

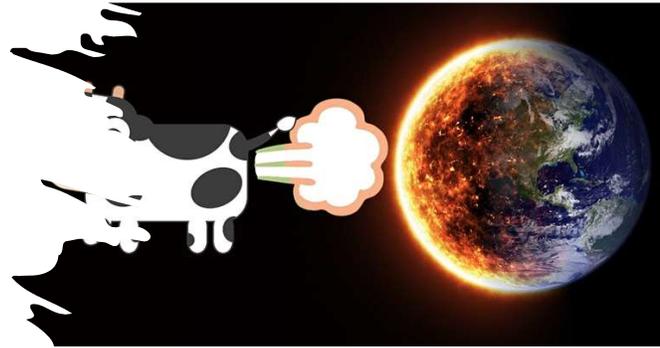
SECA Knowledge Sharing

Methane's role in the climate and ecological emergency - a neglected factor?

Danny Lee

Trustee at

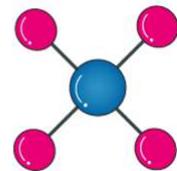
Winchester Action on Climate Change (WinACC)
and
Petersfield Climate Action Network (PeCAN)



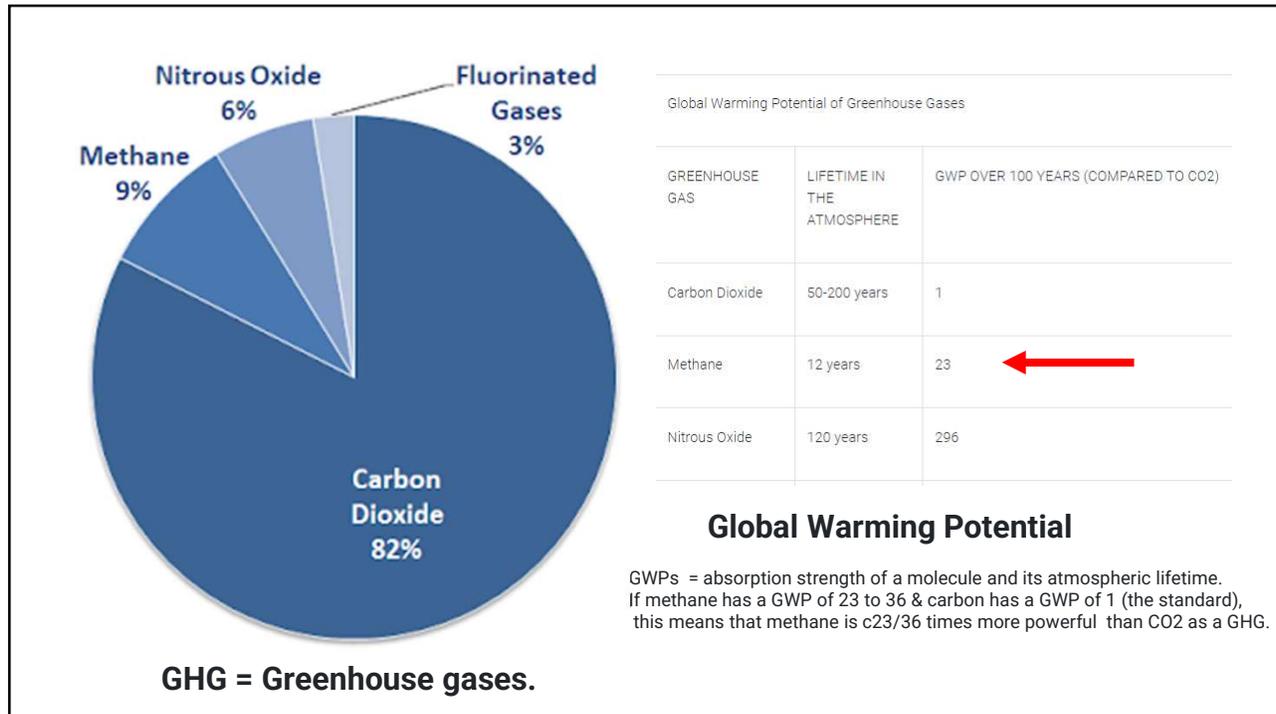
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What is Methane

