# An analysis of the advantages and disadvantages of different Net Zero targets for Jersey

Government of Jersey

March 2021

## The purpose of this briefing note

Since the declaration of a climate emergency by Jersey's States Assembly in May 2019, the Government of Jersey has been working on developing a strategy to make Jersey carbon neutral by 2030.[1] Oxera has been assisting the Government with the economic analysis underpinning this strategy. This briefing note is based on previous studies commissioned from Oxera by the Government of Jersey (see Oxera (2020), 'Quantitative analysis of carbon neutrality by 2030' and Oxera (2019), 'Carbon neutrality by 2030').

The Government has invited Jersey's first Citizens' Assembly to consider the options, and to recommend the scale of Jersey's ambition for carbon neutrality and the deadline for meeting it to the States Assembly.[2]

This briefing note provides information to the Citizens' Assembly on the following key issues.

- A description of Jersey's carbon footprint and its sources of emissions.
- The role carbon offsets can play in achieving carbon neutrality and how they work.
- Arguments both for and against more ambitious carbon reduction targets, including a review of the decarbonisation debates in other jurisdictions.
- The key trade-offs to consider when making policy decisions to achieve carbon neutrality.
- Oxera's analysis of the potential cost of carbon neutrality in the two largest emitting sectors: transport and heating.

This briefing note does not present a view on whether Jersey should decarbonise and does not attempt to provide recommendations on which Net Zero target to choose.

# Glossary

| Term | Explanation |
|---|---|
| Afforestation | Afforestation is the establishment of a forest or trees in an area, often where there was no previous tree cover. Afforestation programmes can be used to increase carbon capture to decrease emissions. |
| Biodiversity | The variety of plant and animal life in the world or in a particular habitat. A high level of biodiversity is usually considered to be important and desirable. |
| Carbon neutrality or Net Zero | Carbon neutrality is achieved by balancing the scope 1 and 2 emissions (see definitions below) produced against any activity that captures, absorbs or reduces global emissions so that they are equal. |
| $CO_2e$ | Carbon dioxide equivalent ($CO_2e$) is a term for describing different greenhouse gas emissions. For any quantity and type of greenhouse gas emissions, $CO_2e$ is the amount of $CO_2$ emissions which would lead to the equivalent amount of global warming. |
| kt $CO_2e$ | A kilo tonne of carbon dioxide equivalent (kt $CO_2e$) is equal to 1,000 tonnes of $CO_2e$. |
| EV | Electric vehicle. Any vehicle that is powered by one or more electric motors. |
| GHG emissions | Greenhouse gas emissions are emissions of any gas in the atmosphere which absorbs and re-emits heat and thereby contributes to the warming of the planet. |
| HVO | Hydrotreated vegetable oil is a second generation biodiesel. |
| LPG | Liquefied petroleum gas. |
| Offset | Offset certificates (offsets) allow a jurisdiction to compensate for domestic emissions by funding emissions reduction projects elsewhere in the world. |
| Scope 1 emissions | Scope 1 emissions are emissions that are directly generated from on-island activities. |
| Scope 2 emissions | Scope 2 emissions are emissions arising from the generation of energy that is imported and consumed by Jersey's residents. |
| Scope 3 emissions | Scope 3 emissions include those emitted in the manufacture and transport of goods and services consumed in Jersey. |

Scope 2 emissions are those arising from the generation of energy that is imported and consumed by Jersey's residents. 95% of Jersey's electricity is imported from France, which has a low-carbon energy mix, relying very little on fossil fuels (oil, coal, gas) to generate electricity.

Scope 3 emissions include those emitted in the manufacture and transport of goods and services consumed in Jersey. They include the full life-cycle emissions throughout a supply chain and emissions arising from the global activities of Jersey businesses.

## Which emissions 'count', which don't, and why?

The Government of Jersey is aiming to achieve carbon neutrality for all GHG emissions.[3] For the purposes of this briefing note, reference to 'carbon emissions' also includes emissions from other greenhouse gases.

The quantitative analysis underlying this briefing note has considered only scope 1 emissions in Jersey. Scope 1 emissions are emissions that are directly generated from on-island activities, such as the emissions from gas boilers for heating or from petrol and diesel vehicles.

Jersey's Carbon Neutral Strategy recognises all scope 1, 2 and 3 emissions, emphasising the importance of local consumption choices across the world.[4] However, Jersey's policy choices will have a significantly greater impact on scope 1 emissions than on scope 2 and especially scope 3.

In Oxera (2020), we assessed decarbonisation measures for Jersey, focusing on scope 1 emissions. These are reported annually through the GHG emissions inventory and the Jersey Energy Trends Report.[5] They provide information about the underlying emitting sectors.

**Jersey's carbon footprint (scope 1 emissions) in 2018 with total emissions of 422 $ktCO_2e$[6]**


Note: The heating of domestic and commercial properties is based on 'residential' and business' categories provided by Aether. Oxera's assessment is that, based on the underlying source data, the vast majority of these emissions relate to heating. The total emissions differ from the sum of the emissions of each sector as the negative emissions from land use change (accounting for -0.2%) and the emissions from industrial processes (accounting for 0.02%) are not included in the figure. Total transport emissions differ from the sum of aviation, marine and road transport emissions as the emissions from 'Non-energy products from fuels and solvent use: Other' are not included in the figure. The percentages do not sum to 100% due to rounding.

Source: Oxera analysis based on 2018 data from Aether.

# What is the role of offsets?

The Government of Jersey has defined carbon neutrality **as balancing the scope 1 and scope 2 emissions produced against any activity that captures, absorbs or reduces global emissions** so that they are equal.[7] Scope 3 emissions across the world do not form part of the baseline for carbon neutrality. This balancing of emissions can be achieved by either abating (i.e. reducing) or offsetting emissions.

## How do offsets work?

Offset certificates are intended to compensate for domestic emissions by funding emissions reduction projects elsewhere in the world, acknowledging that large-scale offset schemes (e.g. afforestation) cannot be undertaken at a large scale in Jersey or are less expensive elsewhere.

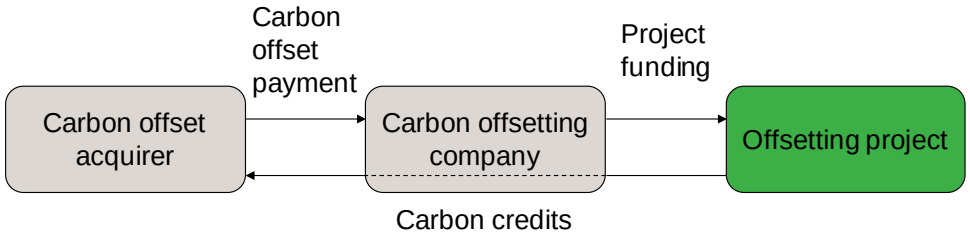
The certified service of offsetting carbon emissions is generally provided by carbon offset companies ('offsetting through an intermediary'). The companies attract funding from governments and businesses seeking to offset their emissions and redistribute these funds to emissions reduction projects around the globe. An alternative is to engage directly with the offsetting project.

Carbon offset **prices are expected to increase** in the future as demand rises and less expensive emissions reduction projects will have already been exhausted.

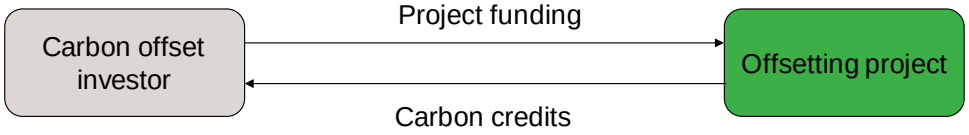
Cheaper projects could be a large-scale replacement of inefficient light bulbs with energy-saving light bulbs, where this would not have taken place in the absence of the project.

