

# The Net Zero Challenge

Project pack



# What is the Net Zero Challenge?



**The Net Zero Challenge** is a project-based activity for secondary students that can be run in class, over an Enrichment Week, as a social action campaign, by a STEM club or at home.

**The challenge is for students to help their community reach Net Zero.** Climate change is the biggest issue future generations face. And it's widely believed that if we can achieve Net Zero carbon emissions – whereby the amount of carbon we put into the atmosphere is equivalent to the amount we take out – we stand a chance of slowing down its effects.

**The Net Zero Challenge** is a way for students to understand what it means on a practical level to reach Net Zero. The changes that are required on a national and local scale. And the tough decisions policymakers have to make when choosing what measures to implement – and how. It's also an opportunity for students to engage in the issue. To do something practical and take social action within their own community.

You can decide on the extent of the challenge (e.g. whether they start small with the challenge of making their school or home Net Zero. Or go big and look to what their village, town or city could do to reach the target). And it's up to you whether they have a deadline to reach Net Zero (e.g. by 2030 or 2050). But *how* they decide on the route they take to achieve the target is up to them!

**This Project Pack provides a framework for you to run the challenge.** There's guidance for you dependent on the time you have available and how you plan to use the activity. So you can scale it up or down to suit your purpose.

## What's in this Project Pack?



**Guidance for teachers** on how to run the challenge.



**Information for students** on how to plan their response – share the **student section** with them directly.



**Case studies** of two real-life Net Zero projects: **Net Zero Leiston** and **Energy Superhub Oxford** to provide students with inspiration and ideas.

## How to use the Net Zero Challenge

**A class activity** – Simplify what students need to do and run the challenge over a few lessons and/or homework activities.

**Climate education** – Help young people understand what the climate crisis involves and the measures that need to be taken locally to address and mitigate its impact (share the [Mock COP](#) treaty from young people for inspiration).

**STEM / Eco Club activity** – Make the challenge the club's focus for an entire term. Consider incentivising the activity (e.g. offering a prize for the best proposal); asking students to present their ideas in assembly; or putting together a judging panel from teaching staff and local community leaders to review the teams' proposals.

**Youth social action** – Give this challenge to students who want to take social action against climate change. It's a way for them to get involved and make a difference, however big or small. It's also a way for the school to show that it's listening to young people and taking action to address this key issue too.

**Remote learning** – Set remote learners the challenge to come up with a 'light touch' response to the proposal. Can they research different technologies or energy sources? Come up with ways to help their home reach Net Zero? etc.

**Enrichment / Enterprise / Development / Themed Week** – Use the Challenge as the target for a week-long activity. Consider bringing in local businesses to deliver relevant careers insight (e.g. local power stations, renewables manufacturers, climate scientists, energy consultants etc.) or tapping into world events (e.g. the UN's COP 26).

**Careers Insight programme** – Could you team up with any relevant local businesses to integrate the challenge into their work insight programme?



Use this Youth Social Action Toolkit from the Careers and Enterprise Company if you plan to structure the challenge as a social action campaign.

## Is this for individuals or groups?

The Net Zero Challenge is best run as a group activity. Students will benefit from working as a team (a skill they can talk about demonstrating through the challenge to employers). And they will also need to divide tasks up amongst their group to complete the challenge in a timely manner.

## Timings

The Net Zero Challenge can be adapted to the time you have available. For instance:

**1-3 hours:** Take a light-touch response to the challenge. For instance, could students create a survey and send it home to find out about energy use amongst their school community (i.e. does anyone produce their own power?) Or, how do most people get their heating (e.g. gas / oil / electric / heat pumps)?

**5-6 hours:** Ask students to research potential ways of reducing carbon emissions in their local area (e.g. as part of the Geography curriculum). What transport options are there? How do most people heat their home? What industry or businesses are in their area? How much green land is nearby?

**10-12 hours:** Could students start to calculate the carbon emissions and sinks in their area? Are there any local engineering or energy consultancies you could invite in to talk to students about the local environment or support with data on local energy use?

**1+ days:** Run the activity as a longer enrichment activity. Use the [week-by-week timetable](#) in the Student section to help students manage their time in putting together their response. Invite a STEM Ambassador to support teams – contact your local [STEM Learning Hub](#) for support. And consider if you can involve any external organisations – e.g. the council, community leaders, local power suppliers – to enrich the activity further.

## What age students is the activity for?

The Net Zero Challenge is targeted at 11-14s. But you can easily adapt the activity to work with younger (e.g. 7-11s) or older (14-16s) students.

## Ideas for adapting the activity to suit younger or older groups of students

**7-11s:** Simplify the challenge to focus on helping young people learn more about their area – and how everyday actions can have an impact on carbon emissions. For instance: ask them to create a questionnaire to share with their families about how they heat their homes or power their cars (do they have an electric, hybrid, petrol or diesel car?, for example).

Alternatively, they could ask about people's attitudes towards different types of technologies (e.g. having solar panels on their homes or a wind turbine at school).

Either questionnaire could be sent home to complete or students could ask local residents on a field trip out of school. The data they get back could be used in geography or maths lessons to link into the curriculum (e.g. creating graphs from the data sets, or looking at the impact of people's actions on the natural environment).

**14+:** You could develop the Net Zero Challenge in a number of ways for older students, dependent on whether your focus is on using it as a curriculum or enrichment activity. For example: extend the challenge to focus on a wider area (e.g. the town). Bring in local businesses to make this part of a work insight programme. Or broaden out the scope to consider some of the bigger macro-economic changes needed (e.g. widespread broadband for smart home technology; green spaces in towns and cities; changes in the energy mix and use of energy storage technologies etc.)

“ The Net Zero Challenge has a flexible framework, so you can adapt it to fit with your curriculum or enrichment objectives ”

## The output

Consider how students should present their response to the Net Zero Challenge. For instance:

- A project report
- A presentation to the class / school / judging panel
- A poster or exhibition board
- A web page
- An event (e.g. Mini United Nations-style forum)



You may want to add some further information specific to how you're running the challenge in the student section (see additional notes).

## Assessment

Decide how you will assess students' responses to the challenge. For instance:

- Marked by you / another assessor / head teacher
- Judging panel – perhaps including external contributors (e.g. local businesses, careers advisers, local community leaders etc.)
- Competition entry

Also, consider what criteria to assess them on and whether you'll weight any sections more than others. For instance:

- Presentation
- Breadth of ideas
- Creativity
- Design
- Viability of response



You may want to add some further information specific to how you're running the challenge in the student section (see the additional notes).