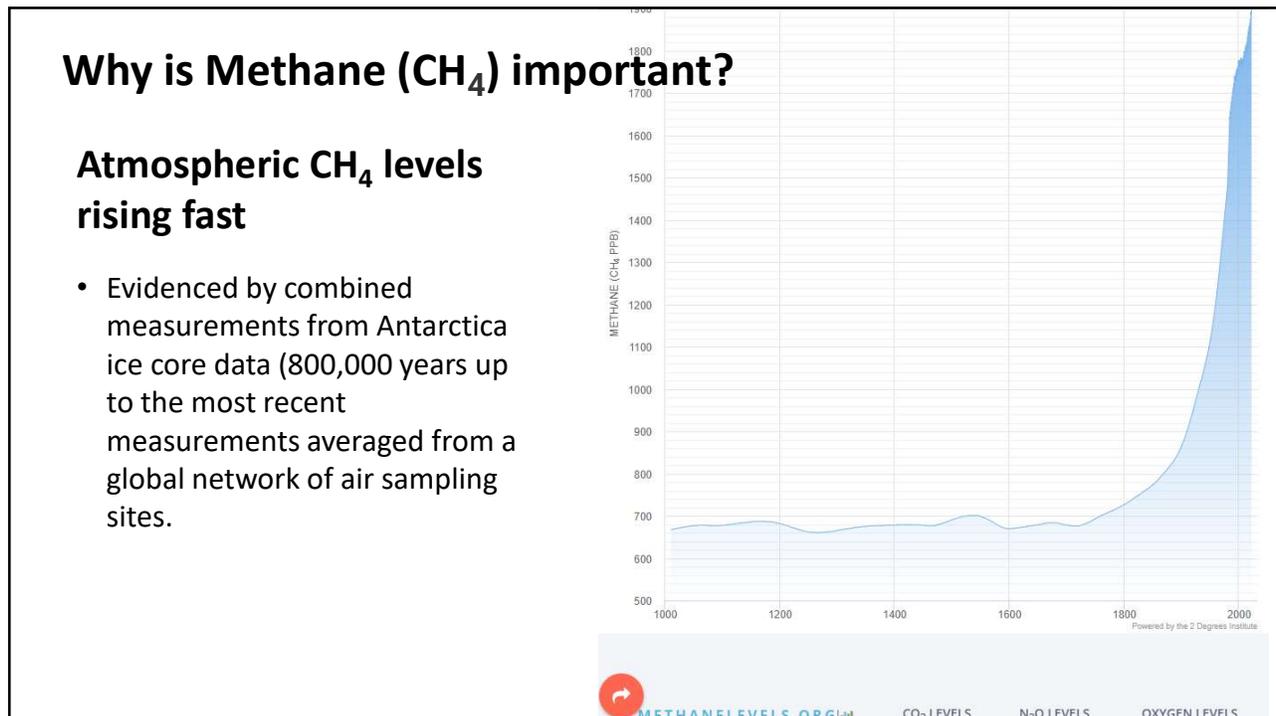
- Simplest saturated hydrocarbons with a chemical formula CH_4
- Odourless or has a sweet oil type smell and has no colour
- A flammable non-toxic gas but...
.... can become deadly when mixed with other gases. CH_4 displaces oxygen to induce asphyxiation.
- If CH_4 spills into the air before being used/captured
 - absorbs heat from the sun, warming up the atmosphere hence it is a **greenhouse gas**, like carbon dioxide



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International Panel on Climate Change (IPCC) Working Groups (WGs)

Three IPCC WGs prepare reports on Climate Change:

- **WG 1** focuses on the physical science - past, present, and future climate change.



