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Inspiration and insight to change
minds and policy

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Carbon Literacy Training

Play your cards right! A different way to teach climate change

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Presented by Dr Petra Molthan-Hill and Vanessa Odell

**NOTTINGHAM
BUSINESS SCHOOL**
Nottingham Trent University

Introduction

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- Why not just sustainability?
- Am I currently carbon illiterate?
- Why us? Why now?
- Training follows wide success in the television and film industry
- It all began in Manchester...



Carbon Literacy
Project



MediaCityUK



Introduction

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- The definition of Carbon Literacy is: -

“An awareness of the **carbon dioxide costs** and impacts of everyday activities and the ability and motivation to **reduce emissions** on an individual, community and organisational basis”.

- This module teaches the fundamental science behind climate change.
- A role-specific module will be available shortly.
- The Standard requires one day of training.

Aims

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The training contains two parts:

Fundamentals

Part 1: the problem

- Explore the challenge of climate change, how it affects the planet and how it can be prevented

Part 2: the solutions

- Discuss the ways that we are already taking action as individuals and in organisations
- Make a commitment to change something as an individual and within the context of the Business School

Role-specific module

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Accounting

Operations

Marketing

Procurement

Entrepreneurship

Strategy

- A role-specific module (TBA)
- Practical measures to reduce carbon
- Support from stakeholders and managers
- Senior sponsorship
- Reduce carbon footprint of organisation
- Knowledge to embed in future role
- Communication

Why are we here?

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Innovation

Efficiency

**Business
Continuity**

Reputation

**Why is this relevant in
the context of a
business school?**

Legislation

Ethics

Differentiation

Profit

Willful denial?

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What do I *really* believe?

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**Political
preferenc
e**

**Private Vs
Personal
persona**

**It's too
complicated**

It's too late!

**Fake
News**

**Confusing
science**

**Time
constraint
s**

**“They”
will fix it**

**Financial
constraint
s**

**Bystander
Effect**

**We've
solved more
complex
issues
before**

**It doesn't
match my
world view**

**It's not my
job**

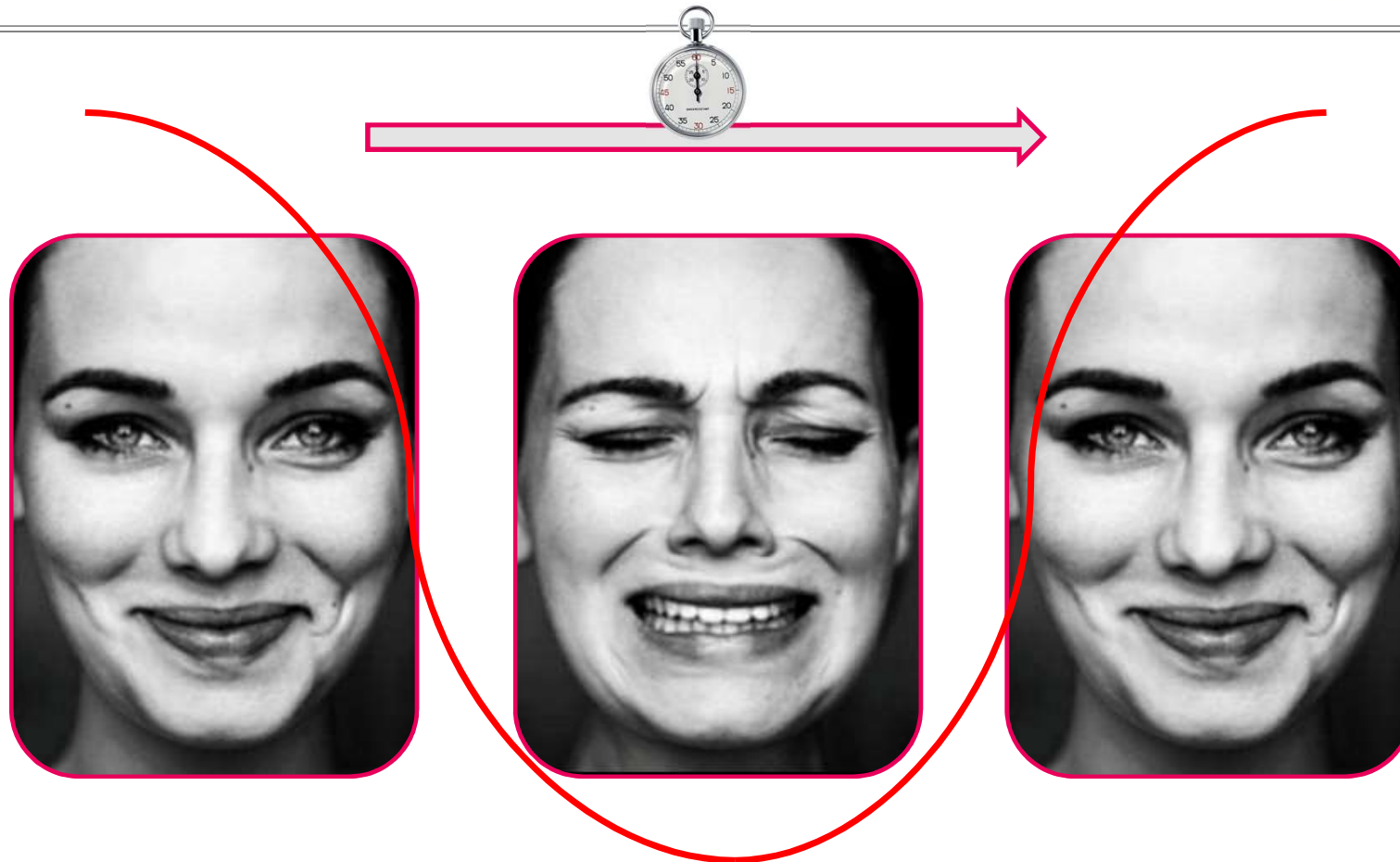
**I'm just one
person**

This might not be easy...

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Do we know what we know (we know)?

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- Everyone on their feet!
- Please place yourself on a line to answer the following questions:

How well do you understand climate change?

Do you believe your organisation can benefit by reducing climate change?

How motivated are you to reduce climate change?

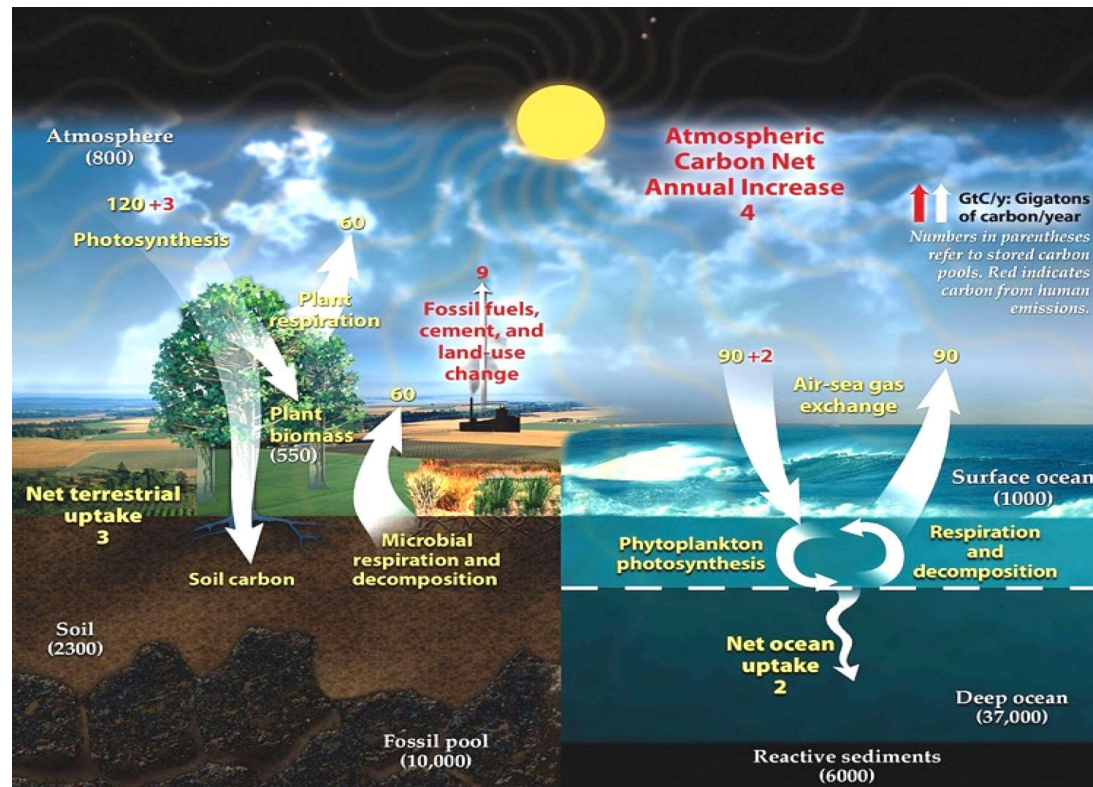


Natural carbon cycle

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>400ppm are highest recorded levels

