

# Fairer Futures | Overview



**Lesson Objective:** To consider changes that we can make to energy and transportation to reduce our emissions, weighing up the advantages and disadvantages of each.

**Facilitator Support:** A Fairer Futures support pack has been provided in this pack to help facilitators get the most from this session. It also contains a glossary of terms used in the lesson plan.

**Workshop Outline:** In this discussion-based workshop, participants are challenged to design an energy and transport plan for Glasgow that supports the city's transition to net-zero emissions. To do this, they will explore different technologies, and understand the impact of their decisions on people's lives.

The Fairer Futures lesson can be an individual activity but is best suited to group working and discussion. Groups of 2-5 can be formed at the beginning of the activity.

**Approximate duration:** This activity takes around 2 hours. However, this is flexible and can be split over two sessions.

## Key CfE Links:

By contributing to an investigation on different ways of meeting society's energy needs, I can express an informed view on the risks and benefits of different energy sources, including those produced from plants. **SCN 4-04a**

I can assess the impact of developments in transport infrastructure in a selected area and can contribute to a discussion on the development of sustainable systems. **SOC 4-09b**

## Additional Curriculum for Excellence Links:

**SCN 3-04b, SOC 3-08a, TCH 3-07a, TCH 4-07a**

## Facilitator Resources

Fairer Futures Support Pack

## Participant Resources

Fairer Futures Worksheet

Glasgow City Fact Sheet

Profile Cards

Energy and Transport Fact Cards

Hopes for COP26

This pack was produced in partnership with The Centre for Energy Policy at the University of Strathclyde.

# Fairer Futures | Workshop Outline



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|--|--|
| <p><b>Hook into the lesson</b><br/>5 mins</p> <p>5 mins</p> <p>5-10 mins</p> | <p><b>Big Question</b><br/><b>Why is it important for us to move away from using fossil fuels as an energy source?</b></p> <p>Invite participants to share their understanding of the link between burning fossil fuels, the release of greenhouse gasses and global warming. Define these terms if needed with the group. Definitions are provided in the <b>Fairer Futures Support Pack</b>.</p> <p>Give participants the <b>Fairer Futures Worksheet</b> which they will use to make notes throughout the activity.</p> <p>Read aloud one of the following statements and ask participants to write on the worksheet and discuss:</p> <p><b>'All petrol and diesel cars should be banned.'</b></p> <p><b>'We could live without electricity.'</b></p> <p><b>'Public transport is the future.'</b></p> <p><b>'Cycling is the future.'</b></p> <p>Ask participants to share their thoughts with the wider group and encourage them to consider different perspectives.</p>  |
| <p><b>Activity 1</b><br/>30-45 mins</p>                                      | <p>Introduce the concept of a <b>'Just Transition'</b>. This refers to a transition to a society that is fair for all people but also protects our planet. Definitions and examples of key ideas for this session are provided in the <b>Fairer Futures Support Pack</b>.</p> <p>Give participants the <b>Profile Cards</b> to discuss the points raised in each. Participants will identify common themes in the experts' answers on their worksheet and identify which profile they agree most with.</p>   |
| <p><b>Activity 2</b><br/>30-45 mins</p>                                      | <p>Pose the scenario that participants have been employed to design an energy and transport plan that supports Glasgow's transition to net-zero.</p> <p>Give participants the <b>Glasgow City Fact Sheet</b>, which gives a profile of Glasgow City. Alternatively, groups may research and create a Fact Sheet for their local area.</p> <p>Assign groups either an <b>Energy or Transport Fact Card</b>. Guided by the <b>Fairer Futures Worksheet</b>, pupils will discuss the card they have been assigned and whether they think Glasgow would benefit from investing in it, as part of a just transition to a net-zero society.</p> <p>Ask each participant/group to share interesting facts that they learned or interesting points of discussion that they noted with the larger group. They should also share whether they think that investment should be made into that form of energy or transport.</p> <p>Once all energy and transport cards have been discussed with the larger group, ask every individual participant to take a vote on which form of energy they would choose to invest in. Do the same with transportation.</p> |
| <p><b>Plenary</b><br/>15-20 mins</p> <p><b>Extension Tasks</b></p>           | <p>Lead a discussion on the implications of their choice, and the steps that could be taken to minimise the impact on already existing jobs and infrastructure.</p> <p>Highlight that the COP26 conference on climate change is the platform for world leaders to have these discussions. Use the <b>Hopes for COP26</b> to find out what the experts have to say.</p> <p>Put your choices to the test using the 'My 2050' online simulator:<br/><a href="https://my2050.beis.gov.uk/">https://my2050.beis.gov.uk/</a></p>   |



## Sarah Watt

Marketing and Media Manager  
Orbital Marine Power

### What do you do?

I work at Orbital Marine Power, a renewable energy company focused on generating clean power from the tides, based in Edinburgh.