First report August 2021 - Code Red for humanity. Methane (CH₄) in the spotlight

- **WG 2** assesses climate impacts. [Second report February 2022 - Adaptation and vulnerability.](#)
- **WG 3** focuses mitigation and greenhouse gases removal from the atmosphere. [Third report in April and will consider ways of cutting emissions.](#)

SYNTHESIS - [Fourth report in October, before the November Cop27 UN climate conference in Egypt, will draw together the conclusions for greater action.](#)

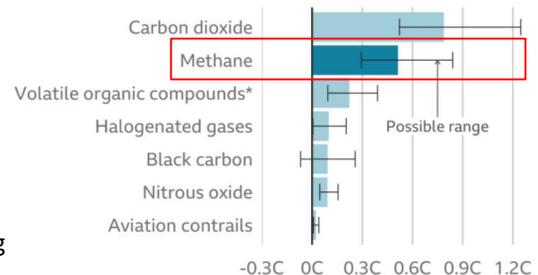
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Methane(CH₄) in the spotlight

WG1 report - Earth already warmed 1.07 °C due to Carbon dioxide and methane

- Carbon contributing 0.75° C and methane 0.5° C.
 - Other greenhouse gases are less important
- Sulphur dioxide emissions have contributed to a cooling of 0.5° C



Lowering methane emissions is critical to avoid a rapid warming as society reduces carbon dioxide emissions

- reduction in carbon dioxide is accompanied by a decrease in sulphur dioxide emissions.

Cutting methane emissions by 40 to 45% by 2030 would immediately slow the rate of global heating, and shave 0.3° C off the increase in global temperature by 2040. WG1 [UNEP report](#) May 2021.

Bottom Line - Failure to curb methane emissions undermines climate emission reduction goals!

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Why is Methane (CH₄) important?



**CLIMATE &
CLEAN AIR
COALITION**
TO REDUCE SHORT-LIVED
CLIMATE POLLUTANTS

- From multiple sources - human and natural.
- Second 'biggest' greenhouse gas (GHG) after carbon
- 23 to 36 more powerful affect on the earth's temperature/climate system than carbon.
- Accounts for c30% global warming since pre-industrial times & is proliferating faster now than ever before.
- Primary contributor to formation of ground-level ozone (O₃), a hazardous air pollutant.
 - Exposure O₃ causes [1 million premature deaths every year](#) and impacts on nature.
- Existence of readily available, low-cost targeted measures combined with methane's short-lived atmospheric lifetime means **significant climate/clean air benefits can be achieved by 2030.**