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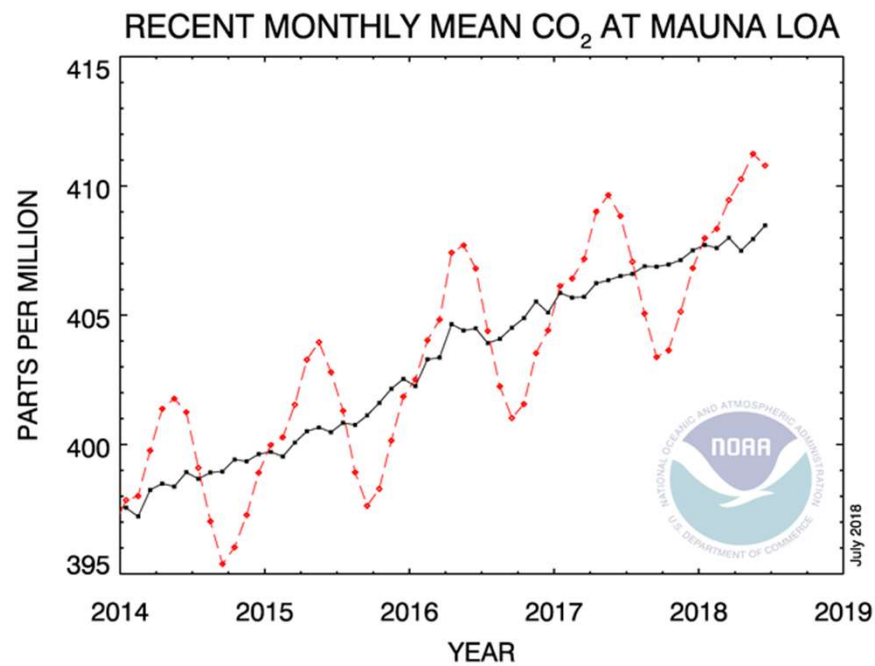
How scientists measure carbon dioxide

CO₂ levels rising

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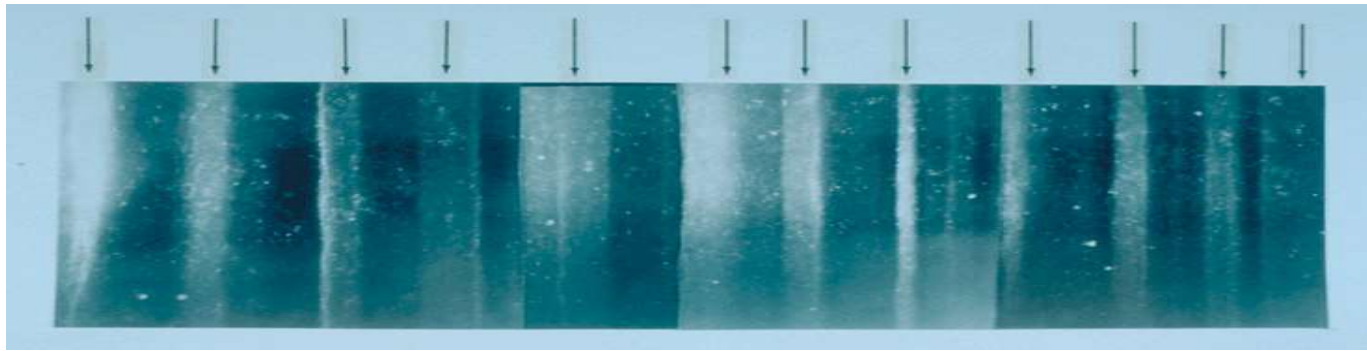


410ppm are highest recorded levels

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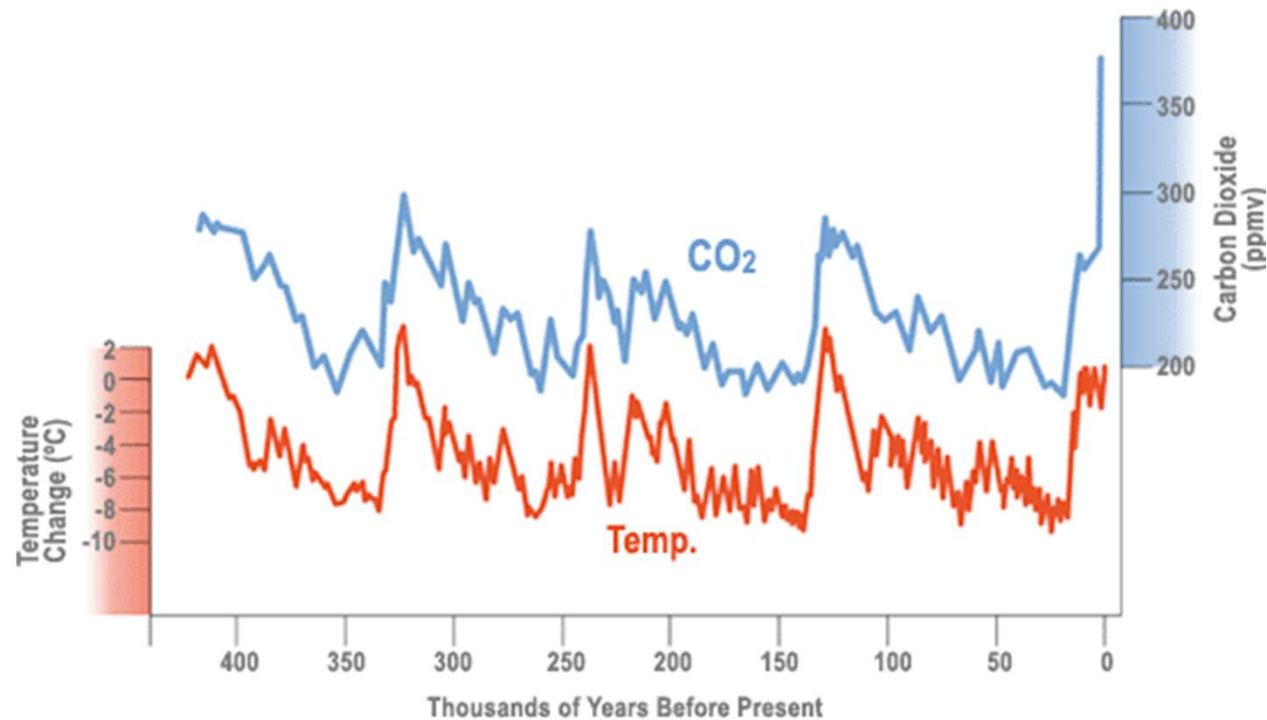
**Ice cores reveal
historic levels of CO₂**

410ppm are highest recorded levels on record.

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Parts per million carbon dioxide

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BUSINESS INSIDER UK **TECH**

The amount of carbon dioxide in the atmosphere just hit its highest level in 800,000 years, and scientists predict deadly consequences

Kevin Loria Jun. 12, 2018, 3:22 PM **4,916**

[FACEBOOK](#) [LINKEDIN](#) [TWITTER](#) [EMAIL](#) [PRINT](#)

Follow Business Insider: [Like](#) Daniel Alexis-Rochefort and 2.7M others like this.

(PPI Free Check Quotes) (Money Advice Club)
(Laalk Eyes) (Clinic Compare Quotes)

- The average concentration of **carbon dioxide** in Earth's atmosphere topped 411 parts

SCIENTIFIC AMERICAN English - Cart

We Just Breached the 410 PPM Threshold for CO₂

Carbon dioxide has not reached this height in millions of years

By Brian Kahn, Climate Central on April 23, 2017

Storror's first was crossing from Europe to Asia by parkour. Bring your next story to life with Canon.

[LEARN MORE](#)

Canon
Live for the story.

