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Sustainable Tourism: The Challenge of Achieving Net Zero in the Scottish Context

Dr. Gokce Ozdemir Umutlu

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CHANGERS
WELCOME**

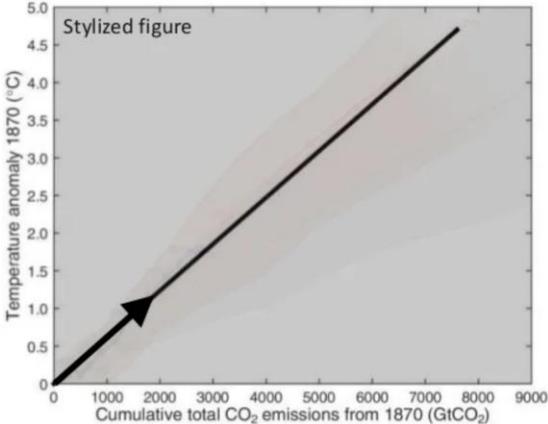
THE SUNDAY TIMES
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Relationship between CO2 and temperature



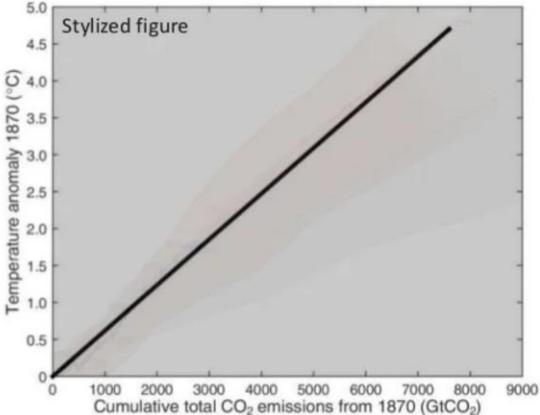
More CO₂ emissions, higher temperature

Temperature rise versus total CO₂ emissions



°CICERO

1Gt CO₂ equals 1 billion tonnes CO₂



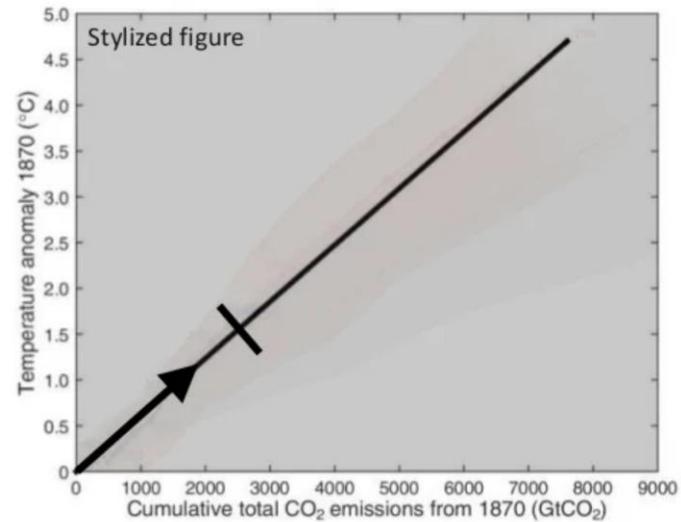
°CICERO

1Gt CO₂ equals 1 billion tonnes CO₂

Why net zero?

- Temperature rise will only stop when CO₂ emissions stop
- Positive emissions: emissions by sources e.g. burning fossil fuels, cutting down forests
- Negative emissions: removals by sinks e.g. growing new forests
- Net = 1 + 2
- All GHG emissions cause temperature rise, however carbon is the most significant, therefore takes focus in discussions

Zero CO₂ emissions, temperature rise stops



1Gt CO₂ equals 1 billion tonnes CO₂

Why net zero?

- ‘Net zero’ is about balancing anthropogenic emissions and removals – a state known as net zero emissions
- It covers the whole value chain to reduce carbon, not just those within an organisation and includes everything: transport, products & services, and waste
- For many organisations, more than 80% of the carbon could be outside the business (indirect emissions, Scope 3)

Getting it right – Net Zero WHAT?

What we say	What it means	Context/Example
Net Zero Carbon Net Zero CO2 Carbon Neutral	CO2 only = Balancing the emissions and removals of CO2	China will be carbon neutral before 2060. This means it might achieve Net Zero Emissions some time before 2060.
Net Zero Emissions Net Zero GHG Climate Neutral	ALL greenhouse gases = Balancing the emissions and removals of all GHGs	Paris Agreement goal — balancing sources and sinks of all GHG emissions. The EU will be climate neutral by 2050. This means it will be carbon neutral around 2040.

