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Climate Literacy 101

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SMALL BUSINESS CHARTER

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Introduction

- Dr Petra Molthan-Hill is Co-Chair of the United Nations Principles for Responsible Management Education (PRME) Working Group on Climate Change and Environment.
- She works as a Professor of Sustainable Management and education for Sustainable Development (ESD) at Nottingham Business School, Nottingham Trent University, UK.
- Petra is an international multi-award-winning expert for Climate Change Mitigation Tools, Greenhouse Gas Management & ESD and leads the 'Climate Literacy Training for Educators, Communities, Organizations and Students' (CLT-ECOS) distributed worldwide in collaboration with QS Impact and UN PRME.
- She has worked with organizations, from SMEs to the NHS, on how to reduce GHG emissions and lead author of the 'Handbook of Carbon Management. A Step-by-Step Guide to High-Impact Climate Solutions for Every Manager in Every Function '.

More info

Agenda

- Defining key terms such as Net Zero and Carbon Dioxide Equivalent
- Greenhouse Gases and Greenhouse Effect
- Carbon Sinks

And Climate Solutions

Halve CO_2 emissions by around 2030

In order to limit global warming to 1.5°C, the IPCC stresses that the world needs **to halve CO_2 emissions by around 2030** and reach Net Zero CO_2 emissions by mid-century.

In addition, the IPCC emphasises ***the need for deep reductions in non-CO_2 emissions across the economy*** to achieve this limit.

CDP (2020) *Foundations for science-based net-zero target setting in the corporate sector:* p5

Net Zero

Do our best, remove the rest!

Swiss Re

The IPCC defines Net Zero as that point when "anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period".

The Paris Agreement sets out the need to achieve this balance by the second half of this century.

CDP (2020) Foundations for science-based net-zero target setting in the corporate sector: p5

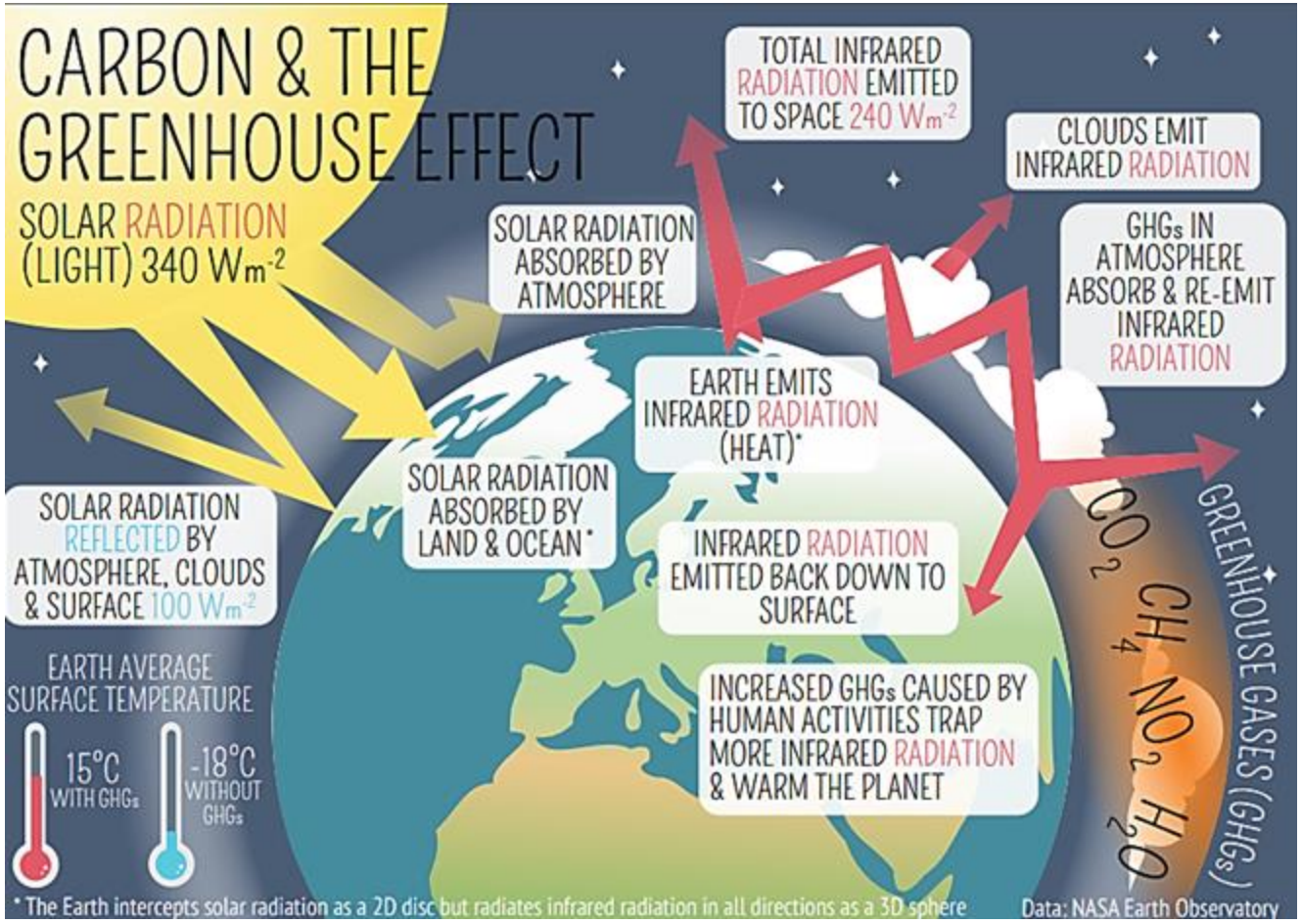
More info:

- https://www.youtube.com/watch?v=gOo8okqpBGE
- https://drawdown.org/solutions/net-zero-buildings

