
Effective monitoring, evaluation.	Mixed – some evaluation surveys in Germany and Austria, and some analysis ongoing in Spain, but not comprehensive.	

Efficiency	Notes	Strength of Effect
Minimal upfront economic burden on households/business.	Little upfront costs in Spain and Germany, more significant in Austria.	
Levers private finance/minimises required public expenditure.	Varies between countries but significant public spending required.	
Does not involve onerous regulation.	Subsidies and financing to transport operators, not much regulation needed.	
Equity	**Notes**	**Strength of Effect**
Addresses low-income consumers, smaller or struggling SMEs.	Additional discounts for lower income groups in Spain, less targeted in Austria.	
Institutional Effectiveness	**Notes**	**Strength of Effect**
Policy learnings are shared and evidence of learning through the programme.	Schemes have been renewed or extended based on passenger uptake, not emissions impact.	
Innovation	**Notes**	**Strength of Effect**
Extent to which the programme is globally innovative.	Several schemes across Europe and example exist from many years ago, eg, Tallinn.	

Canada Strategic Energy Management programmes		
Effectiveness	**Notes**	**Strength of Effect**
Achieves significant carbon reduction.	SEM is a key underpinning action for carbon reduction in industry.	
Focus on short term reduction of energy bills for households/businesses.	Not immediate, but these programmes should rapidly increase businesses capacity to deliver bill savings. Training and support include "quick wins."	
Long-term policy framework providing market certainty.	No evidence on this, but programmes are well established and being increased in scale.	
Scale (in terms of numbers of households/ businesses impacted).	Impact seems to be significant on a large number of businesses, based on Efficiency Canada 2022 evidence.	
Covers demand and supply side.	No supply side element.	
Achieves other non-energy/carbon objectives.	Some effect may be assumed but not a focus.	
Delivers jobs and growth.	Yes, this is about delivering a new workforce.	
Effective monitoring, evaluation.	Given focus on monitored energy savings as part of incentive programme, may be assumed.	

Efficiency	Notes	Strength of Effect
Minimal upfront economic burden on households/business.	Yes – there is an economic burden on businesses, but the focus is on delivering cost-effective savings.	
Levers private finance/minimises required public expenditure.	Yes, this is about co-financing between regulated utilities and businesses.	
Does not involve onerous regulation.	No this is an incentive programme.	
Equity	**Notes**	**Strength of Effect**
Addresses low-income consumers, smaller or struggling SMEs.	These programmes are targeted at larger businesses.	
Institutional Effectiveness	**Notes**	**Strength of Effect**
Subsidiarity: supports, levers from, and builds capacity at lower tiers of government.	There are parallel schemes focused on building local authority capacity for community energy management – these are not captured in this review in any detail but are an important component of the wider policy.	
Policy learnings are shared and evidence of learning through the programme.	No evidence to date.	
Innovation	**Notes**	**Strength of Effect**
Extent to which the programme is globally innovative.	Similar programmes in the US, further review is required to assess if they exist in other countries.	

Benchmarking and Building Performance Standards (BPS) for larger existing buildings – US		
Effectiveness	**Notes**	**Strength of Effect**
Achieves significant carbon reduction.	Yes, over time, as the focus is on a systematic reduction to net zero.	
Focus on short term reduction of energy bills for households/ businesses.	No, this is not a focus of these programmes.	
Long-term policy framework providing market certainty.	Yes, the value and purpose of BPS policies is in providing long-term market certainty.	
Scale (in terms of numbers of households/ businesses impacted).	Yes, because mandatory, these are very large-scale programmes.	
Achieves other non-energy/carbon objectives.	Yes – impact data on property value.	
Delivers jobs and growth.	No evidence of this as a primary focus though might be assumed.	
Effective monitoring, evaluation.	Yes – policy is built around operational data gathering programmes. Evaluation data seems more limited.	

Efficiency	Notes	Strength of Effect
Minimal upfront economic burden on households/business.	Initial benchmarking programmes and long-term nature of policy minimises upfront burden.	
Levers private finance/minimises required public expenditure.	Yes. Public investment is required in the infrastructure to support the programmes.	
Does not involve onerous regulation.	Yes, it involves regulation, however the approach is designed to provide long-term sight and certainty for businesses to allow planned investments.	
Equity	**Notes**	**Strength of Effect**
Addresses low-income consumers, smaller or struggling SMEs.	Some consideration of this is given in more flexible policy requirements, and financial support where the policy impacts apartment buildings, lived in by low-income residents.	
Institutional Effectiveness	**Notes**	**Strength of Effect**
Policy learnings are shared and evidence of learning through the programme.	Yes – the Presidential coalition exists to share learnings and best practice.	
Innovation	**Notes**	**Strength of Effect**
Extent to which the programme is globally innovative.	Australia has NABERS programme, Canadian jurisdictions (eg, Montreal) are increasingly following the US policy approach in this area. Tokyo has long established BPS programme.	

SME Support schemes		
Effectiveness	**Notes**	**Strength of Effect**
Achieves significant carbon reduction.	The Support Scheme for Energy Audits would not deliver any carbon saving directly, but businesses receive recommended actions from audit. Business Energy Scotland has delivered 1 million CO_2e savings.	
Focus on short term reduction of energy bills for households/businesses.	Reduction of energy bills would be medium term, after the business has invested in energy efficiency measures. Behavioural measures would lead to savings.	
Long-term policy framework providing market certainty.	Not part of specific policy package supporting SMEs, but Ireland offers several other services to businesses to help them decarbonise.	
Scale (in terms of numbers of households/ businesses impacted).	Irish support scheme for energy audits issued vouchers to 1,685 businesses over 19-month period.	
Achieves other non-energy/carbon objectives.	Businesses who invest in energy upgrades, likely to see improvements in comfort, year-on-year cost savings, enhancement of reputation as a responsible business.	
Delivers jobs and growth.	Both schemes help more businesses invest in improving their energy efficiency, which stimulates growth in the installer/manufacturer sector.	
Effective monitoring, evaluation.	The Support Scheme for Energy Audits monitors number of vouchers issued, but not the measures that businesses might go on to implement.	