An expensive project could be to invest in carbon capture and storage technologies.

**Carbon offsetting through an intermediary**




**Direct engagement with the supply side of the market**

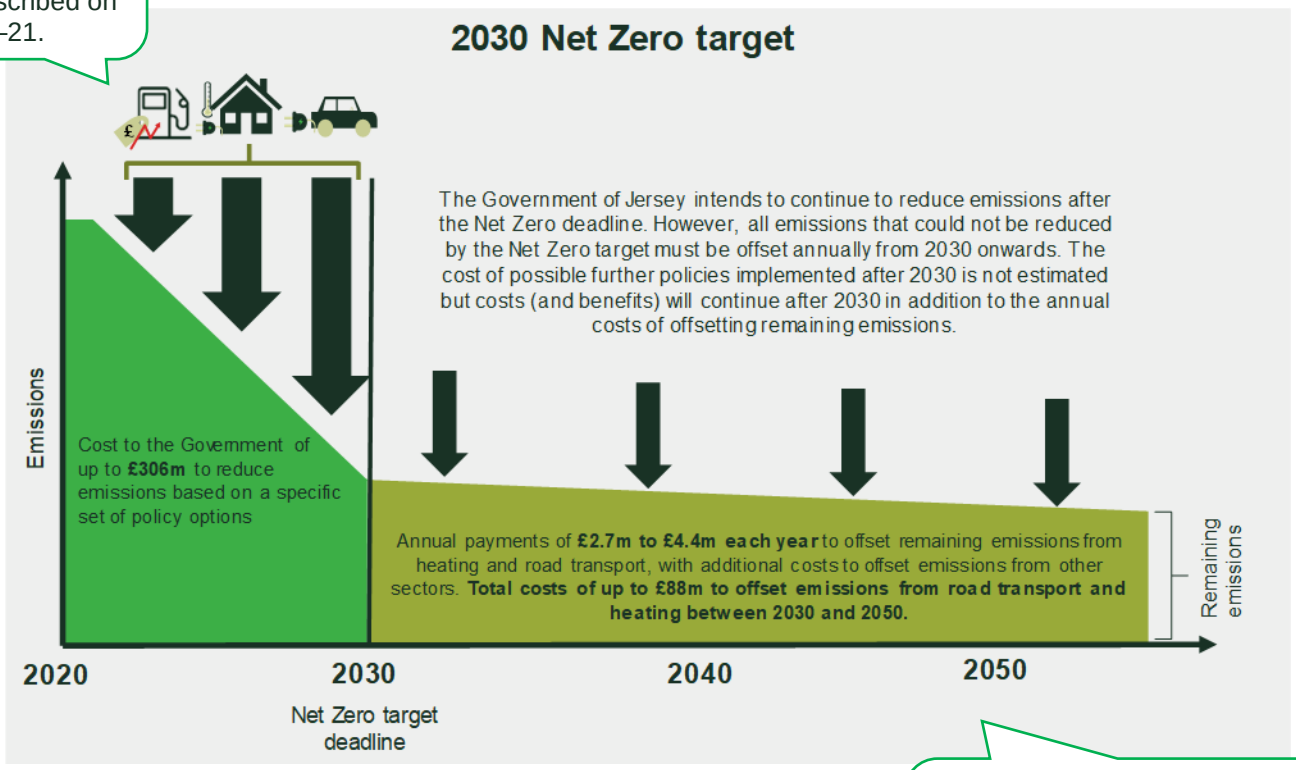



The Government of Jersey considers it appropriate to use carbon offsetting where emissions cannot be abated, but offsets on their own are not a route to carbon neutrality and should only be used where they are accompanied by robust and ambitious measures to reduce emissions.[8]

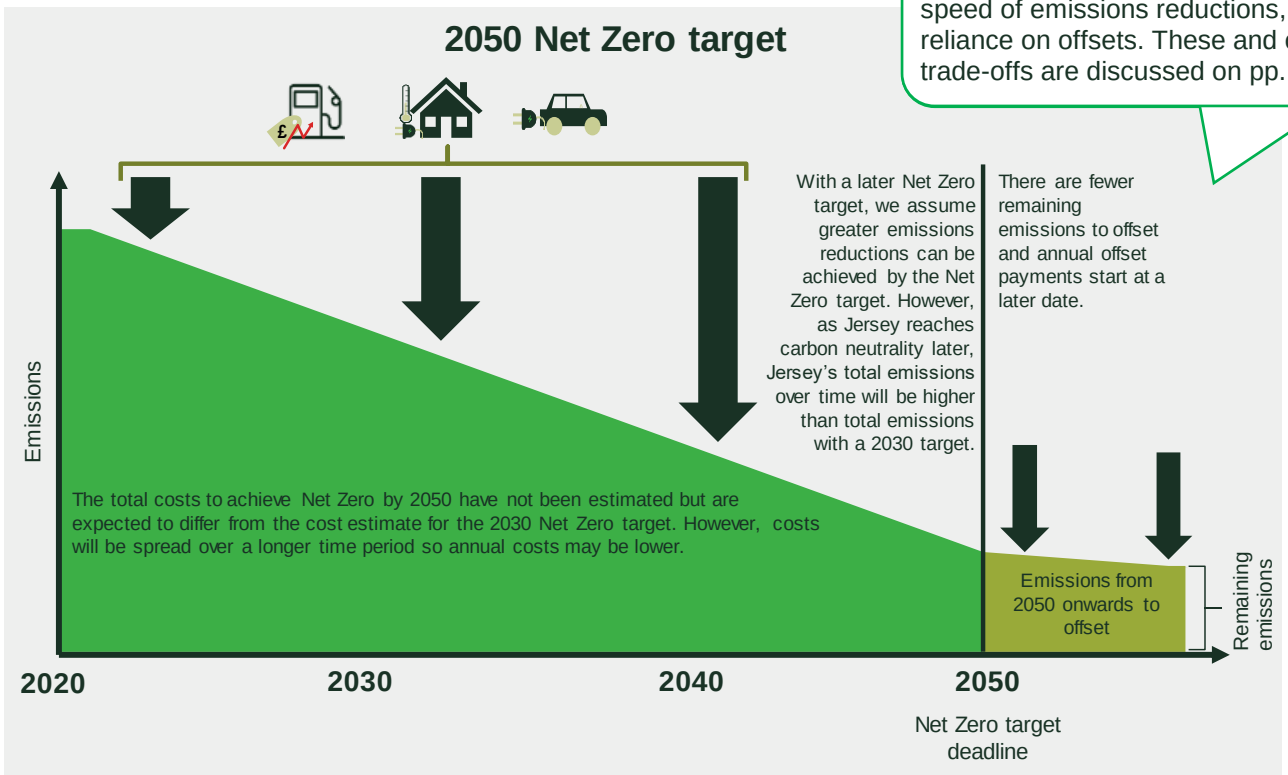
Note that offsetting does not result in any local benefits for Jersey's citizens, such as the better air quality that a reduction in local emissions would bring. However, these benefits will be felt elsewhere in the world.

The two diagrams below illustrate the implications that achieving Net Zero in 2030 and 2050 might have on the speed of emissions reductions, the reliance on purchasing offsets to meet the Net Zero target, and the costs for policy implementations and offsets. The indicative costs provided for the 2030 Net Zero target are based on Oxera (2020), which provides an estimate of the costs to achieve carbon neutrality in the road transport and heating sectors.

The policy measures and associated costs are described on pp. 16–21.




The Net Zero target chosen will determine the balance between costs, speed of emissions reductions, and reliance on offsets. These and other trade-offs are discussed on pp. 8–15.