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Source: [Eve Tamme](#)

Paris Agreement

- The Paris Agreement is the first-ever universal, legally binding global climate change agreement, adopted at the Paris climate conference (COP21) in December 2015
- The Agreement sets out a global framework to avoid dangerous climate change by limiting global warming to well below 2°C and pursuing efforts to limit it to 1.5°C. It also aims to strengthen countries' ability to deal with the impacts of climate change and support them in their efforts
- Signed by 193 'parties' (192 countries plus the EU) – required parties to put forward their best efforts through 'nationally determined contributions' (NDCs)

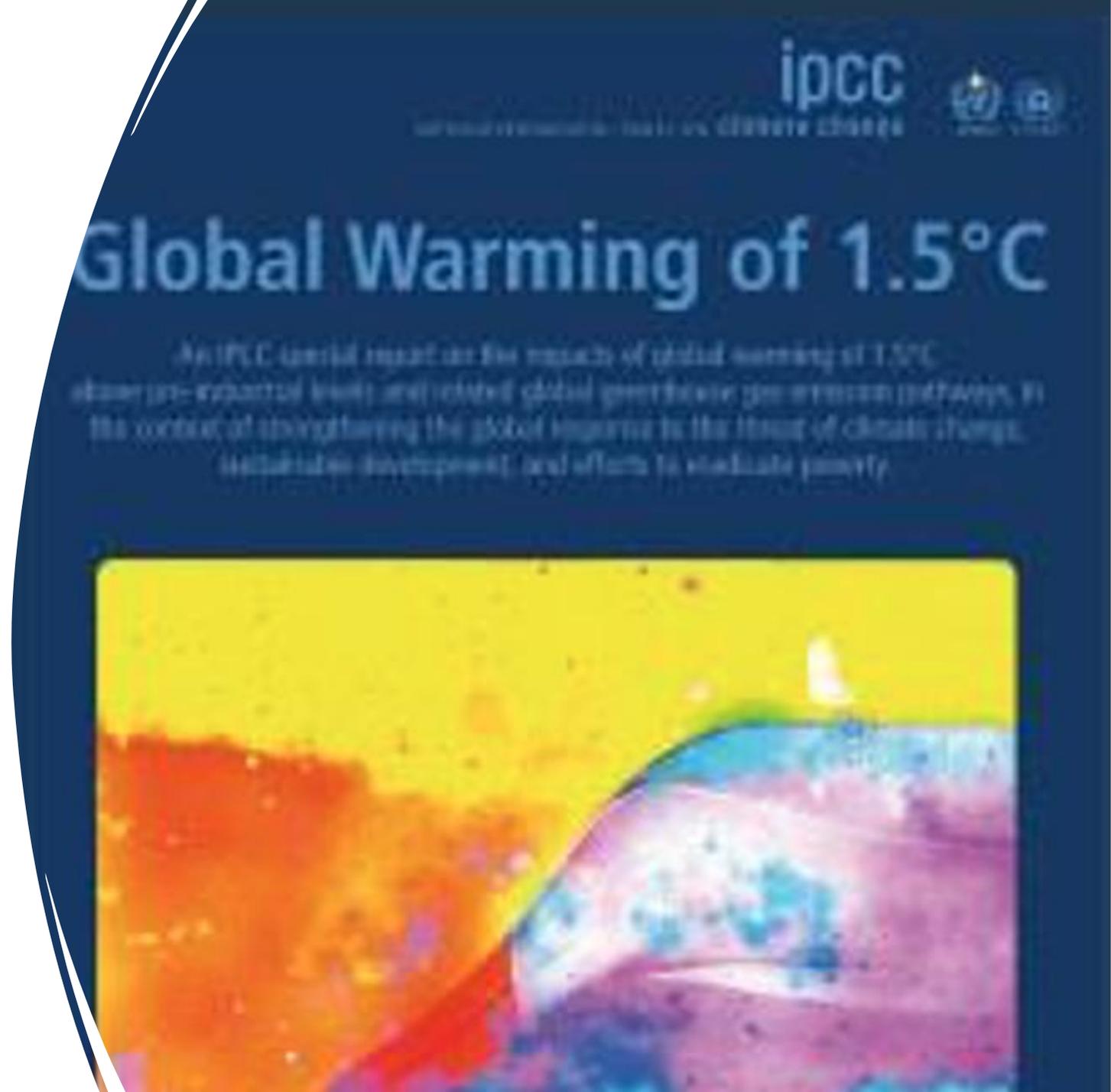


Why 1.5 ° C by 2050?