## For remote learners, home schoolers or community groups

The Net Zero Challenge can be used by remote learners, home educators or community groups (e.g. Scouts, Guides or STEM clubs). Adapt it dependent on the time available and age group of your students, using the suggestions above. For instance: home educators might want to run it as a group project with other home learners, perhaps through a local home education network. Community groups could consider turning it into a competition with local groups competing against one another to come up with the best proposal – maybe even culminating in regional and national championships!



## What next?

There are lots of ways you can enrich student learning after they've completed the Net Zero Challenge:



**Take a trip to one of our power stations to find out more about nuclear power**



**Ask our visitor centre teams to run an assembly or workshop on Net Zero**



**Download one of our school activities**



**Find out about careers helping Britain achieve Net Zero**



**Could students turn any elements of their response to the challenge into practical action right now? Are there any local community action groups they could join up with? Could they write an article on the project for their local paper or council newsletter? This could be the catalyst for real change in your community.**

## Curriculum links

The Net Zero Challenge supports curriculum learning for 11-14s in the following areas:

**Science:** Working scientifically; Physics (energy); Planet Earth (Scotland); Topical science (Scotland)

**Geography / Social Studies:** Human geography; People, place and environment (Scotland)

**PSHE:** Living in the wider world

**Technologies (Scotland):** Technological developments in society and business

## Gatsby Benchmarks

The Net Zero Challenge could help you meet the following Gatsby Benchmarks, depending on what form your activity takes:

**2: Learning from labour market information:** The case studies contain information on the different careers pathways that members from both projects took to reach their current roles. If you involve local businesses or mentors in the challenge, ask them to share information on their companies and any insight into employment opportunities in the area too.

**4: Linking curriculum learning to careers:** The case studies contain insight from members on both projects about how their study options helped them with their career to date. Integrating any work insight programmes with the challenge will further support this benchmark.

**5: Encounters with employers and employees:** The case studies give young people insight into the roles of different people working on the two featured Net Zero projects. You could expand this by linking the challenge to work insight programmes underway with local employers. Or asking them to get involved in running the challenge as an enrichment activity with students.

**Next steps: Take our 2-minute survey to help us measure the impact of this activity on climate action**

# What is the Net Zero Challenge?



**The Net Zero Challenge is a challenge to help your community reach Net Zero.**

It's up to your teacher – or whoever is leading the challenge – to decide on the finer details of your challenge (e.g. whether it's to make your school Net Zero, your home or town – and over what timeframe). But it's **up to you** to come up with ideas for how to reduce carbon emissions in your area down to zero!

## What is Net Zero – and why is it important?

Climate change is the biggest issue your generation faces. It's widely believed that if we can achieve Net Zero carbon emissions – so the amount of carbon we put into the atmosphere is equivalent to the amount we take out (also known as 'offset') – we stand a chance of slowing down its effects.

### Did you know?

The UK is the world's sixth largest economy and the fifth highest all-time emitter of CO<sub>2</sub><sup>1</sup>.

Achieving Net Zero is so important that the Government has made it a legal requirement Britain reduces its carbon emissions down to zero by 2050. So it's a big deal – and we all have a part to play.

**This challenge is an opportunity for you to take social action and consider what can be done where you live to help Britain achieve Net Zero.**

## How to use these Student notes

**Understand what's meant by Net Zero** – and what the carbon emissions / sinks might be in your area

**Plan your approach** – we've included suggestions for how to allocate tasks and respond to the challenge

**Project framework** – use this to structure your response to the challenge

<sup>1</sup> <https://www.mockcop.org/wp-content/uploads/2020/11/20200112-MOCK-COP-Declaration.pdf>

## How to approach the Net Zero Challenge

### Plan your response

Before you start drafting your response to the project, you need to consider how to set up your group first. Spend some time on these initial planning activities and you'll find you manage your time more productively.

#### Who's in your team?

Give your team a name – consider how to link it to your project focus. And consider allocating roles for everyone on the team (e.g. somebody to look after research, somebody to be in charge and keep everyone on schedule etc.)

#### Break down the project into tasks

Read the brief from your teacher or leader and consider how to break the project down into a manageable series of tasks – essentially a list of things you need to do before the deadline. Put them in the order you need to complete them – see the [timetable](#) for some tips. And if you want to be super professional, consider using a Gantt chart to plan out your workload. There are lots of templates online, like [this one](#).

If you have any questions about the project – or are unclear about what you need to do – write these down and run them past your teacher or leader before you begin.

#### Keep notes

Make sure someone in your group takes notes when you work on the project together. And keep a record of everything you learn and consider, as this will help you demonstrate how you settled on your final response to the Net Zero Challenge.

#### TOP TIP:

### Keep focused on your goal



Write down your objective on a piece of paper and keep on revisiting it to make sure you don't deviate from what you want to achieve.

## Project framework

Whether you're tasked with helping your school, street or town reach Net Zero, your project will follow a similar series of steps. Use the project timing guides below, to help you break up the total time you have for the project, so you know how long to spend on each stage.

### Project timing guides



Stage 1:  
**Planning and research**  
2/5 of your time



Stage 2:  
**Development and delivery**  
2/5 of your time



Stage 3:  
**Evaluation and learning**  
1/5 of your time

### Stage 1: Planning and research

This first stage is one of the most important! Good planning and research forms the basis of any successful project. This is the time to allocate tasks and responsibilities amongst your group. It's also a chance for everyone to be really creative, as you brainstorm as many different ideas as possible with your team.

#### What to do at this stage:

##### Find out what's contributing to carbon emissions:

This will give you an idea of the areas you need to tackle to reduce these down to zero. See the [what do you need to know?](#) section for more help with this.

##### Find out what's important to your community:

Ask the people in your area for input, for example:

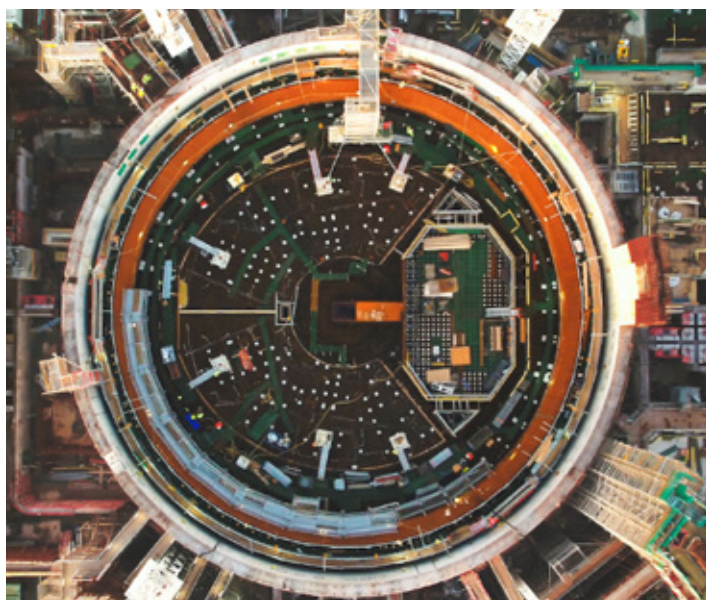
- Create and send home a questionnaire
- Contact local leaders in your area (e.g. 'green' community groups)
- Look at the [useful links](#) section for more inspiration.