Below, we present the results of research into setting Net Zero targets in other jurisdictions: the UK, the EU and the Netherlands. These jurisdictions all have an active debate regarding when to achieve Net Zero and have exhibited a strong commitment to decarbonisation. While citizens of these jurisdictions face challenges in achieving Net Zero that may differ from those in Jersey, all have thoroughly evaluated the advantages and disadvantages of Net Zero targets.

### The UK debate

The UK government has progressively increased its ambitions for UK emissions reductions relative to 1990 levels over the past two decades. In 2003, the government set a target to reduce $CO_2$ emissions by 60% by 2050.[9] In 2008, at the Climate Change Committee's (CCC)[10] recommendation, the target was increased to an 80% reduction in all GHG emissions by 2050.[11] The UK Parliament increased the target again in 2019, after the CCC recommended that the UK reach Net Zero in all GHG emissions by 2050.[12] In 2020, the CCC estimated that the UK must reduce GHG emissions by 68% by 2030 and by 78% by 2035 relative to 1990 levels to achieve Net Zero by 2050.[13]

The CCC has concluded that the more ambitious Net Zero target is necessary in light of global trends in emissions and global warming.[14] The target is deemed to be feasible due to developments and cost reductions in the technologies needed to deliver Net Zero. The CCC states that the more ambitious Net Zero target will stimulate investment and economic recovery following the COVID-19 crisis, and will lead to improvements in health, well-being, and the natural and human environment.[15]

The CCC feels that an earlier Net Zero target would be inappropriate for the UK. This is because it has estimated that the earliest possible date by which the UK could achieve Net Zero without resorting to widespread early scrappage of assets or imposing strict limits on individuals' behaviour would be 2042.[16] However, the CCC states that this target is a highly optimistic estimation that would require policies to work first time without the time to learn from what works and what does not.[17] An earlier Net Zero target would leave less time for a phased transition in which citizens and businesses are adequately supported, and may lead to the introduction of abrupt, inappropriate measures to reduce emissions quickly as the deadline approaches.[18]

### The EU debate

The EU has set increasingly ambitious targets for reducing GHG emissions. In 2011, the European Commission planned to reduce GHG emissions by 80–95% (relative to 1990 levels) by 2050.[19] By 2018, the Commission set out its ambition to reach Net Zero GHG emissions by 2050.[20] The proposed European Climate Law, which is currently under review, would make the 2050 Net Zero target legally binding if accepted by the European Parliament.[21] Similarly, the Commission has increased its desired 2030 GHG emissions reduction target. In 2014, the Commission targeted a 40% reduction in GHG emissions relative to 1990 levels by 2030.[22] In 2019, it proposed increasing the target to 55% and including this target in the European Climate Law.[23] The Commission has cited growing public support for addressing climate change in setting its Net Zero goal, and has stated the need for Europe to demonstrate global climate leadership.[24] The Commission warned that less

ambitious pathways could end up 'locking in' carbon-intensive investments and that early investment and innovation would be necessary to reach the emissions reduction targets. However, arguments were also put forward that this must be balanced against the time it takes to develop infrastructure for low-carbon technologies, business models, and for workers to develop the necessary skills.[25]

### The Netherlands debate

Climate policy has evolved in the Netherlands over the past decade. In 2015, a legal case was brought against the government of the Netherlands on behalf of 900 Dutch citizens, on the grounds that the government had breached its duty of care for its citizens by failing to pursue a more ambitious reduction of GHG emissions.[26] Based on the government's policy at the time, the Netherlands was estimated to achieve a reduction of GHG emissions of at most 17% of 1990 levels in 2020 and the government argued that a further reduction would have a very minor, if not negligible, effect on global GHG emissions. However, the Court stated that any GHG emissions, no matter how minor, contribute to climate change. Accordingly, it was ruled that the government must reduce GHG emissions by at least 25% by 2020 to protect Dutch citizens against the imminent danger caused by climate change.[27]

Emissions reduction targets are now more ambitious with the adoption of the Climate Act in 2018. The government has committed to reducing GHG emissions by 49% by 2030 (compared to 1990 levels), and by 95% by 2050. These targets are legally binding through the Climate Act and are deemed to be feasible and appropriate for the Netherlands as in many areas the transition is already underway.[28]

Today, the government views an ambitious climate policy as necessary to safeguarding the prosperity of the Netherlands in the long term. It considers that the targets will allow the Netherlands to take advantage of economic and social opportunities from its status as a frontrunner in climate action. The 2050 goal allows the government to take a long-term phased approach to ensuring that policy can be adapted and that the most cost-effective and future-proof approaches are used.

### The key considerations relating to the transition to Net Zero

The transition to Net Zero will bring both advantages and disadvantages. We have summarised the key considerations around these arguments and present them below grouped into six categories: emissions reductions; social and environmental considerations; economic considerations; reputational considerations; practical considerations; and cost considerations. The relevance and magnitude of these considerations change for the different Net Zero targets. Many of these arguments were prominent in the jurisdictional debates presented above when determining an appropriate Net Zero target.

#### Emissions reductions

**Reductions in emissions.** Any emissions, no matter how minor, contribute to climate change. A Net Zero target will allow Jersey to reduce its own emissions and end its contribution to climate change, while possibly encouraging other countries to take action. If more countries contribute to climate action, greater global warming can be avoided.

#### Social and environmental considerations

**Improvements in natural and human environments.** Policies to reduce emissions can improve the quality of human and natural environments and can improve biodiversity. For example, increased tree cover in Jersey can improve air quality, increase biodiversity, provide natural flood protection, and provide recreational benefits for citizens.

**Health and well-being benefits.** Policies to reduce emissions can lead to health and well-being benefits for citizens. These include direct health benefits, for example from improved air quality, and indirect benefits such as more comfortable, liveable buildings from insulation improvements. Climate-related policies and improved physical health can have knock-on impacts on mental health and can contribute to alleviating the growing phenomenon of 'climate anxiety'.

#### Economic considerations

**Economic benefits and opportunities.** Achieving Net Zero will require investment which can stimulate economic activity and employment. For example, climate action could create jobs in Jersey in the deployment of low-emission technologies.

**Operating cost savings.** Many low-carbon investments and technologies can bring operating cost savings. Households and businesses can benefit from lower energy bills due to improvements in heating systems and the energy efficiency of buildings. Motorists could see cuts in the ongoing costs of driving as they shift to EVs, which have lower operating costs than fossil fuel vehicles.

**Stimulation of innovation.** The transition to Net Zero may stimulate innovation and the development of new ideas in Jersey as businesses and households are encouraged to undertake low-carbon investment. This could decrease the cost of achieving Net Zero and could lead to economic opportunities.

## Reputational considerations

**Reputational benefits and opportunities.** The choice of Net Zero target will establish Jersey's position on climate action to the international community. An accelerated target may give Jersey a status as a frontrunner in climate action and may help to unlock economic, social, reputational, and diplomatic opportunities. On the other hand, a Net Zero target that is too ambitious to be credibly delivered through emissions reductions where possible could undermine reputational benefits.

## Practical considerations

**Reskilling of workers.** Labour markets must adapt to ensure that workers are qualified to deliver the transition to Net Zero and allow workers to benefit from the economic and job opportunities arising from it. For example, workers will require retraining for the successful deployment of low-emission heating technologies.

**Development of supply chains.** The transition to Net Zero will require significant changes to existing supply chains. It will take time to develop new supply chains, construct the required capacity, and develop new business models for the deployment of low-carbon technologies and the transition to Net Zero. It will be challenging to achieve this and will require significant changes to 'business as usual'.