Efficiency	Notes	Strength of Effect
Minimal upfront economic burden on households/business.	Business Energy Scotland offers the option of a zero-interest loan of up to £100,000 to businesses to help them implement the recommendations from the assessment, however businesses must be able to afford the investment.	
Levers private finance/minimises required public expenditure.	Business Energy Scotland offers a zero-interest loan and therefore leverages private financing to fund the measures, but favourable loan terms, make this more accessible.	
Does not involve onerous regulation.	Both schemes offer direct support to businesses and do not involve regulation.	
Equity	**Notes**	**Strength of Effect**
Addresses low-income consumers, smaller or struggling SMEs.	Both schemes require businesses to invest in energy improvements which can be costly, although Business Energy Scotland offers the option of a zero-interest loan to help businesses finance the measures.	
Institutional Effectiveness	**Notes**	**Strength of Effect**
Policy learnings are shared and evidence of learning through the programme.	Limited data is available to share currently because both schemes are fairly new.	
Innovation	**Notes**	**Strength of Effect**
Extent to which the programme is globally innovative.	Both schemes focus on SMEs, which is a sector that typically does not receive energy efficiency support, making these schemes innovative.	

Mandatory decarbonisation measures in the Netherlands		
Effectiveness	**Notes**	**Strength of Effect**
Achieves significant carbon reduction.	Difficult to calculate but impact likely to be significant.	
Focus on short term reduction of energy bills for households/businesses.	Investments mandated with up to 5-year payback periods.	
Long-term policy framework providing market certainty.	Part of long-standing European Union schemes, forward looking.	
Scale (in terms of numbers of households/ businesses impacted).	All energy intensive companies in the Netherlands are required to take part.	
Achieves other non-energy/carbon objectives.	Possible air quality improvements, but limited detail.	
Delivers jobs and growth.	Works to be carried out, and long-term savings expected, should impact jobs and growth but not the primary aim.	
Effective monitoring, evaluation.	Companies must conduct energy audits, which will provide significant impact data.	

Efficiency	Notes	Strength of Effect
Minimal upfront economic burden on households/business.	Major upfront costs to businesses.	
Levers private finance/minimises required public expenditure.	Primarily financed privately. Public spending only on enforcement.	
Does not involve onerous regulation.	Primarily a regulatory measure. All relevant companies will need to complete audits.	
Equity	**Notes**	**Strength of Effect**
Addresses low-income consumers, smaller or struggling SMEs.	Not targeted to smaller SMEs.	
Institutional Effectiveness	**Notes**	**Strength of Effect**
Policy learnings are shared and evidence of learning through the programme.	Scheme evolving to improve ease of paperwork and to reflect new energy prices.	
Innovation	**Notes**	**Strength of Effect**
Extent to which the programme is globally innovative.	Linked to EU scheme but obligation to implement decarbonisation as well as energy saving measures is new.	

MaPrimeRénov'- France		
Effectiveness	**Notes**	**Strength of Effect**
Achieves significant carbon reduction.	Yes, the programme has a wide range of measures available and options for different households' incomes with the potential to deliver significant carbon savings.	
Focus on short term reduction of energy bills for households/businesses.	The focus is on individual energy efficiency measures, which are likely to take some time to plan/ install. Nonetheless, the programme will deliver benefits in immediate energy savings once measures are fitted.	
Long-term policy framework providing market certainty.	This policy package is expected to be in place for the next decade.	
Scale (in terms of numbers of households/ businesses impacted).	Yes, the scheme is proving successful in reaching large numbers of households.	
Achieves other non-energy/carbon objectives.	More energy efficient homes will improve public health and can reduce burdens on other public services.	
Delivers jobs and growth.	Yes, data on jobs created: roles have been created for the scheme, increasing the skilled workforce in decarbonising homes.	
Effective monitoring, evaluation.	Yes, the whole life customer journey nature of the scheme means data would be available for monitoring of uptake of measures and installation figures.	

Efficiency	Notes	Strength of Effect
Minimal upfront economic burden on households/business.	The financial support is tiered, relative to household income with the greatest support going to those who can least afford measures.	
Levers private finance/minimises required public expenditure.	For all but the lowest income households, it requires a level of householder investment.	
Does not involve onerous regulation.	No, this is a support scheme. However, households have to comply with relevant regulations in the installation.	
Equity	**Notes**	**Strength of Effect**
Addresses low-income consumers, smaller or struggling SMEs.	Yes. All households meeting the basic criteria are eligible, but the greatest financial support goes to low-income consumers.	
Institutional Effectiveness	**Notes**	**Strength of Effect**
Policy learnings are shared and evidence of learning through the programme.	An updated iteration of the scheme from two years prior with increased funding.	
Innovation	**Notes**	**Strength of Effect**
Extent to which the programme is globally innovative.	Tiered funding options is unique, as is the wide range of available measures. Strong focus on customer journey process from assessment to evaluation seems to be distinctive.	

One Stop Shop Service within the National Home Energy Upgrade Scheme – Ireland		
Effectiveness	**Notes**	**Strength of Effect**
Achieves significant carbon reduction.	Yes, the scheme is encouraging deep renovation measures and has a target to move homes up to an energy performance standard (B2 on the Building Energy Rating scale, which refers to a kWh/m^2 target) which, as a consequence, will deliver significant carbon savings. However, impact data is currently limited, so it is unclear if homes are achieving these savings.	
Focus on short term reduction of energy bills for households/businesses.	The scheme is encouraging whole-house retrofit, which takes time to plan and complete, so energy savings are not immediate. However, homes will benefit from energy savings and carbon savings in the long-term, after the renovations are complete.	
Long-term policy framework providing market certainty.	The One Stop Shop Service is part of the long-term national level policy framework, the National Retrofit Plan, which has an ambition to upgrade 500,000 homes and aims to install 400,000 heat pumps in existing homes by 2030.	
Scale (in terms of numbers of households/ businesses impacted).	This scheme is in its first year of operation, and numbers of completed home renovations are low, however there are ambitious targets in place, and it does have potential to scale up.	
Achieves other non-energy/carbon objectives.	The scheme will achieve the wider benefits of energy efficiency, like improved comfort and improved air quality.	
Delivers jobs and growth.	Yes, the One Stop Shop provider market is new and has been developing since the start of the scheme. It has the potential to grow further and create jobs.	
Effective monitoring, evaluation.	Yes, the energy rating of the homes is recorded before and after the renovations, the measures installed in each home and associated savings are monitored.	