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Sources of methane

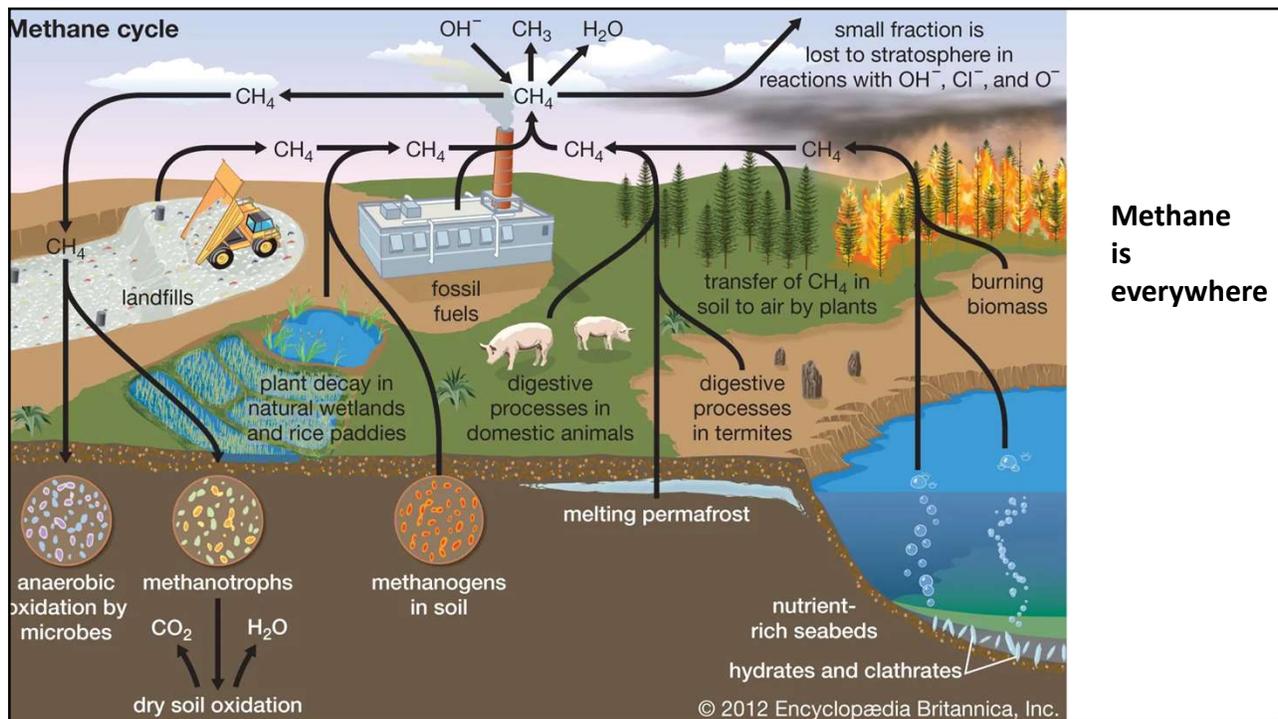


Human-induced sources of CH₄ (60%)

1. Agriculture* 37%
 - livestock and manure handling
2. Natural gas/oil production/coal mining 32%
3. Waste management -landfills etc. 11%
4. Other

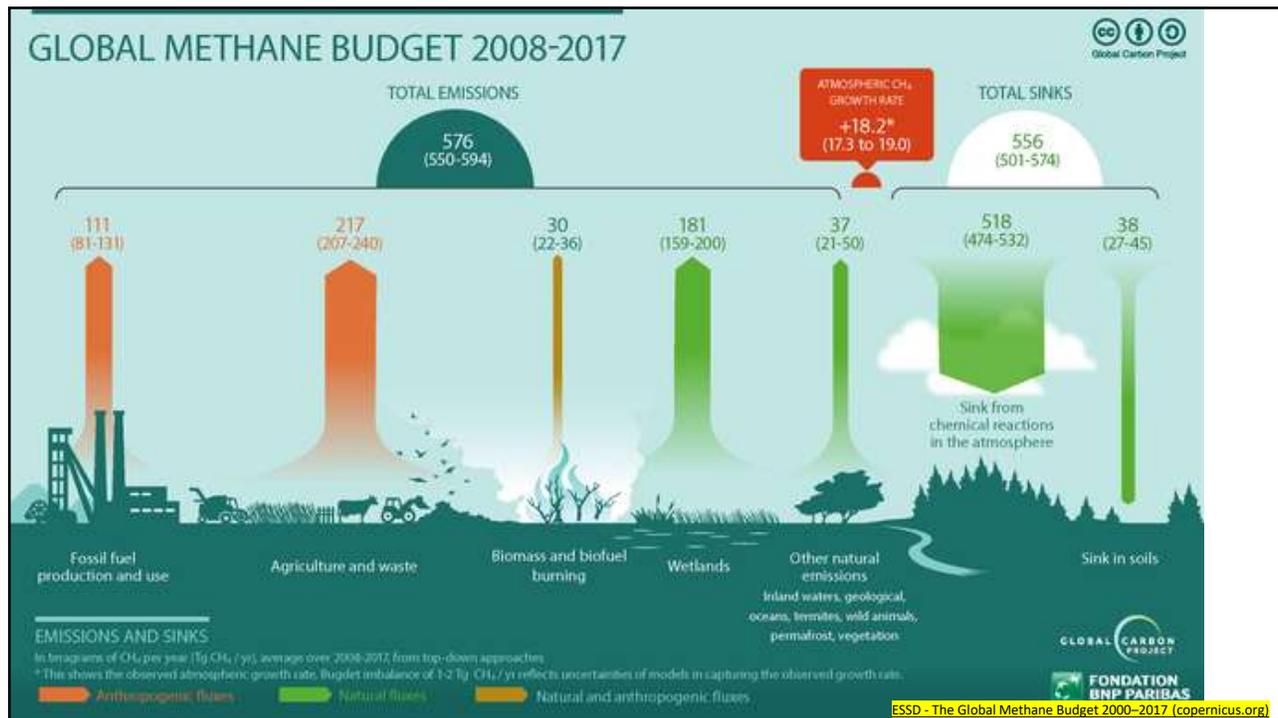
* Projected to grow by 30% by 2050
Source: Global Methane Initiative

