Workshop 3E:
Understanding how Transport affects Climate Change

Energy Co-operatives Ireland
Building community energy networks
energyco-ops.ie

Rethink

South West Mayo
DEVELOPMENT COMPANY LTD
Comhlacht Forbartha
Iarthar Mhaigh Eo Teo

MAYO CLIMATE ACTION AWARENESS WORKSHOPS

LCDC

Rialtas na hÉireann
Government of Ireland

Project Ireland 2040

MAYO.IE

CARO

Climate Action Awareness Group

Energy Co-operatives Ireland
Building community energy networks
energyco-ops.ie

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- South West Mayo Development Company Ltd.
- CARO (Climate Action Regional Office)
- Mayo County Council
- Moy Valley Resources IRD
- Mayo North East Development Company Ltd.

South West Mayo
DEVELOPMENT COMPANY LTD
Comhlacht Forbartha Iardheisceart Mhaigh Eo Teo

CARO

Comhairle Contae Mhaigh Eo
Mayo County Council

Oirthuaisceart Mhaigh Eo
Mayo North East

Energy Co-Op

Energy Co-operatives Ireland

Building community energy networks

energyco-ops.ie

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OVERVIEW

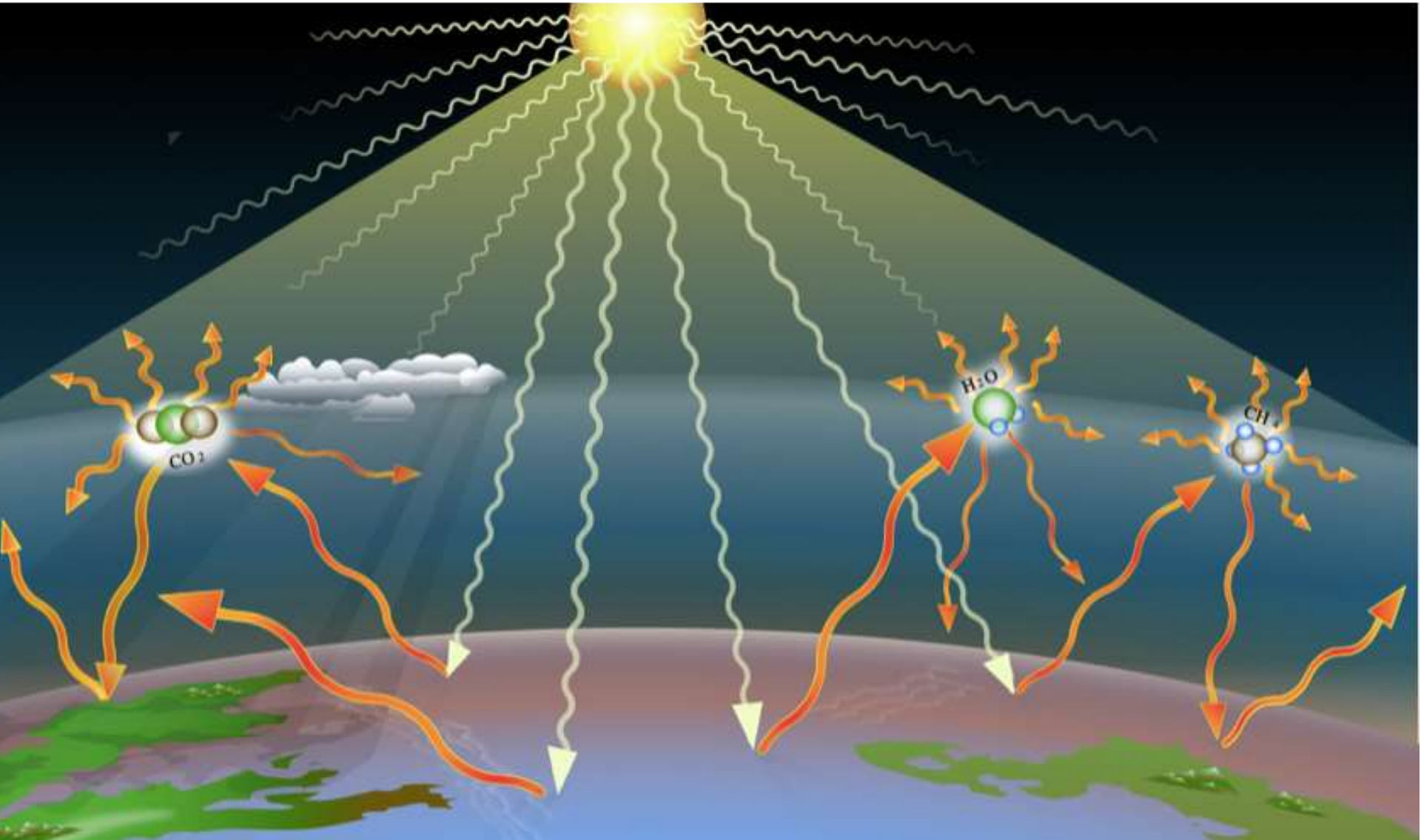
South West Mayo Development Company, as part of a Climate Action Awareness Group, are delivering a bespoke workshop programme 'Mayo Climate Action Awareness Workshops' in 5 Mayo Towns. These workshops will look at a number of topics related to climate change, the relative impacts and adaptation and mitigation actions that can be taken.

The format of these workshops will allow for educating and creating awareness of climate change issues and for interactive discussion around these issues and associated actions that can be taken individually or as a community. The training material will be a combination of both generic and specifically local information using local case studies directed at communities.

This programme will run over a period of 6 weeks, starting the 4th of February 2020 with 3 workshops running in 5 locations around the county. The first two workshops in each location will be common across all 5 locations, with the final workshop focusing on different themes in each location, but open to participants across the whole county.