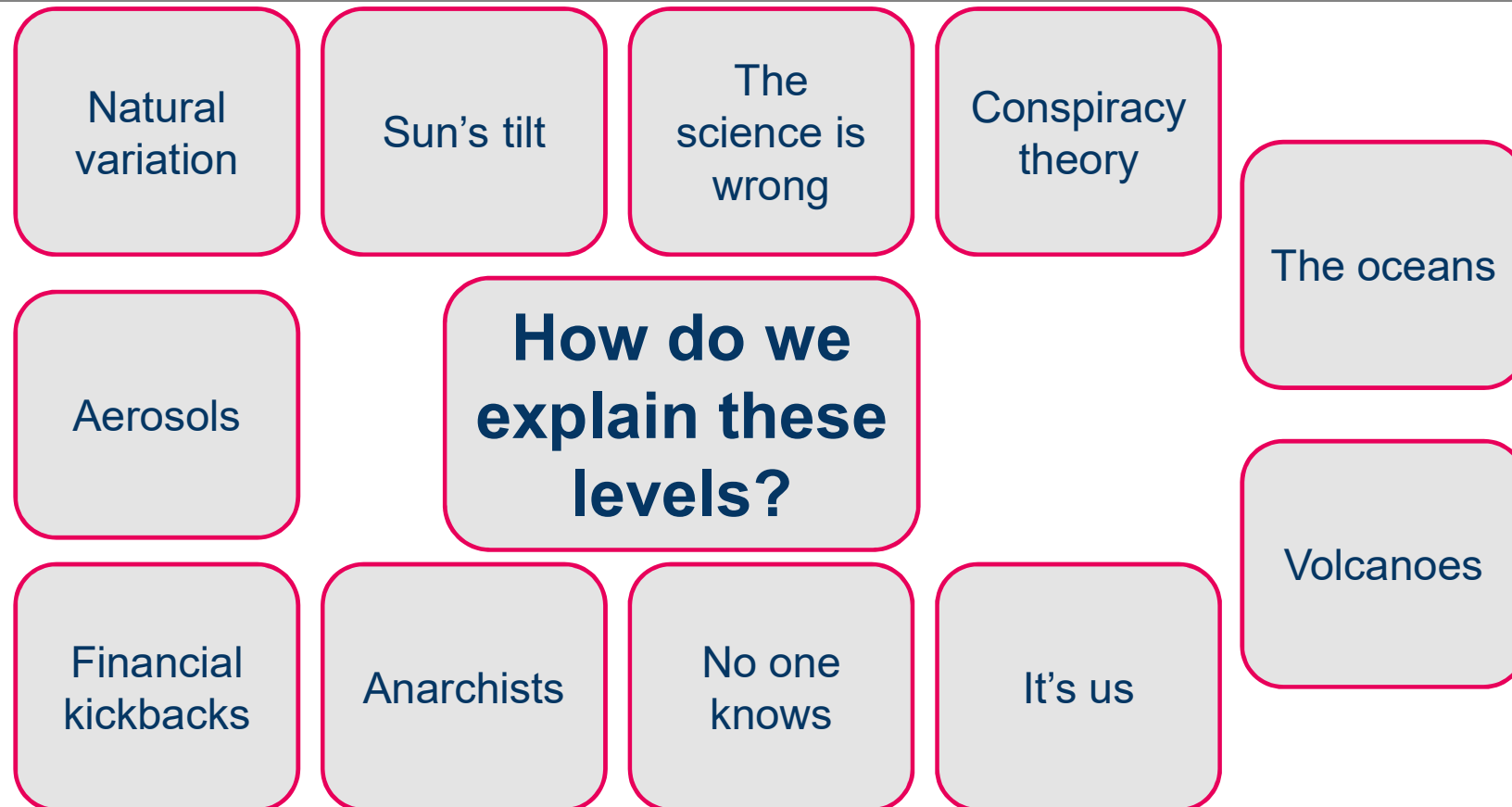
410 ppm
(Parts per Million)

Why are we seeing such high concentrations?

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Anthropogenic climate change

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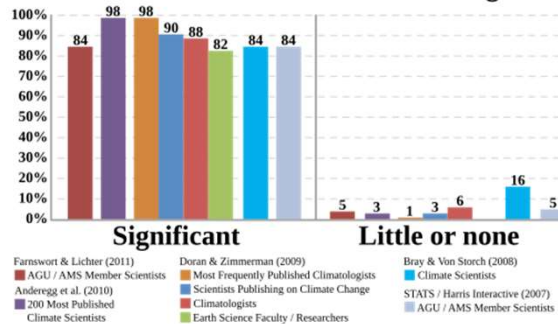


Intergovernmental Panel on Climate Change

"Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and sea level has risen."¹³

"Human influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history. Recent climate changes have had widespread impacts on human and natural systems."¹⁴

Opinions of Climate and Earth Scientists on Human Role in Global Warming



Scientific consensus that climate change is caused by humans is 97%

Greenhouse Effect

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Man-made climate change

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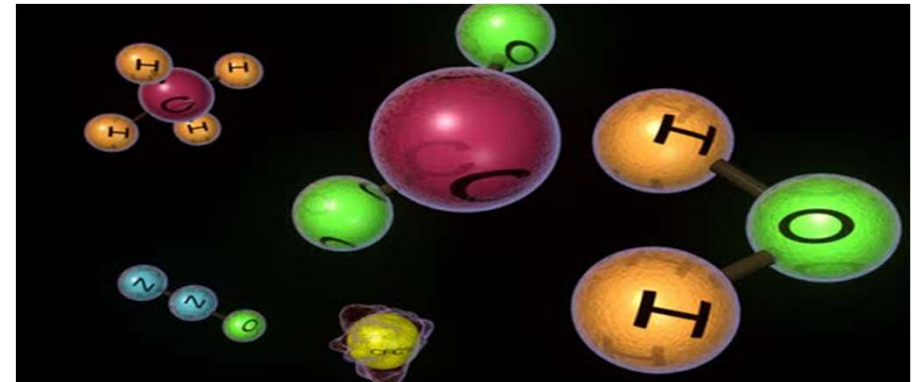


Greenhouse gasses act like a blanket around the earth and trap in heat from the sun.

Greenhouse gasses include:

- Methane (CH_4)
- Water Vapour (H_2O)
- Carbon Dioxide (CO_2)
- Nitrous Oxide (N_2O)

Greenhouse gasses occur naturally



Human activity is creating huge amounts of extra greenhouse gasses that are warming the planet.

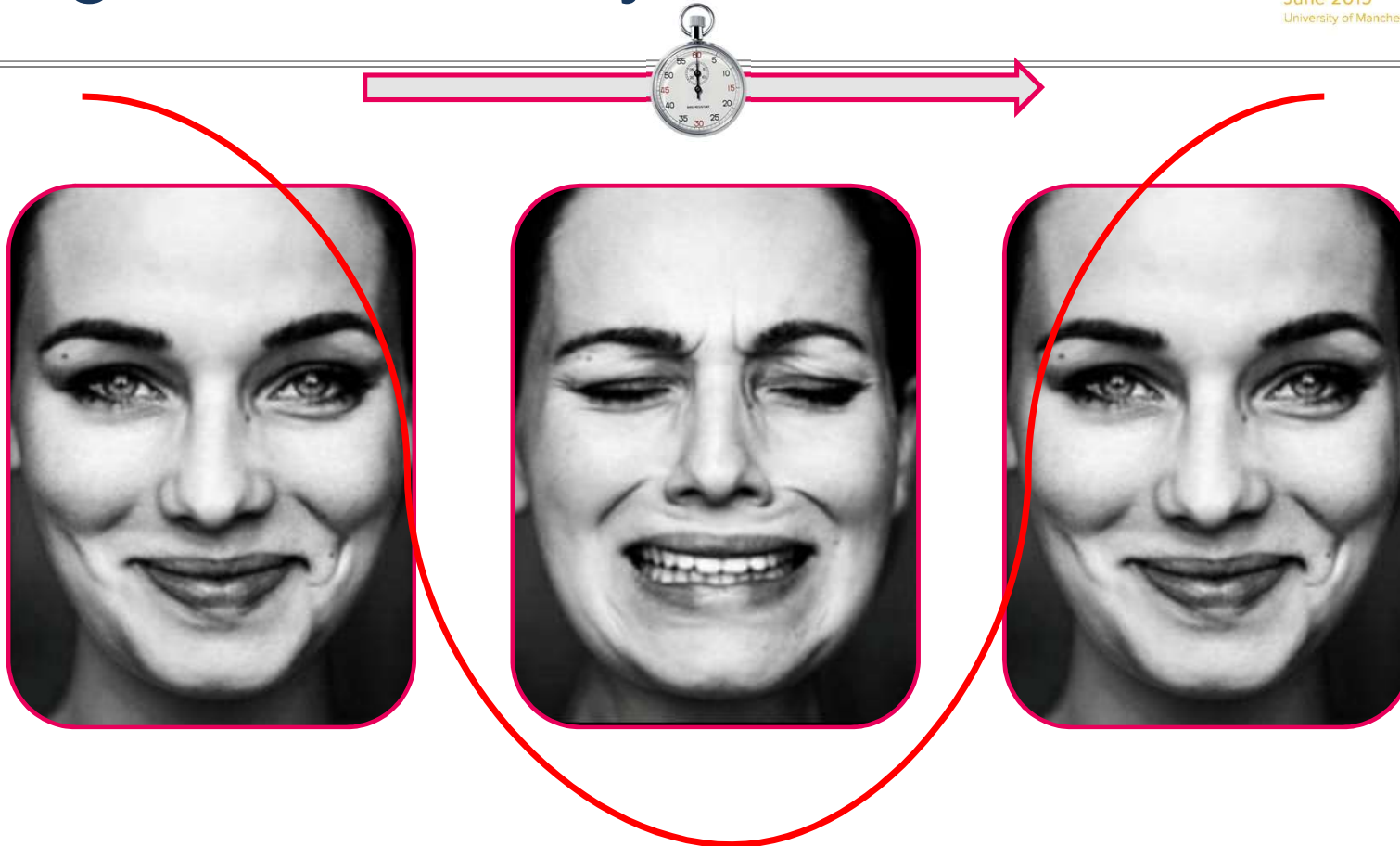
This is called **anthropogenic climate change**.