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Methane is everywhere

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METHANE (CH₄)

Methane emissions caused by human activities are one of the most significant drivers of climate change. Methane is also the main precursor of tropospheric ozone, a powerful greenhouse gas and air pollutant.

SOURCES Methane is one of the fastest growing greenhouse gases in the atmosphere. Human activity causes 2/3 of emissions.

Source	Percentage
AGRICULTURE	42%
FOSSIL FUEL OPERATIONS	36%
WASTE	18%
OTHER	3%

% = global emissions

IMPACTS

CLIMATE Responsible for 40% of warming since the industrial revolution

86x times more powerful than carbon dioxide over a 20-year period

HEALTH Increasing emissions are driving a rise in tropospheric ozone air pollution, which causes 1+ million premature deaths annually. Methane is responsible for roughly 1/2 of these deaths.

- Respiratory diseases
- Heart disease
- Damaged airways and lung tissue

AGRICULTURE & ECOSYSTEMS

Up to **15%** annual yield losses of soy, wheat, rice and maize

LIFETIME IN ATMOSPHERE: 12 YEARS

Since methane does not last long in the atmosphere, efforts to reduce it will bring immediate benefits for the climate and human health.

www.ccacoalition.org/methane

[Methane | Climate & Clean Air Coalition \(ccacoalition.org\)](https://www.ccacoalition.org/methane)

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THE EARTH'S ATMOSPHERE

Layer	Altitude Range (km)	Key Features
TROPOSPHERE	0 TO 12 KM	Commercial aircraft, weather, clouds
STRATOSPHERE	12 TO 50 KM	Ozone layer (20-30 km), high-altitude balloons
MESOSPHERE	50 TO 80 KM	Meteor showers, auroras
THERMOSPHERE	80 TO 700 KM	Karman Line (100 km), satellites, space shuttle
EXOSPHERE	>700 TO 190,000 KM	Exobase (>700 km), outer space

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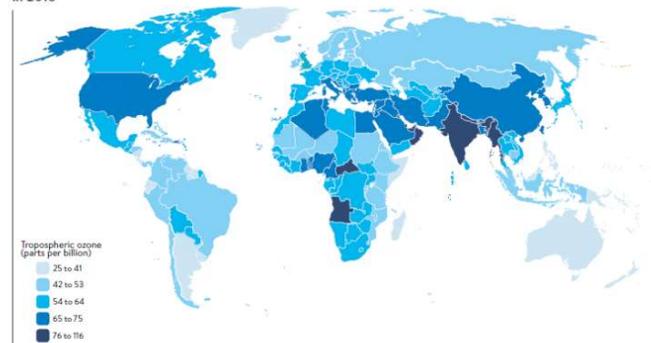
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Methane and Tropospheric ozone

- A short-lived climate pollutant
 - ☐ atmospheric lifetime of hours to weeks.
 - ☐ no direct emissions sources - a secondary gas formed by the interaction of sunlight with hydrocarbons – including [methane](#) – and nitrogen oxides, which are emitted by vehicles, fossil fuel power plants, and other man-made sources.