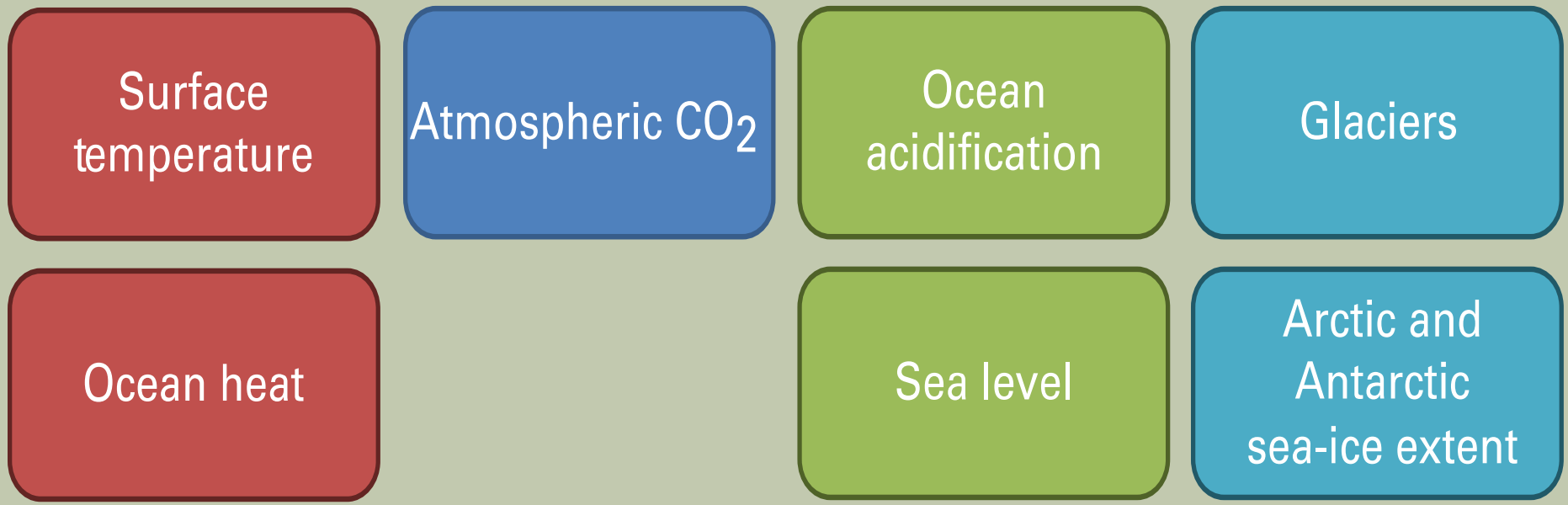
Global Warming – Greenhouse

Greenhouse Gases collecting in the atmosphere trap heat



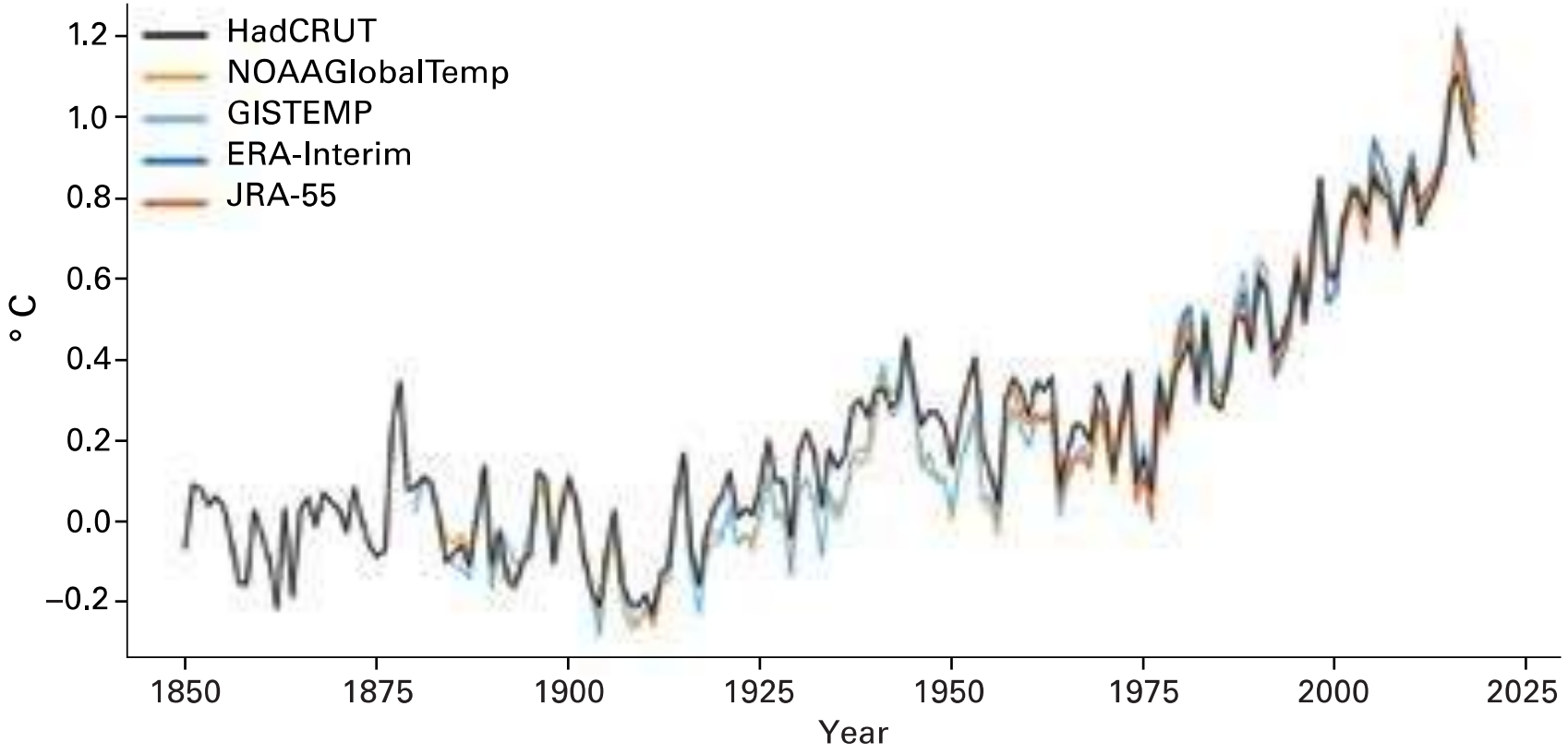
Global Climate Indicators

Indicators which show the changing conditions which humans are causing



Used by WMO and at https://gcos.wmo.int/en/global-climate-indicat

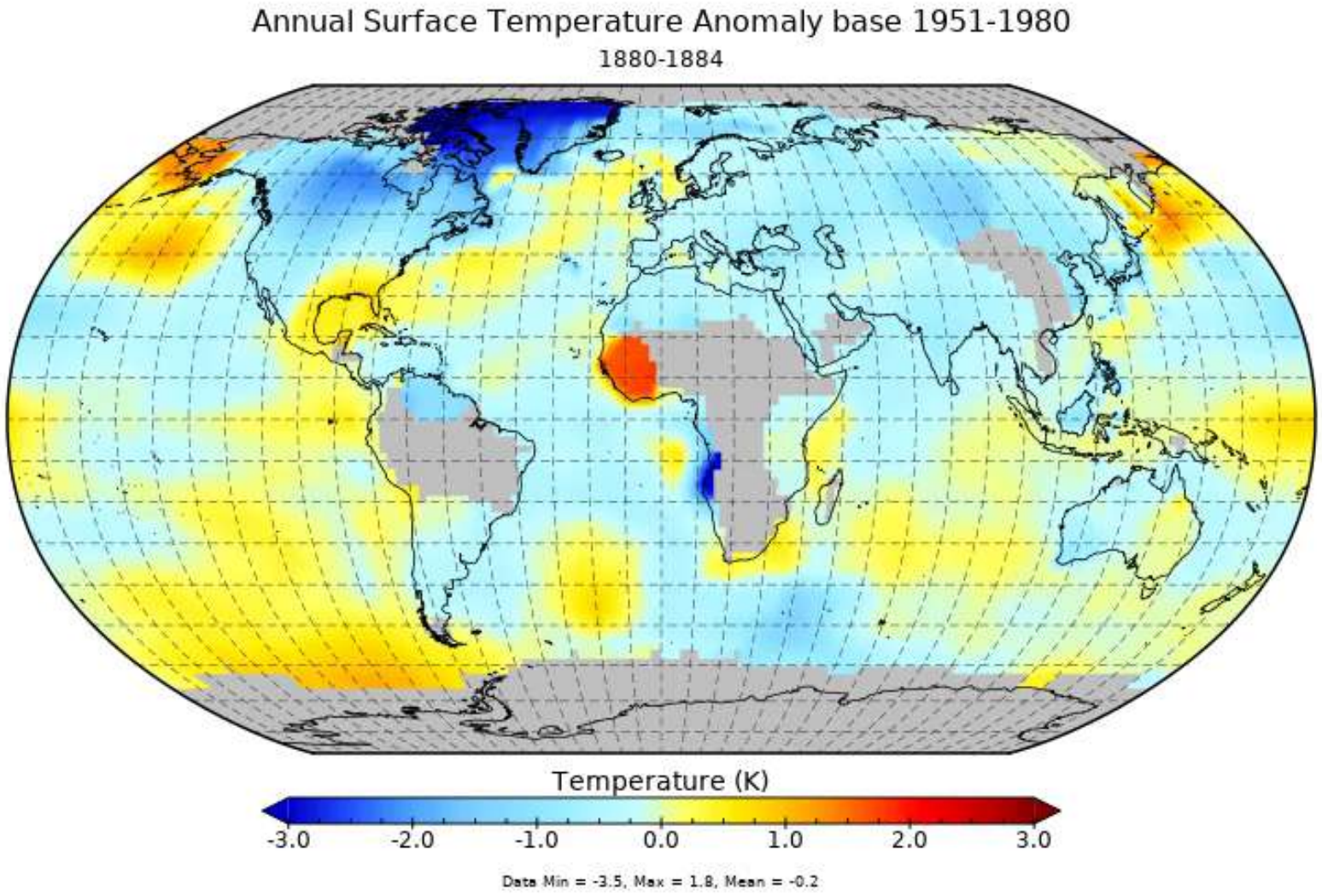
Global Mean Surface Temperature



- Combines land & marine data
- In 2015 a record level of 1°C higher than in 1850
- Industrial revolution

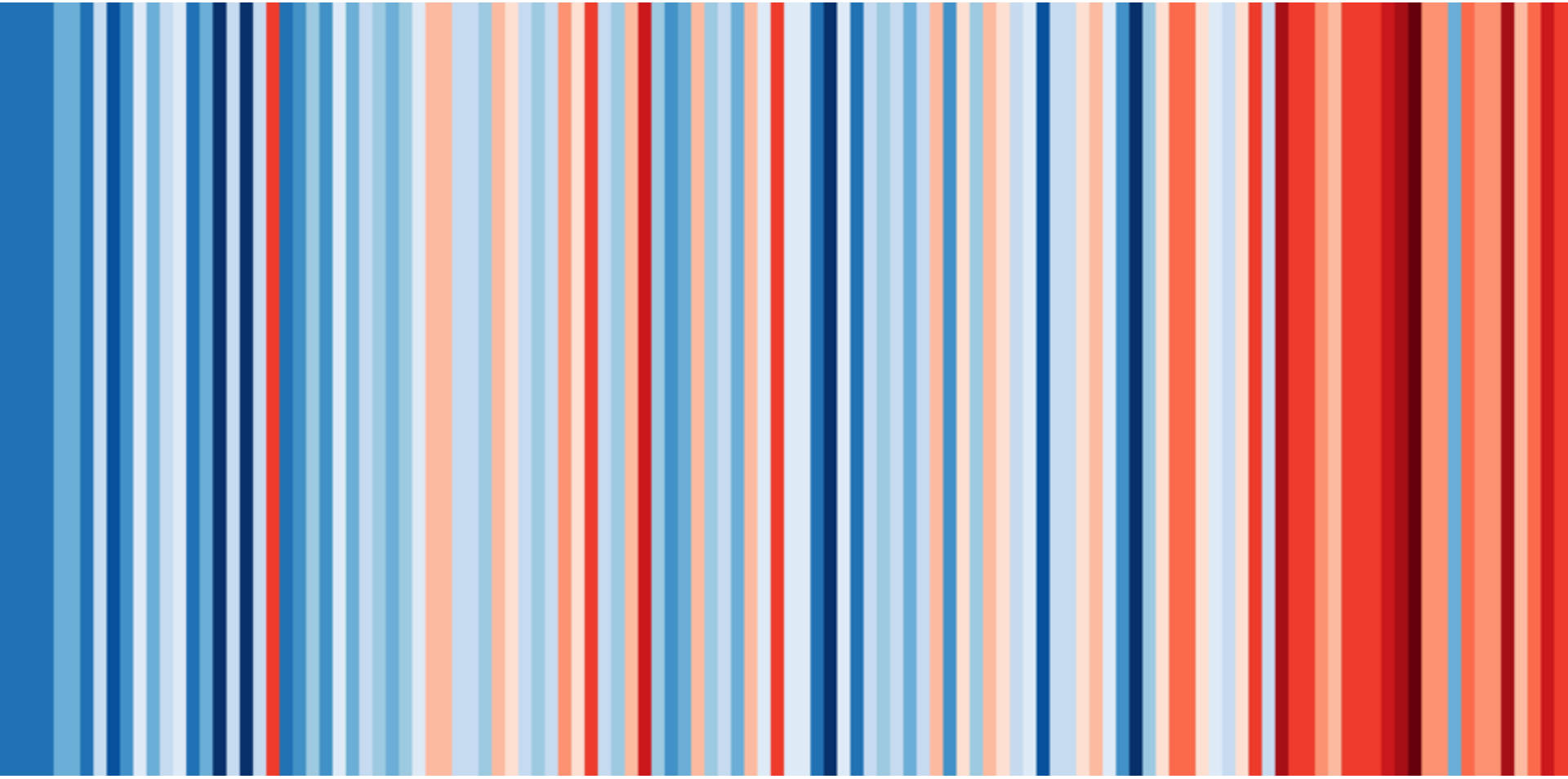
UK Met Office Hadley Centre, WMO (2019), EPA (2016)

Global Mean Surface Temperature 1880-2017



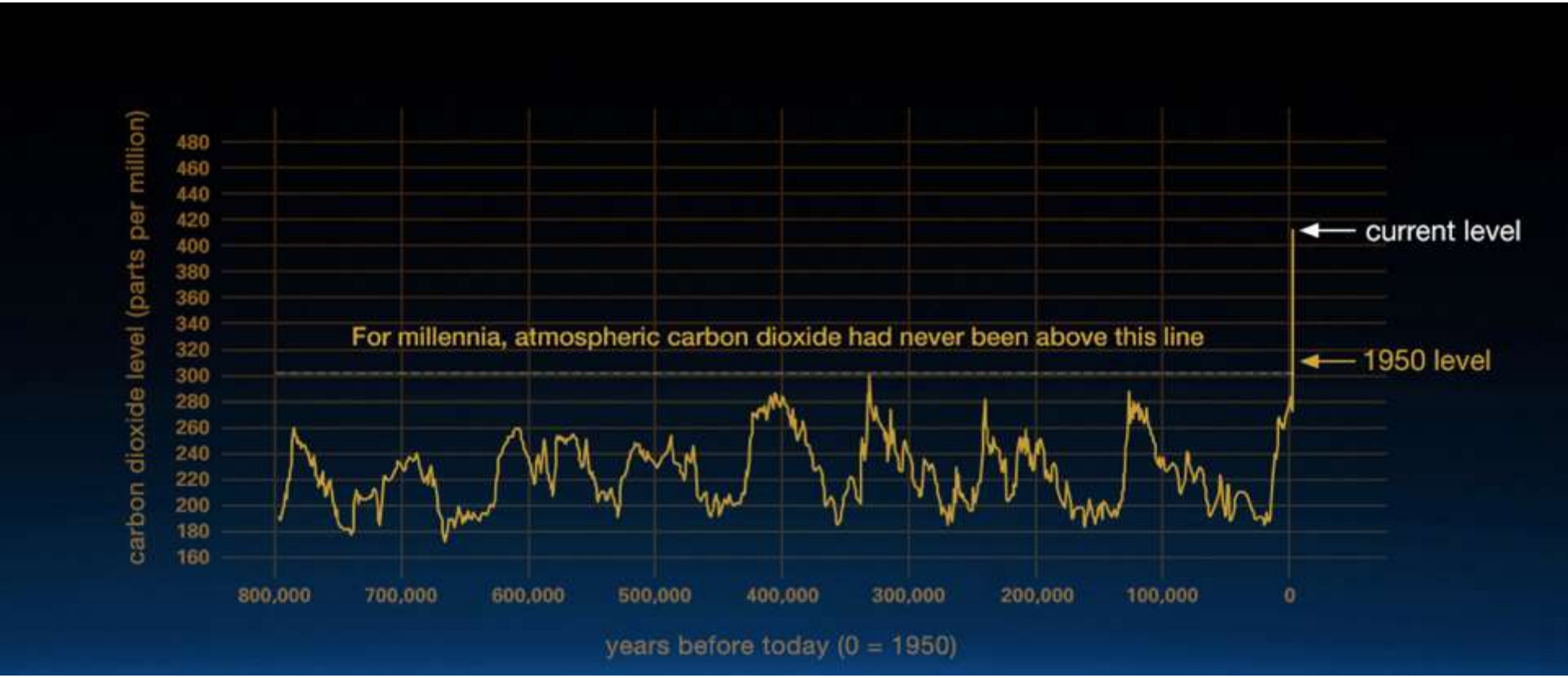
NASA/GSFC Scientific Visualization Studio (2018)

Annual Average Temperatures for Ireland



- The first line on the left is the temperature in 1801 and the temperatures increases as we move across to the 2018 temperature (far right)
- Berkeley Earth data https://showyourstripes.info/stripes/EUROPE-Ireland--1901-2018-BK.

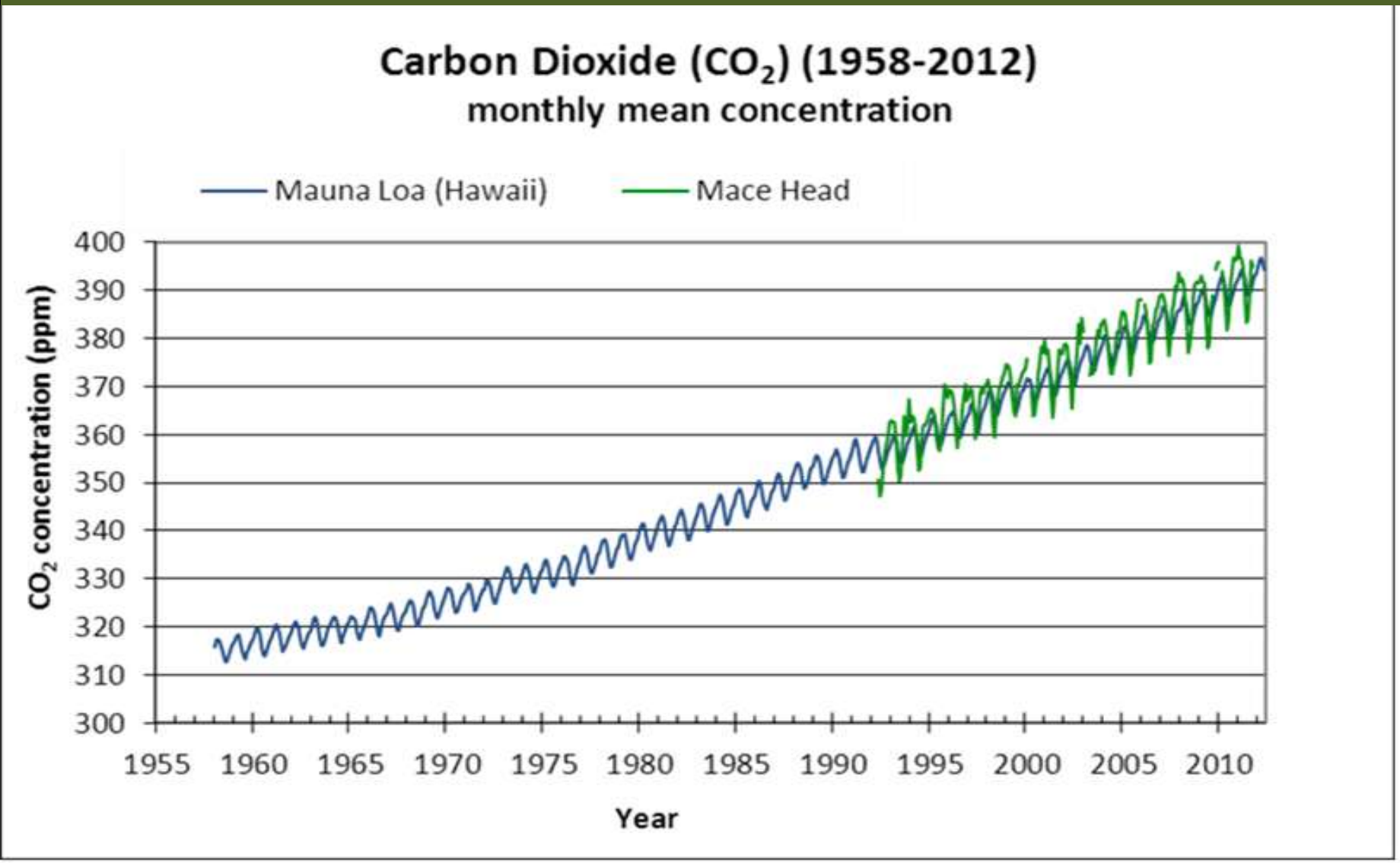
CO_2 Concentration in the Atmosphere



- Graph shows scale of the CO_2 spike over 800,000 years
- Record highs >400 ppm
- Other Greenhouse Gases also like: CH_4, H_2O and N_2O