This might not be easy...

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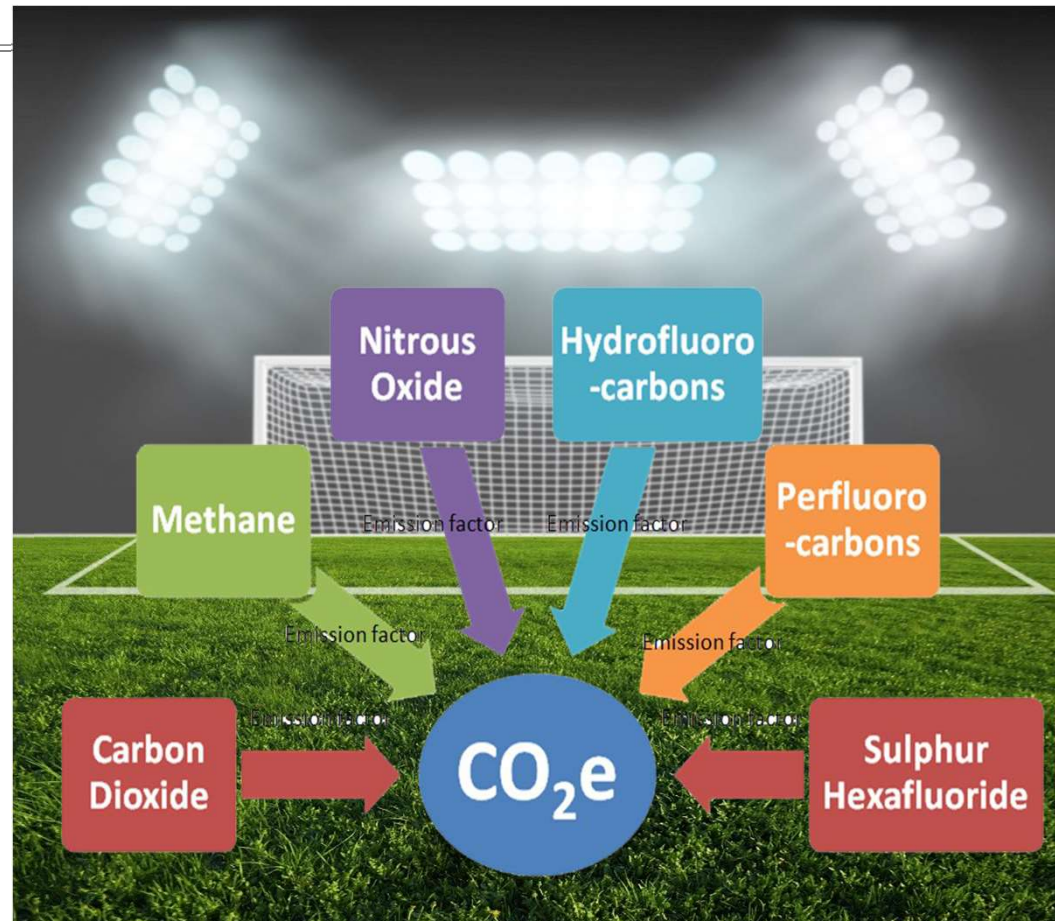


Carbon Dioxide Equivalent

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Activity = Carbon Dioxide Equivalent

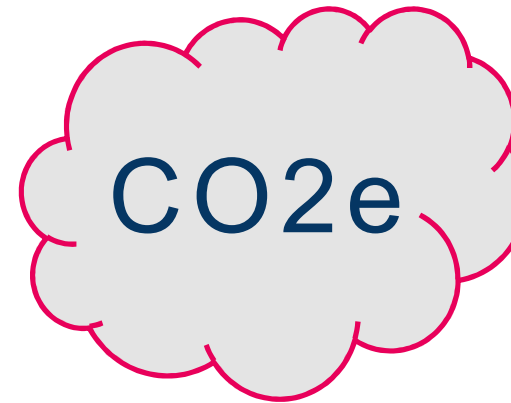
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*Human
Activity*

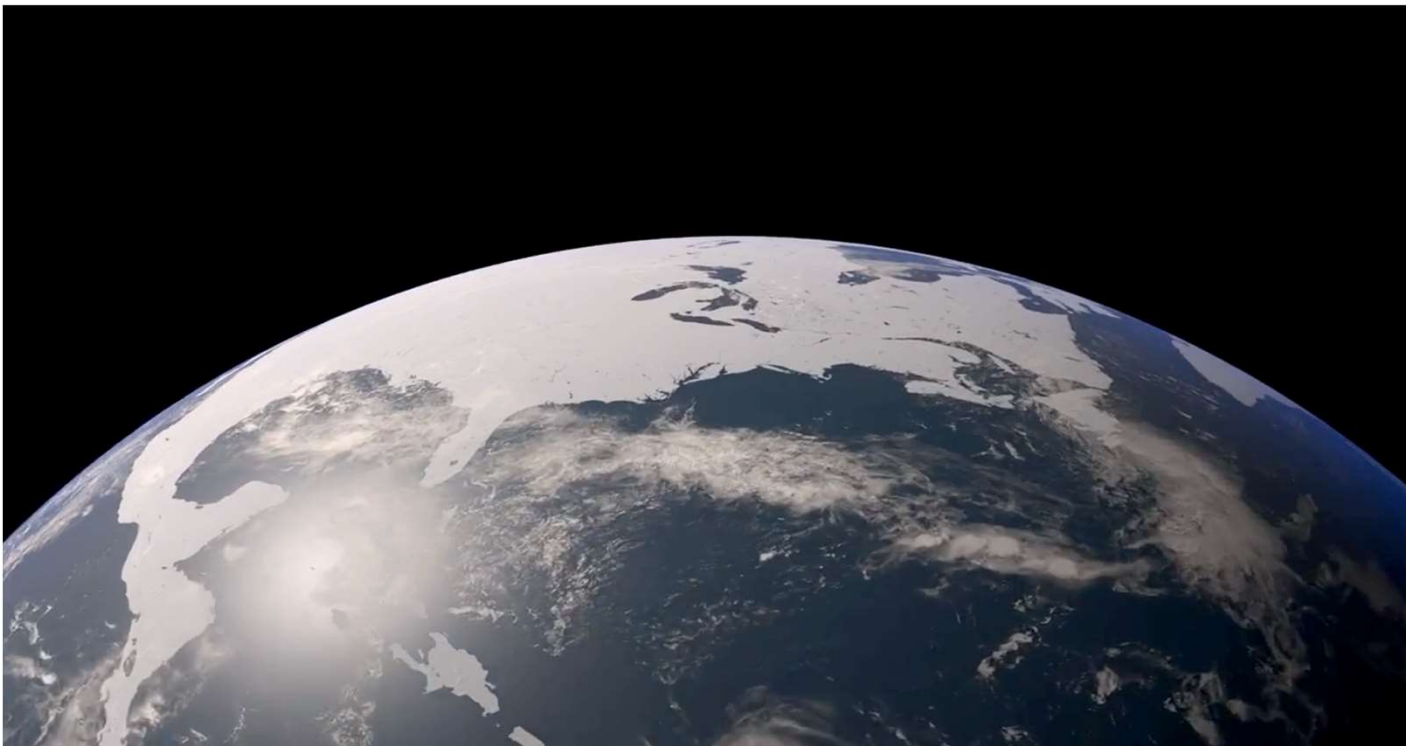


How much is too much?

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UN Sustainable Development Goals

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Commitment to warming of no more than 2 degrees

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1.5 or 2 degrees?

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We are
nearing 1.5
degrees of
warming now



Warming of
more than 2
degrees will
result in
**catastrophic
climate
change**

Current context

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**Past
leaders**

Dialogue

**Future
leaders**

Who is responsible?