**Research ways of reducing carbon emissions and increasing carbon sinks:** Write them all down (you can't have too many ideas at this stage!)

- Take a look at the case studies to find out how these two real-life Net Zero projects approached this challenge
- Look at the [useful links](#) for more inspiration
- Talk to people who are interested in this field or work within this sector in your local area
- Look on social media to find out what influencers like Greta Thunberg are talking about and sharing.

**Log your learnings:** Consider how to store your research so you can share it with your group. You'll need easy access to resources like your project timetable. For instance:

- Can you use your school's learning management platform or online resources, like Google Classroom or Sites?
- Do you want to use software programs, like Excel, to manage audit or survey data, create timetables etc.?
- Have you tried free online project management tools, like Trello? These are handy for getting an overview of what needs to be completed on a project
- Can you create a shared online calendar with key delivery dates that everyone can access?



## Stage 2: Development and delivery

At some point, you'll need to decide which idea(s) to pursue as your response to the Net Zero Challenge. Make sure you also note down which ideas you didn't take forward and why. If you're presenting your ideas at the end or have to provide a project report, you'll want to explain why you made certain choices along the way.

**What to do at this stage:**

**Flesh out your response:** You've got all your ideas, now's the time to work them into a coherent strategy. The aim is to reach Net Zero – but what's your group's specific focus? What makes your project unique? And why have you chosen this approach?

**Remember your brief:** Remind yourself what your objective is with this project. And how you'll be assessed for the task, as this will influence what form your response takes. For instance if it's a *Dragons Den*-style challenge, you'll want to perfect your presentation and prepare for any awkward questions from the Dragons.

**Stick to your schedule:** Remember the timetable you created in the planning stage? Make sure you stick to it, otherwise you won't complete your project on time.

**Pre-empt any challenges:** One of the big tasks when developing a project is anticipating what challenges you might face along the way:

- Revisit the two featured Net Zero case studies to find out what challenges they faced, as this will give you some clues about what to expect
- Think about how you'll get your community on side – changing people's minds or behaviour is probably the biggest challenge any project like this faces. Communication and empathy are key skills that you'll need to overcome this hurdle
- If you have the input of local businesses or experts, talk to them about their experiences. You might not be able to do anything about some of the challenges they mention within the constraints of your project (e.g. legal hurdles). But you should show that you've thought about how you'd address these in a real-life situation.



**How will you deliver your response:** Be mindful of what form your response will take, as this will influence how you collate the information and present it to your teacher / leader:

- For project reports, you'll want a clear flow and structure. Use headers, boxouts and bullets to break up the text. Include illustrations and make sure you have a summary at the start that succinctly defines your response.
- If you're delivering a poster or exhibition board, you'll want to make sure the information is presented clearly and in a logical order. Spend time making sure it looks professional and high quality. Include lots of images too.
- If you're giving a presentation with your response, make sure you have a professional-looking slide deck or some type of visuals (e.g. a presentation board) to accompany your presentation. Make sure everyone is able to contribute and that you practise how to deliver it as a group.
  - Don't forget to be creative! How can your presentation reflect your group's unique style? How can you make it contemporary? Consider alternative ways of presenting information, within the requirements of your brief (e.g. using film, creating a news bulletin or a website etc.). Talk to your leader to sense check your approach.



### Stage 3: Evaluation and learning

Well done, you've reached the end of the Net Zero Challenge! But before you dismantle your exhibition board or archive your presentation, take some time to reflect on what you've learnt. This is an important stage as it's only by reviewing what worked and what didn't, that you can improve next time.

#### What to do at this stage:

**Evaluate your response:** Did you provide a realistic strategy for reaching Net Zero? Did you meet the brief? In what timeframe? And at what cost (if this was part of your brief)?

**Review your feedback:** Did your teacher highlight anything you hadn't considered or make any recommendations?

**How did your team function:** Did you work well together? Keep to deadline? Is there anything you'd do differently if you did it again? Could you have improved on any areas?

**What next?:** Is there anything in your project that you could do now? Why not join a community climate action group? Or write an article for the local paper or council newsletter?

### Delivering a professional report? Here are some tips...

**Presentation is important** – Give it a front cover, and if you're delivering a hard copy, considering having it bound or made into a book.

**Structure it clearly** – Make sure there's a table of contents and clear order to your presentation, with headers and page numbers.

**Appendix** – Include one of these to show your workings for the project (e.g. your Gantt chart, discarded ideas etc.)

**Make it personal** – Why not include some personal reflections from everyone in the appendix or main report? What did you enjoy about this project? Has it made you think more deeply about your own actions in relation to climate change? Are you interested in learning more or pursuing a career in this sector?

**Quiz time!** Wrap up the project with a **quick quiz...**

## Supporting information

We've put together some useful background information here, along with links to find out more online.

### What do you need to know?

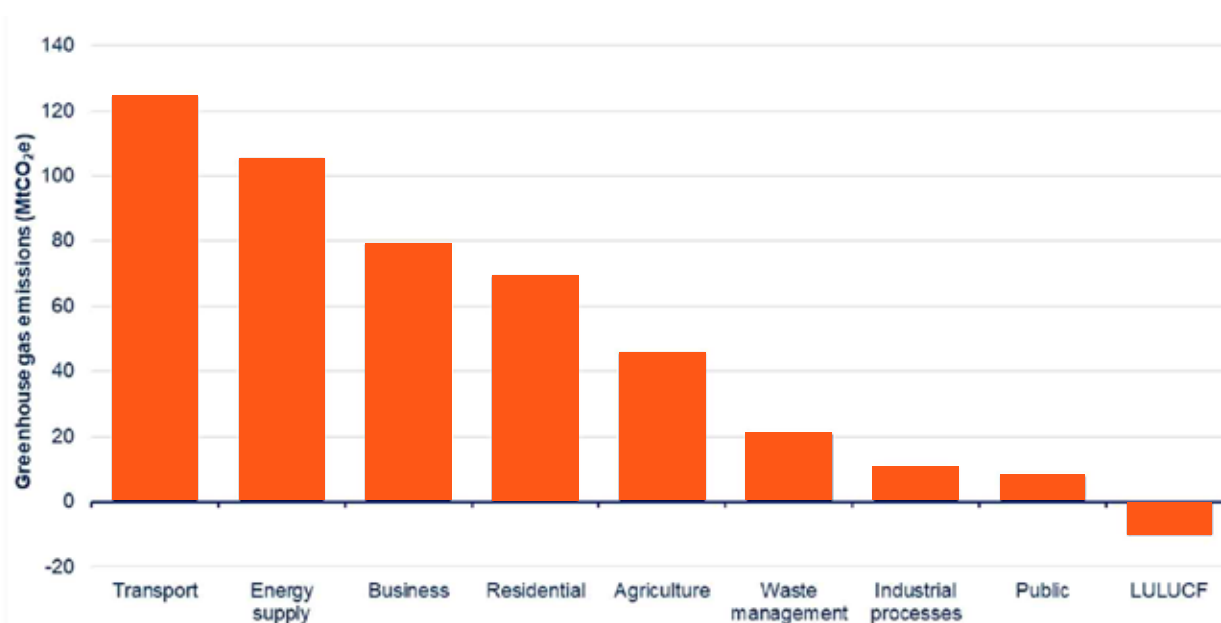
To reduce emissions down to zero, **you need to understand first what's contributing to carbon emissions** in your community.