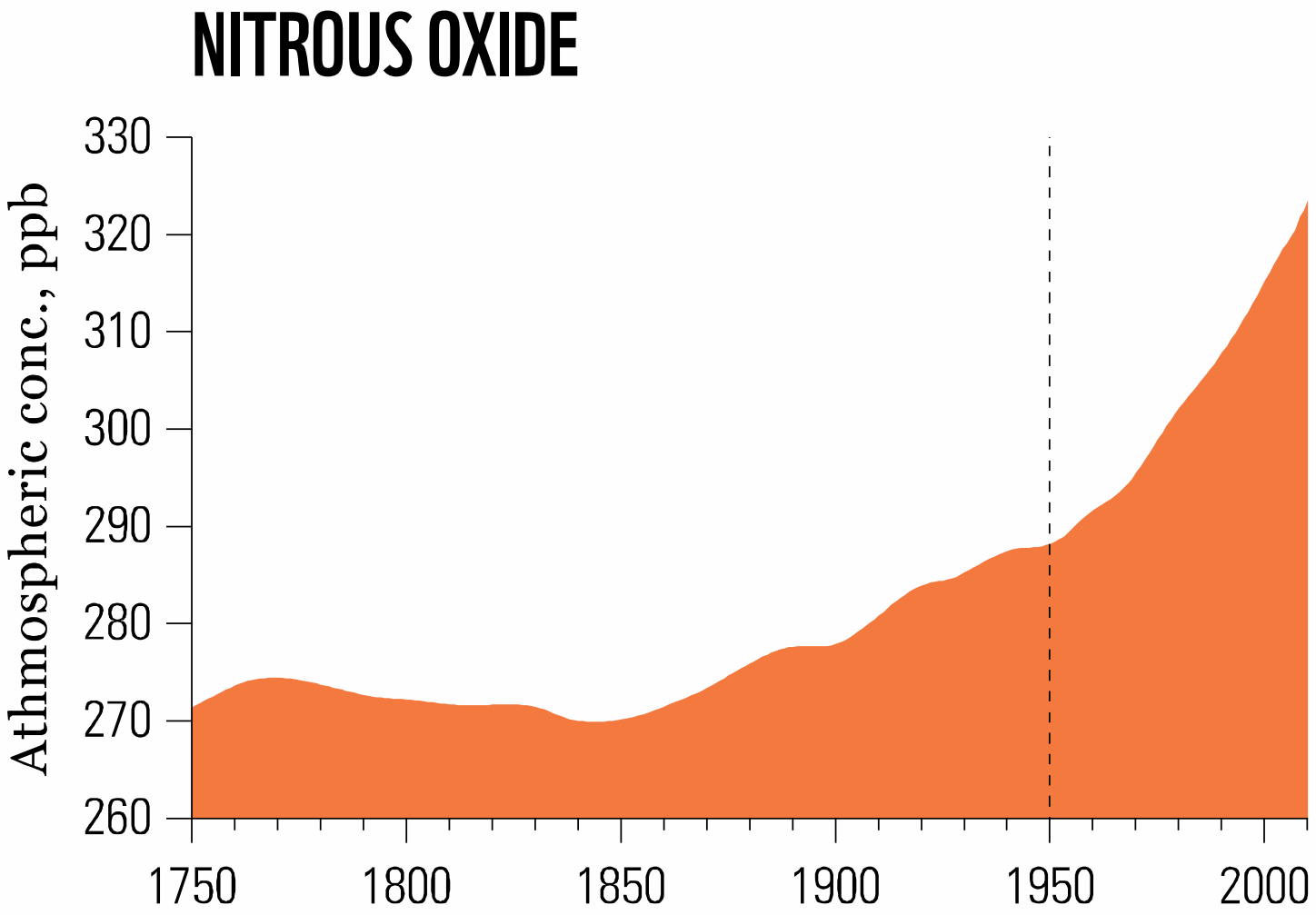
NASA data: https://climate.nasa.gov/evidence/

Atmosphere CO2 Concentration in Mace Head



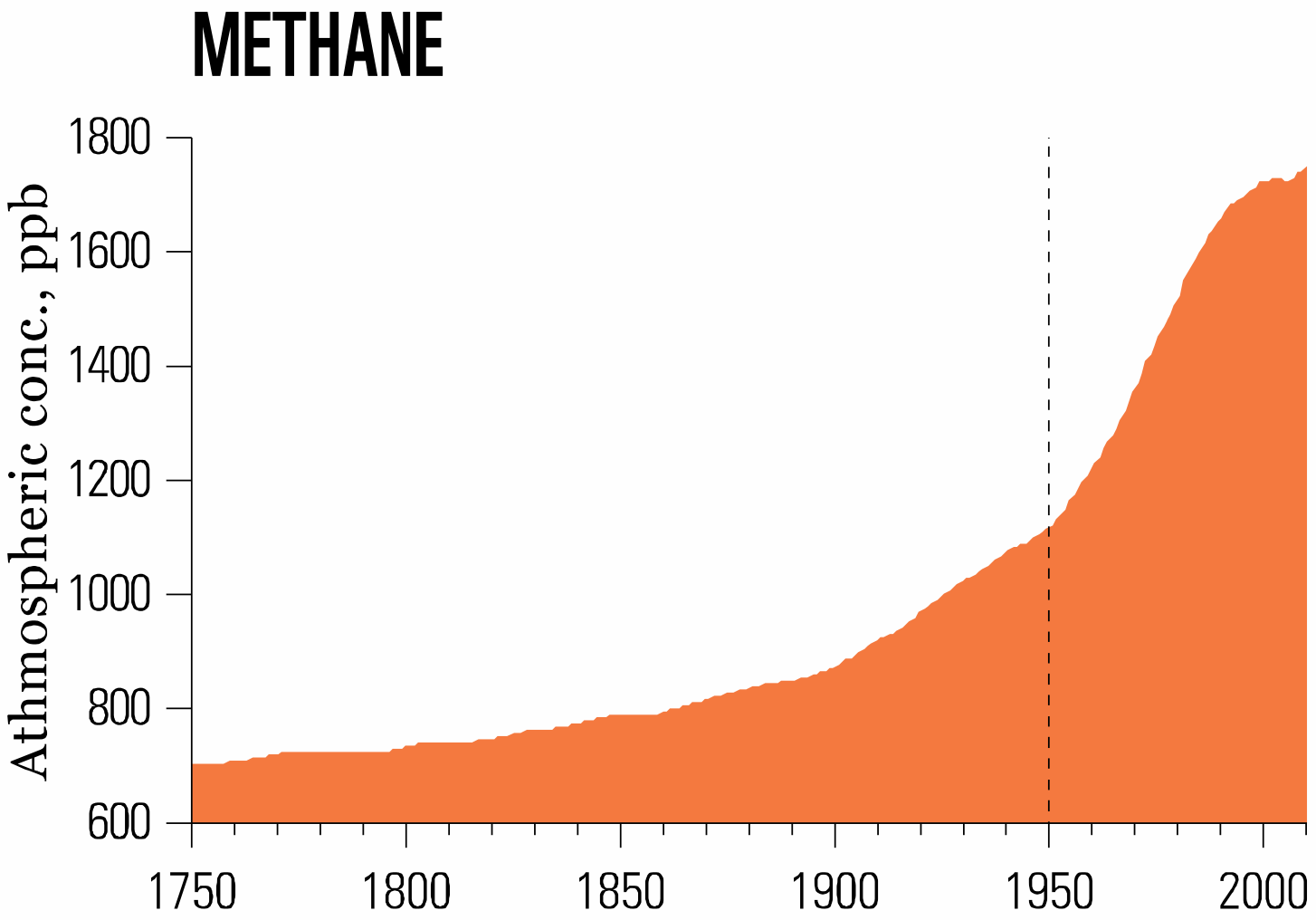
(Dwyer,2013)