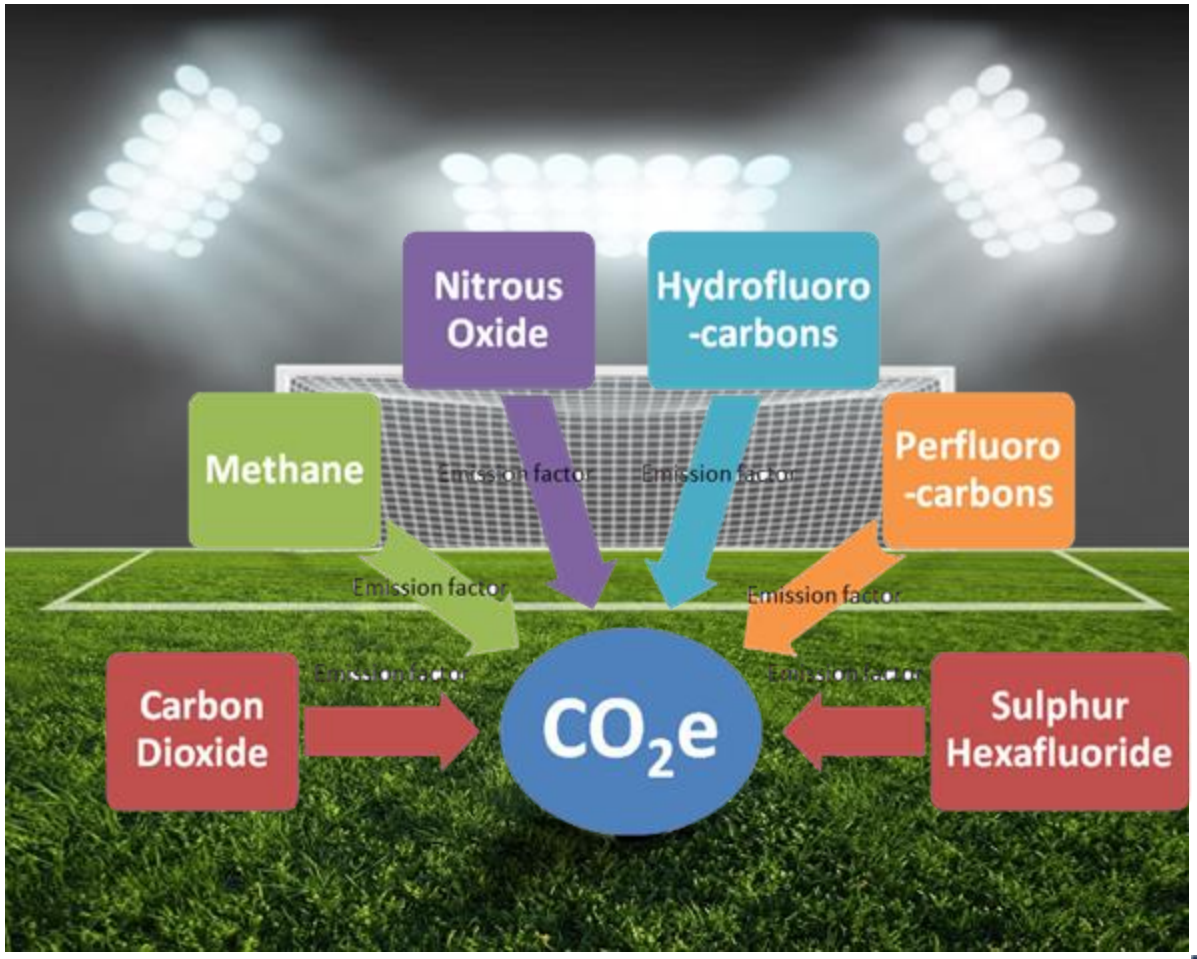
The Greenhouse Effect

https://www.youtube.com/watch?v=G4H1N_yXBiA

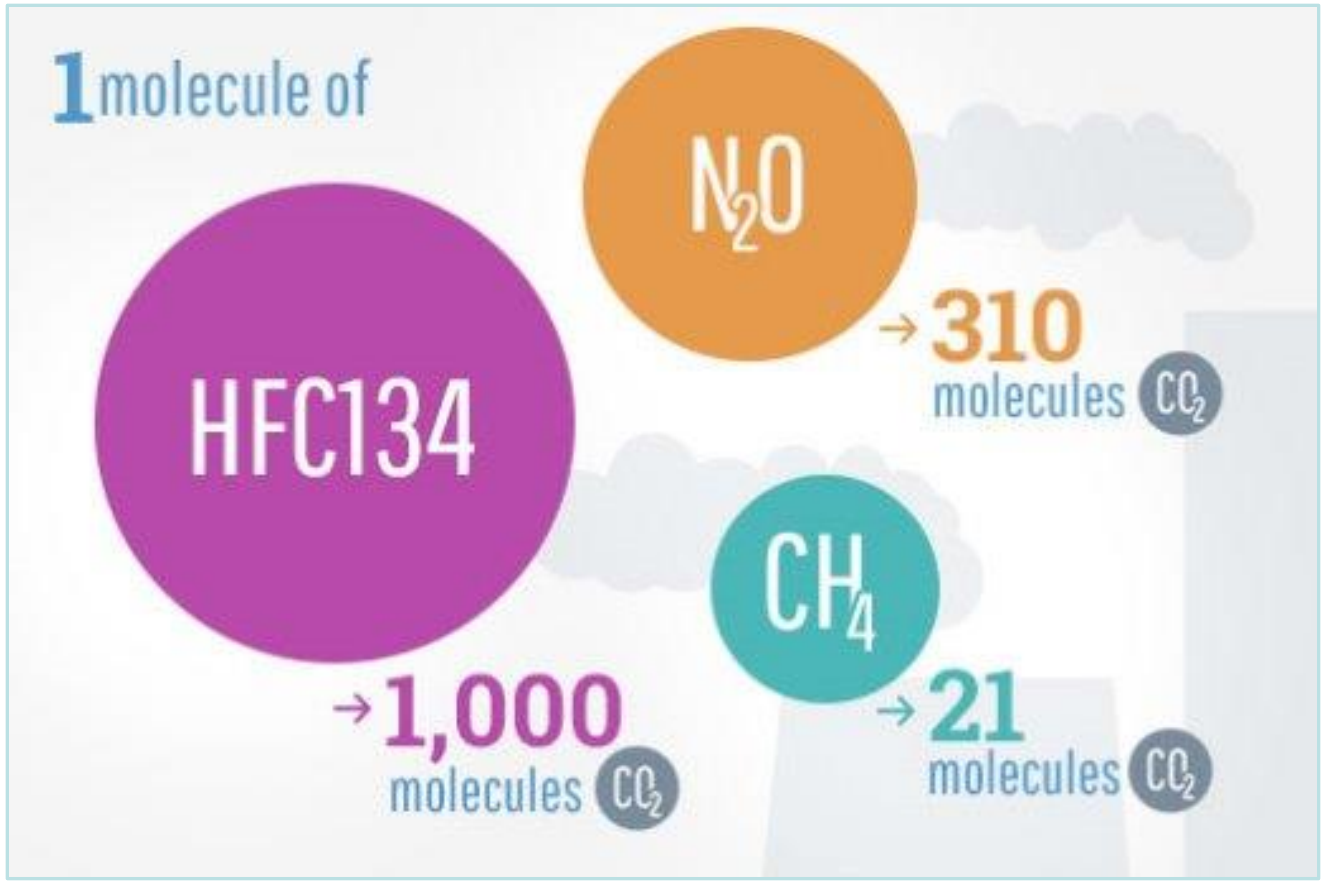
The Greenhouse Effect



Greenhouse Gases and Carbon Dioxide Equivalent



Other Greenhouse Gases



Other greenhouse gases have very high global warming potential (GWP)

Refrigerant gases: CFCs, HFCs

Methane

How much is too much?

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Climate Change Mitigation (Education)

Developing values, knowledge and skills required to make choices and decisions that minimize the use of natural resources, emissions, waste and pollution; while contributing to the development of new solutions to the climate crisis (e.g., rethinking the way we live, buy and consume, how our daily lives are organized, how we socialize, exchange, share, educate and build identities).

Taking individual and/or collective action with the potential to have immediate, direct impact (e.g., reducing energy consumption, using non-polluting and renewable energy sources, environmental conservation, re-forestation and re-greening).

Contributing to policy development with long-term positive impact on societal behaviour by examining economic systems, social structures, cultural patterns, lifestyle expectations, consumerism, wealth distribution, aspirations and value systems and their underlying responsibility for excessive greenhouse gas production.

Table published in: Molthan-Hill, P et al (2021), *Climate change education at universities: Relevance and strategies for every discipline.* in: Handbook of Climate Change Adaptation and Mitigation (3rd edition), Springer: Cham, Switzerland. Adapted from definitions provided by Mochizuki Y, Bryan A (2015) Climate change education in the context of education for sustainable development: Rationale and principles. Research 9(1): 4-26.

Possible policies to reduce emissions

Read more:

- https://www.science.org/doi/10.1126/science.adl6547
- https://www.nature.com/articles/s41558-019-0419-7
- https://www.dw.com/en/why-us-oil-boom-is-not-helping-regular-people/a-71674471

- Increasing renewables e.g. solar if ‘hot’ country
- Changing diets and reduce (food) waste
- Energy efficiency of AI and data centres
- Green public transport, cycling and walking
- ‘Jet zero’, zero emission vehicles and green ships
- Greener buildings
- Green finance and innovation

So one solution is to incentivise buying electric cars?!