#### What are carbon emissions?



Carbon emissions come from anything that releases carbon dioxide into the atmosphere. This could be the jet plane you take to go on holiday. The gas central heating system that keeps you warm. The charger you plug into the wall, which uses electricity to recharge your phone. Or the games console you play at home.

This bar chart shows the main sources of carbon emissions in the UK<sup>2</sup>:



Source: Table 3, Final UK greenhouse gas emissions national statistics 1990-2018 Excel data tables

<sup>2</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/862887/2018\\_Final\\_greenhouse\\_gas\\_emissions\\_statistical\\_release.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/862887/2018_Final_greenhouse_gas_emissions_statistical_release.pdf)

**Transport:** Emissions come from road transport, railways, domestic aviation (planes), shipping, fishing, and aircraft support vehicles. Within this sector, the main source of emissions is the use of petrol and diesel for road transport.

**Energy supply:** This is the name given to emissions that come from generating electricity. The main source of emissions from this sector is the use of natural gas and coal in electricity generation from power stations. As the UK's energy mix has evolved to include more renewables, the amount of emissions produced by this sector has fallen. And since 2016, it's no longer been the biggest contributor to carbon emissions (this is now transport, as the bar chart shows).

**Business:** Carbon emissions from this sector come from burning fossil fuels in industrial/commercial sectors, industrial off-road machinery, and refrigeration and air conditioning.

**Residential:** In this chart, emissions from the residential sector come from using fossil fuels for heating and cooking; garden machinery, and fluorinated gases released from things like aerosols. The main source of emissions from this sector is the use of natural gas for heating and cooking. *NB: The use of electricity in the home isn't included in this segment, but falls under the 'energy supply' definition instead.*

**Agriculture:** Most emissions come from livestock and the use of fertilisers on the soil. But there are some other sources of emissions too – like off-road machinery. Interestingly, it's not carbon dioxide that's the problem here, but methane (from cattle breaking wind!) and nitrous oxide (from fertilisers).

#### Others areas of emissions include:

**Waste management** – This is mostly methane from landfill sites, but also emissions from the burning of rubbish.

**Industrial processes** – This isn't the burning of fossil fuels by big factories and companies, but processes like producing cement and steel.

**Public** – This mostly covers emissions produced from gas central heating in schools, hospitals and public offices.

**LULUCF (Land use, land use change and forestry)** – This is a bit of a misnomer because LULUCF acts as both a carbon emission *and* a carbon sink (see *opposite*). And in the year of this chart (2018), LULUCF removed more emissions than it added. In general, settlements and cropland are the largest sources of carbon dioxide emissions; while forest land and grasslands are the biggest sinks.

### What are carbon sinks?



The good news is that you don't have to eliminate carbon emissions entirely if you add **carbon sinks** into your Net Zero Challenge plans for your local community.

As the name suggests, carbon sinks absorb carbon from the atmosphere. Plants, trees, rivers, oceans, peatlands and green spaces are all carbon sinks, as they're living things that need carbon dioxide to exist. It's why the Amazon – the world's largest rainforest – has been nicknamed the 'planet's lungs'.

It's likely you already have some carbon sinks in your local area (e.g. parks, gardens, waterways or woodlands). So consider how you can ringfence these or increase the amount of sinks in your community to balance out carbon emissions.



## Summary

Remember: the main sources of carbon emissions are:

- Transport
- Heating
- Electricity generation
- Businesses / homes

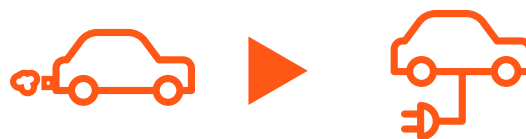
**Did you know... ?** According to the **Committee on Climate Change**, 40% of UK emissions come from households.

There are lots of ways you can encourage people to change behaviour at home to help Britain achieve Net Zero.

### Some possibilities include:



### Changing behaviours in the home:



Petrol/diesel vehicles

Electric cars and buses

A home could save **2 tonnes of CO<sub>2</sub>** a year by switching from a petrol or diesel vehicle to an electric car.

Ditching the car altogether could save **5.2 tonnes of CO<sub>2</sub>** a year<sup>3</sup> – but bear in mind using alternative transport (like a bus) may also release carbon emissions!



Fossil fuels

Renewables and nuclear

Switching to a low-carbon source of electricity could save **1.25 tonnes of CO<sub>2</sub>** a year for the average home.



Gas central heating

Electric boilers and heat pumps

Switching to an electric heating system using an air source heat pump could save **1.9 tonnes of CO<sub>2</sub>** a year.

If you convert from an oil boiler, the saving is just over **3 tonnes of CO<sub>2</sub>** a year.

### Other alternatives:

**Energy efficiency measures** – like insulation and smart home tools – could save **0.6 tonnes of CO<sub>2</sub>** a year.

**Waste** Believe it or not, even reducing and sorting your home's rubbish could reduce carbon emissions by **0.25 tonnes** a year.

<sup>3</sup> Driving a mile in an average car releases 710g of carbon emissions and the typical car drives 7,400 miles a year. So not driving at all saves 5,254kg of CO<sub>2</sub> – equivalent to 5.2 tonnes.





**Carbon sinks:** How can you increase carbon sinks in your area?

**Trees and planting:** If there are any new developments in your area, how can you make sure trees, plants and waterways are included in the plans?

**Green spaces:** How can you protect existing green spaces? Or preserve areas, like peatlands?

## Don't forget...

Two of the biggest hurdles you're likely to face are:

**Changing people's behaviour:** For instance, how do you persuade someone who's only ever used gas central heating to switch to electric heating or a heat pump?