- affects the climate beyond increased heating impacts on evaporation rates, cloud formation, precipitation levels, and atmospheric circulation.
- Impacts mainly occur within regions where tropospheric ozone precursors are emitted, and so disproportionately [affect the Northern Hemisphere](#).

SEASONAL AVERAGE POPULATION-WEIGHTED OZONE CONCENTRATIONS in 2015



Source: Health Effects Institute, 2017

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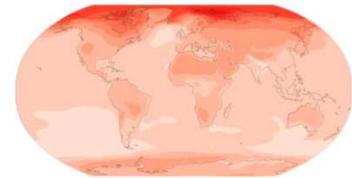
COP 26 – Glasgow Nov 2021



- **The US and the EU announced a global partnership to cut emissions of the greenhouse gas methane by 2030.**
- The Global Methane Pledge aims to limit methane emissions by 30% compared with 2020 levels (inc. UK).
- The pledge covers countries which emit nearly half of all methane, and make up 70% of global GDP.
- **Anyone seen the UK Methane reduction Plan? (for discussion)**

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Conclusion



- CH₄ has a key role in the climate and ecological emergency.
- It is more effective at trapping heat in Earth's atmosphere than CO₂. BUT breakdown is much faster.
 - Raises hopes that quick action can curb emissions to keep global warming below 1.5 C with dramatic cuts by 2030.
- Reducing human-caused CH₄ = one of the most cost-effective strategies to rapidly reduce rate of warming and with big health benefits.
- No integrated UK Action plan = neglected factor!

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End of Danny's Introduction

I will now over to Emily Mott (Weald Action Group)
for
'Methane emissions at various fracking sites'

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**Concluding remarks
after other speakers**

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STAY POSITIVE



Takes only about a decade for methane to break down. Reducing methane emissions now critical for helping keep the world on a path to 1.5°C.

What is the United Nations doing to help limit methane emissions?

- A lot. UN Secretary-General António Guterres convened the UN Food Systems Summit in September 2021 - to help make farming and food production more environmentally friendly.

How much methane can we really cut?

- Human-caused methane emissions could be reduced by as much as 45% within the decade.(cf COP26 30%). Avoids c0.3°C of global heat by 2045, helping to limit temperature rises to c1.5°C. Puts planet on track to achieve the Paris Agreement targets. [Global Methane Assessment \(full report\) | Climate & Clean Air Coalition \(ccacoalition.org\)](#)
- Every year, reduction in ground-level ozone would also prevent 260,000 premature deaths, 775,000 asthma-related hospital visits, 73 billion hours of lost labour from extreme heat and 25 million tonnes of crop losses.

[Methane emissions are driving climate change. Here's how to reduce them. \(unep.org\)](#)

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MORE POSITIVE NEWS

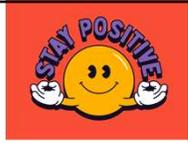


Can CH₄ be extracted from the atmosphere?

- bacteria can be used to extract methane from the air.
- Methane's intense effectiveness as a greenhouse gas, suggests elimination may be financially competitive with carbon capture, even if the technologies themselves are more expensive.
- Opportunity for 'Spend to Save'.