To travel 412 miles or 663 km

- Bike 30 kg CO_2e
- Coach 40 kg CO_2e
- Train 64 kg CO_2e
- Small electric car (driver only) 148 kg CO_2e
- Small efficient petrol car (driver only) 237 kg CO_2e
- Plane 368 kg CO_2e
- Large SUV (driver only) 1.02 tonnes CO_2e

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Embodied carbon of **25 tonnes CO_2e** Range Rover Sport HSE (Calculation by Mike Berners-Lee (2020) *How bad are bananas?* Page 145)

High emitting countries: Canada uses **15.50 tonnes of CO_2 emissions** per capita (EU 6.42; US 15.24)

Low emitting countries: Bangladesh at **0.51 tonnes of CO_2 emissions** per capita (Brazil 2.04; Kenya 0.36)

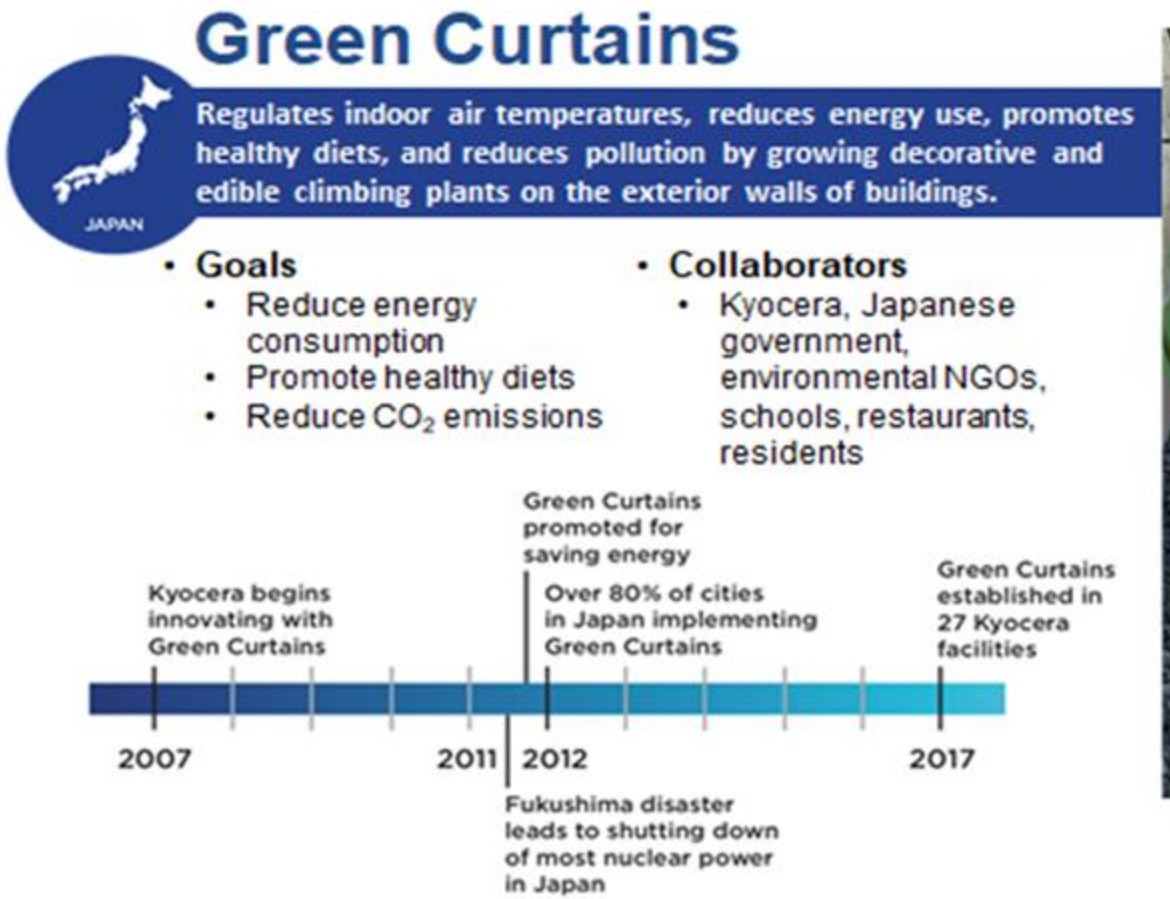
Solutions:

Policies incentivising SMALL electric cars!

And/or bicycles and/or public transport

And/or Car Sharing

Case Studies: Japan



MULTISOLVING INSTITUTE

More: https://www.multisolving.org/wp-content/uploads/2022/05/Green-Curtains.pdf

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QS impact

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Project Drawdown

An excellent resource to familiarize yourself with the solutions and pathways to get us to Net Zero
https://www.drawdown.org

Their aim is to showcase the solutions that will help use to literally draw down the global temperature. In their own words, they describe themselves as conducting an: “ongoing review and analysis of practices and technologies that are able to reduce greenhouse gas concentrations in Earth’s atmosphere”

Project Drawdown focuses on solutions that are:

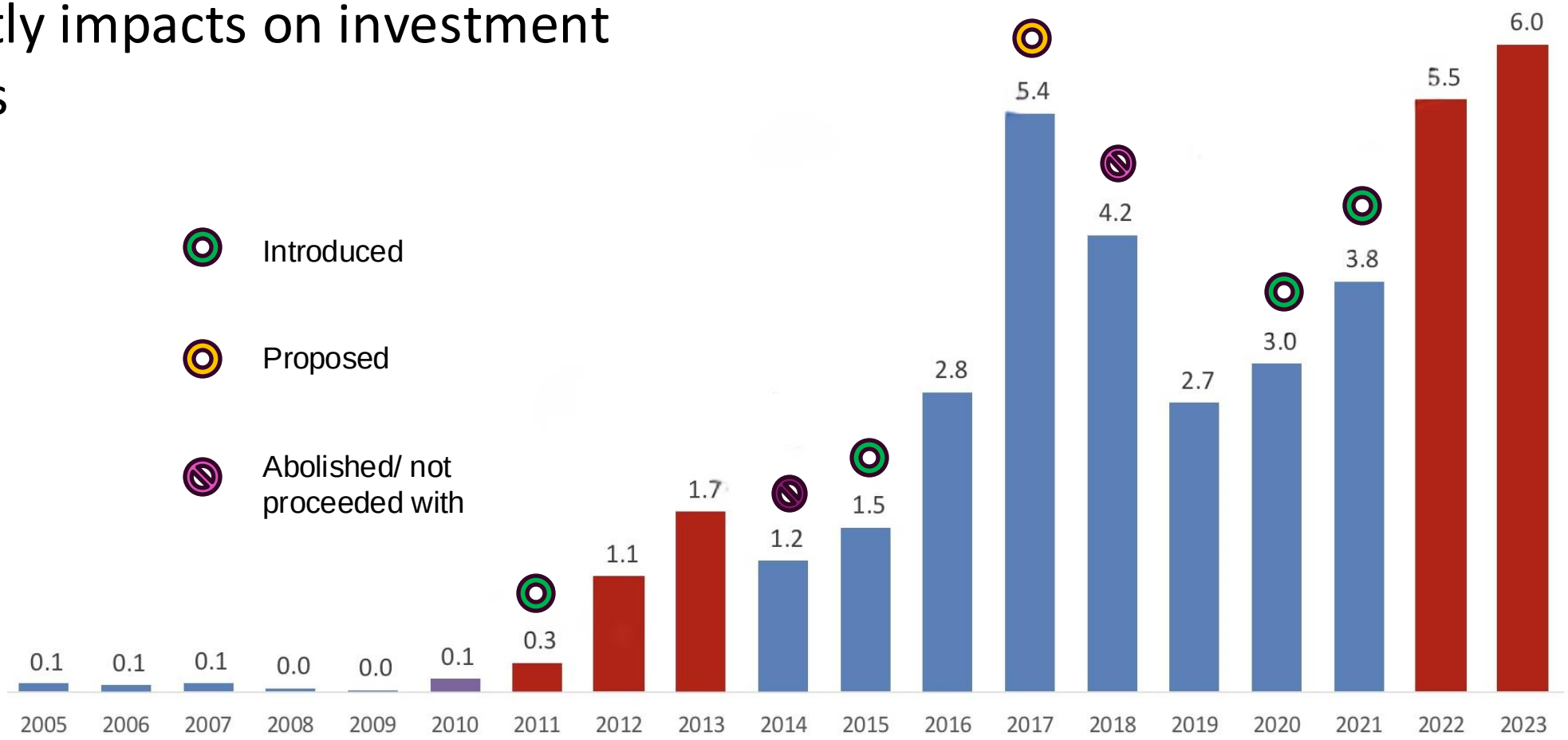
- currently available, growing in scale, financially viable
- able to have a net positive impact