**Infrastructure:** For instance, if you want to persuade more people to drive electric cars, you need to think about the things they're worried about (e.g. not having enough charge points around town), as these will be barriers to take-up.

**So spend a lot of time thinking through your plans** and make sure you have solid foundations behind your ideas.

*For example:* If you want to put a wind turbine on every house in the area to encourage people to create their own renewable energy, think about what the weather conditions are like where you live (i.e. is it windy?) and also people's attitudes. If they're opposed to wind power, for instance, you'll have to spend a lot of time persuading them of its benefits... Or maybe you should consider an alternative altogether!

## Useful links



To refresh your knowledge about climate change and why we need to reduce carbon emissions, take a look at this [BBC News article](#).

The [Committee on Climate Change](#) has some useful information on climate change and how the UK is taking action to reach Net Zero. It also has a [handy infographic](#), which outlines the main sources of carbon emissions in the home.

Read how other young people think Governments should be responding to the climate emergency on the [Mock COP website](#).

EDF's website has useful information on [energy efficiency measures](#) in the home and [energy efficient heating](#).

The Energy Saving Trust has put together a [blog series](#) on how the UK can reach Net Zero. This [article](#), for instance, explores the possibilities of community energy projects.

This [story](#) from the BBC explores how a city can reach Net Zero, using London as an example.

Not sure where to start? Or feeling overwhelmed by the scale of the Challenge? Take a look at the [Lazy Person's Guide to Saving the World](#) on the UN Sustainable Development goals website.

**Now you've finished: Take our quick quiz**  
to find out if you're now a Net Zero Expert!

## Timetable

Here's a suggested timetable to help you respond to the challenge:

|                    |   |
|--------------------|---|
| <b>Session 1:</b>  | Read the brief, get into a group and assign roles to everyone.  |
| <b>Session 2:</b>  | Start researching how you might respond to the brief (e.g. whether you want to distribute a questionnaire). And consider what the main carbon sources/sinks are in your area.   |
| <b>Session 3:</b>  | Dive into your research! Use the case studies, and research what other countries or local projects are doing. If you start to lose your way, re-read the <b>supporting information</b> section to help you get back on track. |
| <b>Session 4:</b>  | Your final session of research... Make sure you've gathered lots of ideas and have thought about any challenges your project might face.  |
| <b>Session 5:</b>  | Decide which ideas to pursue and start developing your response.  |
| <b>Session 6:</b>  | Continue putting together your response. Consider how you deliver it (e.g. if it's a presentation, create an outline and start to flesh out what to include in each section).   |
| <b>Session 7:</b>  | Finalise your response (e.g. if you're presenting it, make sure everyone knows what they're saying and you've practised together).  |
| <b>Session 8:</b>  | Deliver your response to your teacher/leader/assessor.  |
| <b>Session 9:</b>  | Start your evaluation while it's fresh in the mind.   |
| <b>Session 10:</b> | Conclude your evaluation. Consider sharing your learnings with others in your class or your teacher/leader. And what next steps you might want to take (e.g. joining a local climate action group).                           |

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## Additional notes

*Add in here any extra notes you want to share with students, specific to how you're running the Net Zero Challenge.*



## What is Net Zero Leiston?

**Net Zero Leiston** is a community project with the aim of making the Suffolk town of Leiston Net Zero by around 2030. The project has input from some of the world's best engineers

and experts. But it's essentially a people-led project: with the local community deciding which ideas to implement, and community representatives and local councils helping to run the project.

### Key stats



POPULATION:  
5,500



CARBON EMISSIONS:  
16,000 tonnes/year



“ The project will act as a catalyst to continue Leiston’s industrial identity as a leader of the green, industrial revolution. ”

### How to use this case study

This case study is a real-life project that’s working to help Britain achieve Net Zero. We’ve produced this case study to give you ideas for what to include in your own Net Zero plans. To discover some of the challenges and issues you need to consider. And to find out more about how you could pursue a career in a ‘green industry’.





## How did the project come about?

The idea behind the project came from the team at Sizewell C (SZC) – the proposed new nuclear power station next door to Sizewell B, the existing power plant. “We were considering how the building of SZC could contribute to Net Zero – and benefit local communities.”

“Leiston played a big part in the Industrial Revolution – with steam engines built in the heart of town – but this industry had disappeared by the 1980s,” explains Joe Butler, an analyst at SZC. “Through Net Zero Leiston, we want to demonstrate that Leiston can be a pioneer once again – this time by becoming one of the first towns to reach Net Zero. At the same time, we hope the project brings jobs and economic value to the town.”

## What did the project do first?

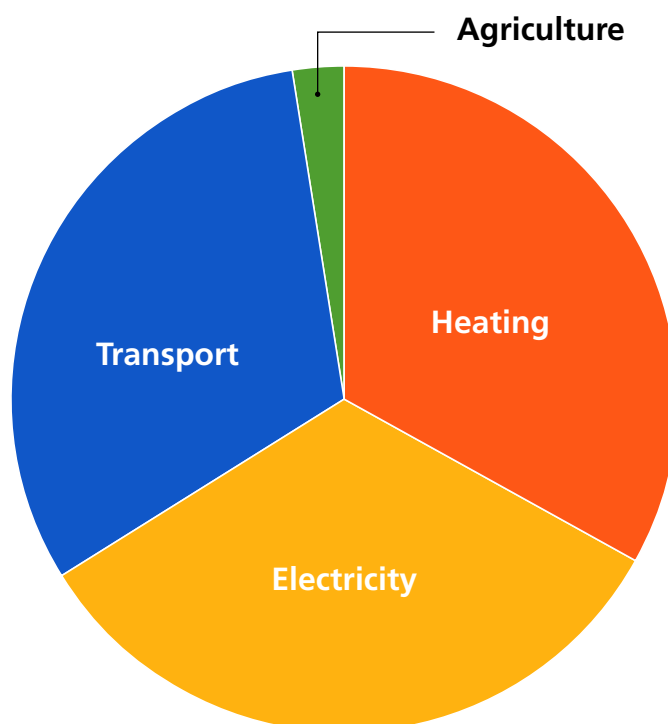
1 To ensure this truly was a community-led project, the first thing the team did was get the community involved. So the Sizewell C project team approached a group called Leiston Together, run by locals and the councils – to involve people like the Town Clerk, John Rayner (*pictured – now retired*). Working together, they came up with some guiding principles for what they wanted to achieve. This gave Net Zero Leiston a focus.

2 Next, they had to measure the town’s current carbon emissions – in order to have a baseline figure for how much to reduce emissions by. To do this, the SZC team appointed Atkins, a multinational engineering company. Their engineers analysed all sources of carbon emissions – from the buildings and energy used in people’s homes (for heating and electricity); to transport on local roads; and local agricultural

land use as well – to calculate the current level of carbon emissions within Leiston and the local parish boundaries. This worked out at 16,000 tonnes a year.