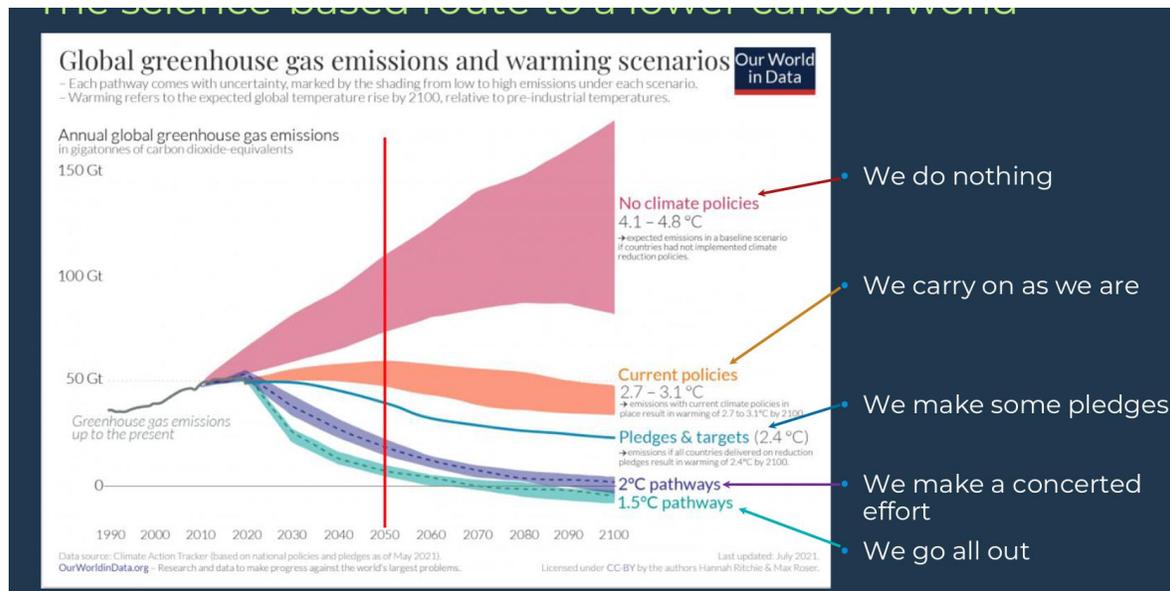
IPCC Special Report, 2018

- To limit global warming to 1.5 we must reach net zero emission targets no later than 2050
- 2 ° C is not enough, the impacts from a 1.5 ° C are markedly less: extreme weather events, impact on biodiversity, ice melt

“Pathways limiting global warming to 1.5 ° C overshoot would require rapid and far-reaching transitions in energy, land, urban and infrastructure (including transport and buildings), and industrial systems. These systems transitions are unprecedented in terms of scale, but not necessarily in terms of speed, and imply deep emissions reductions in all sectors, a wide portfolio of mitigation options and a significant upscaling of investments in those options”



Why 1.5° C by 2050?



	1.5°C	2.0°C	2°C impacts
Global population exposed to severe heat at least once every 5 years	14%	37%	2.6x worse
Number of ice-free arctic summers	At least 1 every 100 years	At least 1 every 10 years	10x worse
Further decline in coral reefs	70-90%	99%	Up to 29% worse
Decline in marine fisheries	1.5M tonnes	3M tonnes	2x worse

Source: Levin, K. (2018, Oct 7). 8 Things You Need to Know About the IPCC 1.5°C Report. Retrieved from <https://www.wri.org/blog/2018/10/8-things-you-need-know-about-ipcc-15-c-report>

Despite understanding the **severity** of climate change impacts, current policies put us on track for **between 2.7–3.1°C**.

Source: Climate Action Tracker, May 2021 update

UK Law on Climate Change



UK Climate Change Act 2019 target of 100% reduction on 1990 emissions, that is, 'net zero' by 2050