Efficiency	Notes	Strength of Effect
Minimal upfront economic burden on households/business.	Although the scheme has been designed to support homeowners to alleviate the burden of upfront costs, they still need to provide around 50% of the funding themselves. However, there is potential for further government coordination and support on providing other low-cost financing instruments to help close this gap.	
Levers private finance/minimises required public expenditure.	Requires householder investment, even though there is a good level of public investment. There is the potential to leverage more private financing through low-cost financing instruments, provided through the One Stop Shop providers.	
Does not involve onerous regulation.	No, this is a support scheme that is delivered mainly through the private sector with coordination and supervision from a public authority.	
Equity	**Notes**	**Strength of Effect**
Addresses low-income consumers, smaller or struggling SMEs.	The One Stop Shop Service is not operating currently for low-income consumers: it is only aimed at the able-to-pay. The National Retrofit Plan has other provisions for those unable to afford energy upgrades themselves.	
Institutional effectiveness	**Notes**	**Strength of Effect**
Policy learnings are shared and evidence of learning through the programme.	The learnings from the first year of operation are being used to streamline the scheme.	
Innovation	**Notes**	**Strength of Effect**
Extent to which the programme is globally innovative.	End to end retrofit support programmes for homeowners are increasingly being developed in Europe and globally. This includes the one stop shop concept (where countries like Denmark have long had a focus). Ireland is particularly of interest to the UK because of the ambition of its approach, and the similarities between the two countries.	

Canada Greener Homes Initiative		
Effectiveness	**Notes**	**Strength of Effect**
Achieves significant carbon reduction.	Yes, the programme is strongly focused on whole house retrofit delivering significant carbon savings: initial uptake has been very strong.	
Focus on short term reduction of energy bills for households/businesses.	The focus is on whole house energy efficiency measures, which are likely to take some time to plan/install. Nonetheless, the programme will deliver benefits in immediate energy savings once measures are fitted. The introduction of the Oil to Heat Pump Accelerator programme is a direct response to the energy crisis, with simplified administrative requirements.	
Long-term policy framework providing market certainty.	Greener Homes is a seven year multi-billion-dollar funding package.	
Scale (in terms of numbers of households/ businesses impacted).	Positive number of applications (280,000 applications). Completed installation numbers (40,000) are lower.	
Achieves other non-energy/carbon objectives.	Seems likely to achieve wider benefits of energy efficient homes, eg, improved air quality.	
Delivers jobs and growth.	Yes, energy assessor development programme has good uptake numbers, and significant increase in numbers of assessors has been delivered.	
Effective monitoring, evaluation.	Yes – strong emphasis with pre- and post- evaluation processes.	

Efficiency	Notes	Strength of Effect
Minimal upfront economic burden on households/business.	Yes, this is mainly an "able to pay" programme, with householders expected to invest alongside the Government. However, elements of the programme do support energy poor households (but more broadly this remains a policy gap in Canada).	
Levers private finance/minimises required public expenditure.	Requires householder investment, does not have specific provisions for building the private finance market. Involves significant government investment.	
Does not involve onerous regulation.	No, this is a support, not regulatory scheme.	
Equity	**Notes**	**Strength of Effect**
Addresses low-income consumers, smaller or struggling SMEs.	This is primarily an able to pay programme, but there are low-income components as part of the policy package.	
Institutional Effectiveness	**Notes**	**Strength of Effect**
Policy learnings are shared and evidence of learning through the programme.	Some changes to scheme design have been made, based on uptake to date.	
Innovation	**Notes**	**Strength of Effect**
Extent to which the programme is globally innovative.	Similar to other retrofit support programmes. Strong focus on customer journey process from assessment to evaluation seems to be distinctive.	

Sobriété énergétique – France		
Effectiveness	**Notes**	**Strength of Effect**
Achieves significant carbon reduction.	The policy package document shows projected savings could overall be significant and this is the basis of the policy, though attribution of savings to such an overarching campaign is difficult.	
Focus on short term reduction of energy bills for households/businesses.	The encouragement of 'eco gestures,' through both energy bill incentives and the communication campaign are likely to lead to a short-term reduction in energy bills for households.	
Long-term policy framework providing market certainty.	The measures under the package are not mandatory, there is no certainty around the long-term continuation of the policy. The awareness campaign ended in February 2023.	
Scale (in terms of numbers of households/ businesses impacted).	Policy package covers aspects across society, however without impact data we cannot be sure this has been achieved.	
Achieves other non-energy/carbon objectives.	Seems likely to achieve wider benefits of energy efficient homes, Eg, improved air quality through increased carpooling and working from home.	
Delivers Jobs and growth.	The policy package is largely focused on encouraging behaviour change; jobs and growth are not aspects of the package.	
Effective monitoring, evaluation.	The pre-evaluation process has been detailed, however because of the nature of the policy package it appears there is no post-evaluation processes.	

Efficiency	Notes	Strength of Effect
Minimal upfront economic burden on households/business.	Yes, the majority of the 'eco gestures,' (except boiler replacement) are behaviour change based, as are those for business. However, elements of the package would require upfront costs.	
Levers private finance/minimises required public expenditure.	The plan is a package of incentives, many of which sit outside Sobriété énergétique but are important for promoting changes in behaviour which lever private finance.	
Does not involve onerous regulation.	No, this is an encouragement campaign, not a regulatory scheme.	
Equity	**Notes**	**Strength of Effect**
Addresses low-income consumers, smaller or struggling SMEs.	Package takes whole society approach rather than focusing on particular groups and promotes low cost/no cost actions. The carpool and home working bonuses arguably support a higher economic bracket consumer. Signposts to MaPrimeRénov' which supports based on household income.	
Institutional Effectiveness	**Notes**	**Strength of Effect**
Policy learnings are shared and evidence of learning through the programme.	These are yet to be realised, but the Minister for the Energy Transition has announced a phase 2 of the Sobriété plan imminently, which will involve assessing the impact and potential improvements to the scheme.	
Innovation	**Notes**	**Strength of Effect**
Extent to which the programme is globally innovative.	It is a large-scale national campaign mobilising multiple sectors, innovate in its ambition and reach.	