3 Atkins’ engineers also calculated the ‘carbon sinks’ (also known as ‘carbon removals’) in the local area too – for instance, the trees, and flora and fauna. These are an important consideration for any Net Zero project because carbon sinks naturally remove carbon from the local environment – in the case of Leiston, by 4,000 tonnes a year.

**Based on these calculations, the project now had a target: to reduce carbon emissions by 12,000 tonnes a year to reach Net Zero.**





“ What makes this project unique is that we have taken a ‘whole systems’ approach – looking at everything we can do to

make the town Net Zero, rather than focusing on one aspect, like transport. ”

Jack Raven, an analyst at SZC

## How Net Zero Leiston is helping Britain achieve Net Zero

**Net Zero Leiston is still in the early stages**, with Atkins now developing the ‘route map’ for the project that outlines what measures the town needs to put in place – along with timelines – to achieve the Net Zero target by 2030. Some of the following measures are being considered for inclusion in the route map:



**Home energy efficiency:** Making homes more efficient (e.g. with better insulation) or switching to heat pumps instead of gas boilers.



**Electric vehicles:** Encouraging more people to swap their petrol or diesel car for an electric equivalent; or to use their car less (e.g. cycle or use public transport more).



**Renewables:** Adding roof-top solar and battery technology (to store unused solar power) to every home; along with micro wind turbines, where feasible.



**Agriculture:** Farmers switching to electric tractors and adopting less carbon-intensive farming methods.



**Carbon sinks:** Measures the community could take to increase carbon sinks – for instance, planting more trees and adding more green areas.



The Net Zero Leiston project team have been road testing some pilot projects too:



**Net Zero Leiston Tariff:** EDF has created a zero-margin tariff (this is the cheapest price that EDF can provide energy without making a loss) to make renewable power affordable for low-income households. This is an exclusive tariff for people living in Leiston and it's backed by 100% low carbon sources. This means the energy demand required for this tariff is purchased from low carbon generators only (like nuclear, wind and solar).



**Hybrid heat pumps:** Residents of Leiston who rely on heating from LPG canisters or oil tanks because their home isn't connected to the gas network are being offered access to a hybrid heating system. This adds an air source heat pump to their existing boiler, so they don't need to overhaul their existing set-up. But as the heat pump can provide about 80% of their heating demand, they don't need to buy or use as much oil (a fossil fuel) to heat their home in the future.



**Energy efficiency measures:** A lot of the homes in Leiston are old, energy inefficient properties that could benefit from insulation. This pilot is using online databases to identify homes with low energy efficiency – using EPC certificates – and offering them ideas to become more energy efficient (e.g. through insulation, in the walls, roofs or flooring). In many cases, there are publicly available funding schemes to pay for these to be installed – or, in some cases, provided free of charge.

## What are some of the key considerations for a project tackling Net Zero?

How do you persuade people to switch from driving a petrol to an electric car? How do you convince households of the benefits of putting solar panels on their roofs? It's also important to recognise that not everyone understands what Net Zero is – or what they need to change in their daily lives to reduce carbon emissions.

“Our biggest challenge is changing people's habits.”

Jack Raven, an analyst at SZC

Net Zero Leiston's strategy for tackling this challenge is to adopt an 'education-first' approach:



**Working with schools:** Net Zero Leiston is working with a partner that will carry out an energy audit within local schools and then run an assembly with the school explaining the findings of the audit. It's a way of introducing the concept of Net Zero at a small-school level scale to help children understand the impact of climate change and what Net Zero means for their community. The aim is that they'll share this information with their families and wider community.



**Creating Net Zero Leiston Champions:** The project team want to engage key members of the local community to become champions. Their role is to talk to friends and neighbours; and spread the message in an organic way.



## What one piece of advice would you give to students?



“To reach Net Zero requires people with different backgrounds and skillsets. So think about what your strengths are, and what you bring to the Net Zero journey in your area.”

Joe Butler, Analyst at SZC

## Future plans

Over time, it's hoped that the Net Zero Leiston project will become its own body; led by the community and evolving to develop new initiatives that are relevant to the area.

There are also some interesting possibilities coming out of SZC, which could help to decarbonise the town further, if the project is consented. For example: capturing and using the excess heat produced from generating nuclear power. This could be delivered to local sites – for example, providing a district heating scheme for nearby housing. Or heating greenhouses and polytunnels nearby to enable farmers to grow exotic fruit, vegetables and plants all year round.



**Other potential uses include:**

- **Cooling for nearby data centres (large buildings that contain lots of servers storing data for internet businesses);**
- **Providing low-cost green hydrogen – for use by vehicles (as a replacement to petrol), as a replacement for gas or as a way of storing energy.**

## Who's behind Net Zero Leiston?



**Leiston Town Council:** Caroline Rinder, the Town Clerk for Leiston-cum-Sizewell Town Council, represents the community of Leiston as part of Net Zero Leiston, providing unique local insight and knowledge to ensure the success of the project.



**East Suffolk Council:** In July 2019, all East Suffolk councillors voted unanimously to declare a climate emergency, and a target was set to reach carbon neutrality by 2030.



**Suffolk County Council:** The Council has an ambition to make Suffolk the UK's greenest county. The plan is to enhance Suffolk's natural and historic environment, and respond to climate change.



**Atkins:** Atkins is a leading global design, engineering and planning consultancy. It's leading the overall consultancy input to the project: setting the study boundary, defining Net Zero, baselining carbon emissions and setting out the infrastructure base case for the area.



**Energy Systems Catapult (ESC):** An independent, not-for-profit centre of excellence, ESC has supported Net Zero Leiston with expert consultancy to help ensure that the needs of households in vulnerable circumstances are at the heart of decision-making for the project.



**Opergy:** An East Anglian-based clean energy consultancy, Opergy has enabled new connections to the Net Zero Leiston project, and has contributed to several chapters for the route map.



**Carbone4:** A world-renowned carbon accountancy expert, Carbone4 is helping to ensure that Net Zero Leiston methodology is robust by both UK and world standards, and has provided expert input to the chapters forming the route map.



**Staffan Qvist:** An engineer and expert consultant on clean energy projects, Staffan is supporting the Net Zero Leiston project by helping to explore innovative uses of local energy infrastructure to assist the ambitions of the project and providing input to the route map.



**Ikigai:** Ikigai is leading the financial feasibility of the integrated energy and transport solutions proposed for the project and will be responsible for structuring an investable business case and sourcing investors to allow the deployment of the technologies that will make Leiston the first Net Zero town in the UK.



**EDF:** Britain's biggest generator of zero-carbon electricity, EDF, is providing the overall project management for Net Zero Leiston, as well as expert input to the potential options to decarbonise Leiston.