Each solution reduces greenhouse gases by avoiding emissions and/or by sequestering carbon dioxide already in the atmosphere.

https://drawdown.org/solutions

Government policy - certainty matters

Changes in Australian government policies directly impacts on investment in renewables

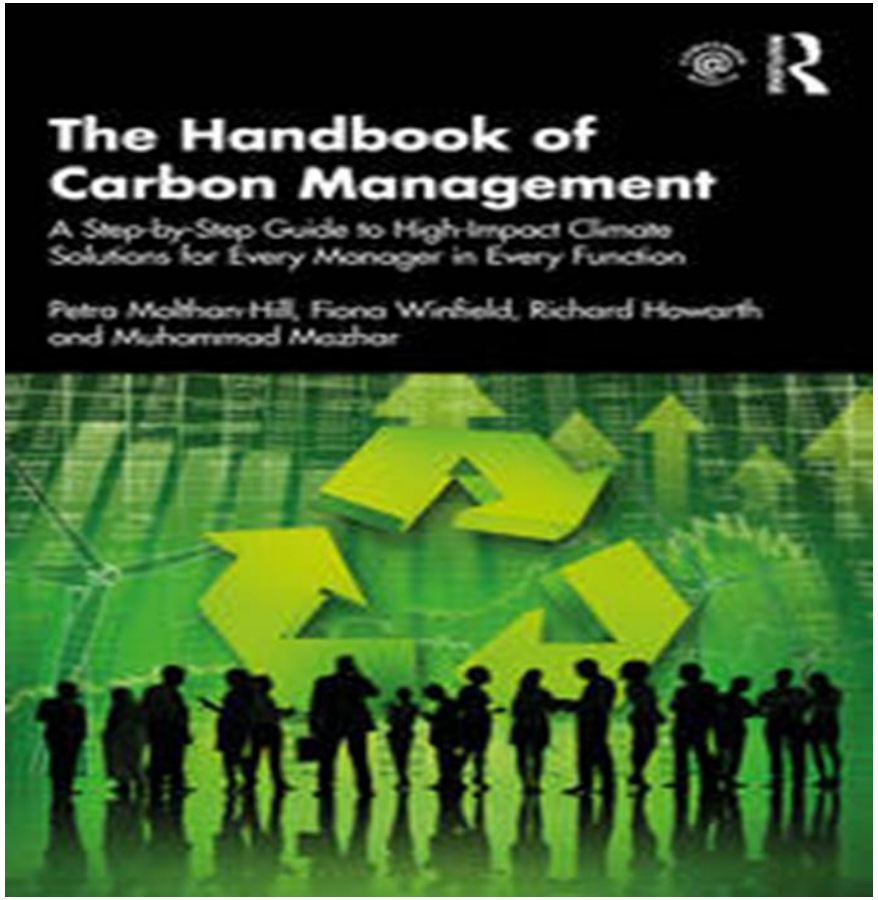


Source: Adapted from SusanMcKinnon Foundation working draft 2024

More ideas that could become national policies…..or change behaviour in your institution/home

The Handbook of Carbon Management: A step-by-step guide to high-impact climate solutions for every manager in every function (Routledge)

Book link is here



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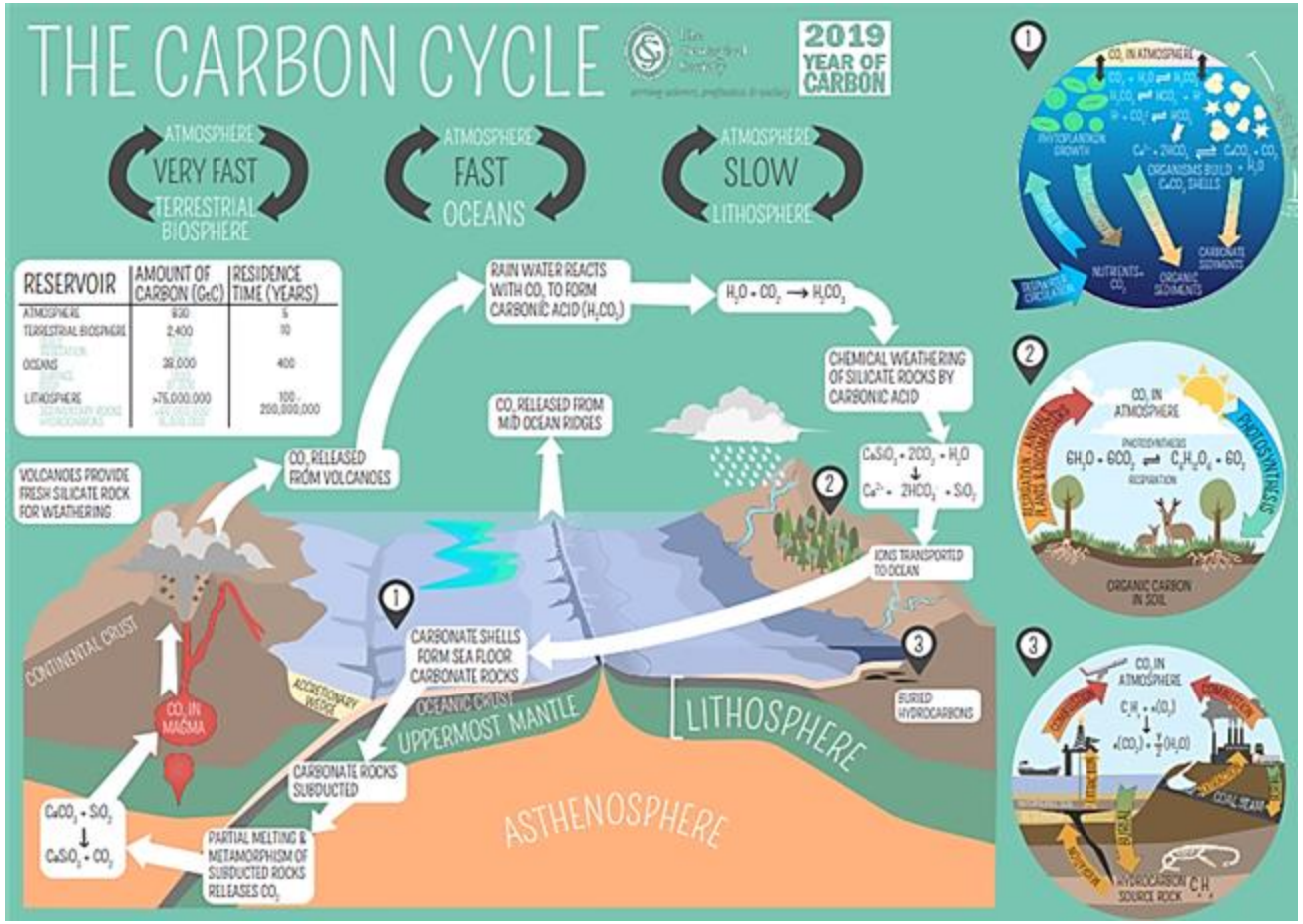
Natural Carbon Cycle And Sinks