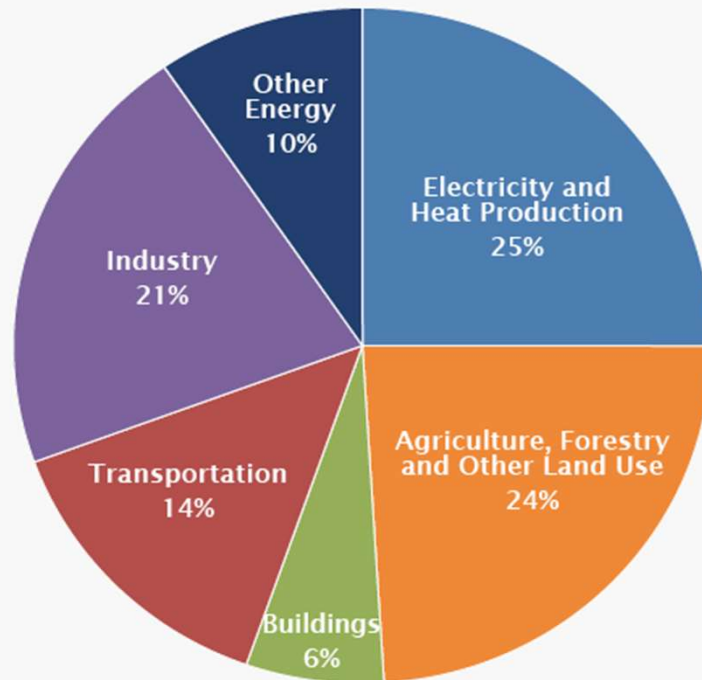
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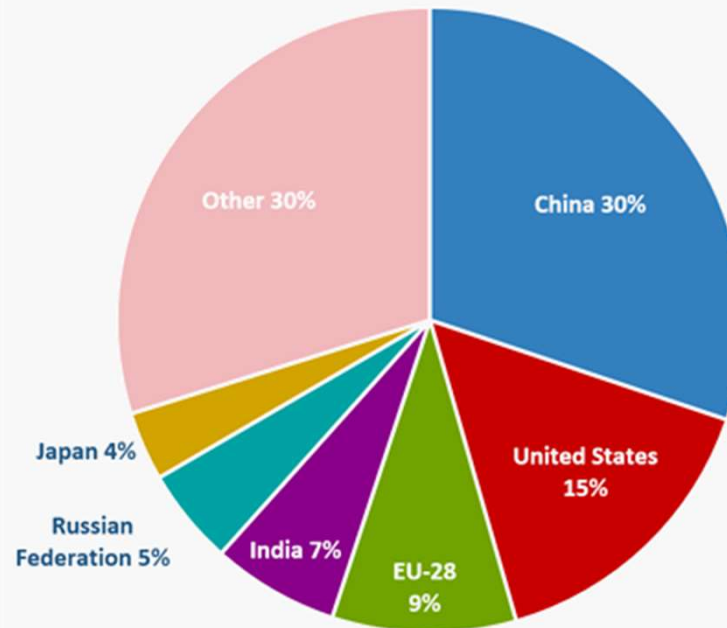
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**Global Greenhouse Gas Emissions
by Economic Sector**



**2014 Global CO₂ Emissions from Fossil Fuel
Combustion and Some Industrial Processes**

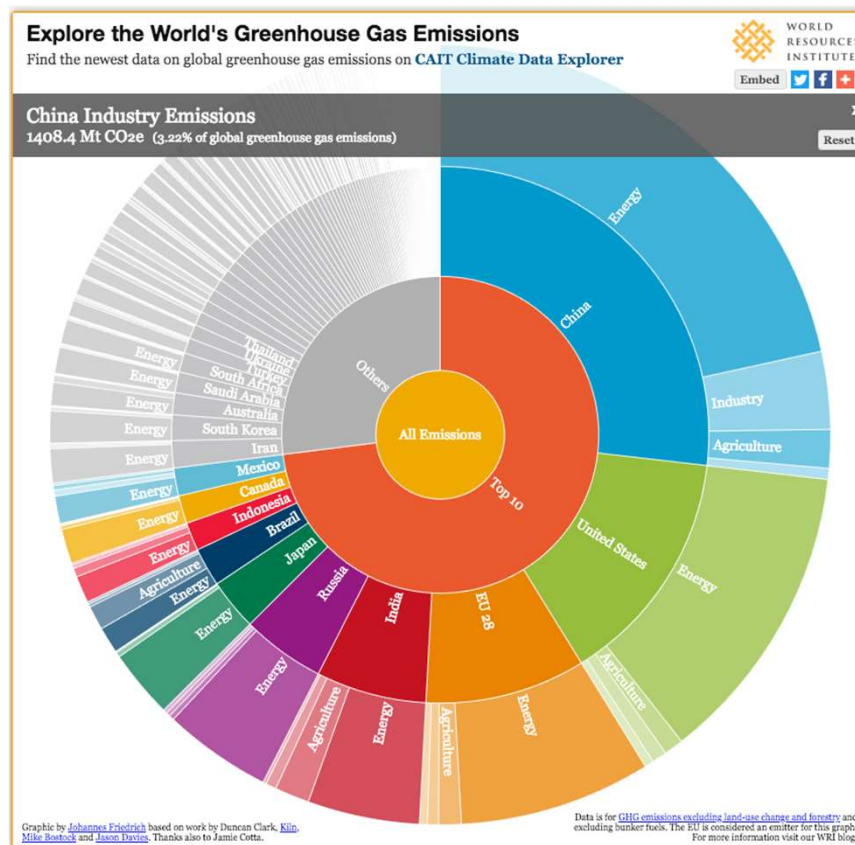


Learn more

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<https://goo.gl/zok9zZ>



Worst polluters 2017

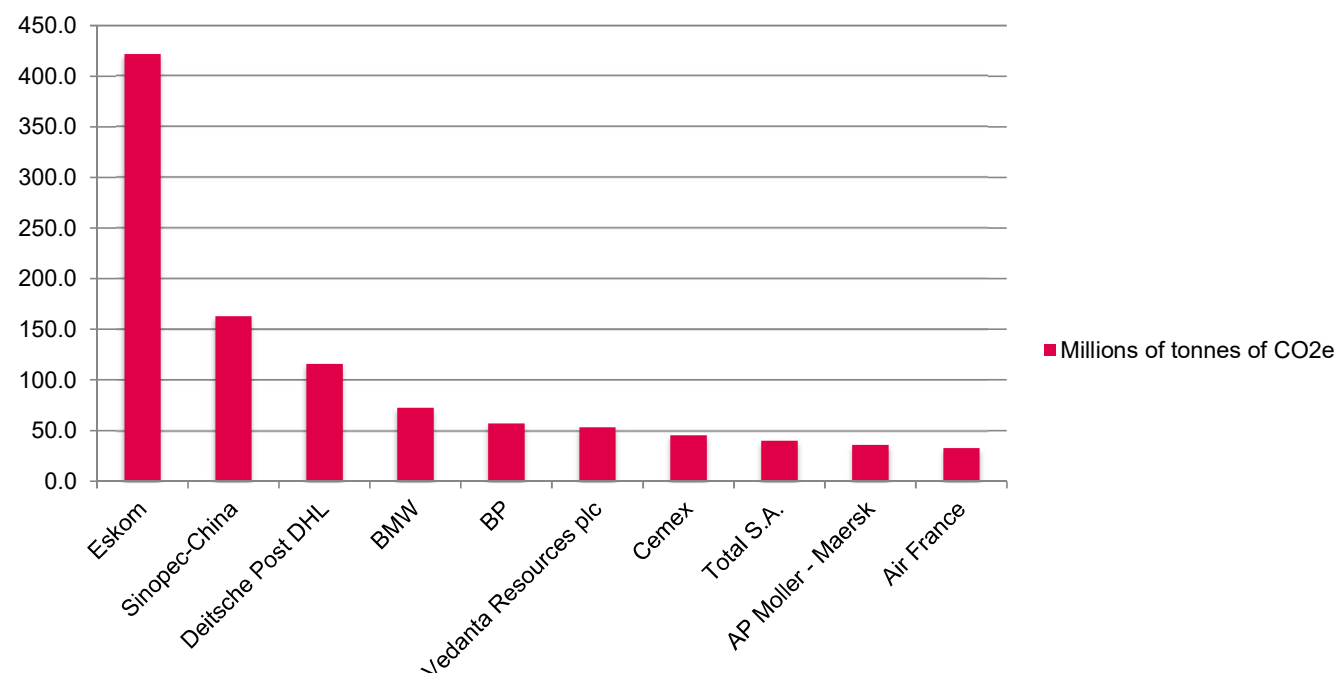
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Millions of tonnes of CO₂e