**Sizewell C (SZC):** A proposed new nuclear power station in Suffolk, SZC has provided the seed funding and project support, as well as useful contacts and partners, to create the Net Zero Leiston project.

“ This project is specific to Leiston, but the exercise could be replicated across other rural towns in Suffolk and the rest of the UK. ”

Joe Butler, Analyst at SZC



## Who are some of the main people involved in the project?

### JACK RAVEN

**Job title:** Analyst at Sizewell C, who looks after community engagement for Net Zero Leiston



**Career:** Joined the EDF graduate scheme. Prior to this, he worked in research and development; and was a researcher in wheat genetics.

**Education:** Graduated from Sheffield University as a chemist.

### JOHNATHAN REYNOLDS

**Job title:** Managing Director of Opergy, a clean energy consultancy



**Career:** Worked across private and public sectors in energy and climate policy, and regional development. Now focused on innovative clean energy and Net Zero solutions.

**Education:** Studied music – and still performs!

### JOE BUTLER

**Job title:** Analyst at Sizewell C, who provides project management to Net Zero Leiston



**Career:** Joined the EDF graduate scheme after previous experience in the oil and gas industry.

**Education:** Graduated with a degree in Economic Sociology from LSE (London School of Economics).

### MARTIN GRAY

**Job title:** Projects Lead, Energy Systems Decarbonisation at Atkins



**Career:** Delivered flagship Net Zero projects for the V&A Dundee amongst others. And worked at Shell, before Atkins.

**Education:** Graduated from Edinburgh University with a Masters in Engineering.



## Careers in the 'green recovery'

Want a job helping to tackle one of the biggest issues our planet has ever faced? Everyone working on Net Zero Leiston is committed to helping Britain achieve Net Zero. So-called 'green industries' or working in the 'green recovery'

(roles that are helping Britain get back on its feet after the Covid-19 pandemic) offer a huge range of jobs and opportunities for anyone interested in pursuing a rewarding and fulfilling career.

## Glossary

Here are some of the key terms referenced in this case study:

**Carbon sinks / removals:** These naturally remove carbon from the local environment. Carbon sinks include trees, plants and oceans, which remove carbon through natural biological processes, like photosynthesis.

**Route map:** Not a traditional map as such, but a project document that outlines what measures Net Zero Leiston needs to take to reach Net Zero, with deadlines for each target.

**Pilot project:** A test project – usually with a small group of participants – to test the feasibility of any measures. It also flags up any unexpected issues or challenges.

**Net Zero:** Britain has committed to eliminating harmful carbon emissions by 2050. This goal is referred to as Net Zero.

**Green recovery:** This is the name given to the Government's plans to rebuild Britain and our economy, which has been severely damaged by the Covid-19 pandemic. By giving funding to green projects and jobs that restore nature and tackle climate change.

**Hydrogen:** A chemical element, hydrogen could provide a clean source of fuel for vehicles and replace gas. The Government wants the UK to develop 5 GW of low-carbon hydrogen production by 2030.

**For the latest on this project, visit [www.netzeroleiston.info](http://www.netzeroleiston.info)**



# Energy Superhub Oxford

## What is Energy Superhub Oxford?

**Energy Superhub Oxford** is a world-first project that's bringing together state-of-the-art technologies – batteries, electric vehicles, heat pumps and artificial intelligence – to help Oxford reduce the city's CO<sub>2</sub> emissions by 10,000 tonnes a year.



“ We want higher adoption rates of electric vehicles and heat pumps than anywhere else in the world. ”

Councillor Tom Hayes, Oxford City Council

## How to use this case study

This case study is a real-life project that's working to help Britain achieve Net Zero. We've produced this case study to give you ideas for what to include in your own

Net Zero plans. To discover some of the challenges and issues you need to consider. And to find out more about how you could pursue a career in a 'green industry'.





Watch [this film](#) to learn more about the project



## If I could share one piece of advice...



“Try and be ambitious. Find out what’s happening in your community already and see if you can fill in the gaps. We need some

strong ideas to try and solve these big problems. So think outside the box.”

Tim Rose, Programme Manager at Energy Superhub Oxford

## How Energy Superhub Oxford is helping Britain achieve Net Zero



**Electric vehicle charging** – A new electric vehicle network at a local park and ride will provide charging for a much larger volume of electric vehicles. What’s unique about the network is it connects straight to the Grid. It’ll provide up to 25 MW for electric vehicle charging: enough power for more than 100 ultra-rapid chargers (that’s enough to power 100 supermarkets).



**37 council vehicles** – like vans, tipper trucks and refuse collection vehicles – will also switch to electric. And the council’s depot will move to the park and ride to make use of the new charging points.



**Battery energy storage** – A new giant battery will enable Oxford to shift from relying on fossil fuels and instead use more renewables, like wind and solar, to generate electricity. Batteries are like giant warehouses for the power grid. They store energy (e.g. if the sun’s shining) and release it when needed (e.g. at night time to charge electric cars).



**Ground source heating** – Around 300 homes will have their gas or electric heating replaced with ground source heat pumps. These use solar energy stored in the ground to provide heat and hot water. They also deliver three times more energy than they use. So for every 1kWh of energy a heat pump uses to power itself, it generates 3kWh of heat.



**Optimisation software** – The brains behind the different technologies is software that makes sure everything works at its best. For instance: that the batteries store energy when it’s cheapest, for example. Or that the city’s electric vehicles only charge during low-cost periods.



## How did the project come about?

Energy Superhub Oxford is what's known as a 'demonstrator' project. It was set up as an example of a 'smart local energy system', using funding from UK Research and Innovation (UKRI) – the national funding agency investing in science and research in the UK. Smart local energy systems bring together different low-carbon technologies to help a local area reduce its carbon emissions.



“ We're going to see a higher quality of life, as people can breathe cleaner air and rely on fossil fuel generation much less. ”

Councillor Tom Hayes, Oxford City Council



## What are the challenges in tackling Net Zero?

Here are some of the things you need to think about for your own Net Zero response, according to Energy Superhub Oxford's Programme Manager, Tim Rose:

### Q: How do you replace fossil fuels and keep the Grid balanced?

A: It's clear that to get to Net Zero we need to generate electricity from zero-carbon energy sources, like wind, solar



and nuclear. And move away from fossil fuels, like coal and gas. But the benefit of traditional fossil fuels is that they can generate electricity at any time of day or night. And also be turned on fast if demand or supply changes quickly. Renewables, on the other hand, only work when the power source is present: if it's sunny or windy, for instance.

This is where batteries come in... They can store any extra electricity generated. And release it when demand is high but supply is low (e.g. at night time). Their role is to stabilise the National Grid and ensure we don't have blackouts due to intermittent electricity supply.