Nitrous Oxide Concentrations in Atmosphere



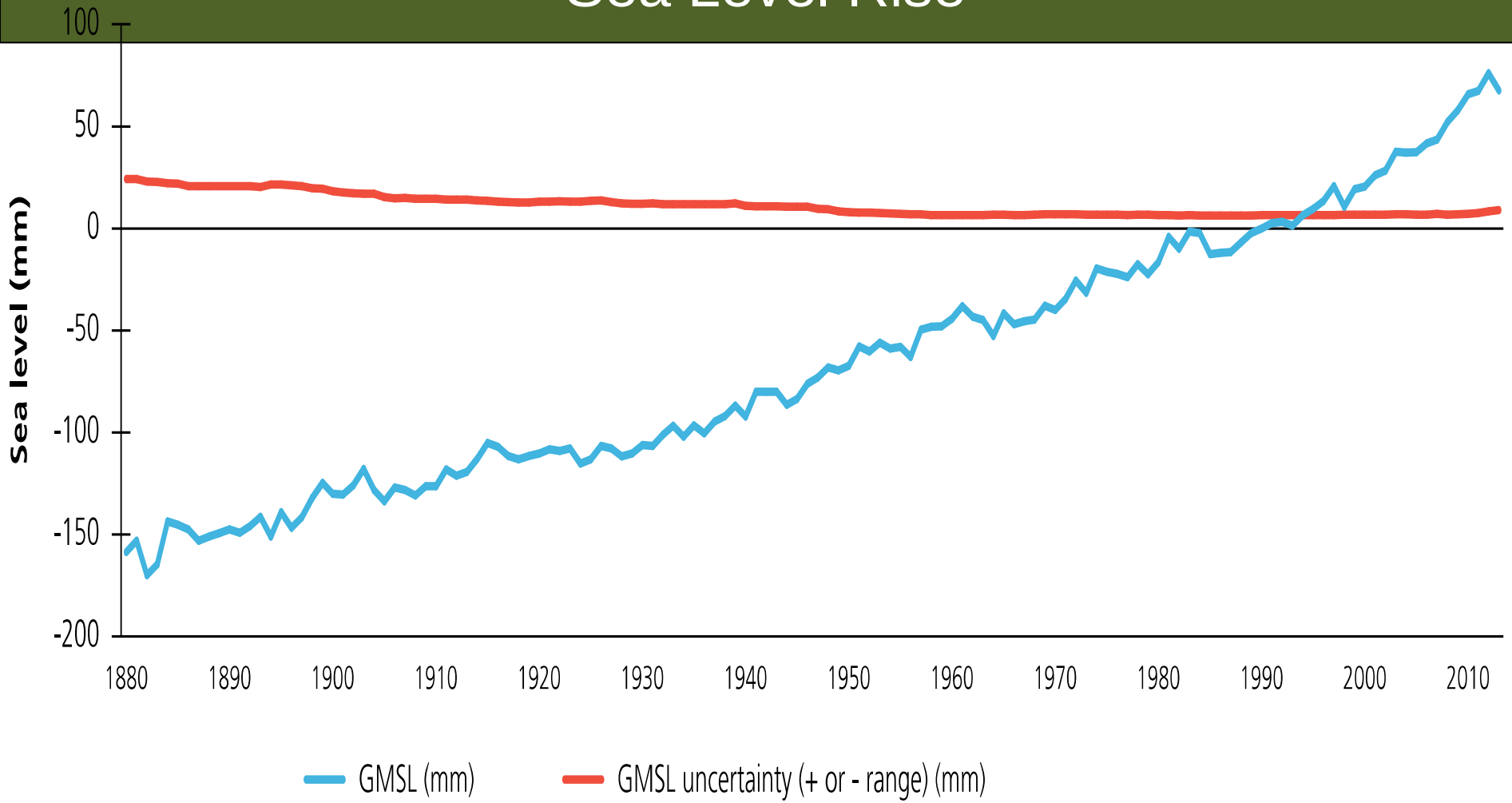
WWF, 2019

Methane Concentrations in Atmosphere



WWF, 2019

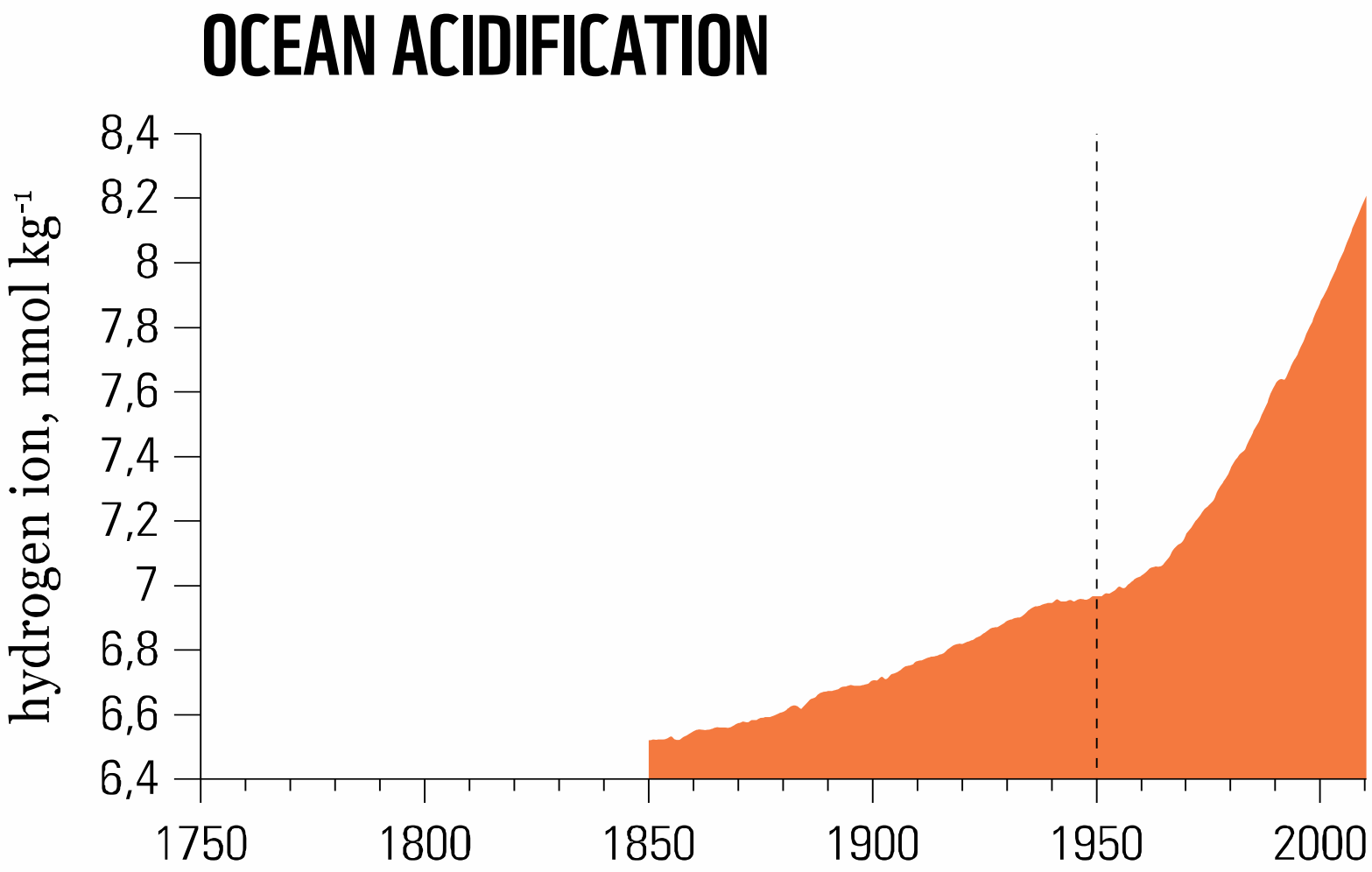
Sea Level Rise



- Heat trapped by oceans leads to thermal expansion
- Global sea level rise of 2 cm each decade in the last century
- Since 1993, average sea level by just over 3 cm per decade

EPA, 2016

Ocean Acidification



- CO2 combines with sea water making it acidic

WWF, 2019

Ice Melt

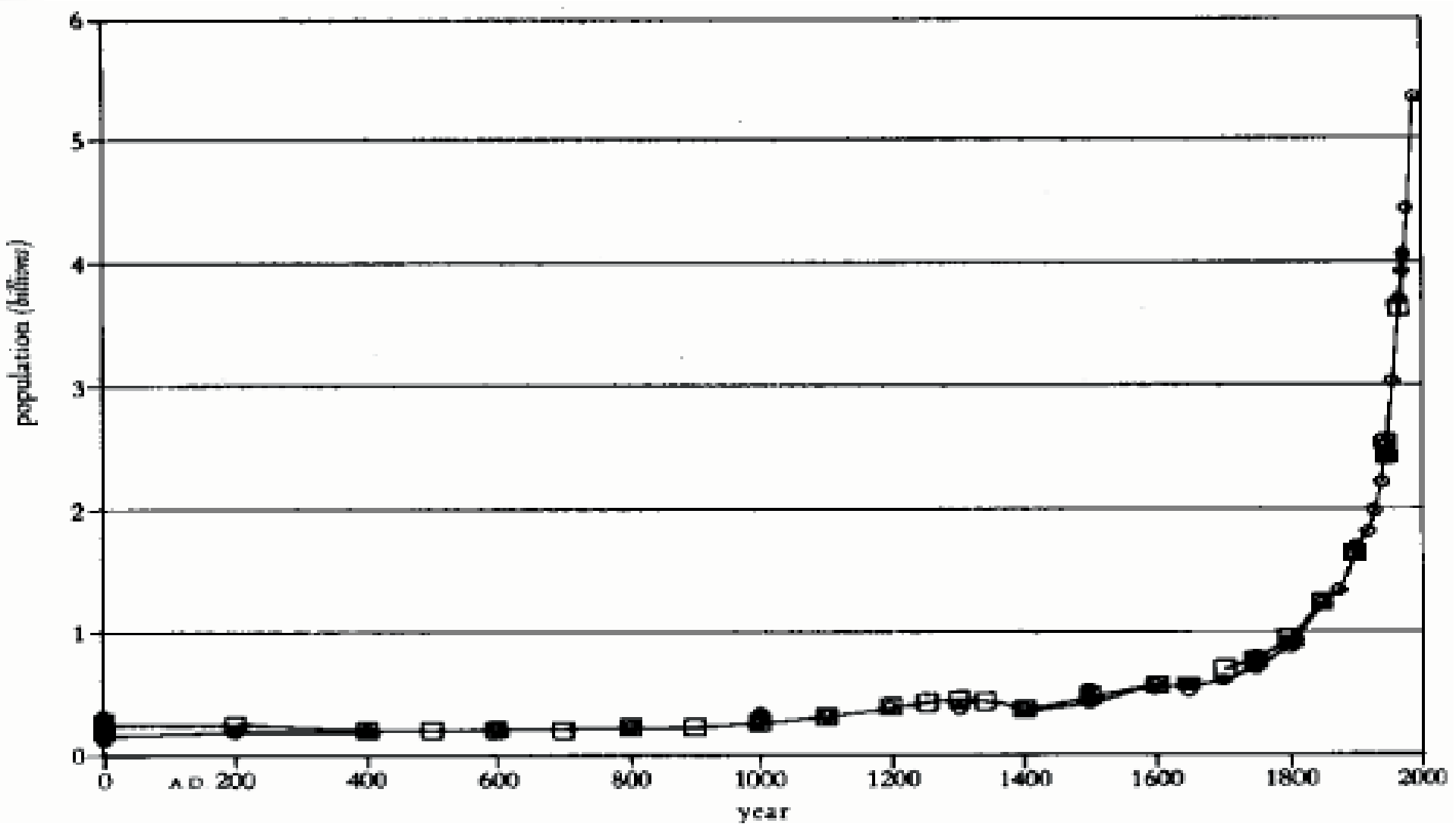
- Muir Glacier disappears (1941-2004)
- National Snow and Ice Data Centre (link below)
- Photos by W.O. Field and B.F. Molnia

http://nsidc.org/data/glacier_photo/index.html

Iceland Mourns Loss of Glacier

https://grist.org/article/heres-why-iceland-is-mourning-a-dead-glacie

Population Pressure 2000 years – The Anthropocene



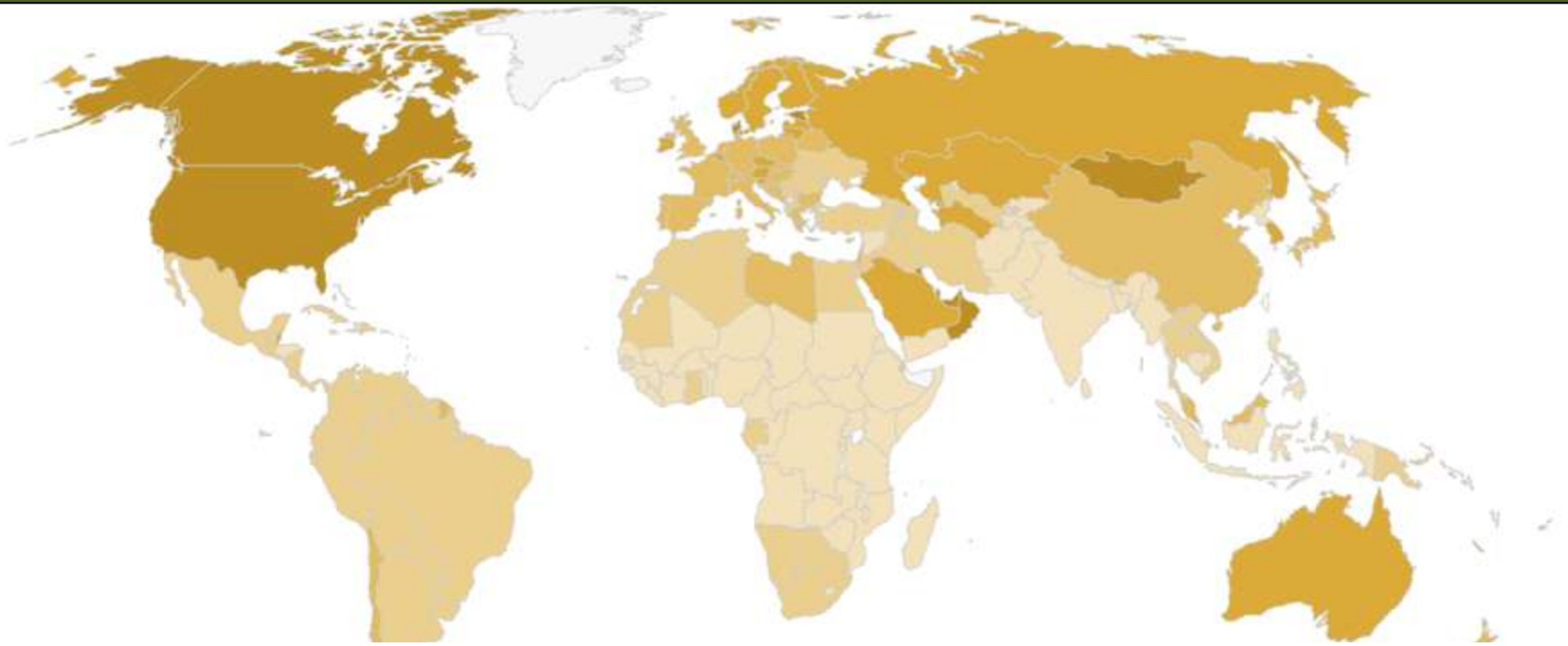
Includes agricultural revolution, industrial revolution now > 7 billion

Ecological Footprints

Workshops focussed on ecological footprint of household energy, waste, food and water use.

So we cover some basic introductory material again before we cover the transport ecological footprint.

National Consumption - Country Ecological Footprints



ECOLOGICAL FOOTPRINT PER PERSON

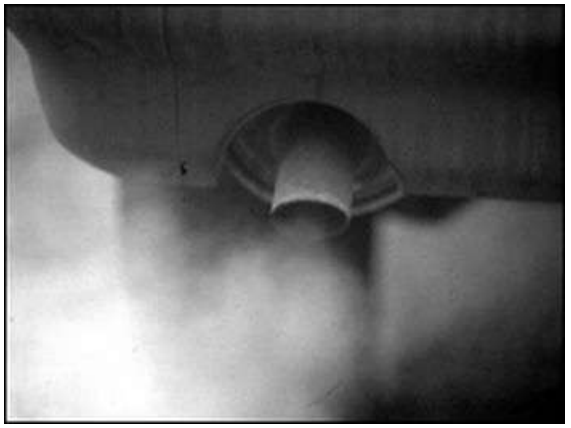
The Ecological Footprint per person is a nation's total Ecological Footprint divided by the total population of the nation. To live within the means of our planet's resources, the world's Ecological Footprint would have to equal the available biocapacity per person on our planet, which is currently 1.7 global hectares. So if a nation's Ecological Footprint per person is 6.8 global hectares, its citizens are demanding four times the resources and wastes that our planet can regenerate and absorb in the atmosphere.

ECOLOGICAL FOOTPRINT PER PERSON OF COUNTRY'S POPULATION (in global hectares)

> 6.7	5.1 - 6.7	3.4 - 5.1	1.7 - 3.4	< 1.7

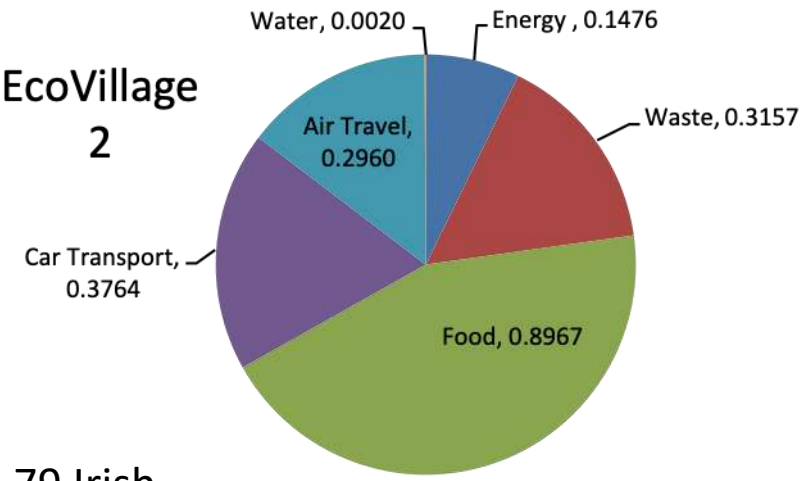
https://www.footprintnetwork.org/licenses/public-data-package-free/