**Development of infrastructure.** The transition to Net Zero will require significant changes to existing infrastructure and the development of new infrastructure. The uptake of low-carbon technologies, for example EVs, will be limited or non-existent until the necessary charging infrastructure is in place.

**Opportunities to learn what works.** It is helpful for policymakers to have the opportunity to trial solutions and policies before committing to them, as well as to learn from what works and what does not in Jersey and other jurisdictions. This can help to identify the most cost-effective and appropriate approaches to achieve Net Zero.

**Administrative constraints and coordination issues.** Coordinating climate policy across different layers of government and across the private and public sectors will be challenging. For example, different groups may not consider each other's interests or may wait for each other unnecessarily, potentially disrupting the transition to Net Zero. It will be important to ensure that the transition is well coordinated and that there is a joined-up approach across government and all sectors and levels of society.

**Societal changes needed.** The transition to Net Zero may require considerable lifestyle changes and policies may require significant commitments from citizens in order to be effective. These changes generally take time and can be difficult to achieve.

**Public support for the Net Zero target.** Public and business support will be a vital component in achieving the Net Zero target as it will require significant commitments and investments from businesses and households.

## Cost considerations

**Cost to the Government.** The transition to Net Zero and many of the necessary policy measures will be costly for the Government. For example, the Government may need to provide grants and subsidies to incentivise low-carbon investment and behavioural change to reach Net Zero.

**Cost to households and businesses.** The transition to Net Zero will be costly for businesses and households, and will require significant changes to the 'status quo'. For example, some policies may require higher energy efficiency requirements for new builds or insulation requirements for existing buildings by a certain year.

**Use of offsets.** Purchasing of offset certificates will be necessary to balance any remaining emissions that cannot feasibly be abated (i.e. stopped) by the Net Zero target. The purchase of offset certificates is an annual recurring cost starting from the Net Zero target year onwards. The annual recurring cost may decrease with more emissions reductions achieved later on.

**Technologies may become cheaper over time and new technology may be developed.** Current technological options to decarbonise may be limited, more costly, less reliable, or in the early stages of development compared to technologies in years to come. Early climate action could possibly lead to investments into low-carbon technologies that may not become mainstream. These investments may then 'lock' Jersey into a particular low-carbon technology, which in hindsight may be considered less optimal and possibly less cost-effective. Some policy measures may be more exposed to the risk of 'better' technology in the future than others, where significant cost reductions or innovation are less likely, such as insulation works.

**'Locking-in' of high-carbon investment.** Delaying climate action can allow high-carbon investments to continue in the short term, such that these investments and assets are effectively 'locked-in' for years to come. These assets may then be scrapped before the end of their useful life or need to be retrofitted in the future (with significant costs).

**Early asset scrappage.** The transition to Net Zero could lead to early scrappage of assets before the end of their useful life, for example vehicles and boilers. This will increase the cost of the transition to Net Zero and is likely to cause an increase in embedded emissions (scope 3), as products are scrapped before the end of their lives and new products must be manufactured and used in their place sooner.

Different Net Zero targets will lead to different sets of advantages and disadvantages. An early Net Zero target of 2030, for example, will mean faster emissions reductions and greater social and economic advantages, but will be accompanied by higher costs and greater practical challenges. The next two pages provide a comparison of the advantages and disadvantages of a 2030 Net Zero target and a 2050 Net Zero target in Jersey.

## Advantages of a **2030** target

- Earlier and greater **emissions reductions** over time.
- Earlier and greater **improvements in human and natural environments**, such as biodiversity improvements.
- Earlier and greater **health and well-being benefits**, such as earlier health improvements from better air quality.
- Earlier and greater **economic benefits** over time, such as earlier economic growth and creation of jobs.
- Earlier and greater **operating cost savings** over time, for example lower energy bills due to insultation improvements.
- Greater stimulation of **innovation** in Jersey with associated economic opportunities from innovation.
- Greater **reputational benefits and opportunities.**
- Greater **avoidance of 'locking-in'** of high carbon investments with associated future cost savings.

## Disadvantages of a **2030** target

- **Challenging to reskill the labour force** in a short time period with high associated costs.
- **Challenging to develop** the necessary **supply chains** in a short time period with high associated costs.
- **Challenging to develop** required **infrastructure** in a short time period with high associated upfront costs.
- **Less opportunity to learn what works** and trial policies before committing to them. This could lead to inappropriate policy choices.
- **Greater administrative constraints and coordination issues**. This could disrupt the transition to Net Zero.
- **Challenging to achieve** the required **societal changes** to achieve Net Zero in a short time period.
- Greater **risk of loss of public support** if the target is seen as unrealistic.
- **Higher annual cost** to the **Government** as policies must be deployed rapidly and **higher total cost** as there may be more need for high financial incentives.
- **Higher cost to households and businesses**, for example greater disruption to the status quo over a short timescale.
- **Greater need to rely on offsets** as less abatement may be able to be feasibly achieved, with **high annually recurring costs starting in 2030.**
- Greater risk of missing out from **price reductions** in existing technologies or **new technologies being developed** in the future.
- Greater risk of **premature asset scrappage.**

**Legend**

- Emissions reductions
- Social and environmental considerations
- Economic considerations
- Reputational considerations
- Practical considerations
- Cost considerations

# Carbon neutrality by 2050: advantages and disadvantages

## Advantages of a **2050** target

- **Less challenging to ensure the labour force has the necessary skills**, with lower associated costs.
- **Less challenging to develop the necessary supply chains**, with lower associated costs.
- **Less challenging to develop the required infrastructure** with costs spread over a longer period.
- **More opportunity to learn from what works and trial policies** before committing to them. This could lead to more appropriate policy choices.
- **Fewer challenges from administrative constraints and coordination issues.**
- **Societal changes** are more likely to **occur over time** without the need for financial incentives.
- **Smaller annual cost** to the Government spread out over a longer period and **smaller total cost** as there may be less need for financial incentives.
- **Costs to households and businesses** will be **spread over a longer time period.**
- **Lower use of offsets** as greater abatement may be able to be achieved by 2050, **with lower annually recurring costs starting in 2050.**
- More **opportunity to benefit from price reductions** in existing technologies and **new technologies** being developed in the future.
- **Smaller risk** of **premature asset scrappage.**