Reduce Your Use campaign – Ireland		
Effectiveness	**Notes**	**Strength of Effect**
Achieves significant carbon reduction.	The behavioural changes will lead to slight carbon reduction on an individual consumer level and when done on a national scale can have significant impact.	
Focus on short term reduction of energy bills for households/businesses.	The focus was on raising awareness of the immediate behavioural changes that people can make to reduce energy use in homes, businesses, and transport.	
Long-term policy framework providing market certainty.	This was a short-term campaign to address the energy crisis.	
Scale (in terms of numbers of households/ businesses impacted).	Reduce your use was a wide national-level campaign which reached the majority of the population in Ireland.	
Achieves other non-energy/carbon objectives.	The campaign also focused on better driving practices and reduction of private car use, which has a positive impact on air quality.	
Delivers jobs and growth.	The focus of the campaign was on immediate short term energy reduction actions, as such it is not linked to growth or job creation.	
Effective monitoring, evaluation.	The reach of the campaign was monitored and the majority of adults in the country were exposed to the messaging. The long-term behaviour changes and impact on energy use and carbon reduction, were not monitored, however, the Irish Government are using the programme outcomes as a spur to research evaluation approaches for similar future programmes.	

Efficiency	Notes	Strength of Effect
Minimal upfront economic burden on households/business.	Yes, the campaign focused on raising awareness on no-cost and low-cost measures, as such had little to no economic burden on households and businesses.	
Levers private finance/minimises required public expenditure.	The campaign was publicly funded by national government.	
Does not involve onerous regulation	No, the campaign did not involve regulation.	
Equity	**Notes**	**Strength of Effect**
Addresses low-income consumers, smaller or struggling SMEs.	The focus of the campaign was on actions that require no upfront costs. The campaign messaging empathised with people's financial worries and emphasised the need to stay warm and healthy, while at the same time looking for opportunities to reduce costs.	
Institutional Effectiveness	**Notes**	**Strength of Effect**
Policy learnings are shared and evidence of learning through the programme.	Reactions to the messaging were monitored throughout the campaign and adjusted according to people's sentiment and response.	
Innovation	**Notes**	**Strength of Effect**
Extent to which the programme is globally innovative.	Although there are similar awareness raising initiatives across the world, Reduce Your Use is a good example of a campaign striking a difficult balance of encouraging people to reduce their energy use where they can, whilst maintaining a healthy living environment, and alleviating worry at a time when there is concern over the cost of living.	

New York Inclusive Community Solar Adder – US		
Effectiveness	**Notes**	**Strength of Effect**
Achieves significant carbon reduction.	N/A – the solar capacity would have been delivered anyway; the incentive ensures distribution to low-income households. The wider package has achieved a significant deployment of solar.	
Focus on short term reduction of energy bills for households/businesses.	Estimates that LMI subscribers would on average see electricity bills lower by 5-20% with the majority seeing 10% discounts.	
Long-term policy framework providing market certainty.	Part of sequential incentive scheme with new funding going out to 2030.	
Scale (in terms of numbers of households/ businesses impacted).	The first round of funding should see 33,720 consumers benefit although take up of solar overall is highest in New York.	
Achieves other non-energy/carbon objectives.	At a package level, possible air quality improvements where fossil fuel generation has been displaced.	
Delivers jobs and growth.	At a package level supports New York solar industry.	
Effective monitoring, evaluation.	NYDSERA collects data on all qualifying schemes and publishes this on a dashboard. Consumer impact data is harder to come across.	

Efficiency	Notes	Strength of Effect
Minimal upfront economic burden on households/business.	Households need to pay a subscriber fee, but this is compensated for by a significant discount on electricity bills.	
Levers private finance/minimises required public expenditure.	Significant public money in incentives – but capital for solar development is privately funded and leveraging this is a key objective if the wider package.	
Does not involve onerous regulation.	Regulation required to deploy the incentive. Helps New York to meet targets, comply with Climate Act and buildings to comply with incoming emissions law LL97.	
Equity	**Notes**	**Strength of Effect**
Addresses low-income consumers, smaller or struggling SMEs.	Targeted at low-income households and related non-domestic users. Provides electricity bill discounts of 5-20%.	
Institutional Effectiveness	**Notes**	**Strength of Effect**
Policy learnings are shared and evidence of learning through the programme.	Programme has been iteratively improved; learnings are being shared and adopted by other states. Learnings from other states have been incorporated.	
Innovation	**Notes**	**Strength of Effect**
Extent to which the programme is globally innovative?	Similar in intent to community energy schemes in Europe and UK (especially Scotland and Wales) but designed to deliver benefits more consistently to low- and middle-income households.	

APPENDIX 2: **Policy Search Process by Country/Jurisdiction**

Methodologies for identifying long list policies	
Australia	The starting point for Australia was using the Energy Policy Tracker and IEA websites, along with using search terms "climate change policies," "energy efficiency policies." Because of its federal structure we also reviewed the Federal Australian Government websites and those of the States (Victoria, New South Wales, Queensland etc.) Energy Saving Trust looked at the information published by Energy Consumers Australia who were also interviewed, providing more in-depth information about relevant policies. At a federal level, the recent change of government has resulted in a much greater focus on reducing energy costs and cutting carbon. Because this change in government has happened recently these policies are still at an early stage of development and so it was not possible to include these in the project. At a state level, there has been a lot of activity, especially looking to cut costs through direct bill support, roll out of renewables and retrofit of homes to reduce energy costs. We identified several policies of interest that are at too early a stage to assess. For example, a town in Western Australia called Esperance has lost its gas anchor load making the remaining supply uneconomical so it is going through a process of rapid electrification with some important lessons and cost implications for similar future shifts elsewhere.
Canada	For Canada there is a rich literature on relevant policies with a number of NGOs monitoring federal government and provincial policy making. The analysis focussed on the publications of "Efficiency Canada" – who publish the Energy Efficiency Scorecard. This provided detailed information on provincial programmes. Because of the number of provinces and policies, focus was initially – in drawing up the long list – on web searches to identify policies in the three highest scoring provinces in Efficiency Canada's Scorecard assessment: Quebec, British Colombia and Nova Scotia. Further information, particularly on the federal-level programmes was then gathered through an interview with Efficiency Canada. Following this research, three main policy areas were identified: strategic management support/ capacity building for energy intensive businesses (delivered by regulated utilities at provincial level); the federal Greener Homes retrofit programme; and benchmarking for commercial buildings. More detailed research into these three areas identified that Ontario and British Colombia had best practice examples of the strategic energy manager support. On further investigation, Energy Saving Trust identified that the benchmarking policies (with linked mandatory performance standards) are more advanced in the United States and so work in Task 2 on this policy area has focused on the US.