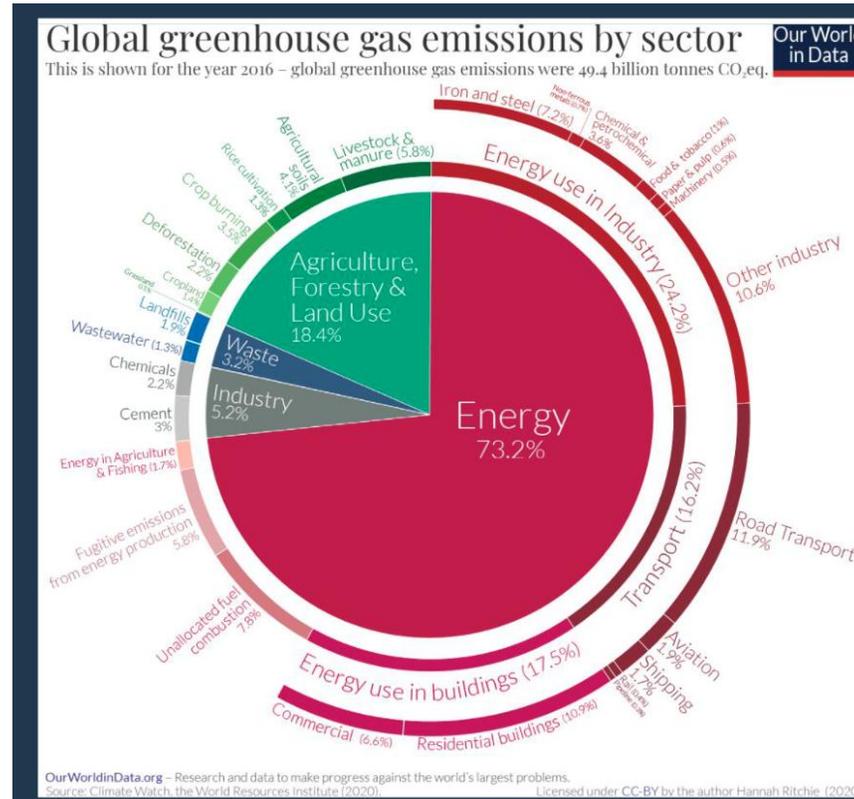


Scotland legislated to reach net zero by 2045



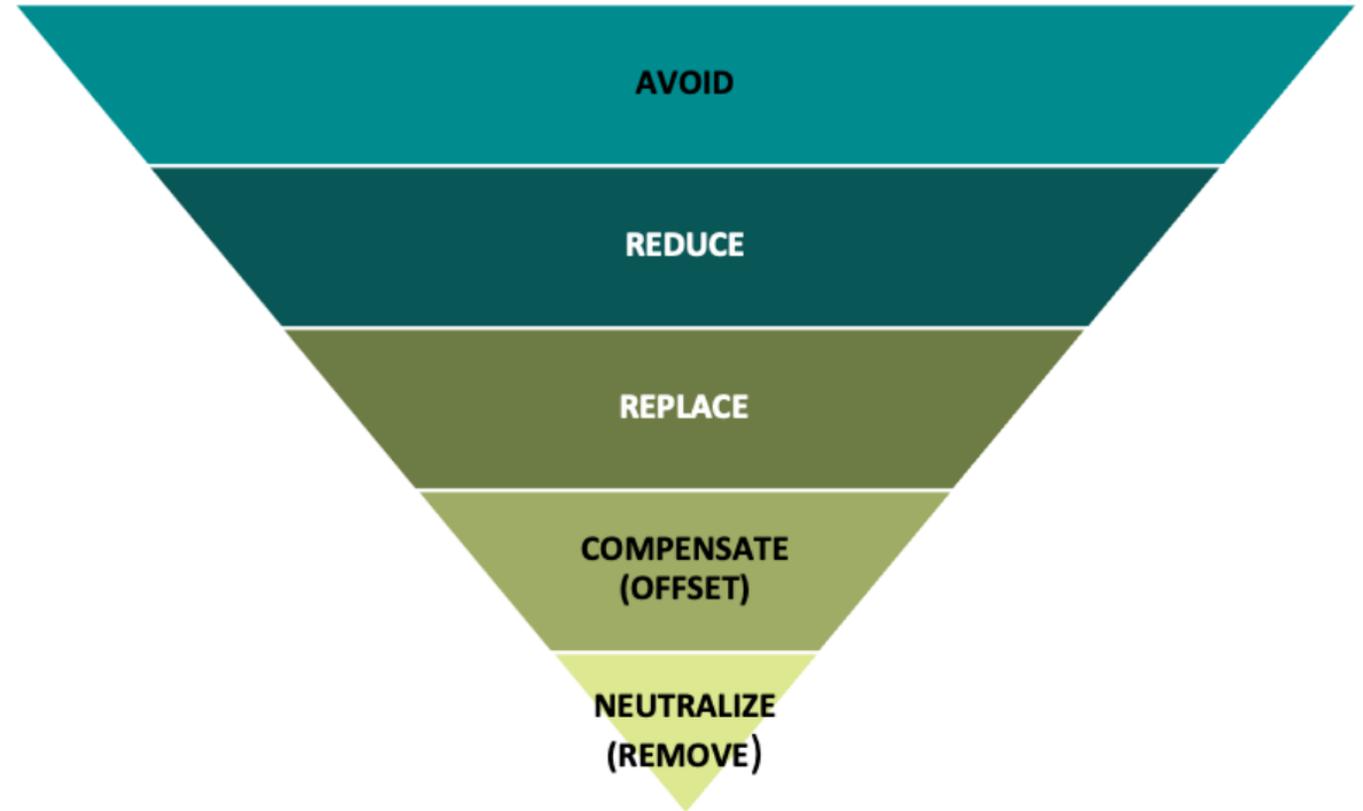
Wales target to reduce emissions by 95% by 2050 but aiming for net zero

Where do GHG emissions come from?



- Industry 29.4%
- Agriculture & Forestry 21.1%
- Buildings 17.5%
- Transport 16.2%
- Use of grid energy 47.5%

How to reduce emissions: GHG Mitigation Hierarchy



How to reduce emissions: limitations

Net-zero targets can play a critical role in addressing the climate emergency, but the lack of a robust benchmark has triggered skepticism around net-zero as a concept.

Common criticisms include:

- Incomplete boundary: Selective inclusion of emission sources in corporate net-zero targets
- Delayed action: Lack of interim milestones for long-term target
- Mitigation deterrence: Focus on offsetting instead of on reducing emissions
- Poor accountability: Lack of scrutiny and accountability on voluntary commitments