## Disadvantages of a **2050** target

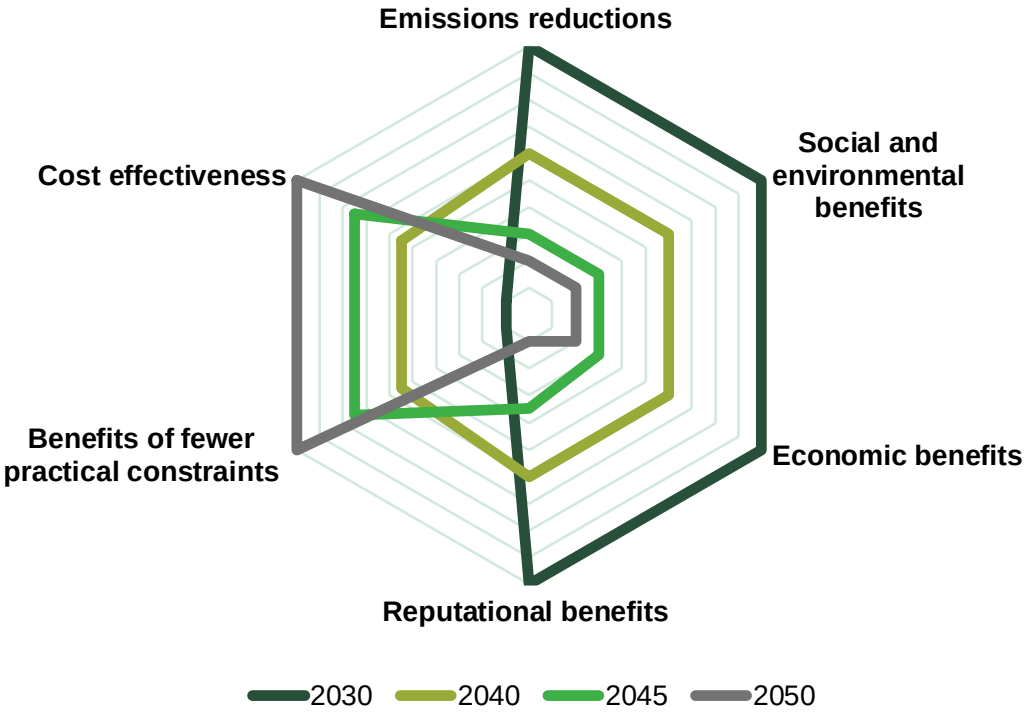
- **Delay in emissions reductions,** with benefits from earlier emissions reductions lost.
- **Delay** in the **improvements to the natural and human environment,** with benefits from earlier improvements lost.
- **Delay in health and well-being benefits**, with benefits from earlier health and well-being improvements lost.
- **Delay in economic benefits**, with additional economic growth and opportunities from earlier action lost.
- **Delay in operating cost savings**, with operating cost savings from earlier action lost.
- **Less stimulation of innovation** in Jersey, with economic opportunities from earlier innovation lost.
- **Little to no reputational benefit** to Jersey, with benefits from reputational opportunities from an earlier target lost.
- **Greater risk of 'locking-in' of high-carbon investments**, with high associated costs.

**Legend**

- Emissions reductions
- Social and environmental considerations
- Economic considerations
- Reputational considerations
- Practical considerations
- Cost considerations

Different Net Zero targets will bring different combinations of advantages and disadvantages. The diagram below provides a stylised illustration of how the benefits across emissions reductions and the social, environmental, economic, reputational, practical and cost considerations may vary with different Net Zero targets of 2030, 2040, 2045 and 2050.

The importance placed on each of these considerations will vary for each citizen depending on their individual priorities. This diagram does not suggest that the six considerations are all equally relevant in deciding on when Jersey should set its Net Zero target.




Note: The outer edge of the diagram represents the maximum benefit that can be achieved in the different considerations across the different Net Zero targets, and the centre of the diagram represents the smallest benefit that can be achieved across the different Net Zero targets. For example, a Net Zero target of 2030 leads to the maximum social and environmental, economic, reputational, and emissions reductions benefits compared to all other Net Zero targets; however, it entails the least benefits from fewer practical constraints and is likely to be the least cost-effective Net Zero target.

Different Net Zero targets entail different combinations of advantages and disadvantages. The decision to achieve Net Zero by 2030, 2040, 2045 and 2050, and the associated policies, will involve a number trade-offs. This section highlights some of the key trade-offs that need to be considered carefully in setting a Net Zero target and making policy decisions.


**These trade-offs are explained in more detail below.**

## Trade-offs in policy decisions

**Earlier benefits vs earlier costs**

An early Net zero target will mean that the benefits of decarbonisation, such as improved air quality, will be enjoyed sooner, however the cost of achieving Net Zero will be incurred sooner, rather than later in the future.

**Incentivising behaviour vs enforcing behaviour**

Achieving Net Zero will require households to make lifestyle changes and businesses to change 'business as usual'. Measures that impose strict controls on behaviour will deliver Net Zero with more certainty but will be more restrictive. Whereas measures that incentivise low-carbon activities, through price changes for example, may be less effective but would be less disruptive and restrictive.

**Taxes vs subsidies**

To achieve Net Zero, households and businesses will need to switch from high-carbon goods to low-carbon goods. This can be incentivised with taxes on high-carbon goods, which make households and businesses worse off but increase government revenue; or subsidies for low-carbon goods, which reduce the burden on households and businesses but increase the burden on government finances.

**Winners and losers**

It will be important to consider who will gain and who will lose from different Net Zero targets and various policy options. Different policies and timelines will have different effects on citizens in different income groups, industries and areas.

**Reputational benefits vs first-mover risks**

Pursuing an ambitious Net Zero target will establish Jersey's position as a leader on climate action and may unlock economic, social, reputational, and diplomatic opportunities. However, being 'the first mover' due to an early Net Zero target gives Jersey less time to learn from what works and what does not in other jurisdictions.

**Operating cost savings vs cheaper and new technologies over time**

With an early Net Zero target, households and businesses can benefit sooner from low-carbon investments, for example, operating cost savings from lower energy bills and driving costs. On the other hand, the upfront cost of existing technology may fall over time after Jersey has already invested, or new technology may be developed in the future which Jersey could miss out on.

**Early asset scrappage vs 'locking-in'**

An early Net Zero target could lead to large-scale scrappage of assets before the end of their useful life. On the other hand, an early Net Zero target will ensure that investments in high-carbon assets do not continue where low-carbon options are available.

## How to decarbonise and reach Net Zero?

In Oxera (2020), we analysed the main policy options available to decarbonise the heating and transport sectors in Jersey under a 2030 Net Zero target. These main policy options were identified in Oxera (2019).[29] The heating and transport sectors made up 64% of Jersey's total scope 1 emissions in 2018. Our study found that six policy measures would be expected to make the biggest impact in terms of reducing carbon emissions in the heating and road transport sectors. Their expected costs and carbon reduction impacts are set out below.

facilitating the **retrofitting of electric heating** to all domestic and commercial properties currently utilising oil and LPG

upgrading the **insulation of the domestic housing stock** to current energy efficiency standards


substantially **increasing existing fuel taxes** to discourage the use of petrol and diesel vehicles


imposing a **ban on the registration of fossil fuel** vehicles

providing financial incentive(s) for the purchase of EVs, either in the form of an **EV purchase grant**, and/or in the form of a **scrappage payment** to owners of fossil fuel vehicles

facilitating the **use of second generation biodiesel**, such as HVO **for all diesel vehicles**, subject to further technical due diligence of the feasibility of such a transition in Jersey

In Oxera (2020), we estimated that if these six policy measures were pursued under a 2030 Net Zero target it would incur a combined cost of between £60m and £360m until 2030 to the Government, which includes the annually recurring costs of offsets until 2050. This cost range heavily depends on some of the specific policy choices (i.e. the level of subsidies paid to encourage people to buy new cars or boilers) and the actual, future costs of retrofitting heating systems and insulation works.

Note, the cost to the Government will ultimately be borne by the citizens of Jersey through higher taxes or reduced public services, now or in the future.

Any emissions remaining in the heating and transport sectors with these measures in place were assumed to be offset. Offset costs were included in the cost range and were estimated to amount to £2.7m–£4.4m each year between 2030 and 2050, with total offset costs of up to £88m.

The costs for achieving Net Zero under a later Net Zero target (i.e. later than 2030) have not been estimated but are expected to differ from the cost estimate presented above.

As shown in the diagram on p. 5, under later Net Zero targets, the recurring annual cost of purchasing offsets would start at a later date (e.g. from 2040 onwards in the case of a 2040 Net Zero target) and would similarly depend on future offset costs and the impact that decarbonisation policies have on reducing emissions by the Net Zero target year.

A later Net Zero target would naturally mean that the costs of decarbonisation policies are spread over a longer period of time, such that the annual cost burden may be lower.

**Central policy decisions strongly affect the cost to the Government:**

The **timing** of introducing these measures can have a significant impact on the overall costs.

For example, under a later Net Zero target a slower timeline for the retrofitting of electric heating for residential properties reduces the additional costs. This is because, for example, gas boilers require replacements after 10–15 years.