Methodologies for identifying long list policies	
Europe	A number of EU wide reviews have been completed of policies, to which Energy Saving Trust has access due to our involvement in many EU-funded collaboration projects. These sources were used to identify an initial list of policies achieving decarbonisation and energy bill reduction objectives. This primary list was further increased by accessing information via the European Energy Network (EnR) – the European network of energy agencies – of which Energy Saving Trust is a member, further expanding the initial long list. Due to the vast number of European policies, many similar in design, the decision was taken to add to the medium list only those which represented policy packages or those which directly filled policy gaps in the UK as Energy Saving Trust understood them. Information campaign policies from France and Ireland were added to the medium list despite the lack of potential impact data as it was decided the cross-sector design and breadth of the policies provides a different format of analysis.
Japan	For Japan, the starting point was the Energy Policy Tracker website, which yielded information on policies up to 2021. Searches were then undertaken for "climate change policies," "energy efficiency policies" and similar terms (with a date range from the start of 2022 onwards). This identified that generally the view was that Japan's policy making had not been focussed in the key areas of interest for the types of policies being considered for this study (the country has a strong focus on decarbonisation through additional nuclear generation). Nonetheless, analysis of policies in Energy Policy Tracker showed some more detailed policies that could be of interest and were included in the initial long list. There was a strong focus in several of the Japanese policies on combining development of potentially stand-alone renewable powered local grids as a disaster preparedness measure, which was thought less relevant to the UK context. Some relevant low carbon transport policies were in place, but these did not seem significantly distinctive from other countries. Accordingly, we did not include any Japanese policies in our medium list.

Methodologies for identifying long list policies	
Korea	For Korea, as with Japan, the starting point was the Energy Policy Tracker website, which yielded information on policies up to 2021. Searches were then undertaken for "climate change policies," "energy efficiency policies" and similar terms (with a date range from the start of 2022 onwards). For Korea, all research (using Energy Policy Tracker initially and subsequent search terms) led immediately to government, and a number of third-party, websites describing the very large-scale K-New Deal programme. This programme provides the overarching policy framework for Korea's response to green recovery from the Covid Crisis. The K-New Deal covers several distinct policy programmes. The decision was taken that the most interesting dimension of this was the large-scale policy package itself; and this was accordingly included in the policy medium list.
New Zealand	We looked at New Zealand by using the Energy Policy Tracker and IEA websites, along with using search terms "climate change policies," "energy efficiency policies." New Zealand has generally introduced policies that have looked to address energy costs with direct cost support and delivering retrofit and energy efficiency measures for home, as well as boosting energy security. There has been a lot of focus on improving active travel provision. Few projects met the explicit scope of the research.

Methodologies for identifying long list policies	
Mexico	The starting point for Mexico was using the Energy Policy and IEA websites, along with using search terms "climate change policies," "energy efficiency policies" in English and Spanish. Overall, Mexico's response to the energy crisis has focussed on energy security and in particular securing supplies of natural gas and oil, yielding few policies meeting the scope of our research. One policy we identified looked at providing advice to SMEs in Mexico City.
US	The US has policies at federal, state and city level. To help assess the large amount of activity existing information regarding policies on the IEA and Energy Tracker websites was initially reviewed. Energy Saving Trust engaged with the American Council for an Energy Efficiency Economy (ACEEE) to understand the areas most likely to identify significant impact and be able to access data. At a federal level, the key developments have been the Infrastructure Act in response to the Covid pandemic in 2021 and the Inflation Reduction Act (IRA) in 2022. These packages provide funding to states and cities – and so focus was primarily on the polices at a state and city level that have been introduced or significantly expanded during the scope of our project. In the case of the IRA this funding is yet to be deployed. A good number of polices were identified at a state level that were within the scope of the project and, ultimately, a number of US policies at a state level were included on the medium list. In many cases there are similar policies across multiple states and cities (eg, community solar, EV subsidies) and in these cases we have looked to identify those examples that have the most impact on cost and carbon or have particular impact on low-income households or SMEs.

APPENDIX 3: **Additional policies considered for inclusion in detailed evaluation**

Canada, Quebec – Dual Energy				
Description of policy			**URLs of key sources of information**	
Grant for installing an electric heat pump alongside an existing natural gas system (ie, hybrid system). Participants are then able to access a favourable tariff, which requires them to use gas at times of peak demand (extreme cold spells) reducing pressure on the system. Developed in collaboration between gas and electricity utilities and with Quebec Government to reduce peak demand on Quebec's system. Quebec has extremely clean electricity (94% hydro), so the programme achieves substantial decarbonisation through electrification while helping to manage pressure on peak load by ensuring gas is used for home heating at times of peak demand. Aims to achieve reduction of 540 million tonnes CO_2 by 2030.			https://www.hydroquebec.com/residential/energy-wise/windows-heating-air-conditioning/dual-energy-offer Interview with Efficiency Canada: https://www.efficiencycanada.org/	
Why not included in Task 2 detailed evaluation			**Vocalised aims of policy**	
Interesting in focus on hybrid heat pumps and launch of parallel flexibility tariff, and in collaboration of gas and electricity utilities. Though interesting, felt to be a rather limited in scope for Task 2.			"Hydro-Québec and Énergir [Quebec gas supplier] have joined forces to fight climate change by proposing a dual-energy offer. The idea is simple: using electricity to meet over 70% of heating requirements and natural gas as an auxiliary source." [URL as above]	
Sector/sub-sector	**Type of measure**	**Date entered into force**	**Part of a wider policy package/ Builds on existing policy?**	**Cost/committed funding of policy**
Domestic – currently gas heated homes	Grant and favourable energy tariff	June 2022	Unknown	Unknown