Personal Consumption, Making the Data Real

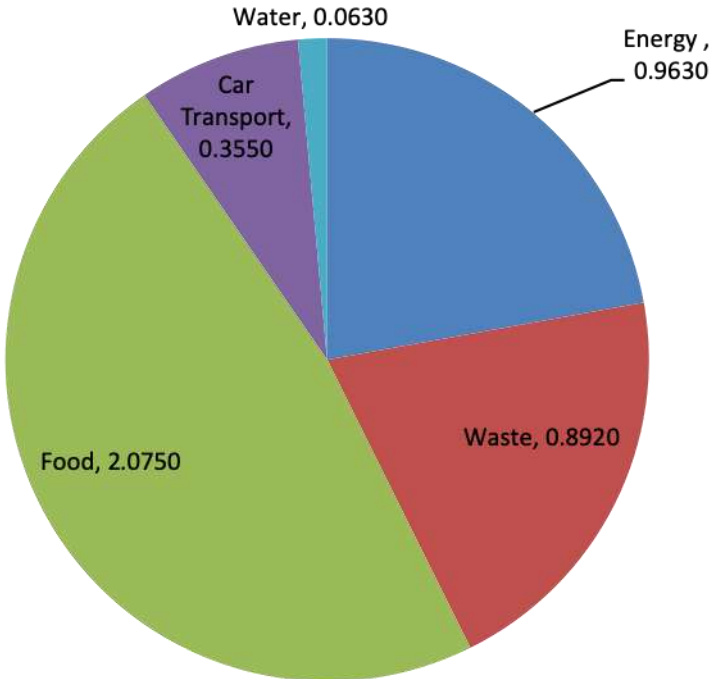


Ecological Footprint (gHa) 82 Irish Settlements

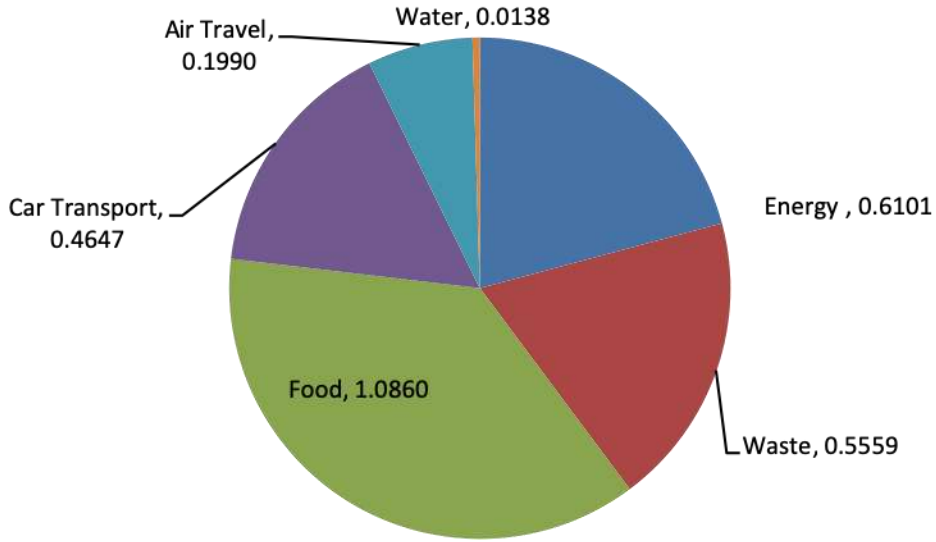
EcoVillage 2



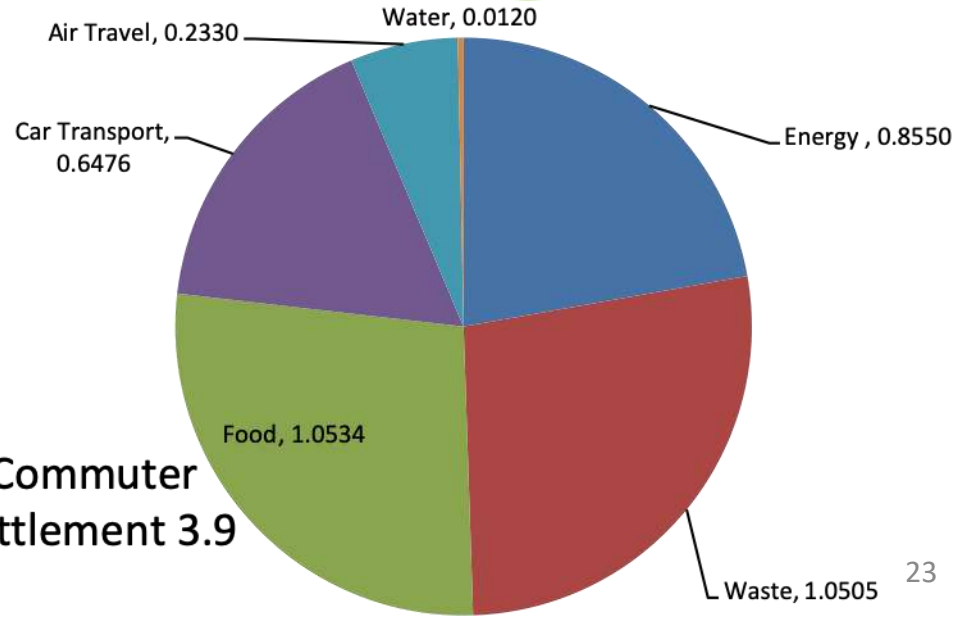
79 Irish settlements 4.3



Ballina 2.9



Commuter Settlement 3.9



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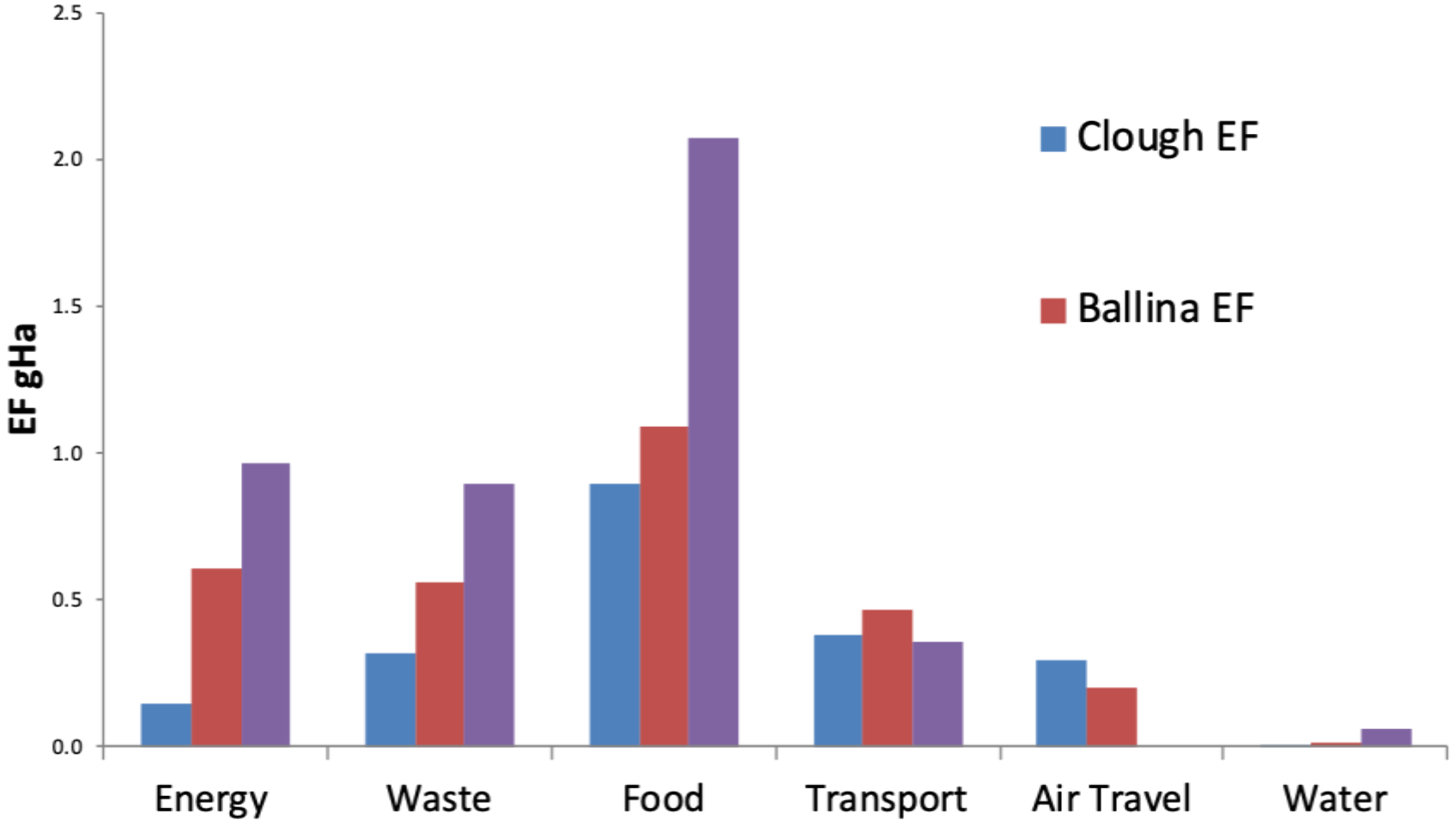
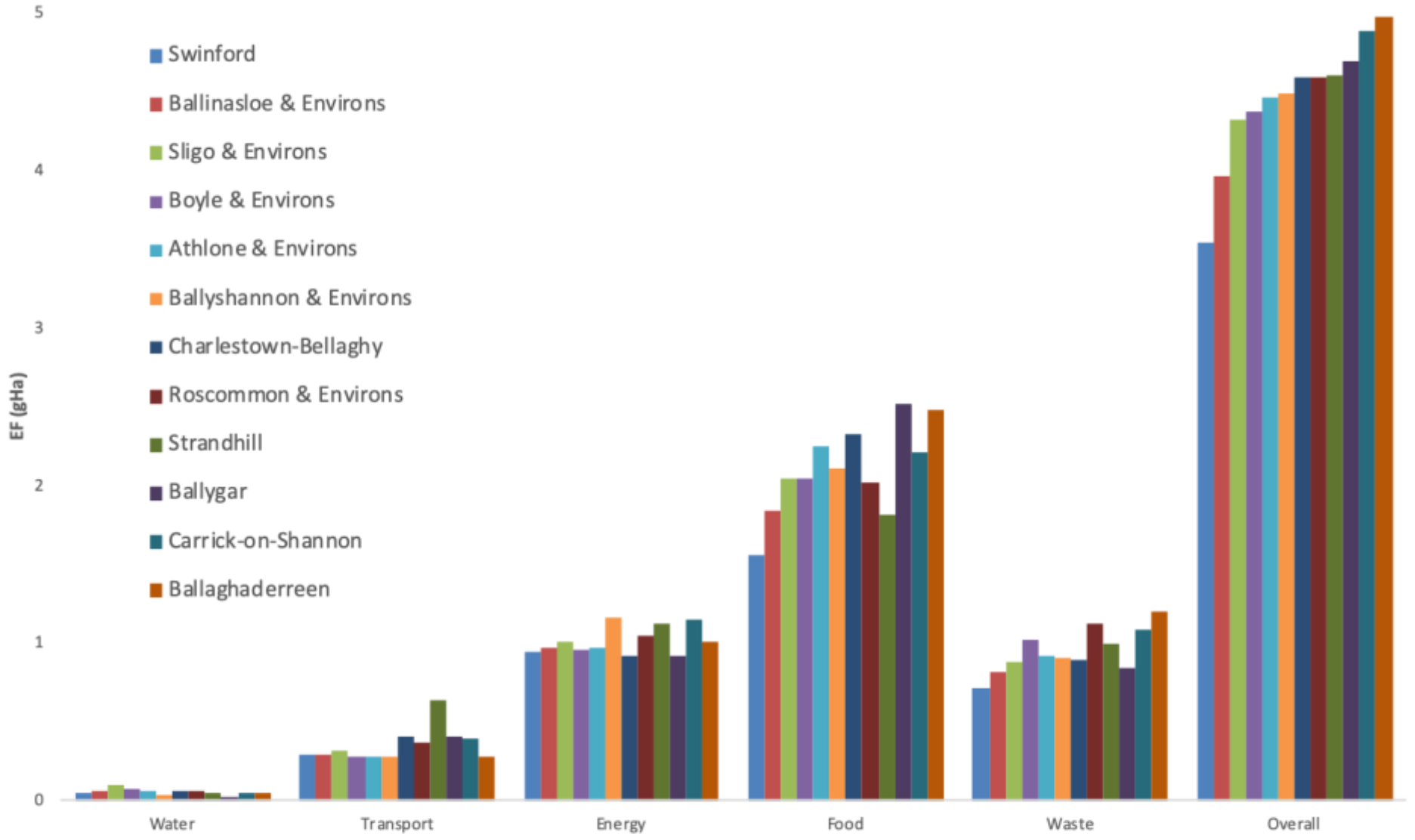


Local Ecological Footprints (Foley, 2006, Carragher & Peters, 2018)

Settlement	Water	Transport	Energy	Food	Waste	Overall
Swinford	0.04	0.29	0.94	1.55	0.71	3.53
Ballinasloe & Environs	0.06	0.29	0.96	1.84	0.81	3.96
Sligo & Environs	0.09	0.31	1.01	2.04	0.87	4.32
Boyle & Environs	0.07	0.28	0.95	2.04	1.02	4.37
Athlone & Environs	0.06	0.28	0.96	2.24	0.92	4.46
Ballyshannon & Environs	0.03	0.28	1.16	2.11	0.9	4.48
Charlestown-Bellaghy	0.06	0.4	0.91	2.32	0.89	4.58
Roscommon & Environs	0.06	0.36	1.04	2.01	1.12	4.59
Strandhill	0.04	0.63	1.12	1.81	0.99	4.6
Ballygar	0.02	0.4	0.91	2.51	0.84	4.69
Carrick-on-Shannon	0.05	0.39	1.15	2.21	1.08	4.88
Ballaghaderreen	0.04	0.27	1	2.47	1.19	4.97
Average	0.05	0.35	1.01	2.10	0.95	4.45

Proximity to Hubs generally reduces car travel and waste dependency

Local Ecological Footprints (Foley, Carragher & Peters)



Car Lock-in

- ¾'s of ALL journeys use the motor car
- Just 6.1% of journeys have a passenger

Mode of travel	2012	2013	2014
	%	%	%
Private car - driver	70.4	69	69.1
Private car - passenger	6.1	5.8	5.3
Walk	13.6	15.4	14.8
Bus	3.9	3.8	4.4
Cycle	1.2	1.3	1.6
Rail / DART / Luas	1.3	1.5	1.4
Taxi / hackney	0.8	0.9	0.9
Lorry / motorcycle / other[1]	2.7	2.5	2.5
All modes of travel	100	100	100

https://www.cso.ie/en/releasesandpublications/ep/p-nts/nationaltravelsurvey2014/keyfindings/

Context for these footprints

- Density of the built form is low
- Frequency of rural bus services and poor shelter
- Poor predictability of buses
- Busy trains are efficient
- Low footprint

- Trains have poor national coverage

Context for Transport

- **Lock in to the motor car (commuter towns with double EF)**
- **Lock in to convenience** – virtually no passengers
- Recent **strong private competition** on major bus routes
- **Busy buses are efficient low transport footprint**

Context for Transport

- Locally produced **biodiesel & bioethanol - disincentivised**
- Approximately **10%** of what we buy in forecourt is biofuel
- **EV charging network** is currently unpredictable
- Charged/charging car where you need to be, **chargers busy**
- **Some not working**
- Can charge at **home**
- **EV cost is high**
- **Running costs are low**
- **Maintenance is low**
- **Car tax is low**
- **Solar PV charges car**

Tranpsort Footprint (Foley, 2006, Carragher & Peters, 2018)

- Vehicle ecological footprint based on **km travelled**, **passenger numbers, and uplift** due to: maintenance of vehicle, scrappage of vehicle, road laying and maintenance.
- **Degraded land** factored in due to road and parking space

- **Average distance travelled per year is about 18,000km**
- Car EF for this is **1.3gHa**
- Bus EF for this is **1.18 gHa** (due to low passenger numbers)
- Train EF is **0.49 gHa** (some trains run beyond their design numbers)
- If buses had more passengers their EF would be lower
- **Public transport can be close to a third of the impact of the car!**

Flights

Aeroplane approximately 700km/h, **faster and travels further**.