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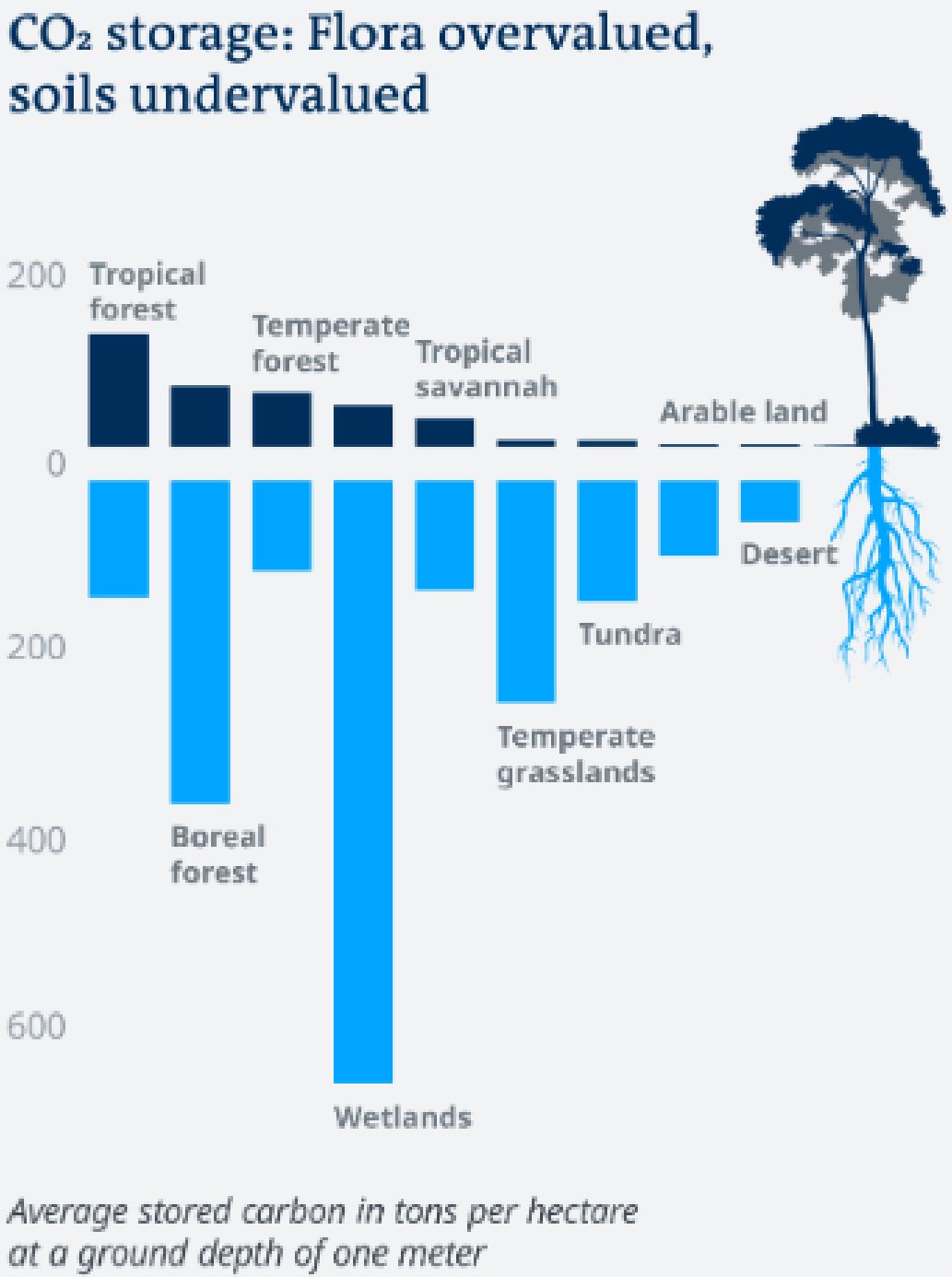
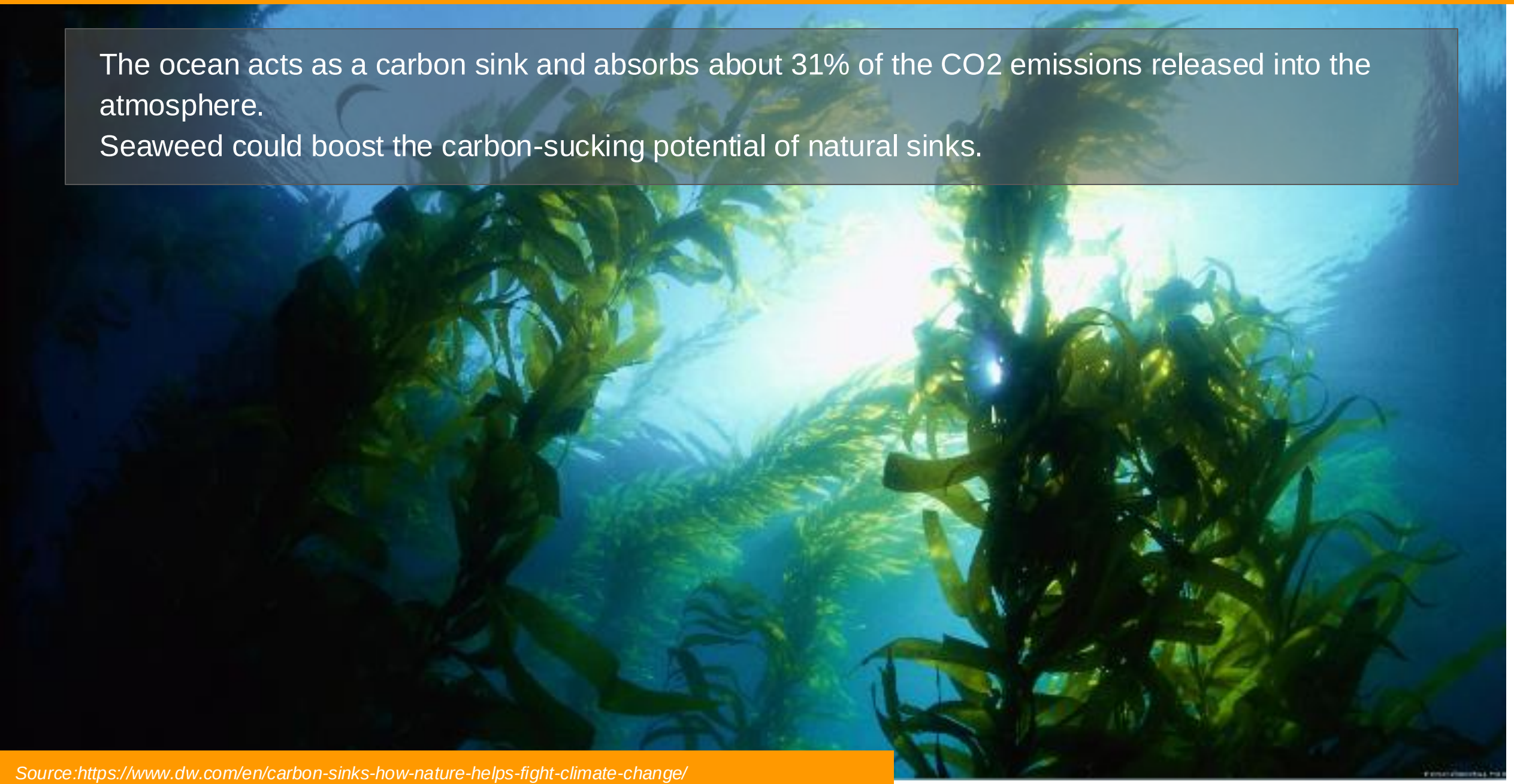