### Q: How do you change people's behaviour?

A: How do you persuade a petrolhead to switch to driving electric? Or convince someone who's had a gas boiler for years to get their heating and hot water from another source? Even persuading people to make little changes – like turning lights off in rooms that aren't used – requires a change to people's habits. How can you encourage this behaviour?

One thing we've done at Energy Superhub Oxford, is run a scheme with local taxi drivers for them to test drive electric taxis. So they can see what it feels like behind the wheel and how efficient they are. By helping them to learn more about electric vehicles, hopefully we can encourage more of them to switch from driving petrol to electric taxis.

## What one lesson have you learned?

“ If you can do a pilot design project to start with, it's really helpful for getting a clearer picture of what the hurdles might be. We didn't, but with hindsight, it would have been a good idea. ”

Tim Rose, Energy Superhub Oxford's Programme Manager



## What's the project timescale?

Energy Superhub Oxford is a three-year project. By the end of that timeframe – or thereabouts due to Covid-19 delays – all the technologies will be in place and working. But this project is only a starting point for Oxford city... The electric vehicle network, for example, can be expanded to include more organisations – local bus companies, for example. Or delivery companies working in the area could charge their fleet at the park and ride. Once the infrastructure is in place, it provides an opportunity to expand on your Net Zero plans and reduce carbon emissions further in your area.

And looking beyond Oxford... The aim is that Energy Superhub Oxford provides a blueprint for how other cities can work towards achieving Net Zero. Pivot Power already has another couple of projects rolling out next year in the Midlands, with 40 planned altogether across the UK.

## How do you get started?

Energy Superhub Oxford's Programme Manager, Tim Rose, outlines the key things to think about when planning your own Net Zero response:

- What's your objective and what's the challenge you're trying to solve?
- What's already going on in your area? What local resources do you have or tools that you can draw on?
- Are there other organisations you could join up with?
- What's a realistic time scale?
- How will you pay for the project?

## Who's behind Energy Superhub Oxford?

Most projects trying to tackle a big issue, like climate change, are led by several different organisations (this is what's known as a 'consortium'). And this is true of Energy Superhub Oxford too, which consists of six partners: Pivot Power (which leads the project), Oxford City Council, Habitat Energy, Kensa Contracting, Invinity Energy Systems and the University of Oxford.

## Each organisation contributes different skills and expertise:



OXFORD  
CITY  
COUNCIL

**Oxford City Council** – A forward-thinking council that wants to be carbon neutral by 2030. In 2019, the city council declared a climate emergency and was the first city to hold a Citizens' Assembly on climate change, inviting locals to share their ideas for how Oxford should reach Net Zero ahead of 2050.



EDF renewables

**Pivot Power** – Pivot Power develops, funds and operates large battery storage projects, which connect directly to the National Grid. Its batteries provide the huge amounts of electricity needed for large electric vehicle charging stations, like that being developed at Oxford's park and ride.



**Habitat Energy** – This company provides the clever optimisation software and services that determine when the batteries store and release electricity.



**Kensa Contracting** – This is the company that makes and installs the ground source heat pumps, which are being rolled out to 300 homes.



**Invinity Energy Systems** – This company is providing the flow batteries being used as part of the battery storage element of the project.



**The University of Oxford** – The University's Environmental Change Institute is supporting the project with expertise and insight.

“ We are all 100% focused on the Net Zero outcome and decarbonising Oxford. We all believe in what we're doing. ”

Tim Rose, Energy Superhub Oxford's Programme Manager

## Who are some of the main people involved in the project?

### TIM ROSE

**Job title:** Programme Manager, Energy Superhub Oxford and Pivot Power



**Career:** Before joining Pivot Power, Tim ran Solarcentury, a world leading solar company. Prior to this, he worked as an executive manager in the aerospace sector.

**Education:** Degree in Chemical Engineering from Edinburgh University.

### TINA MOULD

**Job title:** Capital Project Programme Manager at Oxford City Council



**Career:** Before moving into project management three years ago, Tina worked mainly in operational management roles.

**Education:** Studied Chemistry at university.

### LIZA LEBEDEV

**Job title:** Product Manager at Habitat Energy



**Career:** Before Habitat, Liza worked as a management consultant with McKinsey & Company, and as the Head of Vietnam / the Philippines for Alter Global, a venture capital firm.

**Education:** Degree in History from Yale University.

### DR AMY FEATHERSTONE

**Job title:** Grants Administrator at Kensa Contracting



**Career:** A climate scientist, Amy lived in six different countries – travelling with her work – before settling down in Cornwall with her partner and two cats.

**Education:** PhD in marine biology.

### SAM HAMPTON

**Job title:** Post-Doctoral Researcher, Environmental Change Institute, University of Oxford



**Career:** Alongside his post-doctoral research position, Sam is a sustainability consultant, Geography tutor at Keble College, and an artist.

**Education:** PhD investigating environmental governance of SMEs.

### PAUL DOCHERTY

**Job title:** Operations Director, Invinity Energy Systems



**Career:** Prior to Invinity, Paul worked at manufacturing and engineering groups, including: Jabil, Buro Happold and Motorola.

**Education:** Degree in Manufacturing Systems Engineering and an MBA from the University of the West of Scotland.



## Careers in the 'green recovery'

Want a job helping to tackle one of the biggest issues our planet has ever faced? Everyone working on Energy Superhub Oxford is committed to helping Britain achieve Net Zero. And so-called 'green industries' or jobs in the 'green recovery' (roles that are helping Britain get back on its feet after the Covid-19 pandemic) offer a huge range of jobs and opportunities for anyone interested in pursuing a rewarding and fulfilling career.

“ We are going to be seeing many green jobs generated, the jobs of the future. ”

Councillor Tom Hayes, Oxford City Council



## Glossary

Here are some of the key terms referenced in this case study:

**Adoption rate:** This is the speed at which something new is taken up – in this case, electric vehicles and heat pumps.

**Net Zero:** Britain has committed to eliminating harmful carbon emissions by 2050. This goal is referred to as Net Zero.

**National Grid:** The National Grid is the company that manages the network and distribution of electricity and gas that powers all our homes and businesses. But the 'Grid' is often used to refer to the network itself – of high-voltage power lines, gas pipelines, interconnectors and storage

facilities that together enable the distribution of electricity around the country.

**Blueprint:** A design plan for others to apply to their own towns or cities to make it Net Zero.

**Green recovery:** This is the name given to the Government's plans to rebuild Britain and our economy, which has been severely damaged by the Covid-19 pandemic. By giving funding to green projects and jobs that restore nature and tackle climate change.

**For the latest on the project, visit [energysuperhuboxford.org](https://energysuperhuboxford.org)**