*Scope 1 & 2 emissions

Sources of greenhouse gasses

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Coal



Gas



Oil

Fossil Fuels

Sources of greenhouse gasses

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Gas

Oil

Vehicles

Sources of greenhouse gasses

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Oil

Aviation

Sources of greenhouse gasses

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Coal



Gas



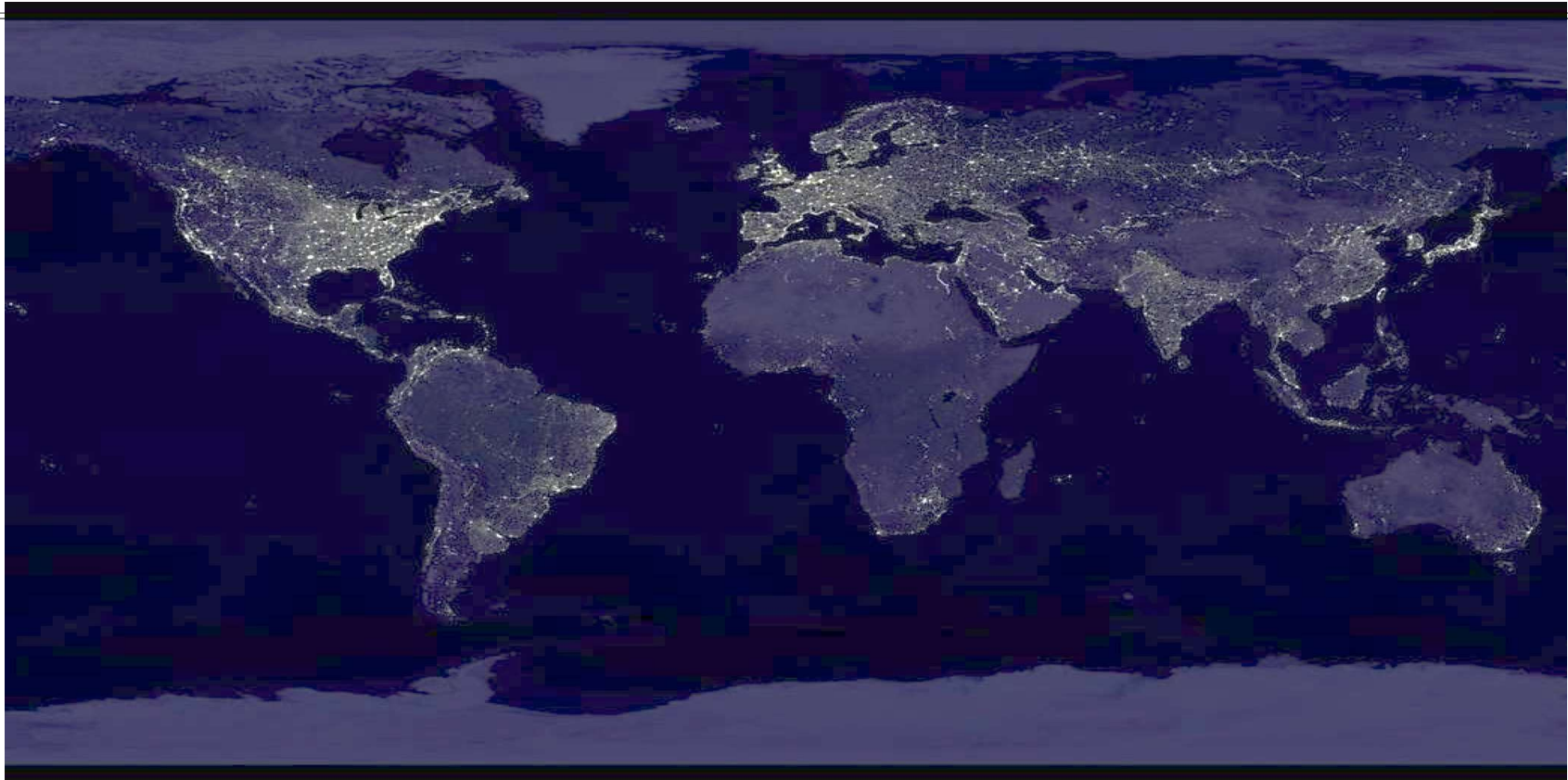
Oil

Electricity generation

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Sources of greenhouse gasses

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Coal



Gas



Oil

Water and space heating

Sources of greenhouse gasses

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Sources of greenhouse gasses

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Nitrous oxide & fluorinated gasses



Coal

Oil

Gas

Other
gasses

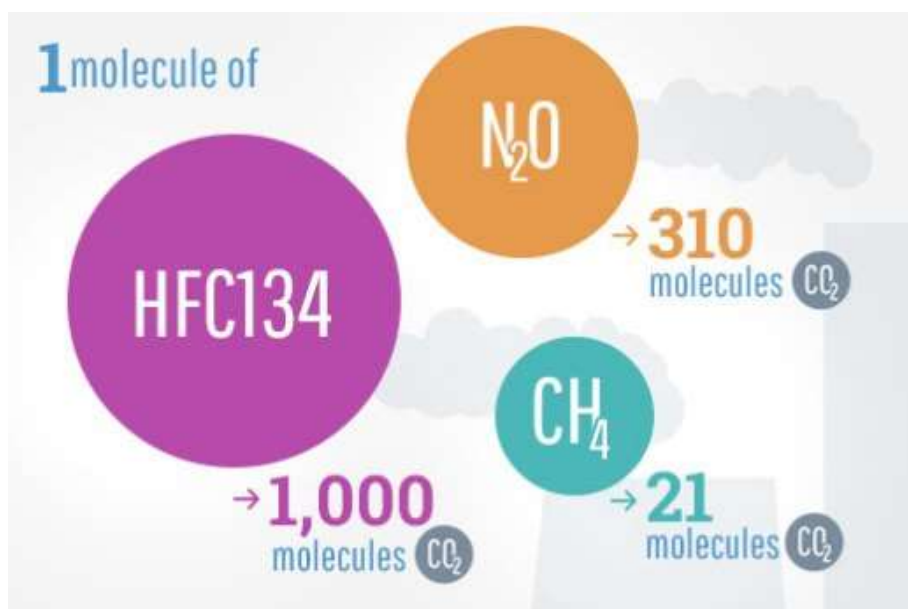
Manufacturing/Big industry

Other greenhouse gasses

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**Other greenhouse gasses
have very high global
warming potential (GWP)**

**Refrigerant gasses;
CFCs, HFCs**

Methane

Reflect

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**What are your initial
thoughts?**

Additional manmade sources

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Deforestation



**Nitrogen
fertilizer**



**Cement
manufacture**

Direct and Indirect emissions

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- Scope 1: Direct Emissions
 - Emissions directly from company activity. Company can control
- Scope 2: Indirect Emissions
 - Emissions that result from consumption of product or service
- Scope 3: Indirect Emissions
 - Indirect emissions company cannot control (eg employee commuting)

Chemicals & cement – scope 1&2 emissions

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2014



- 6.9 Teratonnes of CO₂e
- 6,900,000,000,000,000,000 grams
- 1000s of years in atmosphere

Additional sources of greenhouse gasses

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Landfill

Sewerage

**Cows and
sheep**

Methane

Additional sources of greenhouse gasse

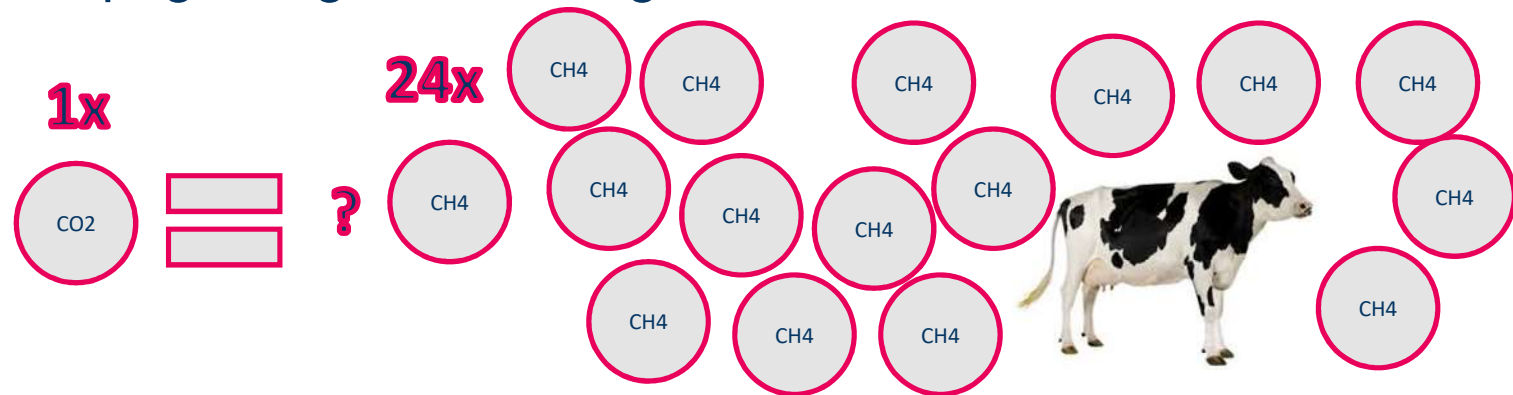
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“Total emissions from global livestock:

7.1 Gigatonnes of Co2e per year, representing 14.5% of all anthropogenic greenhouse gas emissions.” (FAO – United Nations)



Methane

Black carbon

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**Cooking
stoves**



**Particulate
matter
(soot)
absorbs a
lot of heat**



**It is also a
cause of
respiratory
diseases**

Carbon sinks

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Forests



The ocean



**The
atmosphere**



The impacts

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What are the impacts of climate change?