### What does a just transition mean to you?

I think it's about justice for the planet and fairness. It is important that the people who decide what technology we use to tackle climate change are neutral, they don't have any reason to pick one over another.

Tidal power isn't the only solution to climate change but I think it would be really helpful. It's my job to make sure people have the facts and to show them how it works.

### Why is a just transition important?

A just transition is very important. We need everyone to learn ways that they can help climate change. It can be really tough when there are lots of changes. We can't ask everyone to change how they live. We need to balance changing lots of small things with finding new technology to help us.

### How will a just transition affect you and your future?

The climate crisis made me think about if I want to have a family or not. It might not be fair to have children when there aren't lots of natural resources left in the world. I like that I work for a renewable energy company. It's important to me that people give tidal energy as much of a chance as solar and wind energy.

### What are the challenges of a just transition to net-zero?

A big challenge of getting to net-zero carbon emissions is not a lot of people know about it. It's important that we share information and don't blame people for the things they don't know. We have to teach everyone what they can do to help the planet.



## Billy Sim

Managing Director  
New Energy Scotland

### What do you do?

Our goal is to make a green energy source affordable and accessible to anyone in the world. Our hydro energy device sinks and floats in water and generates energy from that movement. It can be used in lots of different water sources like rivers, lakes or the sea.

### What does a just transition mean to you?

It means moving from polluting energy sources that will run out, to clean and sustainable energy sources. It also has to be done in a way that makes life better for everyone.

In my business, it means that we can have people who used to work for oil and gas companies come to work for us. We can give them good jobs and they can help us with the things they learned making energy from non-renewable sources.

### Why is a just transition important?

It creates communities that can benefit from green energy. It would create jobs and opportunities for everyone.

Lots of communities across Scotland have struggled with having very little money. It's good that people and companies can be aware of these but if they can make lives easier it would be even better. I want to build a company that provides good opportunities for anyone, no matter what their background is.

### How will a just transition affect you and your future?

I think it's a good opportunity for people to work together to reverse the damage of climate change. Our work aims to make green energy and save everyone money. That will hopefully open up opportunities for spending in other areas.

### What are the challenges of a just transition to net-zero?

One of the biggest ones is money! If it costs a lot to make renewable energy then it will mean people have to pay higher bills and that's not fair. The challenge is for businesses to make new ways of renewable energy really cheap.



## Chris Dunn

Principle Naval Architect  
Malin Group

### What do you do?

As a naval architect I help to design, build and operate ships and other similar equipment. I look at how we can make “greener” ships by designing ships that use sustainable fuels and new technology.

### What does a just transition mean to you?

Oil and gas have been important for us to advance technology and our economy but it’s really bad for the environment. The transition to renewables gives us an opportunity to change it all. If we use renewable energy, it is better for the environment, better for people's health and we can share the wealth with local communities.

### Why is a just transition important?

Our society isn’t fair. There are huge differences in opportunities across communities. With the just transition, we can change our systems to bring benefits to everyone, not just businesses. We could improve quality of life for lots of people. We have to agree on how we do this though.

### How will a just transition affect you and your future?

Innovators are needed to help make these big changes happen. There are lots of good jobs in engineering now, but not lots of engineers. It means that people who have just graduated are getting good jobs and companies are getting lots of fresh ideas. There are lots of new challenges and technology for us to work with. It’s hard work but I think my job is really fun.

### What are the challenges of a just transition to net-zero?

People don’t like change but they need to if we want to reach net-zero. There are millions of jobs in the oil and gas industry, all of them will be affected by the transition. It’s also going to be expensive! It is possible though; five years ago, electric cars were described as a fad and now they’re outselling diesel cars! It is possible!



## Ian MacKenzie

Chief Executive Officer  
Trojan Energy

### What do you do?

I am the CEO of Trojan Energy. We make charging points for electric vehicles (EVs) that can sit flat underneath the pavement when not in use. Before this I worked for an oil company. I now use those skills to help transition the energy sector to net-zero.

### What does a just transition mean to you?

It's important that we move away from using fossil fuels but it will take a long time if we don't think about how to make it work for everyone. For EV charging that means making them low-cost and available in public places without blocking our streets. We also need to make good jobs for people who used to work in oil and gas industries.

### Why is a just transition important?

The benefits of a just transition are cleaner air, low cost energy and less contribution to climate change but with the changes that will be made some might be negative. There is no transition if it's not a just transition.

### How will a just transition affect you and your future?

I left my career in oil to pursue this new path. The zero-carbon energy industry will continue to grow while the fossil fuel one slowly ends. Moving career paths has lots of highs and lows but there are lots of learning opportunities.