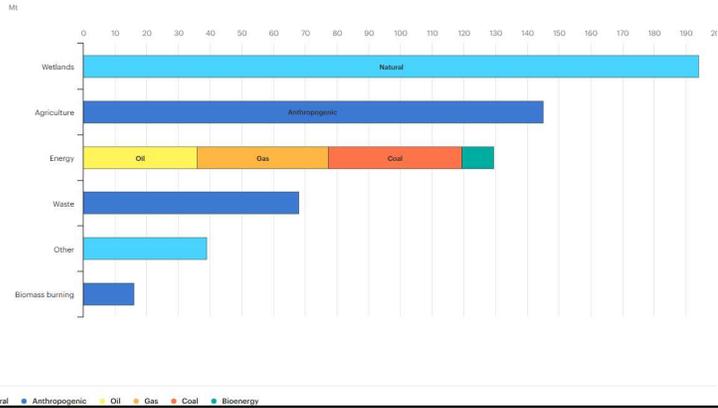
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International Energy Authority (IEA) Methane Tracker 2021



- The energy sector – including oil, natural gas, coal and bioenergy – is one of the largest sources of methane emissions, but efforts to reduce them have often been held back by a lack of reliable data.

Sources of methane emissions



- IEA launched its Methane Tracker in 2019 to reconcile the various and often conflicting sources of data into a coherent set of estimates.

[Methane Tracker 2021 – Analysis - IEA](#)

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THE TIMES

Wednesday March 16 2022 | thetimes.co.uk | No 73732

£2.20 £1.45 to subscribers

Suddenly, we've all warmed to green energy

Interest in wind and solar power is soaring but ministers must do more to help us build and pay for turbines and panels

Alice Thomson



Wear a jumper for Ukrainians, read the placard outside the embassy. Personal warmth has suddenly become political. There is no way Britain can contemplate buying Russian gas or oil. Kent dockers won't even unload the stuff. But Putin's war has offered a moment of clarity about how we want to heat our homes.

Bidding for oil and gas against the rest of the world, it's increasingly clear that Britain needs to be energy independent. We could squeeze more barrels from the ageing North Sea fields or Tory MPs can accept that mini tremors in their constituencies could be the price we'll pay for fracking. But we can't bring back the coal-fired power plants we blew up, nor should we chop down our newly planted carbon-capture trees to burn for warmth.

Energy prices are soaring and even the oligarchs appear to have turned off the underfloor heating before they fled their mansions. The young,

who can barely afford the rent for their shared accommodation, are stunned by their spiralling bills. Pensioners are panicking, the least well off are poleaxed. Factories, farms, hospitals, schools and airlines are also feeling the fear.

By next winter, poorer families will be freezing. This is in no way comparable with the plight of the Ukrainians, but we have to find an alternative and although it may sound as quaint as knitting our own jumpers in a blackout, green energy's time has finally come.

Even Nigel Farage may have to admit it. He thought he'd been so clever, splitting the Tory party again and creating a new divide for his ambitions by demanding a

Factories, farms, hospitals and schools are feeling the fear

referendum on net-zero aims. But campaigning to retain our cheap, dirty energy addiction already seems outdated.

Where Cop26 foundered in convincing everyone that the world needed more environmentally friendly alternatives to fossil fuels, President Putin has succeeded. According to a poll by the independent Energy and Climate

Intelligence Unit, 57 per cent of people said they thought the best way to eliminate dependence on Russia was to expand wind and solar power. Now the prime minister has called for a new energy security strategy. After all, he's going to have to pay if he wants to heat his swimming pool at Chequers this summer.

Last weekend we decided we should have solar panels. It seemed the obvious answer after we lost power during Storm Eunice. But everyone with a roof has had the same idea. According to Solar UK, which manufactures and installs solar panels, domestic and commercial inquiries have increased 50 per cent since Russia invaded Ukraine. "It's astonishing," the manager, Annette Soffley-Atkinson, told me. "Suddenly everyone wants one."

Insulate Britain, best known for its activists plugging their cheeks to the M25, looks prescient. The government wavered too long in drought-proofing homes and improving loft and wall insulation, but the pressure wasn't yet there. Now draught excluders in the shape of sausage dogs have sold out on Amazon and demand for the government scheme to help replace boilers with electric heat pumps has tripled in a month. Consumers are already using less electricity, turning

to websites which show how they can cut the energy used by their washing machines and how much they will save turning down their thermostat by 2C.