Another example is the duration for which an EV purchase grant is offered by the Government (if a grant is offered at all).

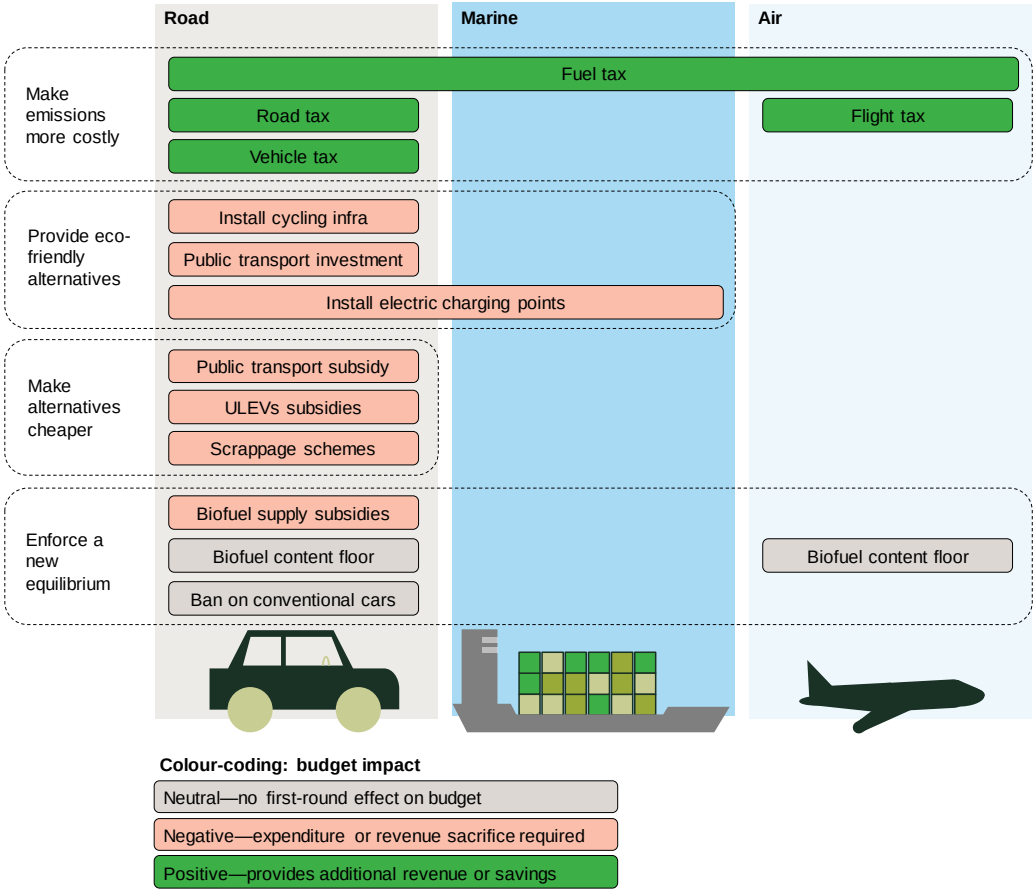
In addition, under a later Net Zero target, the annually recurring costs to purchase offsets will start at a later stage (e.g. from 2040 onwards in the case of a 2040 Net Zero target).

The **specification** of these measures can change the balance of costs between citizens and the Government. The total costs will not change.

For example, if the Government decided to offer EV purchase grants, the cost to the Government would look much higher, but it would remove some of the cost burden from Jersey's citizens of buying an EV.

The Government could also choose to support a smaller number of citizens based on certain criteria, such as income.

As shown in the diagram of Jersey's carbon footprint on p. 3 above, transport accounts for 44% of overall emissions in Jersey. The figure below provides an overview of policies employed in other jurisdictions to reduce emissions from transport.




Note: ULEVS, ultra-low vehicles; infra, infrastructure.

Source: Oxera analysis based on various policy documents; see Oxera (2019), 'Carbon neutrality by 2030', 1 October, p. 2.

We note that, as an island economy, Jersey has a relatively high level of dependence on marine and aviation transport as a means of access to goods and services. To the extent that low-emission technologies for marine and air travel are not as developed as those for road transport, and that Jersey has less control over these emissions (e.g. from international airlines), it is likely that the emissions in these sectors would have to be offset rather than abated in the medium term. Europe's aviation sector has unveiled a sustainability initiative for all of its flights to realise Net Zero by 2050.[30]

Road transport accounts for the majority of the emissions in the transport sector. Taking into account policies already embedded in the 2014 Energy Plan, in Oxera (2020), we considered the following measures as part of our assessment of the road transport sector. We quantified the cost to the Government of implementing these measures, as well as the resulting emissions savings.

- **Measure 1**: substantially increasing existing fuel taxes to discourage the use of petrol and diesel vehicles.
- **Measure 2**: imposing a ban on the registration of fossil fuel vehicles. To the extent that diesel vehicles can immediately transition to the use of HVO (see Measure 4) while maintaining a sufficiently low emission intensity, they can be made exempt from the ban.
- **Measure 3**: providing financial incentive(s) for the purchase of EVs, either in the form of a purchase grant, and/or in the form of a scrappage payment to owners of fossil fuel vehicles.
- **Measure 4**: facilitating the use of second generation biofuel, such as HVO, for all diesel vehicles, subject to further technical due diligence of the feasibility of such a transition in Jersey. This would involve granting HVO an exemption from fuel taxation.

£12m–£22m of the costs arise from the commitment to purchase offset certificates on an annually recurring basis from 2030.

The cost to the Government of delivering Net Zero emissions in Jersey's road transport sector by 2030 was estimated to range between £6m and £200m until 2030. This would reduce Jersey's annual emissions by 74–103 kt $CO_2$e, depending on the Government's policy choices, and would include the costs of offsetting the remaining 21–50 kt $CO_2$e until 2050.

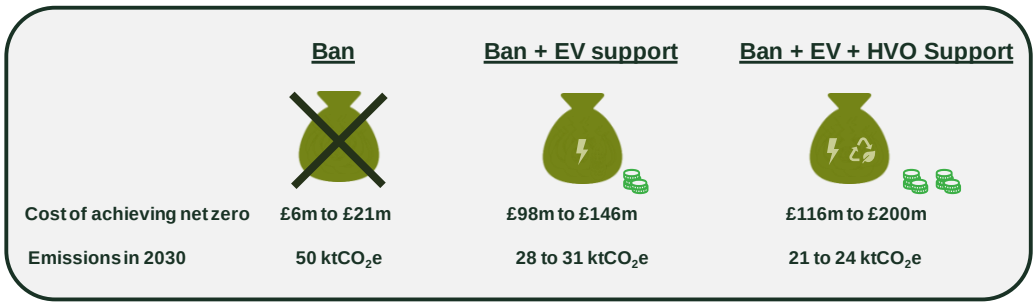
This wide range of estimated costs to decarbonise road transport is strongly affected by:

- the duration of policy measures in place—specifically, the duration of EV subsidisation offered by the Government to facilitate the transition from fossil fuel vehicles to EVs and, potentially, HVO;
- when a ban on the registration of fossil fuel vehicles is assumed to be instated. A measure, such as a ban on registrations, is a strong policy instrument. To avoid imposing a financial burden on households, in scenarios where no financial incentives are being provided (i.e. the lower end of the modelled cost range), we assume that a ban on registering fossil fuel vehicles only comes into effect after 2030.

The range of uncertainty around the cost estimates is illustrated below.