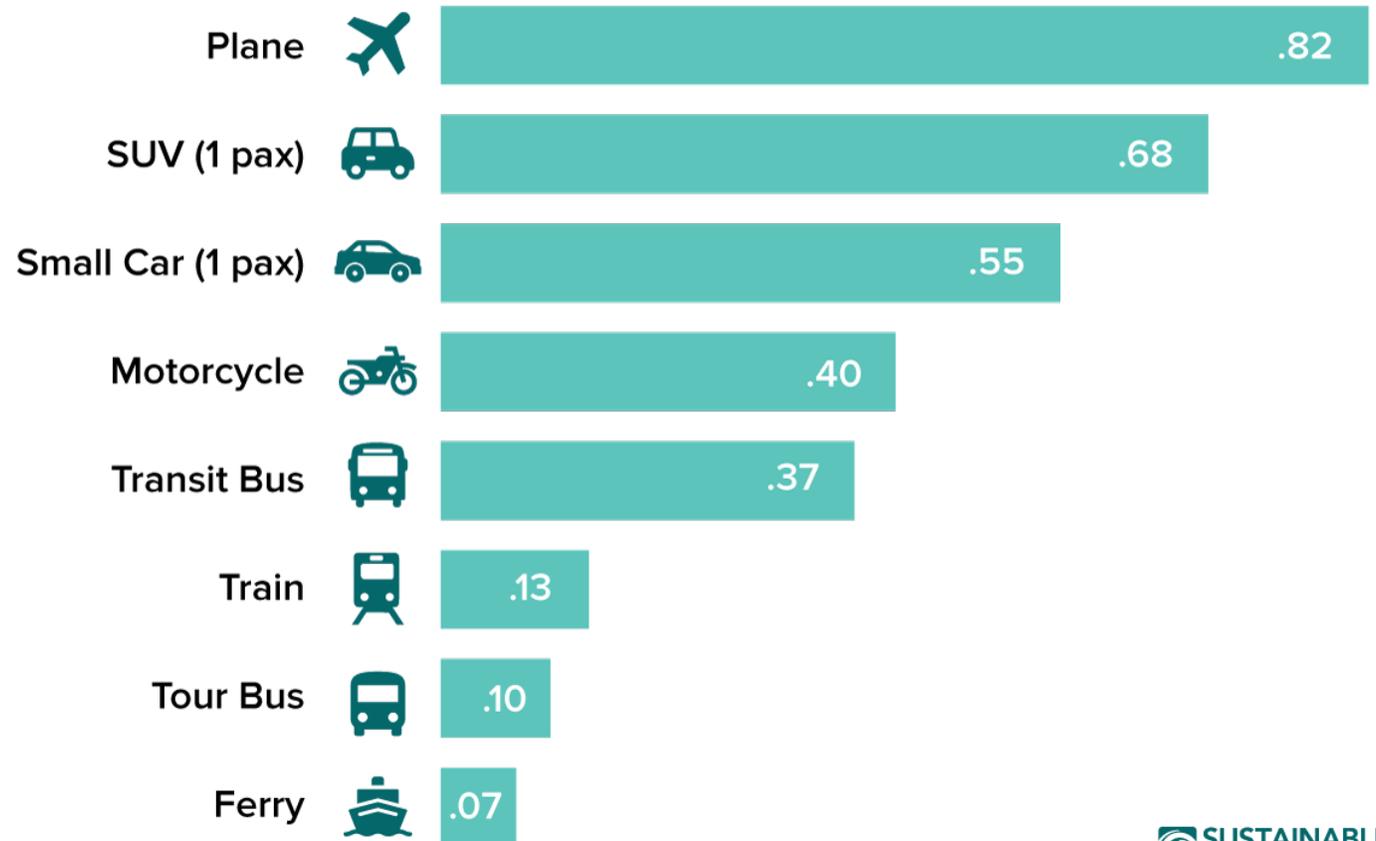
Why is transport a challenge?

- Transport is tourism's largest emitter
- Tourism transport is a rapid growth sector
- Tourism transport has limited short term decarbonization options

Definition: Decarbonization is the reduction in the use of carbon through a range of measures

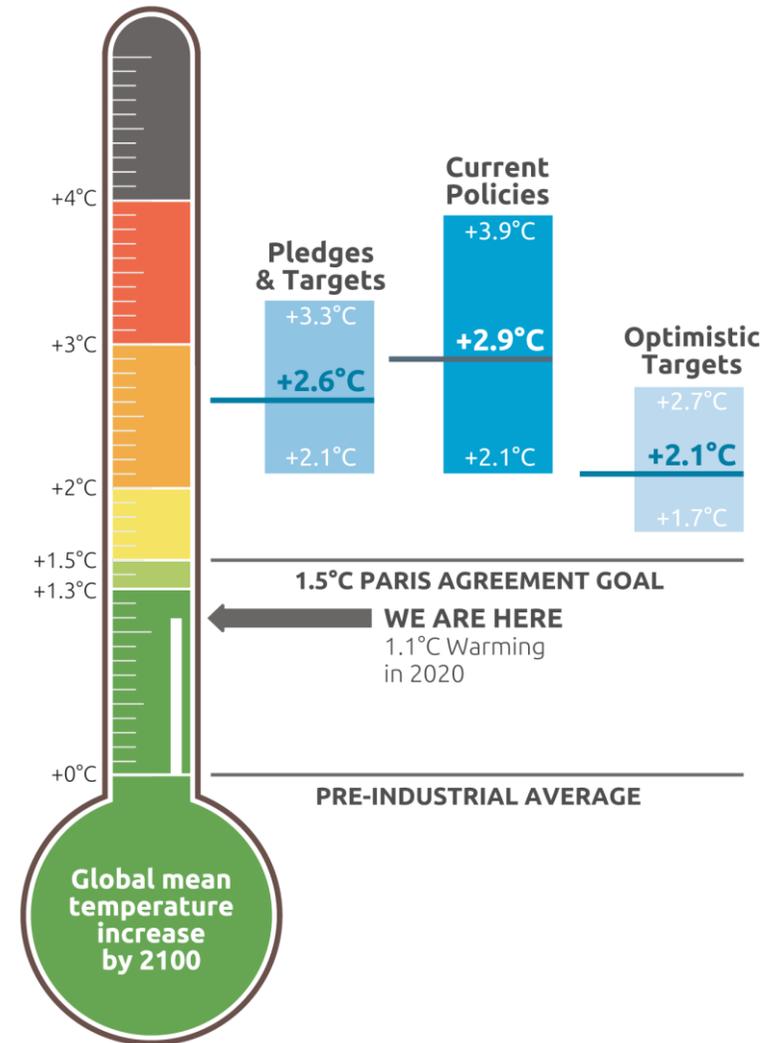
Emissions by Mode of Transport

pounds of CO2e emitted per passenger per mile



Influence of the Intergovernmental Panel on Climate Change and Paris Agreement

Source: Paris Agreement Target Update, Climate Action Tracker 2020



What can we do to decarbonize?