### What are the challenges of a just transition to net-zero?

A just transition needs to benefit everyone. Organisations will need to find ways to put the skills of their employees to use in supporting the transition. I think there should be a tax on carbon emissions to help ensure everyone is focused on reducing them.



# Colin

Expert  
Energy Industry

## What do you do?

I am responsible for several commercial aspects of energy use for my company. I also have a role in emissions reduction for my company, which is an energy intensive industry.

## What does a just transition mean to you?

It's about ensuring that no group or member of society is disadvantaged. This includes financially, in access to opportunities, their wellbeing, health or any number of "non-financial" aspects.

For example, a friend of mine lost their job as a qualified engineer, but the company provided funding to re-train as a music teacher. I believe their life is richer, although they probably have less income than before.

## Why is a just transition important?

Too many areas of the country show the impact of changes that have been far from "just". The UK's wealth was once built on manufacturing. Too many members of society are struggling with finances, health and wellbeing.

The move to service and financial services based economy has provided employment and wealth. There may be more people in employment, but clearly, there have been "winners and losers" in this transition.

## How will a just transition affect you and your future?

I don't know. A transition to net-zero is possible without needing a drastic change; however, there are likely to be changes that happen in the way that we do things.

## What are the challenges of a just transition to net-zero?

Some of the costs involved in achieving net-zero for certain processes and industries are very high. Would society financially support businesses to achieve net-zero? The businesses provide employment, generate wealth and contribute taxes. If they are unsupported in achieving net-zero, instead faced with higher costs to comply, these businesses will close.



## Aoife Hutton

Climate Change Officer  
Keep Scotland Beautiful

### What do you do?

I work with lots of different organisations across Scotland to develop training and help people understand what climate change is, why it is a problem, and most importantly; what are the solutions?

### What does a just transition mean to you?

To tackle climate change, much of the way we live needs to change in a big way. These changes will cause disruption to our daily lives and the way businesses work. It's important that we use these changes to make a fairer and more 'Just' Scotland. No one should be left behind, and we need to make that everyone can access can gain new 'green' skills and move into new 'green' jobs where required. This is all part of what is known as the 'Just Transition'.

### Why is a just transition important?

Changing to more 'green' ways of travelling such as walking, cycling, train, bus or using electric vehicles, would also improve our air quality, reduce traffic in cities, and make us fitter and healthier too.

A Just Transition means making sure that everyone gets to experience these new benefits. We need to make the 'green' options the easiest, most accessible choices – like having safe places to walk and cycle, and affordable and reliable buses and trains near where we live.

### How will a just transition affect you and your future?

As part of my job at Keep Scotland Beautiful, I am delivering Climate Emergency Training to lots of different organisations. We hope to increase the support we can offer, as more and more people want to learn what they can do to help Scotland reach the climate goal.

I am excited by a vision for Scotland where we have more green spaces, there is clean air in cities, public transport is reliable and accessible, our homes are warm, and people have opportunities to work in green jobs that they enjoy. There is lots of good ahead if we all get on board.

### What are the challenges of a just transition to net-zero?

The big challenges for us all will include changing the way we normally do things. We need decision makers to help make the 'green' options the easiest. This includes funding for green projects, for example creating safer places to walk and cycle, and affordable and reliable buses and trains, so that we don't need to use cars as much. For governments and businesses, the challenges include making decisions about how to fund new green projects.



# Shgufta Anwar

Active Travel & South Hub Lead  
Bike for Good



## What do you do?

I support a team of passionate cyclists to deliver active travel services for people of Glasgow, encouraging them to start commuting by bike. We do this by offering bike loans, cycle training and bike maintenance sessions.

## What does a just transition mean to you?

Just Transition is creating a sustainable change where we do not use up all the planet's resources, made possible through a range of social interventions that are not only badly needed to secure people's rights and livelihoods but also that are fair and "just". In my role, it is reducing people's barriers to enable them to cycle as a mode of transport or even by inspiring people to want to make change.

## Why is a just transition important?

Carbon-emitting modes of transport are not accessible to all in society and decrease a person's physical and mental health.

Bike for Good enables people to ride a bike. We believe that cycling is the most effective and sustainable form of transport. We believe it enhances our chances for a healthier life and environment. Cycling has to be accessible! Not only that, but it saves you money and burns fat!

## How will a just transition affect you and your future?

Massively! Glasgow (and worldwide) will be a healthy and inclusive environment where everyone in the community benefits from more people cycling.

It will mean healthier, sustainable, more resilient and connected communities.

It will mean a fair and just society where the actions of one group of people does not cause chaos to someone completely unconnected halfway across the world.

## What are the challenges of a just transition to net-zero?

For active travel, it is the distinct lack of effective cycle infrastructure that links up the whole city and particularly disenfranchised communities. Time and time again we hear that people want to take up active travel but the roads (and cities) are created for vehicles, and not people.