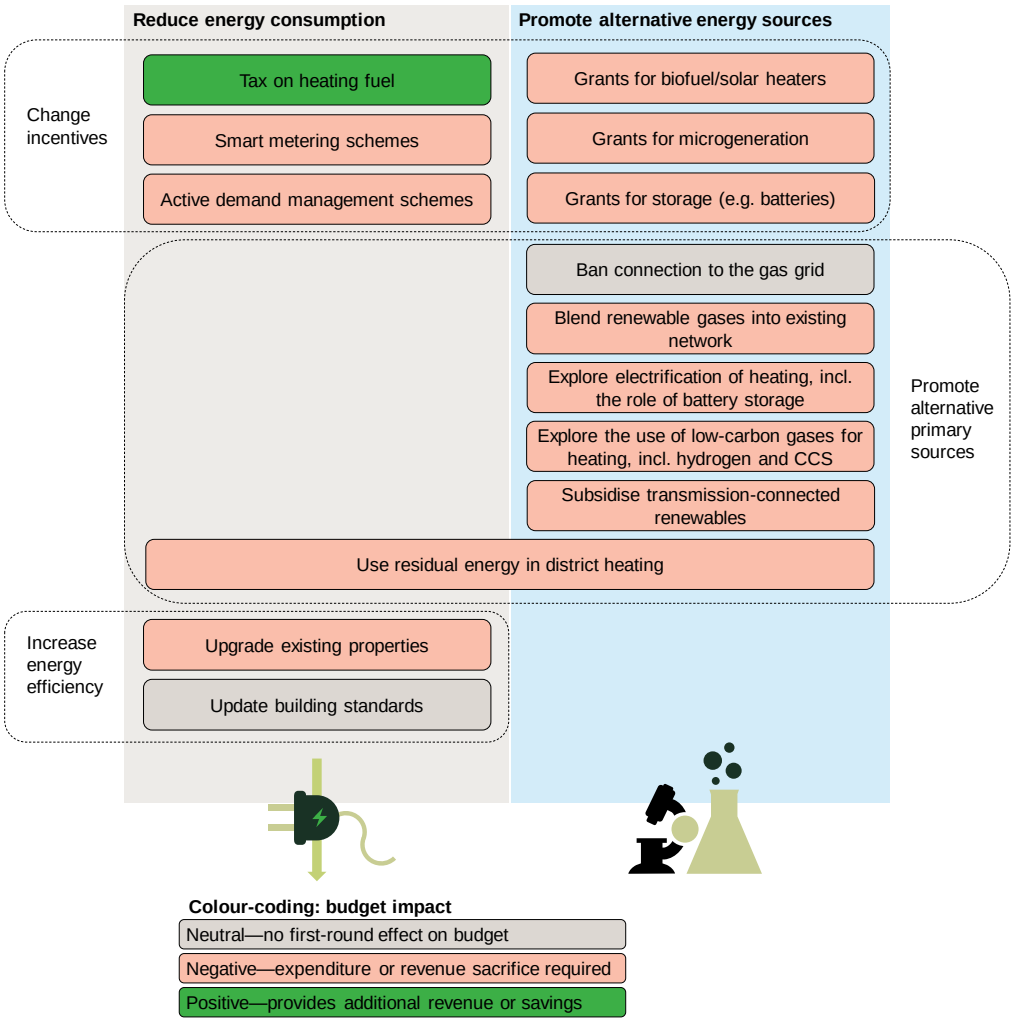
Lowest cost to the Government, with policy choices of no grants for EV uptake and a ban on fossil fuel vehicles coming into effect in 2030.

Mid-range cost to the Government, with EV grants in place until the ban comes into effect (i.e. 2025, 2027 or 2030, depending on the scenario).




The highest cost range assumes that both EVs and HVO receive Government support, with an EV grant offered to all owners of petrol vehicles and HVO tax rebates in place. The support schemes are assumed to remain in place until the ban comes into effect.

Heating accounts for over 30% of overall emissions in Jersey. This includes emissions from both domestic and commercial heating. The figure below provides an overview of policy options to reduce emissions from heating and is informed by policies in other jurisdictions.




Note: CCS, carbon capture and storage.

Source: Oxera analysis based on various policy documents; see Oxera (2019), 'Carbon neutrality by 2030', 1 October, p. 3.

Electrification has the most significant potential to deliver the Government's decarbonisation ambitions. This is owing to high levels of installed interconnection capacity with access to low-carbon imported electricity from France, and the potential synergies between the electrification of heating and the uptake of EVs in the transport sector. Electrification reduces carbon emissions in two ways:

- electric heating systems are more efficient than systems running on oil (which is the second most widely used energy source for domestic heating on the Island, after electricity);

- electricity has a lower carbon factor than any other heating energy source available on the Island. This means that for any given amount of energy consumed, an electric heating system emits the least carbon.

Taking into account policies already embedded in the 2014 Energy Plan, in Oxera (2020), we considered the following two measures as part of the quantitative assessment in the domestic and commercial heating sector. We quantified the cost to the Government as well as the resulting emissions savings.

- **Measure 1**: facilitating the retrofitting of electric heating to domestic and commercial properties currently utilising oil and LPG.
- **Measure 2**: upgrading the insulation of the domestic housing stock to current energy efficiency standards.[31]

£42m–£65m of the costs arise from the commitment to purchase offset certificates on an annually recurring basis from 2030.

We estimated that the cost of delivering decarbonisation of Jersey's heating sector by 2030 could range between £53m and £146m, assuming that heating electrification and insulation upgrades are completed by 2030 and that the Government bears half of that cost. This would reduce annual emissions by 122 kt $CO_2$e and would include the cost of offsetting the remaining 75 kt $CO_2$e until 2050. The cost range is mostly driven by the uncertainty around the unit costs of the required heating equipment and insulation upgrades, and future offset prices. Reducing or increasing the Government support (i.e. the subsidy provided for insulation and heating electrification works) would further affect the cost range (not reflected in the current cost range presented). Delaying the completion of decarbonisation measures to 2050 would increase the cost range to £54m–£159m.

| | 2030 target | 2050 target |
|---|---|---|
| Lowest equipment cost & offset price estimates | **£53m** | **£54m** |
| Highest equipment cost & offset price estimates | **£146m** | **£159m** |

Delaying the completion of carbon reduction measures in the heating sector to 2050 delays the direct benefits from the two measures (i.e. lower ongoing energy charges), while also increasing the cost range to the Government to £54m–£159m owing to expected higher offset costs. Therefore, a significant delay in implementing decarbonisation measures could result in a higher combined cost of emissions reduction and offsets to the Government, and a lower benefit derived by society.

The faster the decarbonisation measures are rolled out, the higher the benefit associated with reducing emissions and the fewer offsets required. Nevertheless, spreading the investments required for the insulation and retrofitting works over a longer period of time lowers the immediate investment burden.

The scope of Oxera (2020) was to estimate the cost of decarbonising the largest emitting sectors, where Jersey can deliver policies most effectively through local policy. Emissions from other sources, such as the aviation sector and energy imports, lie outside the Government's control. Detail on these sources of emissions and options to address them are presented below.

### Energy supply

Emissions from energy supply have decreased substantially over time, by around 76% since 1990, due to a shift towards importing electricity from France rather than relying on on-island energy generation from fossil fuels.[32] On-island energy generation includes the emissions from Jersey's Energy Recovery Facility, where energy is generated from burning waste, and emissions from a back-up fuel generation facility. Jersey has plans to increase the coverage of photovoltaic generation, which can reduce the reliance on electricity generated from fossil fuels and waste, and lead to further emissions reductions.