Soil does not absorb CO2 as quickly, but it outperforms vegetation in the amount it stores. Globally soil contains almost twice as much CO2 as living flora and the atmosphere combined.

https://www.dw.com/en/carbon-sinks-how-nature-helps-fight-climate-change/a-59835700

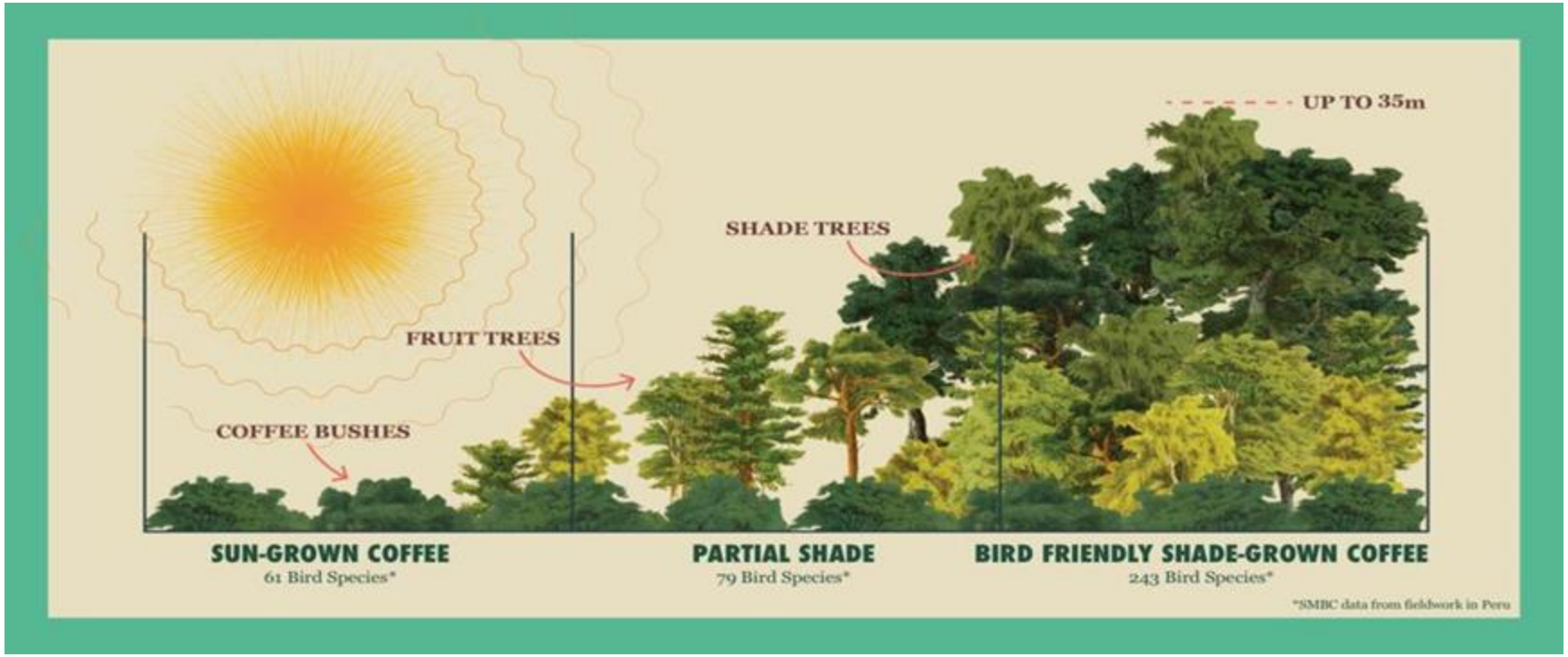
The Unsung Heroes of Climate Action



The ocean acts as a carbon sink and absorbs about 31% of the CO_2 emissions released into the atmosphere.
Seaweed could boost the carbon-sucking potential of natural sinks.

Source:https://www.dw.com/en/carbon-sinks-how-nature-helps-fight-climate-change/

One example: Shade-Grown Coffee (carbon sink)



The difference between shade-grown and certified bird-friendly shade-grown coffees.

(Credit: Smithsonian Migratory Bird Center / CC0)

SMITHSONIAN MIGRATORY BIRD CENTER VIA A CREATIVE COMMONS LICENSE

Shade-Grown Coffee e.g. Bird & Wild

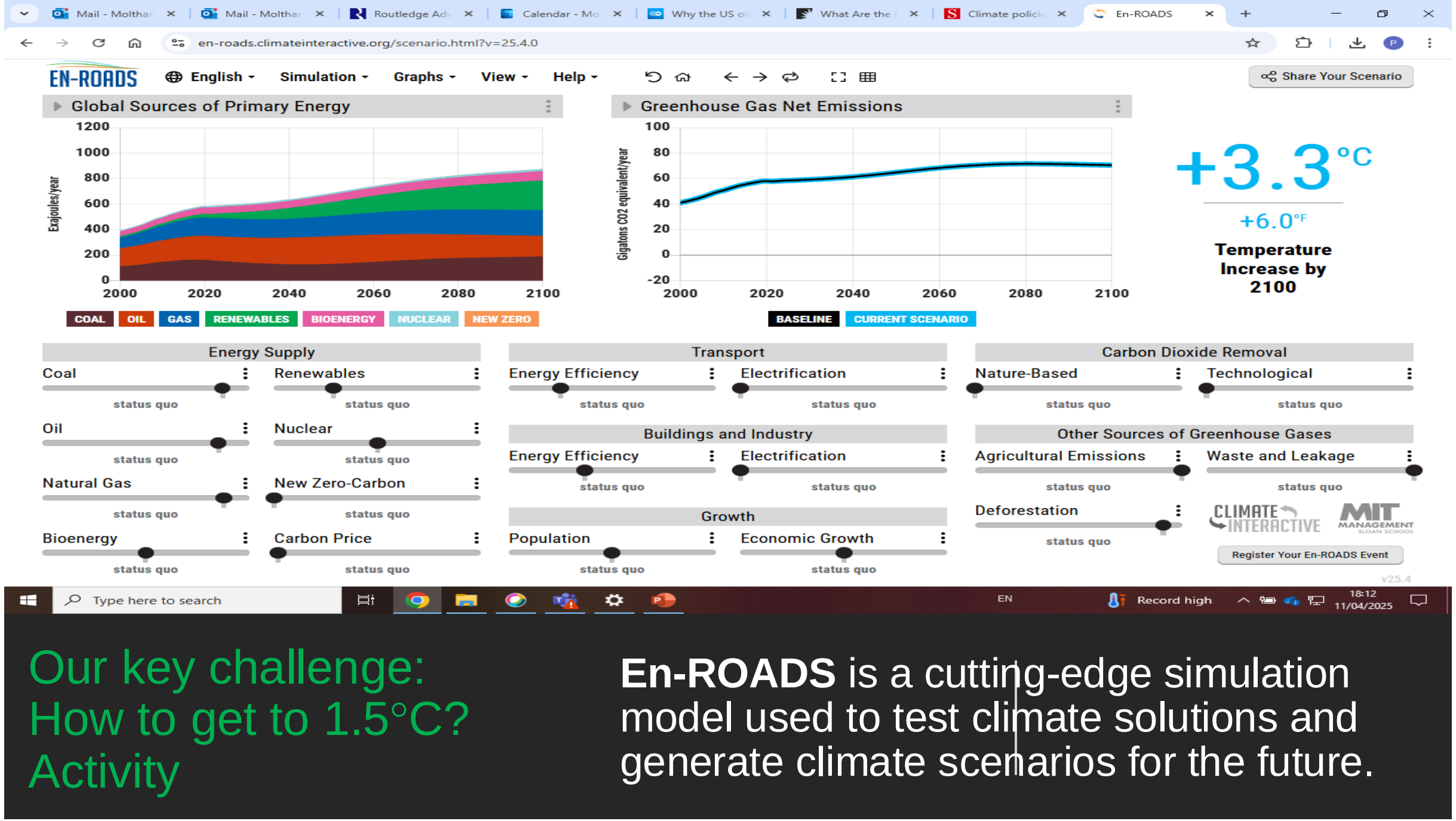
From small to big changes

- Use this coffee in your office and at home
- Offer this coffee in your organisation
- Develop national policies that support the import of shade grown coffee or if you are a coffee growing nation, develop subsidies etc. to support changes