Name: \_\_\_\_\_ Date: \_\_\_\_\_



## Fairer Futures | Worksheet

1. Write the statement to be discussed.

\_\_\_\_\_

2. Read the 'Profile Cards' and discuss the different points that are raised by each person in their profile. Use the table below to make notes on each of the profiles you discuss.

| Name | Notes |
|------|-------|
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3. Each profile has different priorities when it comes to the Just Transition. Which did you agree with the most and why?



You have been employed to plan the future you want for the city, and propose which energy sources and what forms of transport should be invested in to help our transition to net-zero.

You have to decide what energy source is best for Glasgow – **solar, wind, hydro or tidal? What method of transport should be invested in for the city – more cycling infrastructure, hydrogen buses or electric car hire?**

4. Your group will be assigned a Fact Card with information on either an energy source or a type of transportation. Use the Glasgow City Profile and discuss whether the option on the card is a good fit for Glasgow. Use the space below to make notes.

In your discussion consider: **is it affordable? accessible for young families/ disabled people/ the elderly? Will it create new jobs? What physical impact will it have on the city? Note anything else that may impact the community of Glasgow.**



### Hydro Power

Hydroelectric power stations have a low carbon footprint and provide a renewable source of energy. Dammed water holds potential energy that can be turned into electricity. In a hydroelectric power station, the dammed water is released through a pipe to a turbine. When the turbine spins it drives a generator that produces electricity.

With around 80 hydroelectric power stations, Scotland has harnessed around 60% of the estimated hydropower resources available. Small hydropower schemes can be an economical source of electricity for isolated communities, particularly in the developing world.

### Considerations

- CO<sub>2</sub> is released during construction, but some dams around the world also release the greenhouse gas methane (CH<sub>4</sub>). This happens in areas of flooding as plants decompose.
- Dams can also impact on people living in the area and affect the availability of water to communities living downstream.
- Some potential hydro power station sites could be in protected areas while others might be in remote locations that require expensive infrastructure to carry the electricity to the national grid.



## Wind Power

Wind turbines capture kinetic energy from moving air to generate electricity. Modern wind turbines generate energy as the wind pushes on a number of blades to create a rotational motion. Today's wind turbines are technologically advanced, allowing them get the most out of this renewable energy source. Wind is a renewable source of kinetic energy caused by the Sun's uneven heating of the planet's surface

Wind energy is a free, renewable resource so practically all of the costs are to make and install the wind turbines. As the windiest country in Europe, Scotland is well placed to harness wind energy and transform it into low-carbon electricity. Although there is plenty of energy available, we only get electricity when the wind is blowing. The strongest winds tend to be at sea where there are no obstacles such as forests to slow the winds down. Scotland boasts 25% of Europe's offshore wind resources.

## Considerations

- There are carbon emissions related to the building and installation of the turbines before the site is operational.
- Off-shore wind farm machinery needs to be protected from the sea, specialised ships are needed to assemble the wind turbines and expensive power lines must be installed to carry the electricity from the remote site to connect to the national grid.
- The variable output from each wind turbine requires treatment with power electronics to give the smooth output and steady frequency needed for the grid.
- For the UK, the strongest winds are offshore but the costs for offshore windfarms tend to be much higher too – sometimes twice as expensive because of the tricky installation required.



## Tidal Power

Electricity can be generated from our changing tides using underwater turbines which rotate as the tide passes through them.

As the Earth spins, the gravitational pull of the Moon and Sun causes the seas and oceans to 'bulge' which in turn creates huge, predictable ebbs and flows of water around the world. As the tide rises, sluice gates open to allow the water to flow through the barrage, turning the turbine. The flow of water pushes on the blades of the turbine and causes them to spin. The generator converts the spinning motion of the turbine into electricity.

Scotland has around 25% of Europe's tidal energy resources but there are many challenges to overcome before it can become a significant part of the energy mix. There are engineering challenges presented by the harsh conditions of the seas and potential environmental impacts, both positive and negative, which need to be understood. However tidal energy is a free, predictable, low-carbon resource that has great potential. Another option to harness the energy of the tides is to use offshore turbines, rather like an underwater windfarm. Orbital Marine Power is a company that are building tidal turbine that floats off the shore, a bit like a boat that's been anchored. Just one turbine will be as long as a jumbo jet and could generate enough clean energy for 1,700 homes for 1 whole year.

## Considerations

- The tide is completely predictable. There are two tides every 24 hours, meaning that the energy levels can be predicted.
- Tidal turbines are not expensive to build and maintain. The turbines can be mostly obscured underwater, meaning little visual impact.
- The UK has some of the highest tidal ranges in the world which makes it a good location for tidal power.
- If using a tidal turbine on the shore, bird life on the estuary where the turbines would sit would be affected as they rely on the tide to uncover mud flats in order to feed.
- The tidal technologies could interfere with shipping routes and access to ports. This could be damaging to the industry on the island that rely on the ports for importing and exporting.
- The technology is really new and it might not be widely available for some time.