Energy generation makes up 12% of scope 1 emissions, but the vast majority of energy consumed in Jersey is captured in scope 2 emissions. As the Government has included scope 2 in its definition of carbon neutrality and the policy measures for the heating and transport sector heavily rely on electrification, we consider France's decarbonisation plans for its energy sector to be relevant. The 2018 French Energy and Climate Strategy sets out a reduction in fossil fuel consumption of 40% by 2030, in favour of facilitating the development of clean renewable energies. Therefore, the carbon emissions from electricity generated in and imported from France are expected to decrease.[33]

### Air transport

Emissions from air travel cover domestic air travel, which includes travel between the UK and Jersey. As such, Jersey has little control over these emissions, which are driven by the population's consumption and technological advances. Meanwhile, offsetting from consumers or companies remains essential to achieving an early Net Zero target. British Airways and easyJet, two of the major airlines servicing Jersey, have committed to offsetting emissions from their flights.[34]

### Marine transport

Emissions from marine transport include the fuel used by marine vessels that both depart from and arrive in Jersey, such as ferries. Over time, technological changes may allow companies to switch to greener fuels, or benefit from improved fuel efficiency. Meanwhile, offsetting from consumers or companies remains essential to achieving an early Net Zero target.

### Other sources of emissions

Emissions from agriculture, including livestock, crop production and fertilisers, as well as emissions from the treatment of wastewater, make up Jersey's remaining emissions, comprising around 9% of Jersey's scope 1 emissions. There are opportunities to mitigate these emissions, such as land management practices or feed stock changes in cattle. The remaining emissions would require offsetting from the Government, consumers or companies. Over time there may be technological advances.

# Notes

[1] Government of Jersey (2019), 'Carbon Neutral Strategy 2019', December, p. 10.

[2] Government of Jersey (2021), 'Islanders encouraged to join Jersey's Climate Conversation, 1 February, https://www.gov.je/news/2021/pages/climateconversation.aspx; and Government of Jersey (2019), 'Carbon Neutral Strategy published', 31 December, https://www.gov.je/News/2019/Pages/CarbonNeutralStrategy.aspx.

[3] Government of Jersey (2019), 'Carbon Neutral Strategy 2019', December, pp. 42–43.

[4] Government of Jersey (2019), 'Carbon Neutral Strategy 2019', December, p. 29.

[5] Government of Jersey Greenhouse gas emissions inventory: https://www.gov.je/Environment/GenerateEnergy/GreenHouseEmissions/Pages/GreenhouseGasEmissions.aspx#anchor-1 %20for%20the%20remainder%20(37, accessed 15 February 2021.

[6] Note, the analysis and carbon forecasts reported in Oxera (2020) and Oxera (2019) were based on Jersey's 2017 carbon footprint. Numbers might therefore differ slightly.

[7] Government of Jersey (2019), 'Carbon Neutral Strategy 2019', December, p. 29.

[8] Government of Jersey (2019), 'Carbon Neutral Strategy 2019', December, p. 29.

[9] UK government (2003), 'Energy White Paper. Our energy future – creating a low carbon economy', February.

[10] Known as the Committee on Climate Change until December 2020.

[11] Committee on Climate Change (2008), 'Building a low-carbon economy – the UK's contribution to tackling climate change', December.

[12] Committee on Climate Change (2019), 'Net Zero The UK's contribution to stopping global warming', May.

[13] Committee on Climate Change (2020), 'The Sixth Carbon Budget The UK's path to Net Zero', December, p. 13.

[14] Committee on Climate Change (2019), 'Net Zero The UK's contribution to stopping global warming', May, p. 8.

[15] Committee on Climate Change (2020), 'The Sixth Carbon Budget The UK's path to Net Zero', December, p. 13.

[16] Committee on Climate Change (2020), 'The Sixth Carbon Budget The UK's path to Net Zero', December, p. 87.

[17] Committee on Climate Change (2020), 'The Sixth Carbon Budget The UK's path to Net Zero', December, p. 87.

[18] Committee on Climate Change (2020), 'The Sixth Carbon Budget The UK's path to Net Zero', December, p. 409.

[19] European Commission (2011), 'Communication from the Commission to the European Parliament, the Council, the European Economic and social committee and the committee of the regions: A Roadmap for moving to a competitive low carbon economy in 2050', COM(2011) 112, 8 March.

[20] European Commission (2018), 'A clean planet for all: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy', COM(2018) 773; and European Council (2019), 'European Council meeting (12 December 2019) – Conclusions', EUCO 29/19, 12 December.

[21] Council of the European Union (2020), 'Proposal for a Regulation of the European Parliament and of the Council establishing the framework for achieving climate neutrality and amending Regulation (EU) 2018/1999 (European Climate Law) - General approach', 14171/20, 17 December.

[22] The goal was proposed by the European Commission: see European Commission (2014), 'A policy framework for climate and energy in the period from 2020 to 2030', COM(2014) 15, 22 January. This was subsequently endorsed by the European Council: see European Council (2014), 'European Council (23 and 24 October 2014) – Conclusions', EUCO 169/14, 24 October.

[23] European Commission (2019), 'Communication from the Commission to the European Parliament, The Council, the European Economic and Social Committee of the regions: The European Green Deal', COM(2019) 640; and European Commission (N.D.), 'European Climate Law', https://ec.europa.eu/clima/policies/eu-climate-action/law_en.

[24] European Commission (2008), 'Communication from the Commission to the European Parliament, the Council, the European Economic and social committee and the committee of the regions: 20 20 by 2020 – Europe's climate change opportunity', COM(2008) 30, 23 January, pp. 2–3.

[25] European Commission (2019), 'Communication from the Commission to the European Parliament, The Council, the European Economic and Social Committee of the regions: The European Green Deal', COM(2019) 640.

[26] The Urgenda Foundation (N.D.), 'Landmark decision by Dutch Supreme Court', https://www.urgenda.nl/en/themas/climate-case/.

[27] The District Court of The Hague (2015). 'Judgment of 24 June 2015 in the case of the Urgenda Foundation versus The State of the Netherlands (Ministry Of Infrastructure And The Environment)', Case number / Cause list number: C/09/456689 / HA ZA 13-1396 (English translation), p. 53.

[28] Ministry of Economic Affairs and Climate Policy (2019), 'Long term strategy on climate mitigation', December, p. 1.

[29] Oxera (2020), 'Quantitative analysis of carbon neutrality by 2030'; and Oxera (2019), 'Carbon neutrality by 2030'.

[30] Destination 2050 (2021), 'A route to Net Zero European Aviation', 21 February, p. i.

[31] Properties more likely to need insulation measures are those that were constructed before the 1997 Building Bye-Laws. The 1997 Bye-Laws required a higher standard of construction and insulation. Since no precise figures were available on the property stock pre-1997, we used 2001 as the cut-off. To the extent that some houses added to the stock between 1997 and 2001 would have been built to higher standards, this would make the modelled estimate conservative as we would be modelling the conversion and insulation of properties that have already been upgraded. However, we also note that industry feedback suggests that some post-2001 properties also require an insulation upgrade. Quantification of the proportion of these properties within the Jersey housing stock was not possible due to the lack of data.

[32] Aether (2019), 'Development of an emission factor for imported electricity', October, p. 4.

[33] For more details, see the Government of France's website, 'France wants to be the first country in Europe to put the carbon neutrality goal on a statutory footing', https://www.gouvernement.fr/en/france-wants-to-be-the-first-country-in-europe-to-put-the-carbon-neutrality-goal-on-a-statutory, accessed 4 December 2019.

[34] See British Airways (2020), 'British Airways' UK Offsetting scheme takes off', press release, https://mediacentre.britishairways.com/pressrelease/details/86/0/11944, accessed 10 February 2021; and easyJet (2021), 'Leading the industry on sustainable travel', https://www.easyjet.com/en/sustainability, accessed 10 February 2021.