- Sequester soil carbon
- Reduce soil erosion
- Provide habitat

- Stopped deforestation
- Water overconsumption

https://birdandwild.co.uk/

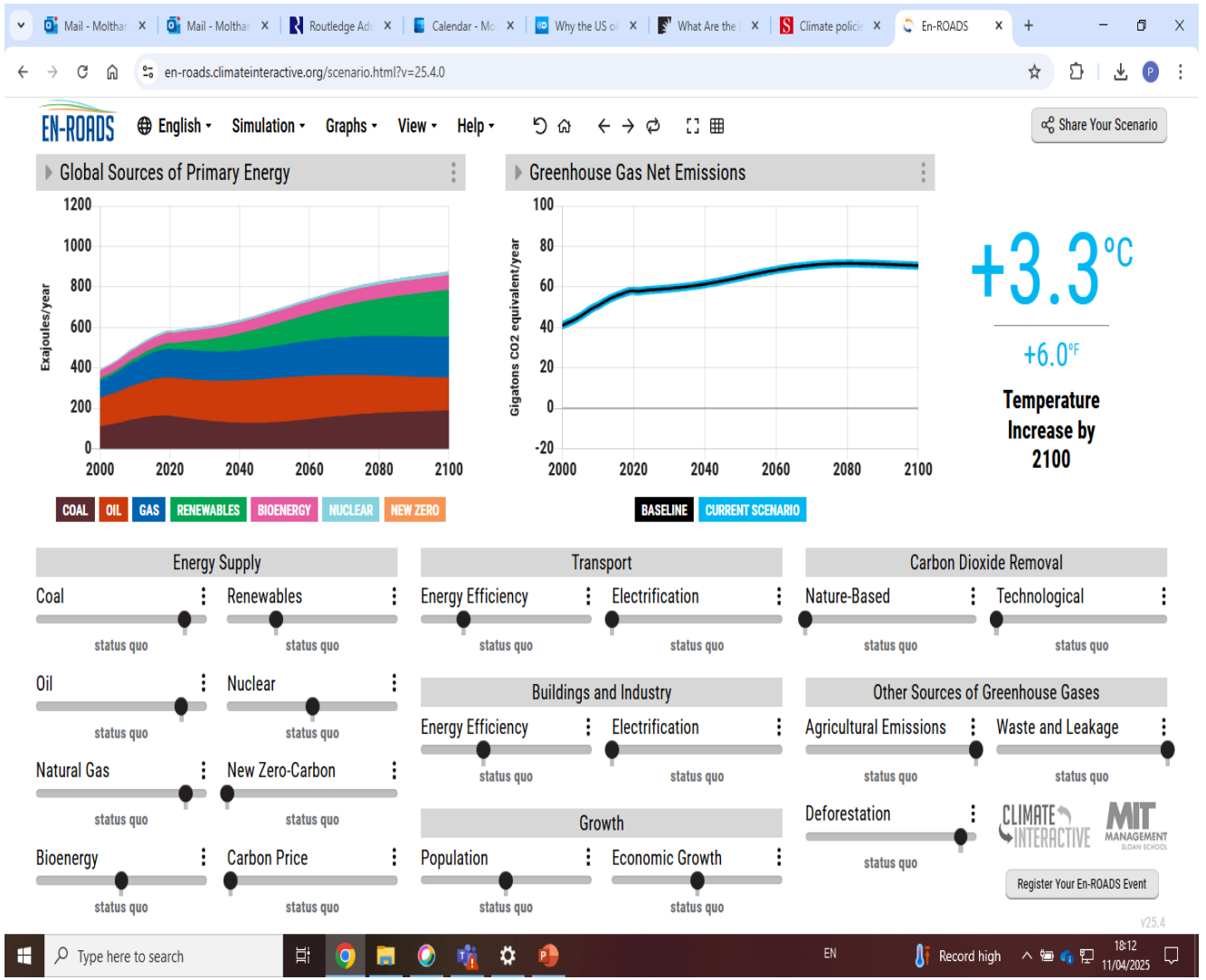


Our key challenge: How to get to 1.5°C? Activity

En-ROADS is a cutting-edge simulation model used to test climate solutions and generate climate scenarios for the future.

Our key challenge: How to get to 1.5C? Activity

- https://en-roads.climateinteractive.org/scenario.html?v=25.4.0

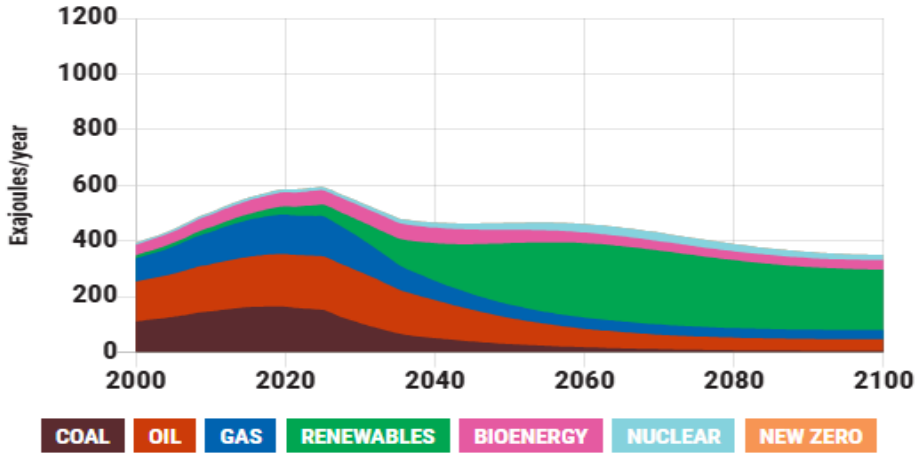


Mail - Molthar | Mail - Molthar | Routledge Adv | Calendar - Mo | Why the US oil | What Are the E | Climate policie | En-ROADS

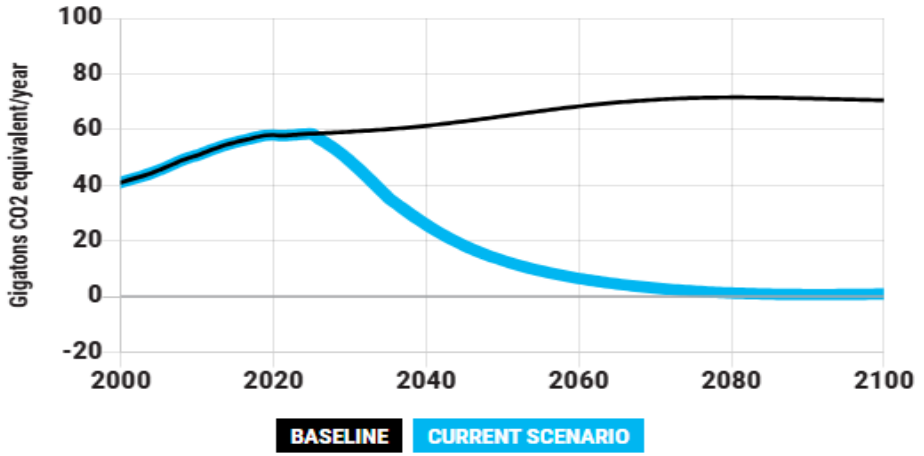
en-roads.climateinteractive.org/scenario.html?v=25.4.0&p39=250&p47=5&p50=4.8&p373=50&p375=50&p60=97&p417=97&p61=100&p57=-10&p67=100