Distance is critical as emissions are often not felt.

Low infrastructure (airport) so distances have significant impact.

Distances estimated using an electronic calculator called Mapcrow, calculates linear one way distance (http://www.mapcrow.info).

Fuel Tank Sizes

Car 50 L

Boeing?

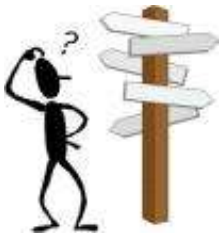
100 L

1000 L

10,000 L

100,000 L

200, 000 L



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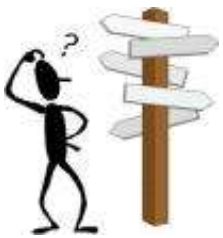
Fuel Tank Sizes
Car 50 L

Boeing?
100 L
1000 L
10,000 L
100,000 L
200, 000 L
4000 times bigger, 200 passenger, 1000L each



Flights

Travelling in **economy** class reduces your footprint

No bags reduces it too

Number of passengers is critical too, this reduces pkm impacts relative to other modes

Two uplift factors one for maintenance and manufacture (1.45), and another for the extra fuel entailed in international travel (1.68) providing an uplift factor of 2.44 (Carragher, 2011)

travels 14 times further in an hour

1 hour – 50km

1 hour - 700km

Flights

One trip to Sydney can increase your transport footprint 8 fold

Destination	Distance km	Total gHa
London	938	0.06
Rome	3764	0.23
Sofia	4942	0.30
Canaries	5830	0.36
San Francisco	10156	0.74
Florida	11432	0.84
South Africa	19538	1.43
Sydney	34408	2.52

Reducing your Transport Footprint

On average a bus or train has 10 times less impact on the environment than a car per km therefore we need to walk, bus, bike and use trains more - these are sustainable choices.

Actual carbon emission figures vary according to the type of vehicle and the number of people using it. **Intercity coaches are best – as low as 20g of CO2** per passenger kilometre. These coaches travel long distances and often carry large numbers of passengers. This makes them the best form of travel if one wants to avoid carbon dioxide.

Reducing your Transport Footprint

Our air travel is much more polluting than our car journeys. As well as carbon dioxide, **jet engines emit oxides of nitrogen and huge quantities of water vapour** which are powerful warming agents. The contrails (stream of water vapour) in the picture are **released at an extremely damaging part of the atmosphere**. As a result of these extra emissions, it is now thought that air travel emissions are about **three times as bad** as the simple carbon dioxide output might suggest. Our flight footprint calculations are conservative and take the CO2 emissions and degraded land into consideration only.

One return flight to the US will double the emissions of a year's car use

Reducing your Transport Footprint

There is no end to the growth of cheap air travel, it is is immensely popular and many **governments are willing to build airports to accommodate air travel**. The consequence of unconstrained growth of aircraft emissions, **even at the relatively modest rate of 2.5 per cent compounded a year, is to double aircraft emissions in the next 30 years.**

shorter distances travelled

Ferrys: **18g CO2 per pkm**
Short haul flights: **91g CO2 per pkm**
Long haul flights: **109g CO2 per pkm**

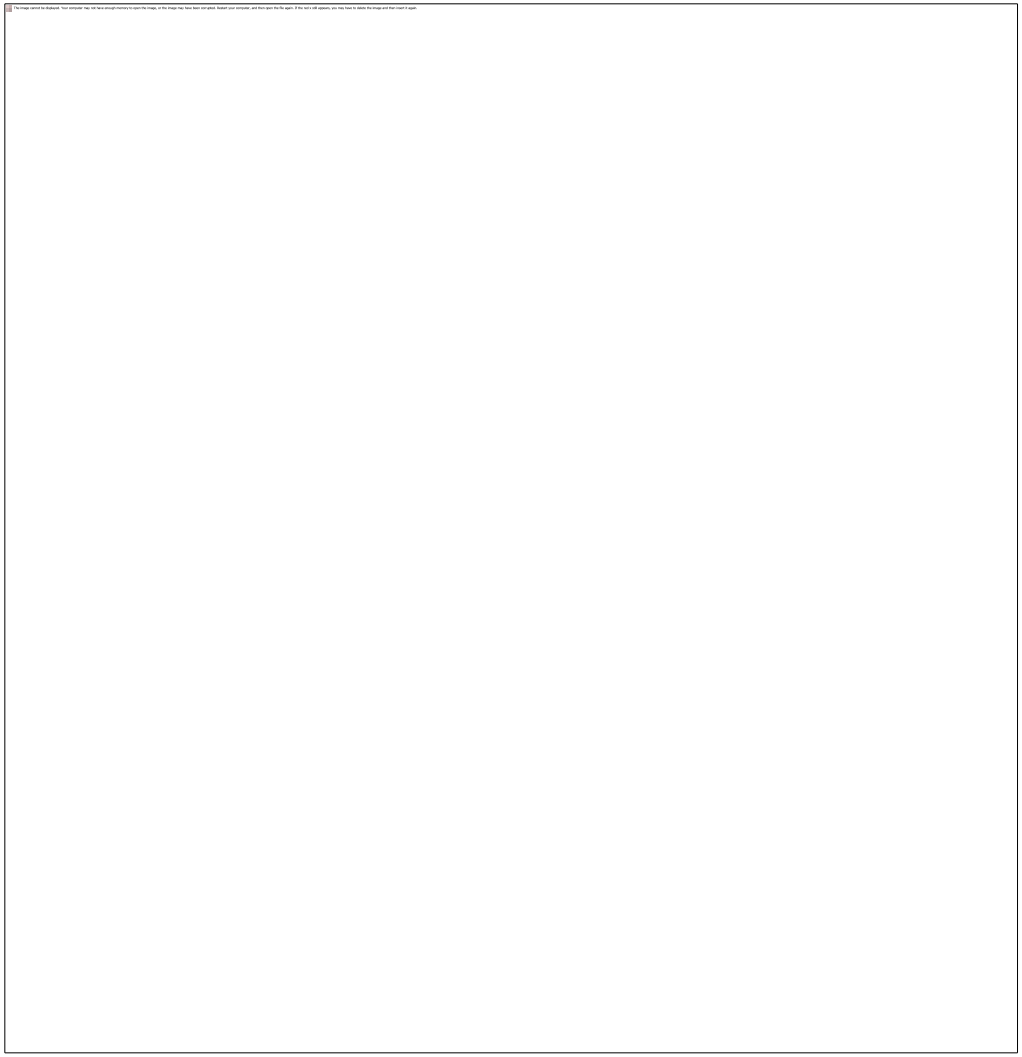
Reducing your Transport Footprint

Some of the quotes of people using ferries instead of planes are: **‘It was a fun holiday’,** ‘The ferry was nice and spacious’, ‘We saw a lot more than we would on an air trip’, ‘We had some time in Nice and Lille, including a good breakfast on the way back with another family we'd met’, ‘The view of Nice and the Cote D'Azur from the boat was wonderful’ **‘We never had a moment's sense of being herded through the travel process**’ & ‘There was plenty of time at every stage’.

Irish Transport Policy Since the Millenium with Policy References on right

EU-related: New Passenger Car Labelling on fuel economy rating (1999/94/EC)	2001	YES
EU-related: Promotion of Biofuels or other Renewable Fuels for Transport	2005	YES
Speed Limits	2005	YES
Transport 21- Capital investment in Infrastructure	2006	YES
Advice to Fleet Managers	2007	YES
How Clean is Your Car?	2007	YES
Emissions based vehicle registration tax and annual motor tax for private cars	2008	YES
Mineral Oil Tax (excise duty change)	2008	YES
EU Standard, 3% biofuel with 10% by 2020	2008	YES
Increse aviation efficiency through international cooperation	2008	YES
Smarter Travel Plan (investing in infrastructure)	2009	YES
National Cycling Policy Framework (increase cycling 2% to 10%)	2009	YES
EU Standards new cars 130 g (2015), 95 g CO2/km (2020)	2009	YES
Eco-driving bus & train. Efficient scheduling.	2009	YES
Private car scrappage scheme - up to €1500	2010	YES
Eco-driving Awareness Campaign	2010	YES
Electric Vehicles - €2,000-5,000 grant	2011	YES
Biofuel Obligation Scheme	2011	
EU Standards new Light Duty Vehicles 175g (2017), 147 g CO2/km (2020)	2017	YES

Recent Irish Policy – Climate Action Plan, 2019



Funding for Greenways

https://www.gov.ie/en/news/bb7931-ministers-announce-funding-call-for-more-greenways/

Case Study 1 – Zero Transport Emissions

Knocknacarra Cycle Bus, email: galwaycyclebus@gmail.com

Healthier

https://www.facebook.com/pg/Galwaycyclebus/photos/?ref=page

A dedicated school cycle bus serving the community of Knocknacarra.

Services during school term

Others: Dublin Cycle Bus, Ballina School Walking Bus

Issues with safety and car curtailment

Emissions effectively zero

Aluminium bikes have high manufacturing emissions

Lobby for improved cycle ways

881,000 bikes in Amsterdam; more than one per person

Case Study 2 – Zero Transport Emissions

Community Bikes, Clonakilty

Case Study 3 – Zero Transport Emissions

Mheitheal Rothar, Galway City

Facebook: @AnMheithealRothar

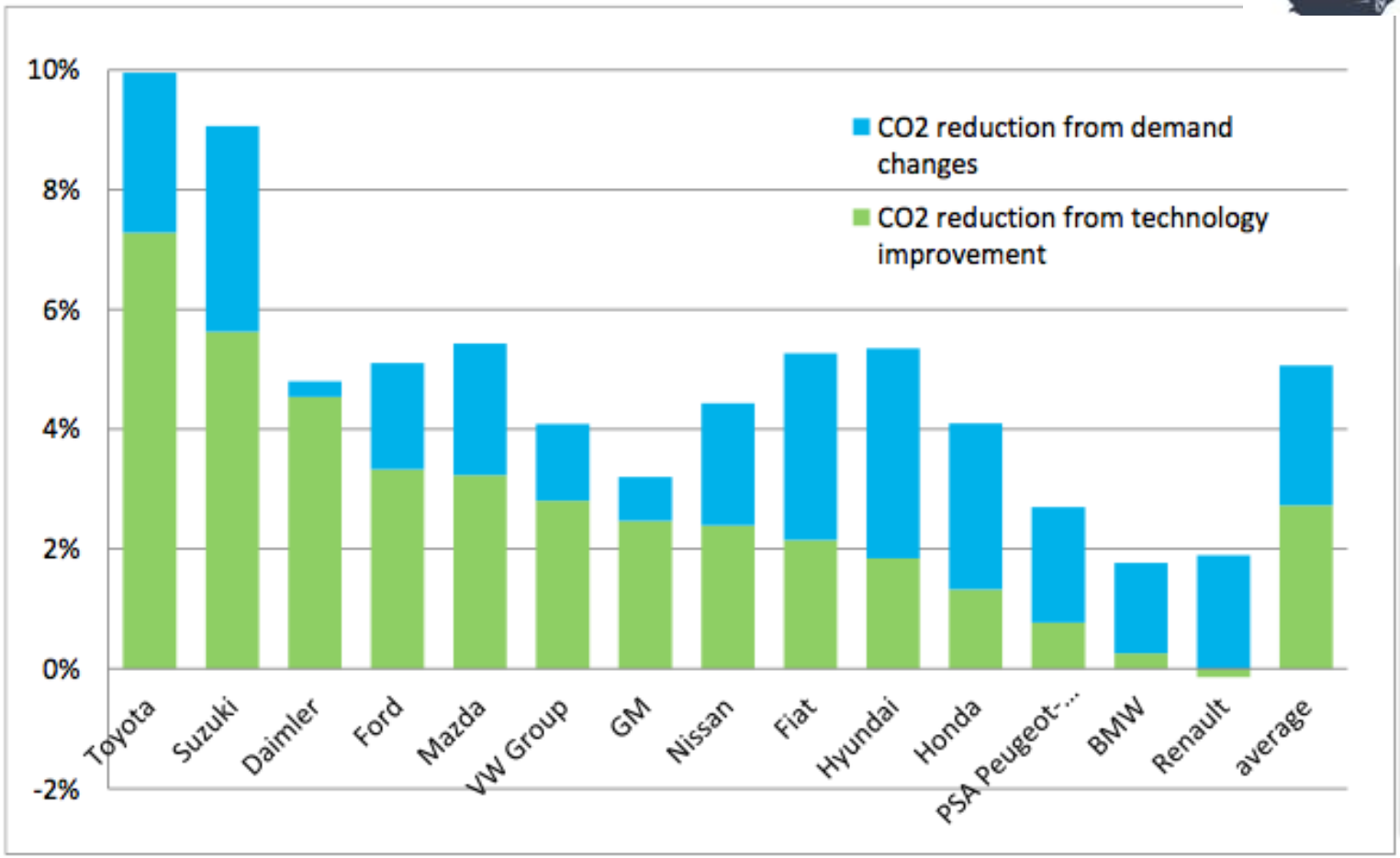
Case Study 4 – Rural Transport – When you Need it

Clare Accessible Transport

http://clarebus.ie
https://locallinkmayo.ie. - anybody used this?