- Avoiding journeys
- Shifting destinations and transport mode
- Rethinking aviation and tourism marketing
- Switching to electric
- Enhanced use of biofuels
- Frequent flyer tax/levy



Challenges to decarbonization

- Continued dependence of oil and fallacy of techno-optimism
- Population and economic growth
- Collective sense of entitlement to status quo



State Regulation and Climate Change

- 'Ideological' role of government in regulating society
- From science to societal rules
- Legally binding 'hard' legislation aimed at reducing carbon emissions, usually with punitive measures.
- Reflective of the political norms, processes and status-qua of actors at different scales
- 'Implementation gap' results from political risk of challenging neo-liberal growth
- State regulation weakened by globalization



Edinburgh Net Zero Project

- Edinburgh's Net Zero by 2030 target (aligned with Scottish Government climate goals)
- Role of the City of Edinburgh Council
- Importance of tourism in the city economy vs. carbon impact
- Key challenge: high visitor numbers and historic built environment

Low-Carbon Transport

Expansion of electric buses and trams
Pedestrianisation and low-traffic neighbourhoods
Improved cycling infrastructure for residents and visitors

Sustainable Buildings and Accommodation

Energy-efficiency retrofits in hotels and historic buildings
Heat networks and low-carbon heating trials
Green tourism certification (e.g. Green Tourism awards)

Public Space and Events

Low-carbon festival planning (e.g. waste reduction, reusable systems)
Sustainable procurement for major tourism events

Highlands and Rural Scotland

a. Sustainable Mobility

- Investment in electric vehicle charging infrastructure
- Promotion of public transport and slow tourism
- Challenges of long distances and car dependency

b. Low-Carbon Visitor Experiences

- Eco-lodges and off-grid accommodation
- Nature-based tourism with low energy use
- Encouraging longer stays instead of short, high-impact visits

Isle of Skye

a. Community-Led Renewable Energy

- Community-owned wind and hydro projects
- Revenues reinvested into local services and sustainability

b. Tourism Management and Carbon Reduction

- Managing visitor numbers to protect landscapes
- Promotion of responsible travel messaging
- Tension between accessibility and emissions reduction

c. Key Challenges

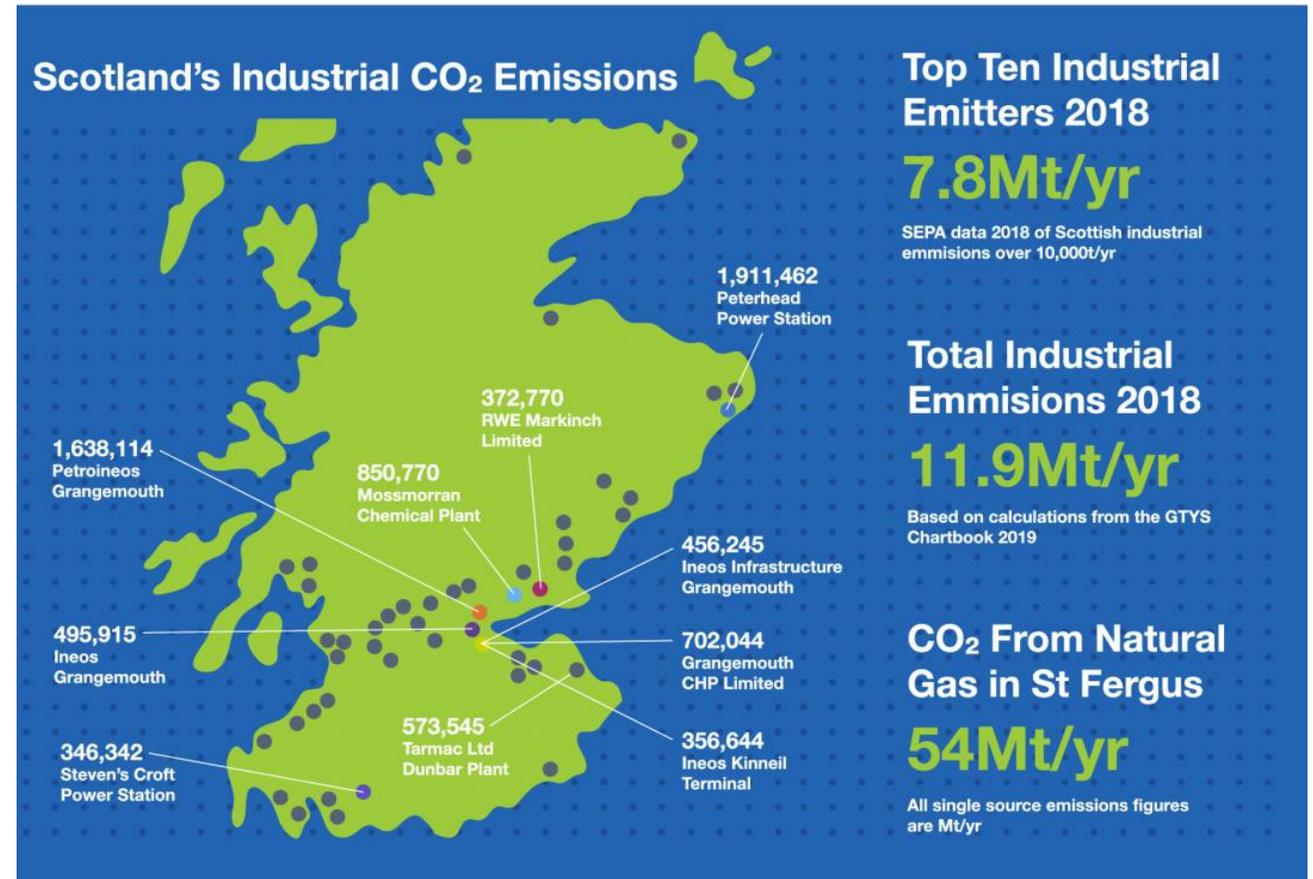
- Dependence on car and ferry travel
- Seasonal tourism peaks
- Limited infrastructure capacity