Direct and indirect impacts

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Direct impacts:

- Physical changes to the world and its systems

Indirect impacts:

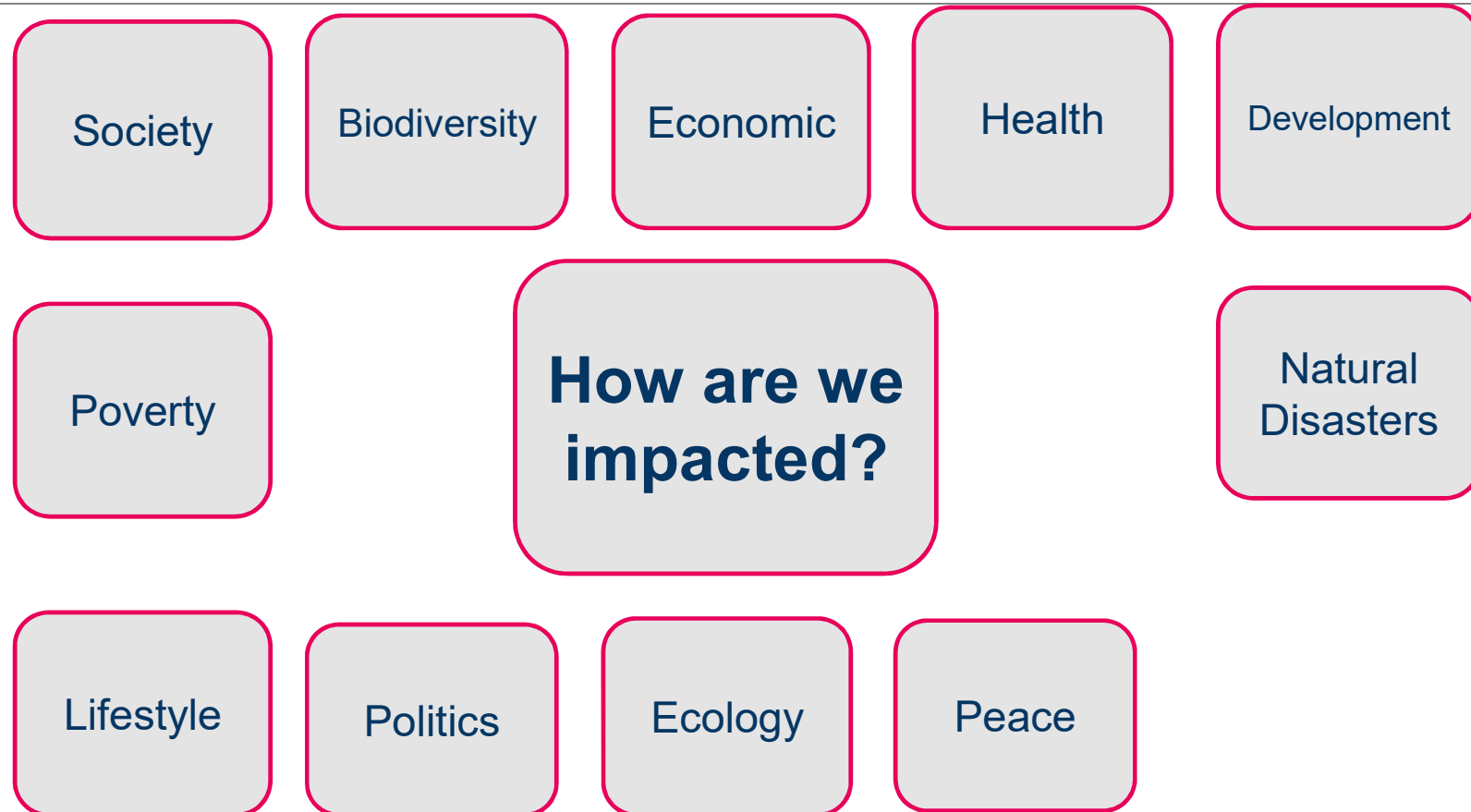
- How these changes affect us

What are the impacts on the world?

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Impacts

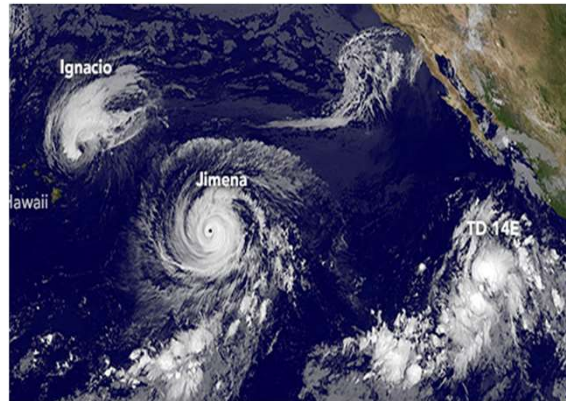
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Sea-level rise



Storms: El
Niño/La Niña



Heat-waves

Impacts

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Flooding



**Extreme
cold**



**Ocean
acidification**

Impacts

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Drought



Food
shortage



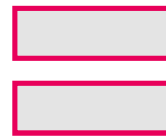
Extinction

Carbon price of everyday activities

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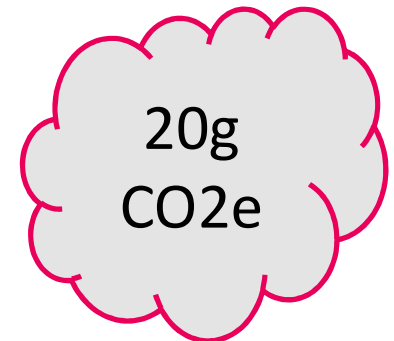
18g
CO2e

Drying your hands using a standard hand drier

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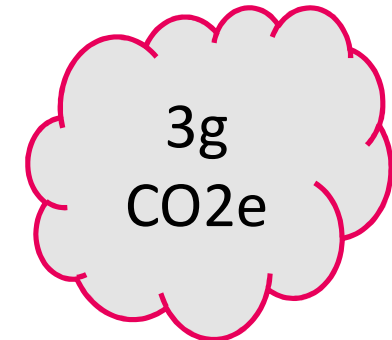


Drying your hands using an efficient hand drier

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Drying your hands using a single paper towel

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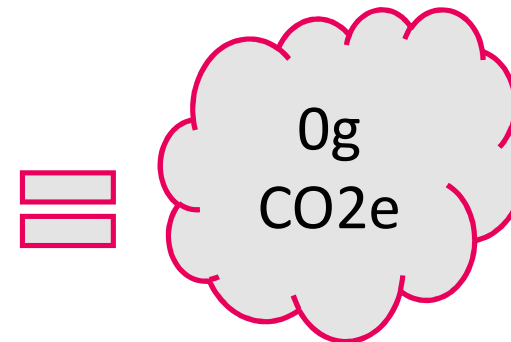
10g
CO₂e

Letting your hands air dry naturally

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Texting a customer

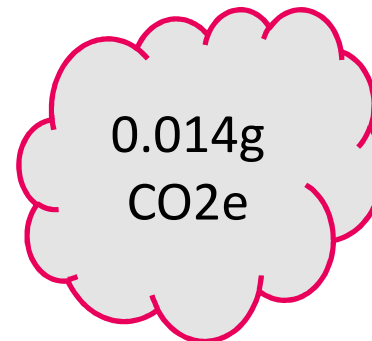
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Emailing a customer

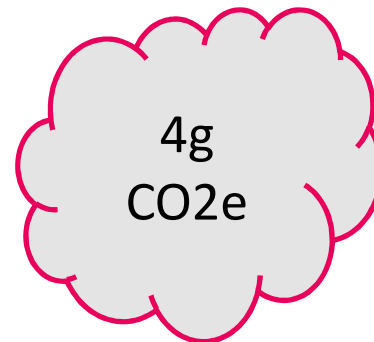
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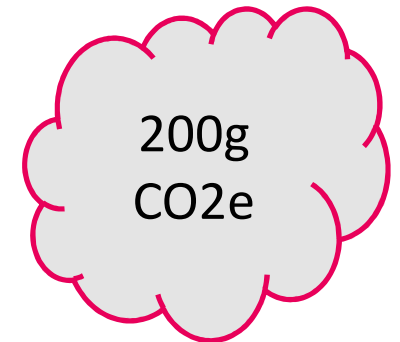
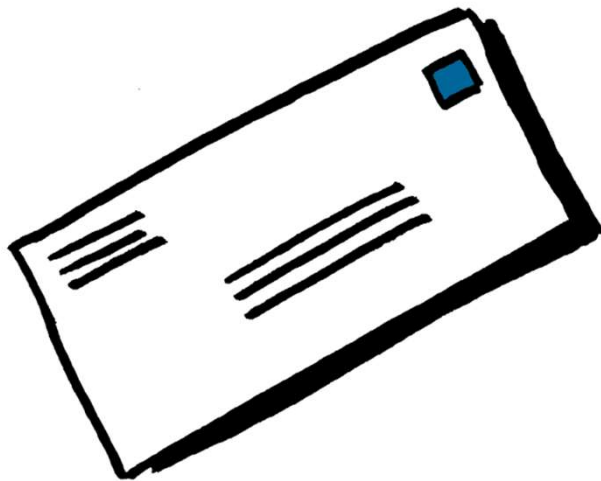


Sending them a letter

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Cycling a mile to a meeting (having eaten)

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90g
CO₂e

Going to the same meeting by bus

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150g
CO₂e

...and by tram

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190g
CO₂e

...and taking a taxi

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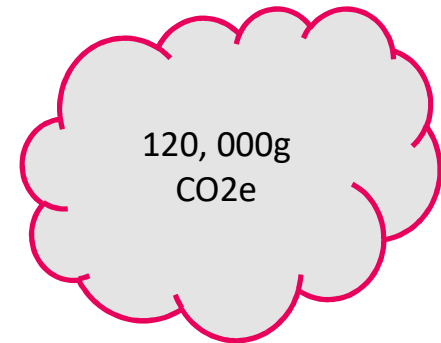


London to Glasgow and back for a conference by train

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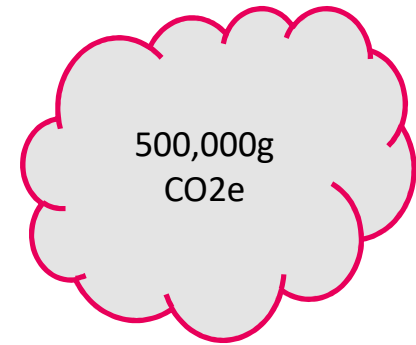


London to Glasgow and back for a conference by plane

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1 person to study in a university for a year

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444,444 buckets!