## Solar Power

The most common method of converting light energy into electricity uses photovoltaic cells, also known as solar cells. These devices rely on a phenomenon known as the photovoltaic effect, which can generate electricity with no moving parts. Although some carbon dioxide is emitted during manufacture and installation, once built the cells harness the Sun's freely available energy to generate electricity without emitting carbon dioxide.

During the day, energy from the Sun reaches the ground as sunlight. Solar panels contain a grid of individual solar cells that can convert light energy into electrical energy by taking advantage of the photovoltaic effect. A layer of glass protects the solar cells, which has an anti-reflective coating to stop sunlight from being reflected away. Solar cells produce electricity in a form called direct current but an inverter turns the output into the alternating current that we use in our homes. The electricity that solar panels generate can be connected directly to our household electricity systems or to the national grid.

## Considerations

- Solar power varies with cloud cover, time of day and year. This 'intermittent' supply of raw energy creates a challenge for the energy system. To ensure a reliable supply of electricity we need to find better ways of storing electricity.
- Wherever sunlight falls, solar panels can generate electricity – even on the International Space Station.
- Because solar panels are made of a grid of individual cells, they can be as big or as small as necessary. They can be fitted to rooftops, make up large solar farms or be integrated into our electronic devices.
- There are emissions associated with the manufacture and installation of solar panels.
- Solar panels can contain small amounts of environmentally toxic metals and elements (e.g., Lead, Selenium, Cadmium) which need to be properly disposed of.
- Researchers are working to find cheaper ways of producing and recycling solar cells.
- New types of solar panels are being developed, like solar glass for windows, solar shingles for roofs and even floating solar farms.



### Cycling Infrastructure

Cycling is a form of transport that has been popular since late 19th century, when the bike as we know it was invented. In the UK it is estimated that approximately 42% of the population have access to a bike. Prioritizing bicycles ensures reliable transport for all income groups. Travelling by bike is emission-free, as well as being a healthy way to travel.

To improve cycling infrastructure, the city could invest in creation of lots more new cycle lanes as well as installation of many more bike-for-hire stations across the city.

### Considerations

- In comparison to a car, purchasing a bicycle has much lower upfront costs, as well as lower running costs.
- Many employers offer employees access to ‘cycle to work’ schemes, offering discounted cycling equipment that can be paid in installments.
- If a third of all inner-city car travelling was replaced with cycling, a 30% reduction in traffic jams could be seen.
- Cycling is a form of exercise that reduces the risk of heart disease for those who regularly cycle.
- Not everyone is a proficient cyclist, so some may be afraid to cycle on roads, and cycling is not an activity that is accessible to everyone.
- Cycling may not be appropriate for those with longer distances to commute, and people may be put off by significant inclines on their journey. This could be addressed through use of e-bikes.
- Cyclists are more exposed to weather conditions than users of other forms of transport, especially during winter months.



## Hydrogen buses

Hydrogen buses make use of hydrogen gas as a fuel source. Since the 1990s hundreds of hydrogen buses have been in operation worldwide. Aberdeen is already making use of this clean technology. It has had hydrogen buses in operation since 2015 and began operation of the world's first double decker hydrogen bus towards the end of 2020.

### Considerations

- The use of hydrogen as a fuel results in a vehicle with no exhaust fumes. The only by-product that is produced is water.
- Hydrogen buses run much more quietly than traditional vehicles with internal combustion engines.
- The electricity required to generate hydrogen fuel can be from renewable sources.
- Buses can take passengers on set routes only, with some walking required between the bus stop and the passenger's final destination.
- Transporting hydrogen fuel has higher costs than transporting other forms of fuel, such as petrol or diesel.
- The system of fuel cells and electric motors required for these vehicles is not as durable as traditional internal combustion engines, and so require more maintenance and don't last as long.



## Electric Car Infrastructure

Electric cars are gaining popularity, with an increase in registrations of fully electric cars up by 127% in 2020, in comparison to 2019. Electric cars do not produce emissions through exhaust gases like cars with traditional petrol and diesel engines. Over the lifetime of the vehicle, electric cars are cheaper to run than petrol or diesel cars, due to the fact that electric cars have fewer moving parts and so experience less wear and tear. Electric car charging stations are popping up all across the city and country, making it easier than ever before to charge an electric car. In 2020, there were over 1,500 charging points across Scotland.