United States, Multiple States – Regional Clean Energy Hubs				
Description of policy			**URLs of key sources of information**	
$36 million initiative to establish and support Regional Clean Energy Hubs as centres of outreach, awareness, and education in each of the ten Regional Economic Development Council (REDC) regions, to improve community engagement and ensure that all New Yorkers can benefit from the State's clean energy transition.			https://www.nyserda.ny.gov/About/Newsroom/2021-Announcements/2021-09-23-RFP-Clearinghouse-Clean-Energy-Hub	
Why not included in Task 2 detailed evaluation			**Vocalised aims of policy**	
Innovation potential for UK seems limited.			Improve community engagement and ensure that all New Yorkers can benefit from the State's clean energy transition.	
Sector & sub sector impacted	**Type of measure**	**Date entered into force**	**Part of a wider policy package/ Builds on existing policy?**	**Cost/committed funding of policy**
Multiple – community level focus	Information provision	23 September 2021	Climate Leadership and Community Protection Act (Climate Act)	$36million

United States, New York State – Pilot to Decarbonise Affordable Housing, United States				
Description of policy			**URLs of key sources of information**	
This is a pilot program to fund electrification in affordable housing.			https://www.nyserda.ny.gov/About/Newsroom/2021-Announcements/2021-08-30-Governor-Hochul-Announces-Agreement-with-New-York-City-Department-of-Housing-Preservation-and-Development-Establishing-a-24-MILLION-Pilto-to-Decarbonize-Affordable-Housing	
Why not included in Task 2 detailed evaluation			**Vocalised aims of policy**	
Unclear of evidence – also UK already has policies in this area.			"Work will include transitioning from fossil fuel-based heating and cooling to highly efficient heat pump technology, boosting energy efficiency, lowering greenhouse gas emissions and providing improved indoor environment quality."	
Sector/sub-sector	**Type of measure**	**Date entered into force**	**Part of a wider policy package/ Builds on existing policy?**	**Cost/committed funding of policy**
Buildings – Heat	Grant	30 August 2021	Forms part of the Climate Leadership and Community Protection Act	$24 million

US, New York State – Community Heat Pump Systems Pilot				
Description of policy			**URLs of key sources of information**	
A Community Heat Pump Systems Pilot will promote community thermal networks that harness geothermal and waste energy to heat and cool buildings. The winning projects will explore clean energy options in 600 buildings to reduce carbon emissions and air pollution with two-thirds of funding being directed to projects that support disadvantaged communities.			https://www.nyserda.ny.gov/About/Newsroom/2021-Announcements/2021-07-19-Governor-Cuomo-Announces-Nearly-4-Million-Awarded-to-Grow-Community-Heat-Pump-Networks-Across-New-York-State	
Why not included in Task 2 detailed evaluation			**Vocalised aims of policy**	
Similar solar focused policies were included. May be multiple examples including Chicago, Colorado, Washington DC. Forms part of the Climate Leadership and Community Protection Act.			Investment in community thermal networks to both advance clean energy options and deliver long-term energy savings to communities in need.	
Sector/sub-sector	**Type of measure**	**Date entered into force**	**Part of a wider policy package/ Builds on existing policy?**	**Cost/committed funding of policy**
Buildings – heat	Grant	19 July 2021	New York Climate Leadership and Community Protection Act (Climate Act)	$4 million

Sweden – Climate Bonus Cars				
Description of policy			**URLs of key sources of information**	
A grant of €6,000 for the purchase of a low emissions vehicle. The grant is available to businesses and individuals. Scheme is now being phased out.			https://blog.wallbox.com/en/sweden-ev-incentives/ https://transportstyrelsen.se/sv/vagtrafik/Fordon/bonus-malus/bonus/berakna-din-preliminara-bonus/ https://www.regeringen.se/pressmeddelanden/2023/01/regeringsbeslut-om-formerna-for-klimatbonusens-avveckling/	
Why not included in Task 2 detailed evaluation			**Vocalised aims of policy**	
California was thought to provide a better example of these types of policies. Sweden is seen as one of leading countries in incentivizing the installation of public and private EV chargers and promoting take up of EVs.			Encourage transition to low emission vehicles.	
Sector/sub-sector	**Type of measure**	**Date entered into force**	**Part of a wider policy package/ Builds on existing policy?**	**Cost/committed funding of policy**
Transport – EVs	Grant	Unclear	Unclear	Unclear

Germany – Short Term Energy Supply Security Measures Ordinance (EnSikuMaV)				
Description of policy			**URLs of key sources of information**	
Compulsory restrictions/limits across sectors. For example, not being able to use gas or oil to heat certain public spaces like swimming pools. Advice for public buildings to turn off heating in hallways and unused rooms, reduce hot water use in showers and swimming pools. Reduce unnecessary lighting in public spaces, for example decorative lights and turn off water fountains. Advice to commercial sector included keeping shop doors closed, turning off heating in unused rooms, ban on some AC units and fan heaters.			http://www.gesetze-im-internet.de/ensimimav/ https://www.bmwk.de/Redaktion/EN/Downloads/Energy/0901-22-lav-energieeinsparverordnungen-en.pdf?__blob=publicationFile&v=10	
Why not included in Task 2 detailed evaluation			**Vocalised aims of policy**	
Chose to focus on similar French "Sobriété Énergétique " initiative.			Lower Gas consumption.	
Sector/sub sector	**Type of measure**	**Date entered into force**	**Part of a wider policy package/ Builds on existing policy?**	**Cost/committed funding of policy**
Multiple/behaviour change	Regulation	1 September 2022 -28 February 2023	Part of a wider regulatory law EnSimiMav)	Unknown