National Policies and Programmes

- Scotland's National Tourism Strategy: "Scotland Outlook 2030"
- Net Zero Nation public awareness campaigns
- Support for low-carbon tourism businesses

Low-Carbon Accommodation and Hospitality

- Carbon-neutral and net-zero hotels
- Local sourcing of food and reduced food miles
- Energy monitoring and reporting



What Scotland Is Doing Well

- Strong policy ambition and clear targets
- Integration of climate goals into tourism planning
- Community involvement, especially in rural and island areas
- Growing availability of low-carbon transport options

Remaining Challenges

- International travel emissions outside local control
- Equity issues between urban and remote destinations
- Balancing economic dependence on tourism with climate goals
- Risk of “greenwashing” vs. real emissions reduction





Scottish Government Climate Goals

- Scotland has set legally binding climate targets
- Net zero greenhouse gas emissions by 2045
- More ambitious than the UK-wide 2050 target
- Climate goals apply across all sectors, including tourism

What Does “Net Zero by 2045” Mean?

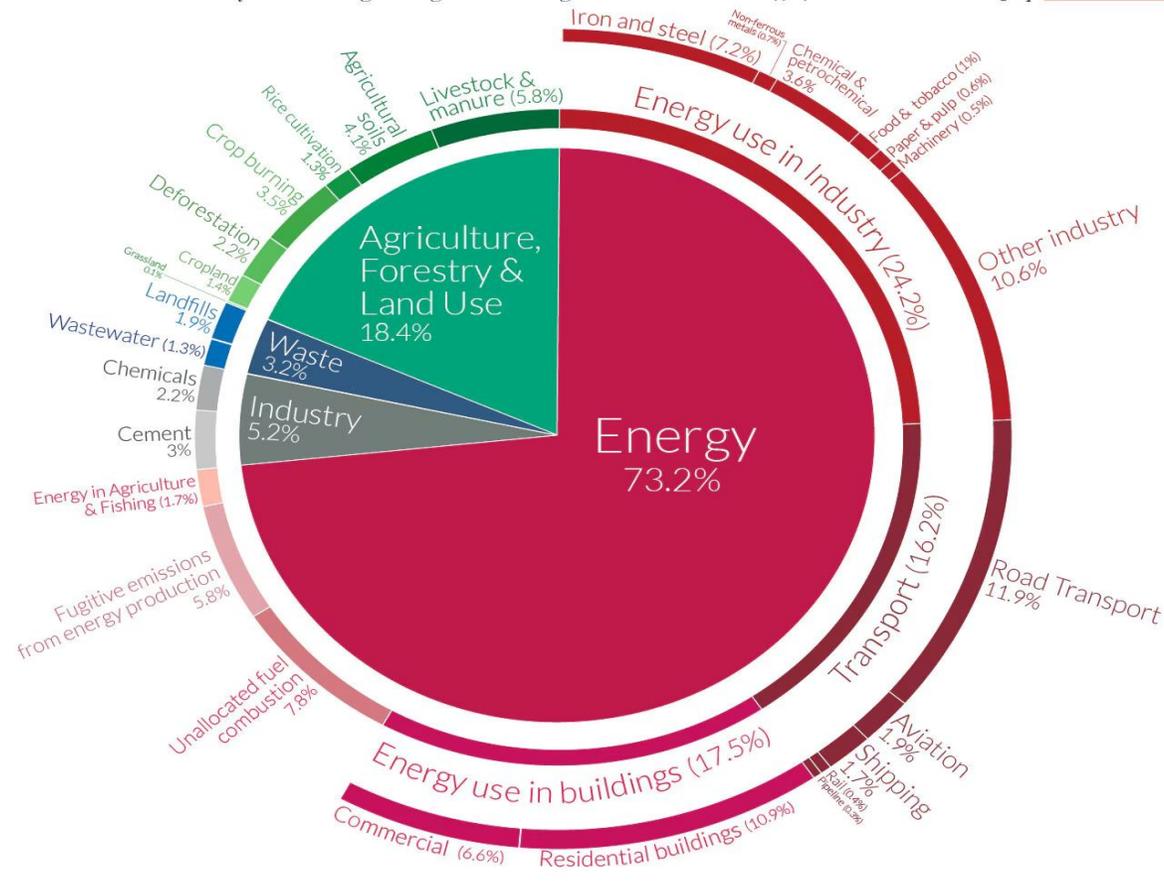
- Reduce emissions as much as possible
- Balance remaining emissions through carbon removal (e.g. forests, peatlands)
- Focus on:
 - Clean energy
 - Low-carbon transport
 - Energy-efficient buildings
- Net zero is a long-term transition, not a single action