## Considerations

- Electric cars do not produce emissions through exhaust gases like cars with traditional petrol and diesel engines
- Only accessible to those with a driving license.
- The distances that can be driven with an electric car are limited, with charging required more often than refueling with a petrol or diesel car.
- There is currently a limited range of electric cars, but this is always improving, with the upfront cost of electric cars also reducing as time goes on.
- Charging stations aren't as accessible or as available as petrol stations and current design reduces space on pavements/driveways.
- Not everyone has a driveway or parking space where they can have a personal electric car charging point.
- Companies like Trojan Energy are coming up with new charging point designs – for example, one that can be stored under the pavement when not in use.
- Manufacture of electric vehicles and installing charging points have associated emissions.
- A reliable source of electricity must be available to charge electric vehicles when required, especially if demand from electric vehicles increases significantly.
- Electric vehicles still contribute to congestion and air pollution through their tyres and breaks, and don't carry the health benefits of active travel options like walking or cycling.



### COP26

In November 2021, Glasgow will host the 26th Conference of the Parties, COP26. This is an international conference on climate change in which world leaders meet and discuss their strategies to stop the ongoing damage to our planet. This will be the biggest international conference the UK has ever hosted, so all eyes will be on Glasgow.

COP26 is a particularly important conference as it will be the first COP to take place after the landmark Paris Agreement's measures take effect. Almost all countries signed the Paris Agreement at COP21 in Paris in 2015. It aims to restrict global temperature rise this century to 'well below' 2°C above pre-industrial levels and pursuing efforts to limit it to 1.5°C. COP26 is the first opportunity since then for nations to come together to review these commitments.

The Scottish Government has committed to ending our contribution to climate change by 2045. This goal was set within the Climate Change Bill which was introduced to the Scottish Parliament as a direct response to The Paris Agreement.

Information Sources: COP26 Official Website - <http://ukcop26.org> and the Energy and Climate Change Intelligence Unit website - <http://eciu.net>

### Sarah Watt, Orbital Marine Power

“I am infinitely hopeful that COP26 will highlight the urgency of climate change. It is exactly the platform that we need to show global citizens that it is entirely possible to make the transition to carbon neutrality. I see COP26 providing a surge of enthusiasm for protecting our planet, but it will be imperative for large businesses and corporations to leverage their presence in our lives to change minds about the urgency we are facing. We need to get people talking about, and concerned about, the climate emergency, and I want to see politicians, business leaders and global philanthropists use their platforms to influence their followers to do more.”

### Billy Sim, New Energy Scotland

“Scotland has a long and distinguished past in relation to innovation and we should be rightly proud of our history. But we also must look forward and how we can create new inventions that will shape our future generations, whilst meeting our net-zero targets, and achieving a just transition in the process.

Our approach to help people to transition to carbon neutral is to produce large amounts of green, renewable energy at a lower cost than at present. COP26 will have the eyes of the world on Glasgow. This is our chance to shine and show the world that we are still a nation of innovators and visionaries.”



### Chris Dunn, Malin Group

“COP26 will give us a once-in-a-lifetime opportunity to get directly involved in what could be the most significant climate change event of our lifetimes. We need to use the exposure that this event will bring to make sure that every single person in Glasgow, Scotland, and even the UK, understand why we need to change and more importantly how they can individually make a difference. This will create the momentum we need to start implementing the necessary changes, and hopefully will inspire a whole new generation of engineers who will bring their ideas to the table and help make the just transition a reality.”

### Ian MacKenzie, Trojan Energy

“Change can happen and faster than you may think, but it will take all of us working together to make it happen. The benefits of the energy transition for the world are clear but in order for us to accelerate the change we need to bring everyone with us. This means using our skills and ingenuity to create solutions that benefit all, creating new job opportunities and being bold in our approach as a nation and as all nations to ensuring the transition is supported.

To quote the beloved TV character Bob the Builder -

**“Can we fix it – yes we can!”**

### Colin, Energy Industry Expert

“The challenge for COP26 is to create the vision and pathway to net-zero for the benefit of all on the planet and not get lost in individual country’s interests. I believe that progress will be made, targets agreed, ambitions set and perhaps some agreements on cooperation between nations to achieve this; however, I also believe that there will be work for COP27 to do!!”



### Aoife Hutton, Keep Scotland Beautiful

“I hope that COP26 gives decision makers a new motivation to make bold decisions about the future that will create a fairer, more ‘Just’ planet for us all.

At a global scale, we must also have a ‘Just Transition’. This means richer countries should play a big role in helping other countries to adapt to the impacts of climate change and the huge changes that are required to reduce greenhouse gas emissions.

A ‘Just Transition’ means no-one gets left behind. In moving towards net-zero, there could be opportunities for all countries, including new green jobs and healthier, fairer places to live and work.”

### Shgufta Anwar, Bike For Good

“Cop 26 is about connecting the dots. Worldwide there is amazing work going on but in small silos. This event is a huge opportunity worldwide (and our beloved Glasgow) to bring those silos together, garner strength and encourage whole communities to inspire people to take individual (and resultant global) actions.