But more needs to be done on a national level. The prime minister yesterday suggested mini modular nuclear power stations as an option, but Chernobyl once again lurks in voters' minds. What Britain urgently needs is more wind farms, which already provide a quarter of our

Interest-free loans should go to those who install solar panels

energy. Before settling on solar panels, we thought about a mini-windmill in the garden but the five-figure cost proved prohibitive.

Nimbleys have always objected to living near vast turbines but when the alternative is energy rationing or regular blackouts, they may become more accommodating, especially if they benefit personally with lower prices.

Britain could eliminate its dependence on Russian gas within two years by building more onshore wind farms, according to Octopus Energy, the fifth largest energy supplier. There are 11,000 turbines in the UK. Britain would need another

3,000, says Zoisa North-Bond, head of Octopus's renewables arm, a "totally achievable" goal in the next two years. "This target is totally achievable in the next two years. In the last year alone, we've had 1,500 communities asking us to build wind turbines."

She believes the reason villages and towns now want them is because they can "look out of the window, see the turbine turning and know they can get cheaper energy". The company offers residents who sign up to power from its nearby wind turbines 20 per cent off the cost of electricity when they are spinning, and 50 per cent when they hit their maximum rate.

The government should help by relaxing planning rules and providing interest-free loans to households for their solar panels and to companies creating windfarms. The money spent investing in green energy will be worth it.

By swinging the country towards renewables we will have set ourselves up not just to avoid being beholden to corrupt or aggressive regimes, but to meet our net-zero goals by 2050. Ultimately it could be more cost-effective too. It's a rare win-win situation; green energy that was beginning to look like a luxury in the face of a cost-of-living crisis now looks like the solution to some of our woes.



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METHANE ACTION PLAN

What can be done to achieve methane net zero? Perhaps an action plan?

1. Establish at a local level an assessment of CH₄ leakage from onshore oil/gas sites plus gas mains and landfills (Gas distribution companies & Environment Agency).
 - And push for gas mains to be partially decarbonised (20% of natural gas with hydrogen) in advance of any plans for national/regional transition of heating to heat pumps and alternatives.
2. Establish similar baseline report for livestock and manure handling for South-East agriculture areas from requisite agencies/local authorities.

For 1). & 2). seek clarity of action to reduce methane emissions to a net zero

- If requests for action from above are rejected, then seek MP support for National and regional Action! Appeal for **WHO Global Air Quality Guidelines**.

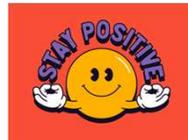


GLOBAL METHANE ASSESSMENT

Summary for Decision Makers

[2021 Global-Methane-Assessment_summary.pdf](#)

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Thank-you

Danny Lee

Trustee at

Winchester Action on Climate Change (WinACC)
and
Petersfield Climate Action Network (PeCAN)

SECA Knowledge Sharing

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References

Listen to the Real Story - <https://www.bbc.co.uk/sounds/play/w3ct1hsw> for more information

[IPCC points to methane as key driver of warming | Cornell Chronicle](#)

[Methane facts and information \(nationalgeographic.com\)](#)

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[Climate change: Five things we have learned from the IPCC report - BBC News](#)

[Why Methane Matters | UNFCCC](#)

[WHO Global Air Quality Guidelines](#)

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www.carbonbrief.org/methane-emissions-from-fossil-fuels-severely-underestimated

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End

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If needed as space filler (This slide hidden.

Sources of Methane (Global dynamic view)

[SVS: Sources of Methane \(nasa.gov\)](#)

[\(1766\) Sources of Methane - YouTube](#)

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Killer Facts

Over 10-20 years, the influence of CH₄ is at least as large as CO₂!

GWP – 82.5 over 20 years
30 over 100 years

(Reference Carbon=1 – lifetime 50-200 yrs)



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