The Scottish Government has proposed a legally binding target of net-zero greenhouse gas emissions by

2045 at the latest

Global greenhouse gas emissions by sector

This is shown for the year 2016 – global greenhouse gas emissions were 49.4 billion tonnes CO₂eq.



OurWorldinData.org – Research and data to make progress against the world's largest problems.

Source: Climate Watch, the World Resources Institute (2020).

Licensed under CC-BY by the author Hannah Ritchie (2020).

Why Tourism Is a Challenge for Net Zero

- Heavy reliance on:
 - Air travel
 - Car-based travel in rural areas
 - Energy-intensive accommodation
- Popular destinations often in remote or fragile locations
- Emissions from visitors are difficult to fully control locally

Why Tourism Also Matters for Climate Action

- Tourism can support:
 - Investment in low-carbon transport
 - Community renewable energy projects
 - Sustainable business practices
- Visitors can influence demand for:
 - Greener accommodation
 - Slower, longer stays
 - Responsible travel choices

Transport as a Major Source of Emissions in Scottish Tourism

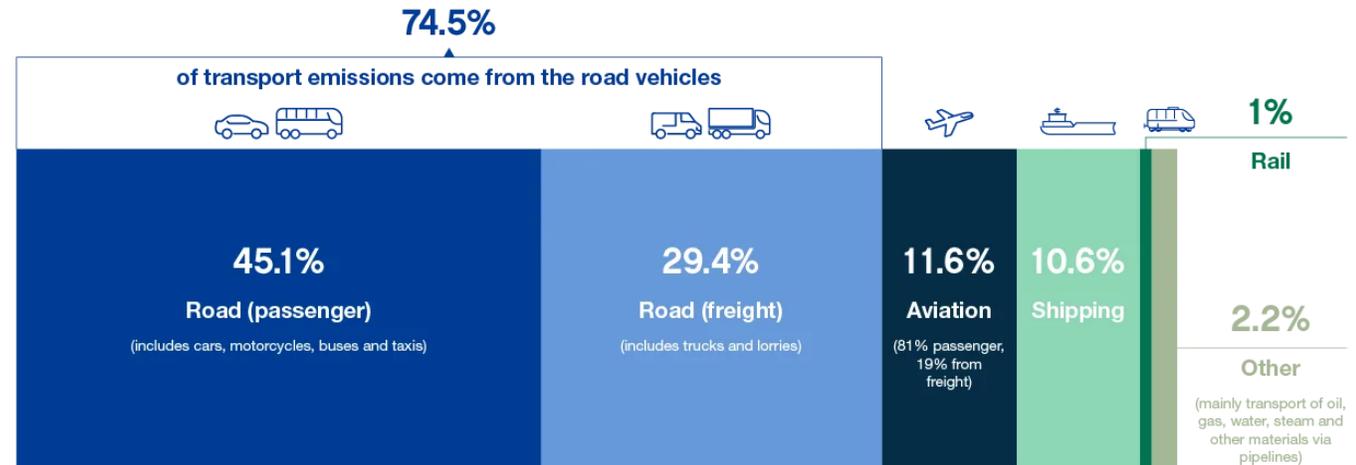
- Transport is the largest source of tourism emissions
- Scotland's geography increases travel distances
- Rural and island destinations depend on car and ferry travel
- Net zero tourism requires low-carbon transport choices
- Transport remains the hardest sector to decarbonise

Why Tourism Transport Is High-Carbon

- Visitors often travel:
 - By plane to reach Scotland
 - By car to access rural and island destinations
- Remote tourism areas have:
 - Limited public transport
 - Long travel distances
- This makes emissions harder to reduce than in urban contexts

Global CO₂ emissions from transport

This is based on global transport emissions in 2018, which totalled 8 billion tonnes CO₂. Transport accounts for 24% of CO₂ emissions from energy.



OurWorldInData.org - Research and data to make progress against the world's largest problems.
Data Source: Our World in Data based on International Energy Agency (IEA) and the International Council on Clean Transportation (ICCT).



- We are not yet on track to reach net zero by 2050 – commitments fall short, and it is likely that emissions will increase by 14% by 2030, compared to 2010 levels
- National governments, the largest emitters, need to do more
- At the same time, there is ongoing debate as to whether 1.5 targets are enough to counter the climate emergency



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