*“I found it was difficult to change the world, so I tried to change my nation. When I found I couldn't change the nation, I began to focus on my town. I couldn't change the town and as an older man, I tried to change my family... Their impact could have changed the nation and I could indeed have changed the world.”*

–The unknown monk.

## Fairer Futures | Glasgow City Fact Card



**Population:** 1,861,315

**Size:** 492km<sup>2</sup>

### Biggest Industries

Glasgow was once a major shipbuilding and manufacturing city. It's still an important location for manufacturing, especially for satellites, but it's also important in financial and business services, communications, biosciences, creative industries, healthcare, higher education, retail and tourism.

### Weather

- Annual rainfall is 1,245 mm or 49 inches. Glasgow is the rainiest city in the UK.
- Generally, like most of Scotland, the weather is very changeable. The winters are cold and overcast with short spells of snow, if any. The summers are mild and typically overcast or humid. Heatwaves and sunny spells are rare, but even then, temperatures will typically remain below 30°C.

### Landforms

The city is located on the banks of the River Clyde, 20 miles from the west coast of Scotland. The River Clyde is not the only river that runs through the city, there is also the River Kelvin. It is only approximately 30 miles from the famous Loch Lomond and approximately 40 miles from Loch Katrine, which is where Glasgow gets most of its fresh water supply.

### Housing

- Most people in Glasgow (72%) live in flats.
- Glasgow has one of the highest percentages of highly energy efficient rated homes in Scotland, with over 50% of homes ranking in the 2nd or 3rd highest categories.
- Across Scotland, approximately 25% of people live in fuel poverty (when the cost of heating a home is more than 10% of the household income), for those living in flats this percentage tends to be higher.

### Transport

- 50% of journeys around Glasgow are less than 3km.
- 46% of households in Glasgow don't have access to a car, in social housing this rises to 71%.
- Only 45% of people in Glasgow believe that buses were good value for money, compared to 61% in other large urban areas across Scotland.
- There is a large train network connecting Glasgow City to the Greater Glasgow Area and an underground train service that circulates round the city.
- City Bikes are available across the city.



### Energy and Our Planet

We all use energy – from heating, cooking and lighting to transport, as well as manufacturing products and gadgets. In less than 40 years our total energy consumption has doubled. With our population rising and energy reliant modern living standards, we are demanding more energy than ever before.

The constant, steady availability of energy underpins our modern lives. However, one of the biggest challenges for society, which is being considered at international, national and local levels, is how our increasing demand for energy can be met, at an acceptable cost to the environment and the economy. This is often referred to as the energy trilemma.

In the recent past, we have been heavily dependent on fossil fuels to fuel our lifestyles. However, releasing energy from fossil fuels involves burning them. This process leads to the emission of gases called greenhouse gases into our atmosphere, such as carbon dioxide (CO<sub>2</sub>). These gases have become concentrated in our atmosphere, and as a result our planet is getting warmer. This is known as global warming. The increase in global temperatures is having a devastating effect on our planet, and everything that calls it home.

To stop our planet getting warmer, we need to reduce the levels of greenhouse gases in our atmosphere. Many nations have set 'net-zero' targets – where countries will not add more greenhouse gasses to the environment than they remove. Reducing our consumption of fossil fuels is a vital part of this – but achieving this will have a huge impact on our lives.

Find out more: [Geobus Climate Science in a Minute - What is the Greenhouse Effect?](#)

### Just Transition

To describe something or some action as "just", is to say that it is morally right or fair. In the context of climate change and societies transition to net-zero, it means that everyone is able to benefit from this new, more sustainable system and no one is left behind. There is no single change that can be made to achieve a 'just transition'. It will involve many changes, but also many opportunities. Importantly, history tells us that moving away from an industry without providing support for those it affects leads to major areas of deprivation, depression, social injustice and crime

To help save our planet we need to move to net-zero emissions, and we have an opportunity to do so in a way that benefits everyone. The many 'just transitions' that will need to happen will take place in all areas of our society. This can be achieved by ending our reliance on fossil fuels, making the most of the resources we have, adopting new technologies and developing more planet-friendly infrastructures. This is why COP26 is so important. World leaders and governments will have the chance to make clear plans and bold moves towards these ambitious goals.



A recent publication from the Scottish Government Just Transition Commission set out the following aims:

- Pursue an orderly, managed transition to net-zero that creates benefits and opportunities for people across Scotland. Delivery of this must be a national mission
- Equip people with the skills and education they need to benefit from the transition
- Empower and invigorate our communities and strengthen local economies
- Share benefits widely and ensure burdens are distributed on the basis of ability to pay.