Belgium – Recommendations to local authorities and private sector				
Description of policy			**URLs of key sources of information**	
Local authorities and private companies received guidance from national government on how to save energy in public buildings and public spaces: • Road lighting hours reduced. • Heating temperatures in offices not exceeding 19°C, turned off at weekends. • Air conditioning minimum temperature of 27°C. • Maximum temperature for swimming pools. • Turn off heating and ventilation in unused rooms. • Turn off outdoor lighting between 7pm and 6am. • Turn off unused appliances.			https://www.thebulletin.be/node/97339 https://www.brussels.be/energy-measures-public-and-christmas-lighting	
Why not included in Task 2 detailed evaluation			**Vocalised aims of policy**	
Similar to French Sobriété Énergétique, which seems more ambitious. Example of government guidelines and restrictions on energy use in response to energy crisis for local government and private sector. Local authorities and commercial businesses received recommendations on reducing, lighting in public spaces, heating temperatures in pools, offices, ventilation restrictions, turning off unused appliances.			Energy saving	
Sector/sub sector	**Type of measure**	**Date entered into force**	**Part of a wider policy package/ Builds on existing policy?**	**Cost/committed funding of policy**
Public buildings and spaces, commercial and residential	Guidance for local government	End of 2022	No	Unknown

France – Heat fund reinforcement				
Description of policy			**URLs of key sources of information**	
Fund to support the production of heat from renewable sources, geothermal, use of biomass, heat pumps and solar thermal, waste heat recovery. Fund increased by €20 million in response to COVID and increased by €150 million in response to the energy crisis.			https://expertises.ademe.fr/energies/energies-renouvelables-enr-production-reseaux-stockage/passer-a-laction/produire-chaleur/fonds-chaleur-bref https://www.iea.org/policies/1011-heat-fund https://www.gouvernement.fr/actualite/le-fonds-chaleur-levier-de-la-transition-énergétique -des-industriels-entreprises-et-collectivites	
Why not included in Task 2 detailed evaluation			**Vocalised aims of policy**	
Not strongly focused on direct household/business energy saving. Other French policies being considered.			Support production of renewable heat.	
Sector/sub sector	**Type of measure**	**Date entered into force**	**Part of a wider policy package/ Builds on existing policy?**	**Cost/committed funding of policy**
Collective housing, industry, local authorities, tertiary sector	Grant	2009	Wider policy package – unknown Existing policy – yes	€520 million in total (€150 million added because of the energy crisis)

Netherlands – National insulation program				
Description of policy			**URLs of key sources of information**	
National program to improve insulation of dwellings in the Netherlands. Focus is on poorly insulated dwellings and households with low incomes/vulnerable to energy poverty. Ambitious targets of insulating 2.5 million homes, with an emphasis on the 1.5 million homes with the lowest energy ratings. High use of natural gas in the Netherlands, similar to UK, so learnings highly relevant.			https://www.volkshuisvestingnederland.nl/onderwerpen/nationaal-isolatieprogramma	
Why not included in Task 2 detailed evaluation			**Vocalised aims of policy**	
Canadian, Irish, and French retrofit support programmes were thought to be of more interest.			Support people with increased living costs, reduce demand for energy, reduce risk of energy poverty.	
Sector/sub sector	**Type of measure**	**Date entered into force**	**Part of a wider policy package/ Builds on existing policy?**	**Cost/committed funding of policy**
Domestic buildings	Financial support	2022	Wider policy package – unknown Existing policy – no	€4 billion

Ireland – Increased and accelerated grants				
Description of policy			**URLs of key sources of information**	
Grants available to the able to pay domestic sector for individual energy efficiency measures such as wall insulation and renewable energy systems such as solar PV, heat pumps, including air to air systems and funding for technical assistance.			https://www.seai.ie/grants/	
Why not included in Task 2 detailed evaluation			**Vocalised aims of policy**	
Considered in Task 2 alongside Irish One Stop Shop initiative. Example of existing support scheme for home renovations being strengthened, an increase in public funds committed to renovation grants.			Energy saving	
Sector/sub sector	**Type of Measure**	**Date entered into force**	**Part of a wider policy package/ Builds on existing policy?**	**Cost/committed funding of policy**
Domestic, energy poor households, public sector, SMEs, communities	Grants	2022	Yes, part of National Home Energy Upgrade Scheme	"€481 million allocated (40% increase on 2022), including: • €337 million for residential and community upgrades • €75 million for business and public sector • Exchequer funding, including €291 million from carbon tax"

Italy – Ecobonus, Superbonus, Conus Casa				
Description of policy			**URLs of key sources of information**	
Tax relief for home renovations. Superbonus – tax relief for improvement of at least two energy classes, Ecobonus – energy improvement of buildings. A tax relief scheme to encourage home renovations in Italy which used an innovative financial mechanism to incentivise action and proved popular, with high take up. This was an existing scheme that was strengthened to support the building industry after the Covid-19 pandemic. Scheme has been scaled back in 2023.			https://www.enea.it/en/news-enea/news/energy-enea-3-5-billions-invested-with-the-eco-bonus-in-2019-42-billions-since-2007 https://www.theguardian.com/world/2023/feb/17/italy-scraps-superbonus-110-green-tax-credit-scheme	
Why not included in Task 2 detailed evaluation			**Vocalised aims of policy**	
Withdrawal of the policy, following claims of fraud.			Support the recovery of the building industry post-pandemic and improve energy efficiency of buildings in Italy.	
Sector/sub sector	**Type of measure**	**Date entered into force**	**Part of a wider policy package/ Builds on existing policy?**	**Cost/committed funding of policy**
Domestic buildings	Financial support	Ecobonus introduced in 2014, Bonus Casa in 2018	Wider policy package – unknown Existing policy – Yes	€3.5 billion in 2019

Sweden – Commercial & Service Buildings: Long-term measures to reduce gas dependency				
Description of policy			**URLs of key sources of information**	
Setting requirements to install solar PV in private, public, and commercial buildings of at least 10kW by end of 2021. The solar systems must be connected to electricity grid and used for self-consumption.			https://energimyndigheten.a-w2m.se/Home.mvc?ResourceId=208766	
Why not included in Task 2 detailed evaluation			**Vocalised aims of policy**	
Renewables. Relevance questioned as scheme not developed in response to energy crisis per se.			Part of Sweden's commitment to be carbon neutral by 2045 and for electricity generation to be 100% renewable by 2040.	
Sector/sub sector	**Type of measure**	**Date entered into force**	**Part of a wider policy package/ Builds on existing policy?**	**Cost/committed funding of policy**
Commercial and Service Buildings	Regulation	Requirements were announced in 2020	Scheme providing grants and loans for installing PV systems and part of Sweden's commitment to be carbon neutral by 2045 and for electricity generation to be 100% renewable by 2040. Goal to have 1 million solar PV systems installed in Sweden by 2030.	The Government had allocated a budget of SEK1.2 billion ($128 million) for the solar rebate scheme.