Breakout Session – What is your Travel Footprint?

Decrease of emissions – 2 ways



Source: Transport & Environment 2010

Supported by INTELLIGENT ENERGY EUROPE

Contract: IEE/09/688/SI2.558236
Duration:17.04.2010 to 16.04.2013
Created: 10.03.2011

Cleandrive and Eco-Driving

https://ec.europa.eu/energy/intelligent/projects/en/projects/clean-drive

The next 3 slides carry some of the eco-driving measures from Cleandrive – an Intelligent Energy Europe project

Reducing your Transport Footprint

Reducing the most **inefficient journeys** – **3 miles or under**

Benefits the pocket and walking or cycling benefits the health

Save a tonne of CO2 and **€1000 per year by sharing your journeys,**

Cloughjordan share journeys and cars…..

For cars which turn off at traffic lights – its **best not to deactivate this**

For cars that do not automatically turn off when idling, switch off if you will be stopped for more than **9 seconds**

Reducing your Transport Footprint

Plan ahead by combining trips (shopping, school runs etc.), use less congested routes & avoid rush hour

An energy-aware driving style can save 13% on fuel and emissions

Inflate tyres correctly to manufacturer's recommendation

Avoid harsh acceleration or heavy breaking also slowing down in good time saves fuel, **smooth style around bends**

Cars are parked 95% of the time, do you need a second car? In Belgium neighbours buy the second car between 2 houses

Reducing your Transport Footprint

The **sun-roof** fully open consumes up to **4%** more fuel, half-open - 3%

A roof rack can increase fuel consumption by **40%** and a **cycle rack with two bicycles by 10% - 15%**

Use **air-conditioning** sparingly – it increases fuel costs

Rear screen heater's increases fuel consumption by **3% - 5%, so switch it off when the window is demisted**

Front windows half open consume more fuel at higher speeds so use the air vents instead

Reducing your Transport Footprint

Do not carry **unnecessary weights in the boot**, clean it out!

The average new car emits **120g** of carbon dioxide for every kilometre.

SUV's can emit a staggering **330g** carbon dioxide per km.

Work from home, whenever possible, and use video conferencing

Why consume 2 litres of petrol to but one litre of milk?

Before the days of fossil fuel Rudolf diesels engine ran on **vegetable oil**

& **Henry fords** first model T car ran on **bioethanol.**

Currently **10%** of our fuel mix is imported biofuel

Compare cars on sust-it.net

Reducing your Transport Footprint

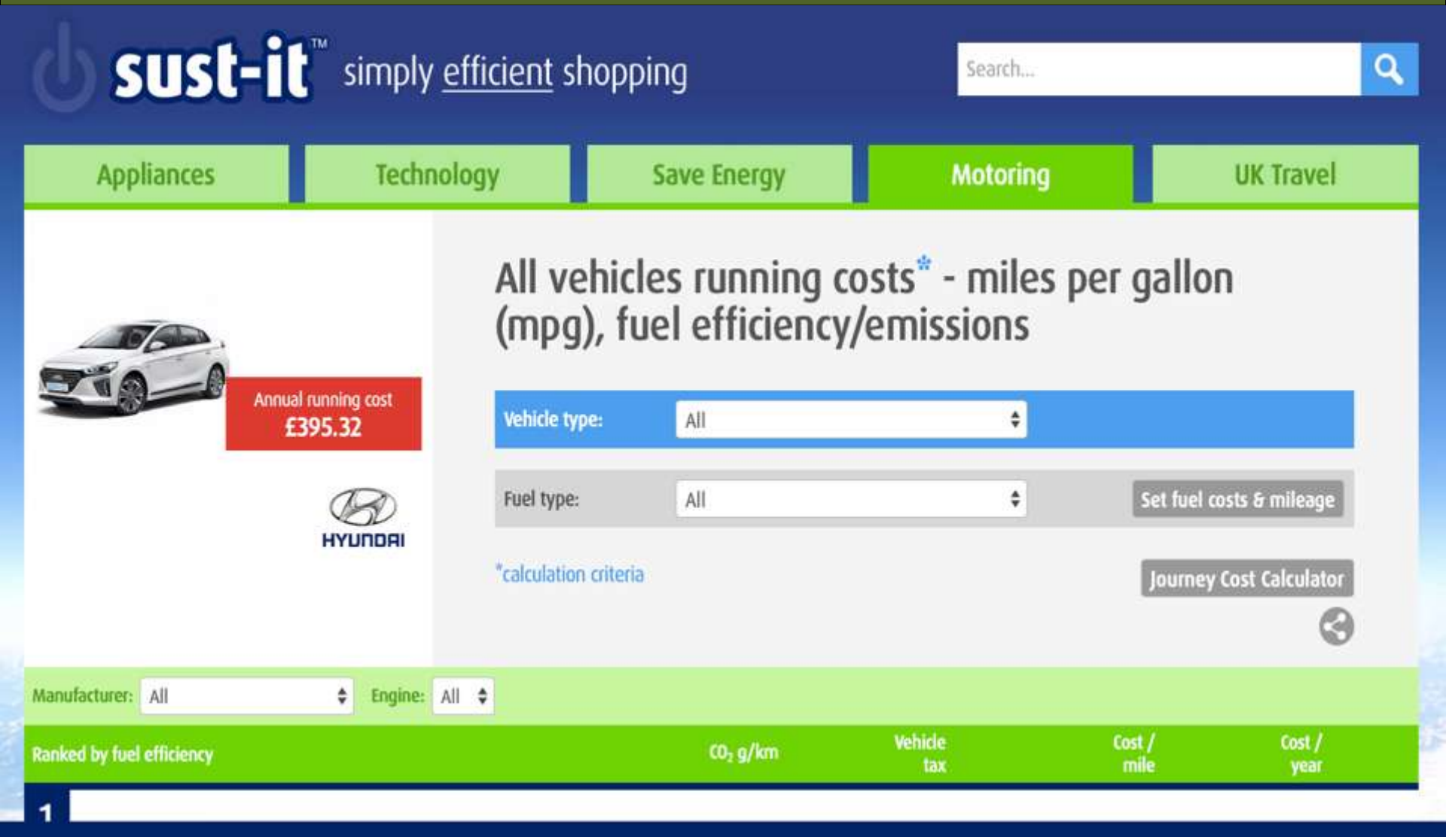
Case Study I: The Foleys, Shoreside, Ballina- and their Sustainable Transport choices

Our last 3 surveys told us that Caroline and Liam have made sure that carbon dioxide emissions from their transport habits are smaller than most others in Ballina. Their small emissions have been due to their careful use of the train and buses for some of their weekly transport. In the past Caroline has used buses for 70 miles per week and trains for about 250 miles per week. This conscientious sustainable behaviour also saves time as she was able to work, read or even rest while in traffic free transit. There are times when buses and trains do not fit into our busy schedule but a small increase in their use would really help reduce our transport emissions in Ballina and bring with it the obvious benefits in terms of reduced global warming, increased social and health benefits and traffic relief. The choices made by this family have meant that their travel has caused only 20g of carbon dioxide emissions per mile instead of maybe 300g of carbon dioxide emissions per mile in an SUV car. This is 15 times better for the environment!

Case Study II: The Bourke Family, Grange Road, Ballina

For Fiona and Ger not many of their weekly car trips are inefficient, at 3 miles or under, and this reduces car fuel use and emissions. Close to 2/3's of our time while driving is spent in the car alone whereas only 1/6 of the driver's time is spent alone in the Bourke family. These transport habits are extremely sustainable and they produce over 5 times less emissions than other Ballina residents. Also walking about 10 miles or so a week saves on fuel and emissions for their family.

Buying a Low Emissions Car



https://www.sust-it.net/miles-per-gallon-mpg-fuel-efficient-cars.php

Electric Vehicle Running Costs and Grants

- EV - **lowest car tax** at €120
- EV – for every €10 it costs to run a diesel its just **€2.60 to run an EV**
- EV and plug in hybrid **grants** https://www.seai.ie/grants/electric-vehicle-grants/ can be €2-5,000, depends on cost of EV
- EV **home charger grant** – up to €600 https://www.seai.ie/grants/electric-vehicle-grants/electric-vehicle-home-charger-grant/
- EV **business cars** https://www.seai.ie/blog/electric-car-for-business/

Electric Vehicle Running Costs and Grants

- EV Car comparison resource (EVs and Hybrids)
  - **sust-it.net**
  - https://www.seai.ie/grants/electric-vehicle-grants/grant-eligible-cars/
- Range anxiety early Nissan Leaf 2012 – 140km per charge
- **New Leaf (385km), Hyundai Kona, Kia Soul > 400km on a charge.**
- **Peugeout 106, Opel Corsa and Renault Zoe less expensive <300km**
- Always leave home with **enough charge to get back**
- **Charging is free** (except for fast charge), as is the **parking, tolls** too soon!

Mayo County Council Electric Vans (CARO, 2019)

January 2019, CEO of Mayo County Council, **Peter Hynes**: "…… I am proud that we are moving on to the next phase of the transformation of this organisation to being more **energy efficient, greener, more environmentally aware and more environmentally friendly**".

12 EV's on Inis Mor

Population 845

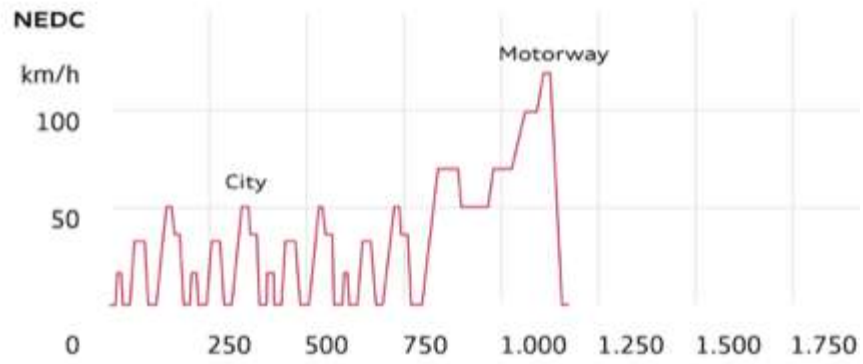
Hybrid Urban versus Rural

Worldwide Harmonized Light-Duty Vehicles Test Procedure

Toyota Prius
Battery Range: 63km
Petrol: 1798cc
Kerb weight: 1317kg

Renault Megane
Kerb weight: 960kg

New WLPTP Testing



Hybrid performs best under the WLTP conditions. But if it was just motorway driving do you think the hybrid which is **38% heavier** would be more efficient?

Buy a car with a low CO_2 per km but also **low weight** if you drive large distances mostly, for urban driving hybrids are very good.

DRIVE FOR GREEN

Route - **Ireland (Mayo) – UK – France – Belgium – Netherlands – Germany – Denmark – Sweden – Finland - Russia – Kazakhstan – Mongolia – China – Russia – USA – Canada - Greenland – Iceland – Ireland (Mayo)**

*It will be fantastic to have an opportunity to **showcase your business's commitment to Climate Action and Sustainability** in an innovative, exciting and positive way!

- **National and Regional TV**

  Late Late Show

- **Radio and Newspapers**

- Social Media Influencers of 10,000,000+ followers
- **Guarantee**

Virgin media

THE IRISH TIMES

Irish Examiner

RADIO

Independent.ie

100 102 TODAY fm

BBC NEWS

BioNETT

Intelligent Energy Europe Project
https://ec.europa.eu/energy/intelligent/projects/en/projects/bio-nett

Developed local biofuel chains, Rapeseed Oil **farms** and **refining**, PPO in MWRA, South Tipperary, Limerick and Cork. The Biofuels Obligation Scheme and its licensing favoured import, not indigenous oil, and has killed the farms and the processing plants.

Biogas plant in Murcia uses wastewater to produce methane and runs 4 vehicles at 420km each.