EN-ROADS English Simulation Graphs View Help Share Your Scenario

Global Sources of Primary Energy



Greenhouse Gas Net Emissions



+1.5°C

+2.7°F

Temperature Increase by 2100

Energy Supply

Coal: status quo
Renewables: status quo
Oil: status quo
Nuclear: status quo
Natural Gas: status quo
New Zero-Carbon: status quo
Bioenergy: status quo
Carbon Price: very high

Transport

Energy Efficiency: highly increased
Electrification: highly subsidized

Buildings and Industry

Energy Efficiency: highly increased
Electrification: highly subsidized

Growth

Population: status quo
Economic Growth: status quo

Carbon Dioxide Removal

Nature-Based: high growth
Technological: high growth

Other Sources of Greenhouse Gases

Agricultural Emissions: highly reduced
Waste and Leakage: highly reduced
Deforestation: highly reduced

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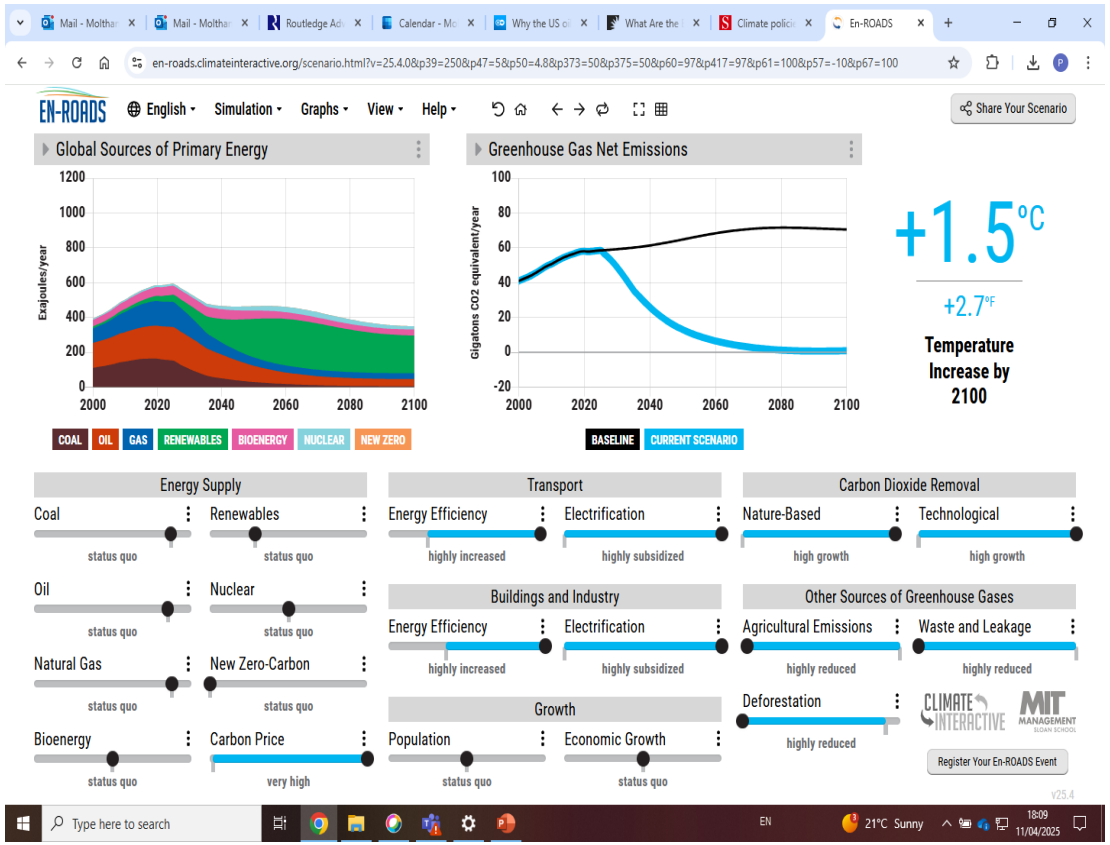
Register Your En-ROADS Event

v25.4

Type here to search | EN | 21°C Sunny | 18:09 11/04/2025

Solutions from En-ROADS



Big changes will be achieved by:

- Increasing energy efficiency and electrification in transport, buildings and industry.
- Reducing Methane e.g. by reducing food waste.
- Increasing natural carbon capture as much as possible, including stopping deforestation and increasing afforestation.
- Agreeing on a carbon price.
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John Doerr, Venture capitalist and New York Times number-one bestseller author

Speed & Scale: A Global Action Plan for Solving our Climate Crisis Now

- Reduce our current worldwide emissions of 59 gigatons (GT) to 27 gigatons.
- Objectives and Key Results (OKRs) to do so; his ***top-line OKR is to reach net-zero emissions by 2050 – and to get halfway there by 2030, a critical milestone.***

In order to achieve a reduction worldwide by decarbonizing the grid, from the current 27 GT to 3 GT by 2050, John Doerr has chosen for example the following key results (plus 5 more to decarbonize the grid):

- **KR 2.1 Zero Emissions** – 50% of electricity worldwide comes from zero-emission sources by 2025, 90% by 2035 (up from 38% in 2020). This would reduce 16.5 GT.
- **KR 2.2 Solar and Wind** – Solar and wind are cheaper to build and operate in 100% of countries in 2025 (up from 67% in 2020).

Australian governments & cleaner vehicles

- 2022 National Climate Change Act – new Vehicle Efficiency Standards came into effect on 1 January 2025 for new passenger and light commercial vehicles
- Several Australian states offer incentives for electric vehicle adoption
- NSW Government has committed to transitioning its fleet to electric
- May 2025 National election – Opposition has committed to winding back on Vehicle Efficiency Standards, even though new standards are still well below EU, UK and many other countries

Denmark – parties united in action

- Local carbon atlas to help local authorities (Kommune) forecast and plan mitigation actions: Danmarks Meteorologiske Institut (in Danish)
- The Climate Act (2020, amended in 2021): sets emission target - 70% (2030) (-40 %, 2021), climate neutrality by 2050, reduction of CO2 emissions from plastic waste – climate council expanded, fund doubled – reporting obligations, climate policy on imports and consumption *(Source: LSE)*
- Council on Climate Change: advises on how Denmark can most effectively and cost-effectively undertake the transition to a low-carbon economy by 2050
- National Adaptation plan and strategy
- Building networks / Collaborations: State of Green: Green transition in Denmark
- Global Climate Action Strategy: increase global climate ambition, reduce global CO2, strengthen focus on climate adaptation and sustainable development, shift financial flows from black to green, collaborate between sectors on green solutions. *(Source: Danish Government Global Climate Action Strategy)*

Want to learn more?

Improve your general climate literacy by yourself

Free online course with
[Future Learn]

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Or get a Carbon Management Certificate
Designed with Stephen Snider, Harvard alumnus

https://charteredcertifications.com/learning/courses/ccml

Please send this Referral Code to anyone who might be interested, so they will enjoy a special 10% discount when registering to this program with this Coupon Code:

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Certified Carbon Management Leader (CCML)

Petra Molthan-Hill and Stephen Snider

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an initiative of the UN Global Compact

Or get expertise through a master's module

Climate Solutions for a Net Zero Future

Discover climate solutions you can implement in your industry, workplace, or household to help achieve a net zero future.

Master's level, 10 credits or just for fun, you can join any time…..

More info here:

https://www.futurelearn.com/microcredentials/climate-solutions-for-a-net-zero-future

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Thank you

Want to find out more?
Please contact Prof Dr Petra Molthan-Hill

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https://www.linkedin.com/in/petra-molthan-hill-b9909720/