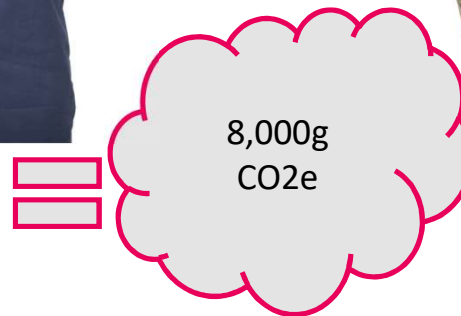
8,000,000g
CO₂e

Washing up by hand with the water running

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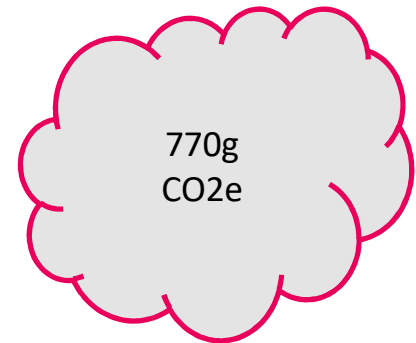


Using a dishwasher on 55 degrees Celsius

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Who is taking action?

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2005 - Kyoto protocol enters into force - countries commit to reducing greenhouse gas emissions by 18% on 1990 levels.

2015 - Conference of Parties (COP21) Paris Climate Agreement approved

Business urgency to act beginning to be understood

Who is taking action?

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Action at international and local level

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Manchester: A Certain Future (MACF) has the following aims:

- To reduce the city's carbon emissions by 41% by 2020
- To engage all individuals, neighbourhoods and organisations in a process of cultural change that embeds low carbon thinking into the lifestyles and operations of the city
- Prepare for and actively adapt to a rapidly changing climate
- Make a rapid transition to a low carbon economy.

Business Students' demand for climate change education (Yale Study 2016)

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96% think businesses should be leading efforts to address climate change

64% want environmental sustainability integrated into both core curricula and career services/counselling at business schools

79% of students say they feel only “moderately” to “not at all” knowledgeable about how to make business more environmentally sustainable

Yale, CBE, GNAM, WBCSD, 2016. Rising Leaders on Environmental Sustainability and Climate Change: A Global Survey of Business Students.

http://cbey.yale.edu/files/Rising%20Leaders%20on%20Environmental%20Sustainability%20and%20Climate%20Change%20Nov_2015.pdf

Examples of best practice

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Forbe's list of best environmental companies, 2017:

1. Siemens AG | Germany | Industrials
2. Storebrand ASA | Norway | Financials
3. Cisco Systems Inc | United States | Information Technology
4. Danske Bank A/S | Denmark | Financials
5. Ing Group | Netherlands | Financials
6. Commonwealth Bank of Australia | Australia | Financials
7. Koninklijke Philips NV | Netherlands | Industrials
8. Johnson & Johnson | United States | Health Care
9. Koninklijke DSM NV | Netherlands | Materials
10. Enagas SA | Spain | Utilities

PLEASE ADD
HERE THE
COMPANIES YOU
WISH TO
FEATURE

Challenges

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US exited from Paris
Climate Agreement

Brexit

Climate change denial

Third runway approved
at Heathrow

What are the current
challenges?

Inertia

Rise of populism

Economic uncertainty

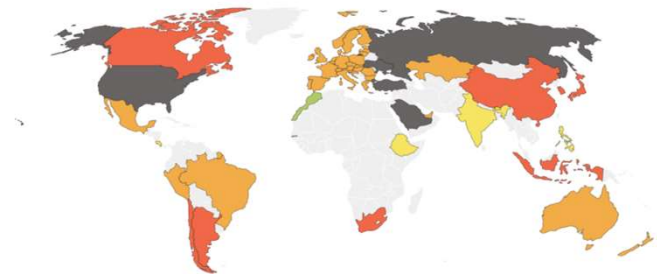
Lack of knowledge

2 degrees targets

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LAST UPDATE: July 2018

CRITICALLY INSUFFICIENT	HIGHLY INSUFFICIENT	INSUFFICIENT	2°C COMPATIBLE	1.5°C PARIS AGREEMENT COMPATIBLE	ROLE MODEL
4°C+ WORLD	< 4°C WORLD	< 3°C WORLD	< 2°C WORLD	< 1.5°C WORLD	<< 1.5°C WORLD
RUSSIAN FEDERATION	ARGENTINA	AUSTRALIA	BHUTAN	MOROCCO	
SAUDI ARABIA	CANADA	BRAZIL	COSTA RICA	THE GAMBIA	
TURKEY	CHILE	EU	ETHIOPIA		
USA	CHINA	KAZAKHSTAN	INDIA		
UKRAINE	INDONESIA	MEXICO	PHILIPPINES		
	JAPAN	NEW ZEALAND			
	SINGAPORE	NORWAY			
	SOUTH AFRICA	PERU			
	SOUTH KOREA	SWITZERLAND			
		UAE			

Reflect

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What are your thoughts?

Personal carbon impacts

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Step 1: Measure

**Tools to measure are
called carbon calculators**

**Carbon calculators are
available for people and
organisations**

**Software packages are
available**

Personal calculators:

- <https://www.carbonfootprint.com/calculator.aspx>
- <http://footprint.wwf.org.uk/>
- <https://www.resurgence.org/resources/carbon-calculator.html>

Carbon calculators for businesses:

General:

- <http://www.climatecare.org/business/business-co2-calculator/>

SMEs

- <https://www.carbontrust.com/resources/tools/carbon-footprint-calculator/>

Industry

- <http://www.carbonsolutions.com/calculator.html>

Media

- <https://calc.wearealbert.org/uk/>

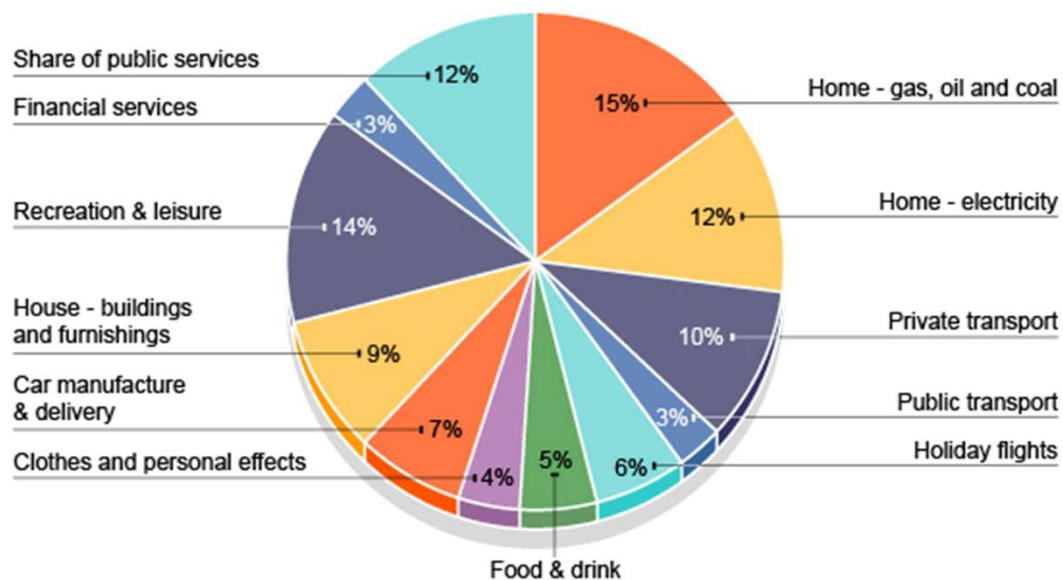
Personal carbon impacts

Step 2: Reduce

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Pie chart showing a break down of a typical person's footprint in a MEDC

The SDG Accord

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End extreme poverty, inequality and climate change
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