Biogas in Kalmar (60,000 people) runs 15 buses and enough for 300 more cars

Case study for a Hydrogen car in Ireland

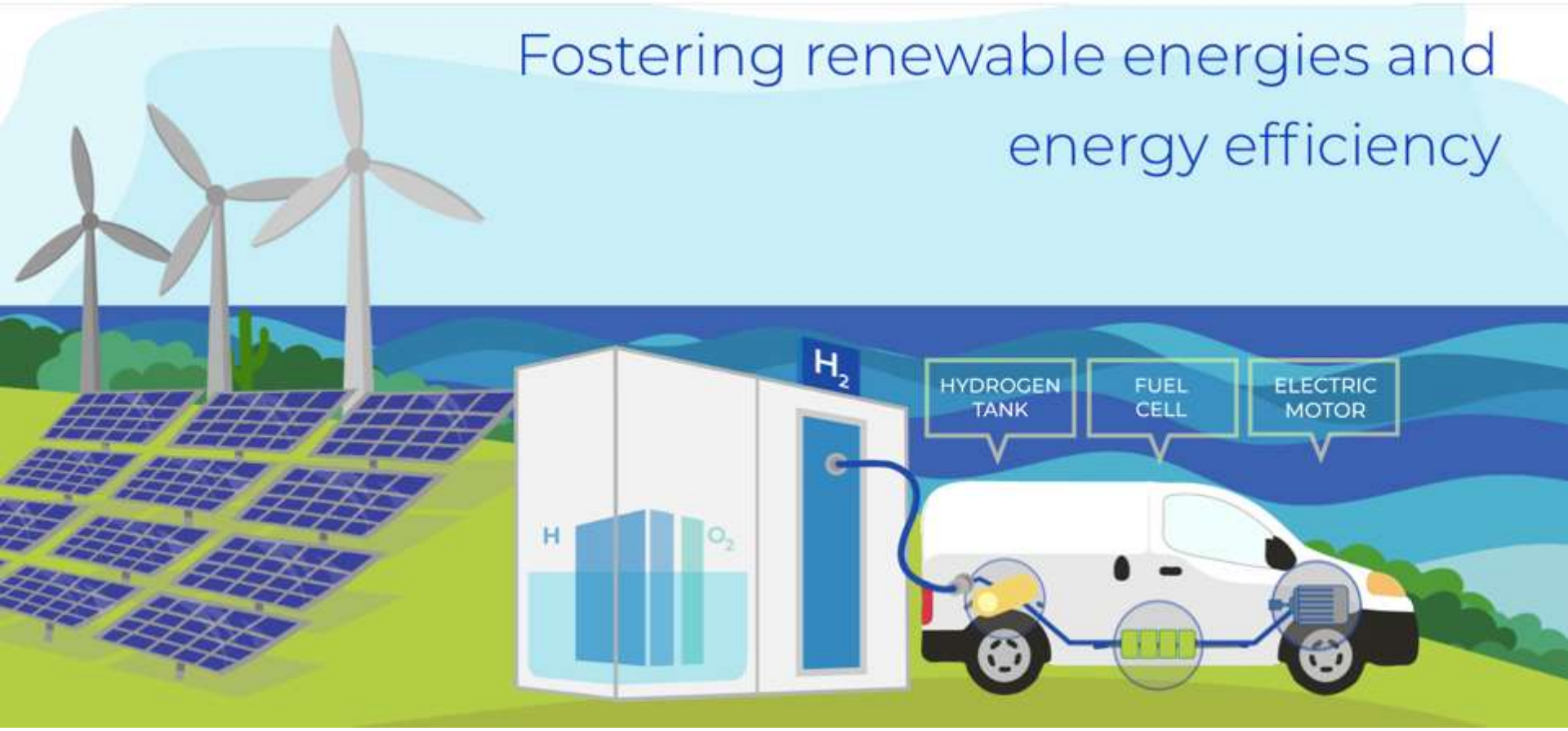
'A Hydrogen Roadmap for Irish Transport 2020-2030-Hydrogen Mobility Ireland'.

The report presented in Dublin to Richard Bruton, TD, Minister For Communications, Climate Action and Environment gives the green light to hydrogen vehicles including **30 buses, 50 cars and 10 trucks being on Irish roads by 2023**.

Here is the Hydrogen car which We drove with the **Minister of DCCAE** – he was impressed!

Projects like **GENCOMM** https://www.nweurope.eu/projects/project-search/gencomm-generating-energy-secure-communities/#tab-4

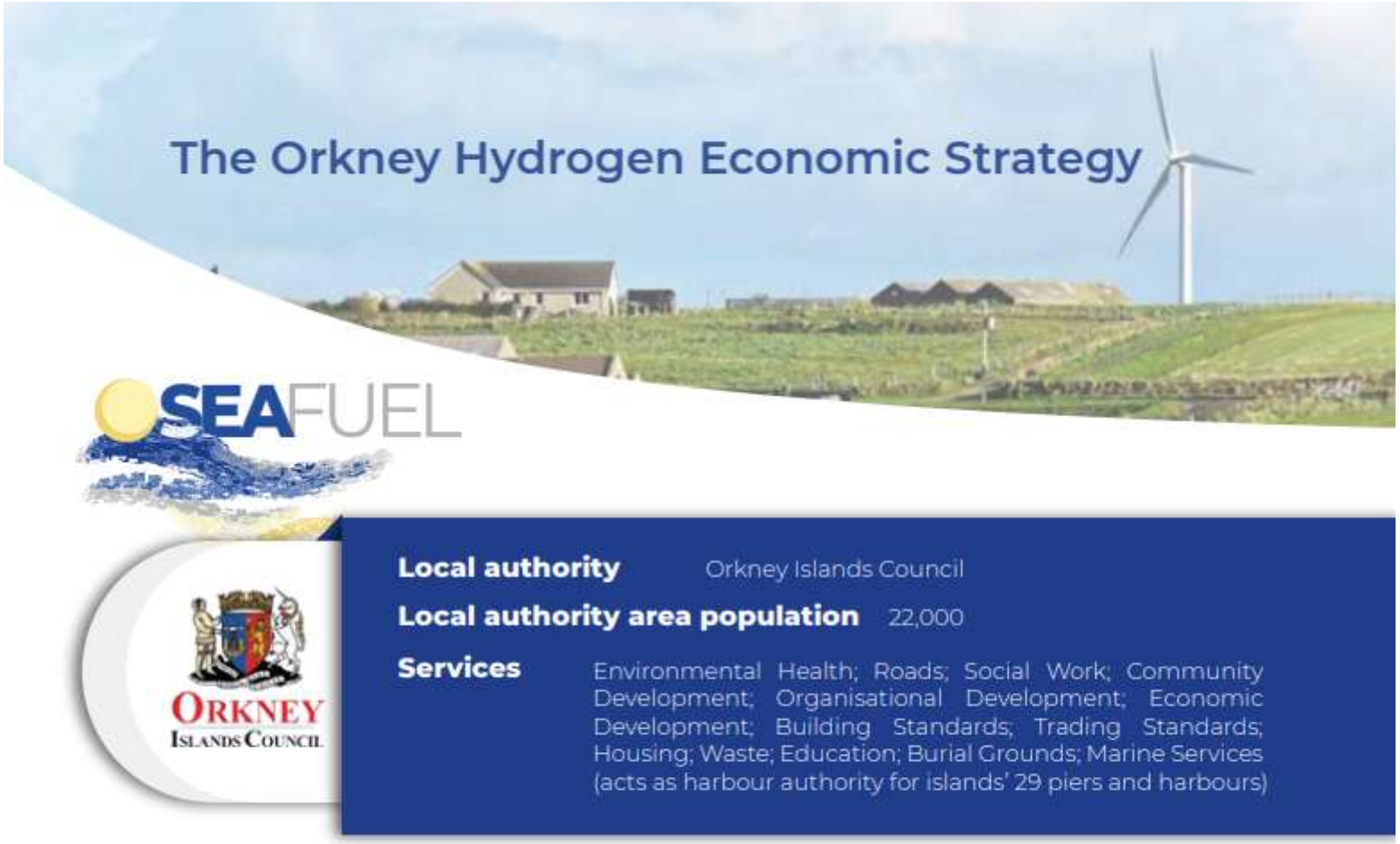
Case study for Hydrogen Solutions on the Aran Islands



Project website: http://www.seafuel.eu

- **Feasibility on Valentia Island**
- **Feasibility on Inis Mor**

Feasibility for Hydrogen Solutions on the Aran Islands



Orkney Island Case Study

http://www.seafuel.eu/wp-content/uploads/2019/10/Orkey.pdf

Cloughjordan Ecovillage, Tipperary

Cloughjordan Ecovillage, Tipperary

- Car inhibition, impeding – narrow roads, slow progress
- Inconvenient - shopping
- Planning
- EVs
- Train Station
- Go-car
- Journey sharing
- Car sharing

Sliabh Beag Community Hotel, Monaghan – Why Fly?

Reducing tourist distances, keep recreation local

Community Fund – supports Sustainable Transport

2020 call has opened its €20 million fund, if your community needs homes and community buildings retrofitted then review this link: https://www.seai.ie/grants/community-grants/project-criteria-and-funding/

2019 call results

In 2019, SEAI supported 57 projects under the Communities scheme. €25.3million is the total government funding invested. This will help support energy efficiency upgrades in 698 homes and 570 non domestic buildings. Total project costs will come to €65.8 million.

Cumulatively the programme has now supported upgrades in 18,200 homes and 2,570 non-domestic buildings.
34,676 tonnes CO2 emission reductions annually
122.5 GWh total energy credits saved (obligated energy suppliers)

Case study – Smarter Travel

- Westport was chosen as a winner in a national Smarter Travel competition and allocated funding
- **€5.3 million** funding to transform Westport 2012- 2016.
- **Changing infrastructure, and developing campaigns and incentives to change attitudes and perceptions.**
- **Aimed to reduce car transport**

http://www.westportsmartertravel.ie

Case study – Smarter Travel

http://www.westportsmartertravel.ie

Case study – Smarter Travel

WESTPORT Town Council and Mayo County Council, by way of a plan to adapt and redesign the natural and built environment, won a bid for Westport to become a Smarter Travel Demonstration Town. This provided the resources to further utilise an old railway line linking the town centre to the Quay area.

The end result today is greenways and pathways encircling the town linking residential areas to schools, work places and the commercial centre. These new greenways have set a precedence in reshaping the design of urban areas to promote health and well-being. The greenways offer a viable alternative to the car in preference of cycling and walking.

Not since the 1970's has a safe, convenient and useful method of transport existed since cars and trucks took over the roadways of Ireland.

Darren Cawley

▲ Westport Schools celebrating Bike Week

http://www.westportsmartertravel.ie

Case study – Smarter Travel

A PERSONAL STORY

FOR me personally I cannot overstate the benefits of cycling both on a standard bike and an electric one. In recent years I have suffered from various health problems and also had a major accident. Truthfully, cycling has been an absolute lifeline. It's been my physio and my favourite leisure activity. Recently I've been testing out the electric bike and find it particularly beneficial on the days when my pain level is highest. I would recommend cycling to everyone.

- Richard Bermingham

► Noel Gibbons, Mayo Raod Satey Officer, enjoying a cycle around Westport with his daughter Aisling.

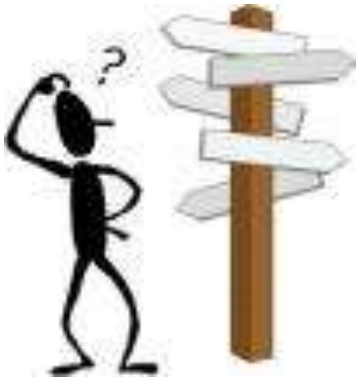
▲ Ben Cooper leads the Legends Cycle into Louisburgh last week.

http://www.westportsmartertravel.ie

Breakout Session – What can we do to reduce transport footprints?

Breakout Session – What can we do?

What can individuals and communities do to reduce their transport footprints?

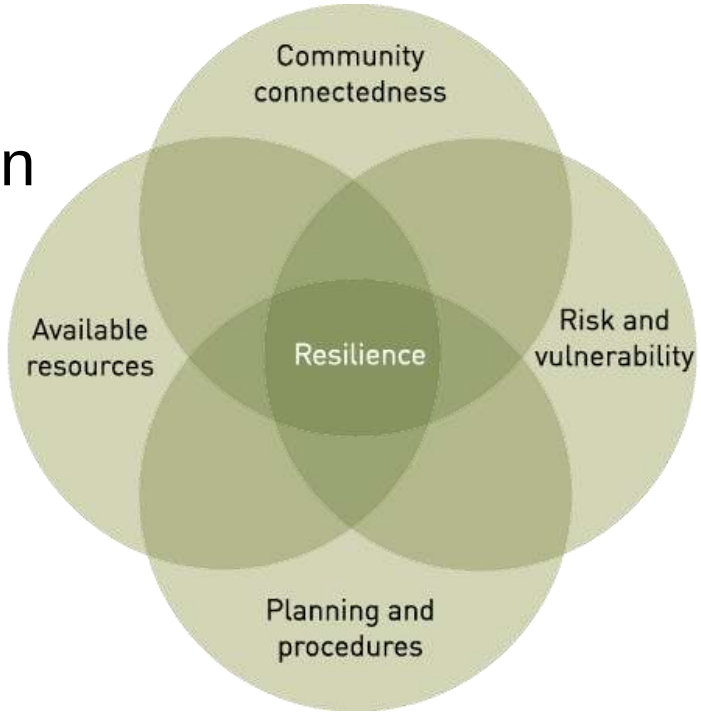


Your ideas?

Breakout Session – What can we do?

Resilience is strengthened when you work with your Local Authority and generate and submit to plans, local, regional and national:

1. Community Futures Plans
2. County Development Plans
3. Climate Mitigation Strategy Plan
4. Local Economic and Community Plan
5. Biodiversity Management Plan
6. Peatland Management Plan
7. Conservation Action Plan (CANN)
8. Surface Water Management Plan
9. Neighbourhood Climate Action Plan
10. Business Continuity Plan
11. Community Resilience Plan
12. Invasive Species Management Plan



Arbon, 2014. Developing a model and tool to measure community disaster resilience https://ajem.infoservices.com.au/items/AJEM-29-04-04#sthash.DitYa9i5.dpuf

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energyco-ops.ie

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