Greece – Public building energy renovation				
Description of policy			**URLs of key sources of information**	
Public buildings given a target of 10% reduction in energy consumption compared to 2019 baseline. Mandatory consumption reduction in all public services for immediate savings, such as restrictions on heating temperature. Plans also cover medium term improvements to building fabric, to improve energy efficiency and appoint a person responsible for achieving the targets. Public authorities are required to record progress on digital platform. Policy would affect 212,000 public buildings with a current energy consumption of 5,340 GWh in 2021 which is equivalent to 10.8% of the country's energy consumption. Interesting aspects include the inclusion of immediate actions to reduce energy like heating restrictions, as well as medium term measures to improve building fabric and also recording measures on a publicly accessible online platform, in order to measure progress.			https://www.minfin.gr/web/guest/-/ypegraphe-e-kya-gia-ta-metra-exoikonomeses-energeias-sto-demosio https://ypen.gov.gr/platforma-exoikonomisis-energeias-ypodomon-dimosiou/ https://government.gov.gr/metra-gia-tin-exikonomisi-energias-sto-dimosio/	
Why not included in Task 2 detailed evaluation			**Vocalised aims of policy**	
Similar to French Sobriété Énergétique. Targets placed on public buildings to reduce energy consumption.			Energy reduction in the public sector	
Sector/sub sector	**Type of measure**	**Date entered into force**	**Part of a wider policy package/ Builds on existing policy?**	**Cost/committed funding of policy**
Public buildings	Regulation	September 2022	Linked to requirements set out at EU level in the EPBD and EED.	Unclear. Public authorities are expected to cover cost of measures out of their budgets.

Croatia – Financial support for transition to efficient economy. Businesses (co-financing by R&R + RePowerEU)				
Description of policy			**URLs of key sources of information**	
Financial support offered to SMEs to install energy efficiency measures and on-site RES. – Co-financing (R&R + RePowerEU) of optimization of consumption and cost reduction measures for companies (prioritizing replacement of natural gas by electricity, and PV installation for self-sufficiency). Interesting aspect is the focus on supporting SMEs with energy efficiency and also renewables.			None	
Why not included in Task 2 detailed evaluation			**Vocalised aims of policy**	
Other SME policies identified			Unknown	
Sector/sub sector	**Type of measure**	**Date entered into force**	**Part of a wider policy package/ Builds on existing policy?**	**Cost/committed funding of policy**
SMEs	Financial support	September 2022	Wider policy package – unknown Existing policy – yes	1.9 billion HRK (approx. €250 million)

Netherlands – Increased budget for Energy Investment Tax Allowance (EIA) scheme and Environmental investment allowance (MIA/VAMIL)				
Description of policy			**URLs of key sources of information**	
Under the Environmental investment deduction (MIA) and Arbitrary depreciation of environmental investments (Vamil) schemes, businesses including SMES receive tax reductions for investments in energy efficiency and other investments which reduce environmental impact.			https://english.rvo.nl/subsidies-programmes/energy-investment-allowance-eia https://english.rvo.nl/subsidies-programmes/mia-and-vamil	
Why not included in Task 2 detailed evaluation			**Vocalised aims of policy**	
Taken forward in Task 2 initially but then rejected as seemed not significantly different to policies that the UK has abandoned/revised. An interesting example of scheme to encourage businesses to invest in technologies that would improve their environmental performance. Businesses can select products from a long list of technologies.			Energy use reduction in commercial sector.	
Sector/sub sector	**Type of measure**	**Date entered into force**	**Part of a wider policy package/ Builds on existing policy?**	**Cost/committed funding of policy**
Commercial, SMEs	Financial support, tax allowance	Started in 1996, extra budget added in 2023	Delivered as part of EU policy requirements under Art 7 of the EED.	Budget increased by €150 million for both schemes in response to the energy crisis. The budget for MIA in 2023 is €192 million and the budget for Vamil in 2023 is €25 million.

South Korea – Korean New Deal				
Description of policy			**URLs of key sources of information**	
Very large-scale package – headings for programmes in the package include: • Smart Green Cities • Energy Efficient Buildings • Innovative Green Industry Support • Low-carbon Transition in • Energy Digitalization • Redevelopment in K-New Deal • Energy Infrastructure Improvement			https://www.nesta.org.uk/feature/stories-change/smart-economic-recovery-south-koreas-green-new-deal/ https://english.moef.go.kr/pc/selectTbPressCenterDtl.do?boardCd=N0001&seq=4948	
Why not included in Task 2 detailed evaluation			**Vocalised aims of policy**	
Korean policy environment is very different to UK. Already discussing US IRA and EU packages as examples of large framework polices.			"The Korean New Deal, announced in Korea on July 14, plans to invest 160 trillion won (114.1 trillion won worth of fiscal investment) to create 1,901,000 jobs by 2025 based on two main policies – the Digital New Deal and Green New Deal- and an overarching policy support to strengthen employment and social safety net".	
Sector/sub sector	**Type of measure**	**Date entered into force**	**Part of a wider policy package/ Builds on existing policy?**	**Cost/committed funding of policy**
Multiple	Grants, subsidies, loans	July 2020	Policy package which builds on earlier stimulus packages which have had green focus- see NESTA blog.	£75.5 billion

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