The just transition to net-zero emissions will particularly impact Scotland's oil and gas industry. Oil and Gas UK have worked closely with the UK Government to set out the North Sea Transition Deal. Within this deal, the oil and gas sector and the UK Government have committed £14-16 billion to invest in new technologies and support the reskilling of workers by 2030. This deal also allows for the support and creation of approximately 40,000 direct and indirect supply chain jobs. This is just one example of an industry taking steps towards a more sustainable future.

**Information Source - Scottish Government Just Transition Commission**

<https://gov.scot/publications/transition-commission-national-mission-fairer-greener-scotland/>

## **COP26**

In November 2021, Glasgow will host the 26th Conference of the Parties, COP26. This is an international conference on climate change in which world leaders meet and discuss their strategies to stop the ongoing damage to our planet. This will be the biggest international conference the UK has ever hosted, so all eyes will be on Glasgow.

COP26 is a particularly important conference as it will be the first COP to take place after the landmark Paris Agreement's measures take effect. Almost all countries signed the Paris Agreement at COP21 in Paris in 2015. It aims to restrict global temperature rise this century to 'well below' 2°C above pre-industrial levels and pursuing efforts to limit it to 1.5°C. COP26 opportunity since then for nations to come together to review these commitments.

The Scottish Government has committed to ending our contribution to climate change by 2045. This goal was set within the Climate Change Bill which was introduced to the Scottish Parliament as a direct response to The Paris Agreement.

**Information Sources: COP26 Official Website - <http://ukcop26.org>**

**and the Energy and Climate Change Intelligence Unit website - <http://eciu.net>**



### Greenhouse Gases

These are gases in the Earth's atmosphere that allow sunlight to pass through and warm the Earth. They trap the heat that the sun gives us and prevent it from leaving our atmosphere. Without greenhouse gases our planet would have an average temperature of minus 18 degrees Celsius! The main greenhouse gases are water vapor (H<sub>2</sub>O), carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (NO<sub>2</sub>) and ozone (O<sub>3</sub>). The majority of human generated CO<sub>2</sub> emissions come from the burning of fossil fuels. The majority of CH<sub>4</sub> emissions come from agriculture.

### Carbon Emissions

This refers to the release of greenhouse gases into the atmosphere. Greenhouse gases are the main contributors to climate change. Since greenhouse gas emissions are often calculated as carbon dioxide equivalents, they are often referred to as 'carbon emissions' when discussing global warming or the greenhouse effect. Since the industrial revolution the burning of fossil fuels has increased, which directly correlates to the increase of carbon dioxide levels in our atmosphere and thus the rapid increase of global warming.

### Net-zero

In general, for something to be net-zero means that it results in neither a surplus nor a deficit of something specified when gains and losses are added together. In the context of climate change it means producing enough energy (from renewable sources) to offset or balance any energy consumed. In Scotland, the new Climate Change Bill commits Scotland to a target of net-zero emissions of all greenhouse gases by 2045. This is tougher than a net-zero carbon target, which commits only to balancing carbon dioxide emissions. Achieving net-zero emissions will mean that we no longer add more greenhouse gasses than we take out of the environment.

### Just Transition

In short, the Just Transition is moving from our current state in society to one that is sustainable and fair for everyone and the planet. The International Trade Union Confederation described just transition as an integrated approach to sustainable development, where social progress, environmental protection and economic needs are brought into a framework of democratic governance, where labour and other human rights are respected and gender equality achieved.



## Non-renewable Energy

This is energy that comes from a finite source, meaning that it will run out or it won't be replenished for thousands or even millions of years. Most sources of non-renewable energy involve the burning of fossil fuels.

## Renewable Energy

This is energy that comes from a source that will always be available to us, like the sun. Examples of renewable energy sources are solar energy (sun), wind turbines (wind), hydro or tidal energy (water).

## Fossil Fuels

Fossil fuels are a non-renewable energy source. They include oil, coal and gas. These fuel types were created by a natural process, the decomposition of organic matter buried under ground for millions of years. Oil, coal and gas can be used to generate electricity but by doing so we need to burn them which releases CO<sub>2</sub>, a greenhouse gas, as well as other pollutants.

## Active Travel

Active travel means making journeys by physically active means, like walking or cycling.

## COP26 (26th Conference of the Parties)

The United Nations Framework Convention on Climate Change (UNFCCC), the UN's climate body, holds an annual summit known as a COP, or Conference of the Parties, attended by national ministers and, for the key summits, heads of state. The UNFCCC establishes agreements between the Parties to act on climate change. It also takes scientific guidance from the Inter-governmental Panel on Climate change (IPCC), who present their Assessment Reports (AR) every five years.

## Carbon Footprint

A carbon footprint measures the total greenhouse gas emissions caused directly and indirectly by a person, organisation, event or product.

Calculate your carbon Footprint on the WWF website - <https://footprint.wwf.org.uk/>