



Welcome to the 13th Health Estates
Conference!



26th June 2025
Leonardo Hotel, Milton Keynes, Midsummer
Boulevard, Milton Keynes, MK9 2HP



Please scan the QR Code on the screen
below to register your interest for our
accredited training courses.

Register your Interest





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Chair Opening Address



Rob Jepson

Group Director of Estates and Facilities
Manchester University NHS Foundation Trust



Keynote Presentation



Kay Mulcahy

Associate Director of National Estates Operations
NHS England



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Panel Discussion



Fay Lane
Senior Estates and Facilities
Workforce Manager
NHS England



Tim Wilkins
Programme Director
Georges, Epsom and St Helier
Hospital Group



Martin Mizen
Senior Director of Estates & Facilities
Essex Partnership University NHS Trust



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Case Study

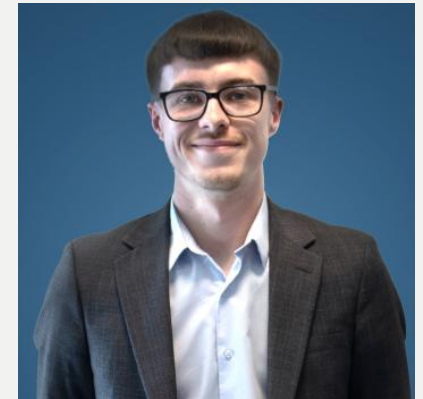




Case Study



Dr Christian Hornung
NHS GP, Clinical Director Tone Valley PCN;
Founder “Energy Coop”
Energy Coop Ltd



Reece Jensen
Business Growth
Manager
Direct Business Group



Powering Healthcare's Future:

NHS Net Zero,
Data-Driven Sustainability
and Cost Savings



Dr Christian Hornung – GP Partner TVH, PCN CD Tone Valley, Co-Founder of Energy Cooperative

Reece Jensen – Strategic Partnership Team Manager, Direct Business Group

Vic Nation – Business Efficiency Manager, Taunton Vale Healthcare & Energy Cooperative



Our Story of **Collaboration** – How it Started and What We've Achieved

Challenge

Digital consultation hub
increased energy
consumption

Opportunity

Reduce carbon footprint
and accelerate the
move to NHS Net Zero

Problem

NHS drive for greener
practices did not
address the increased
energy use from new
technology

Solution

Energy Cooperative
developed to source
REGO certified
renewable energy



Expansion **Beyond** Primary Care

GP/PCNs Group Buying Power

- Partnered with DBG
- Significant savings
- 28% cost reduction
- Rapid expansion

Community Pharmacies

Digital pharmacy systems – PMR, scanners & clinical checks digitalised increased energy consumption

Secondary Care

New Victoria Hospital, hospitals, care homes and NHS administration

- Increased consumption due to technology

Beyond Healthcare

Agriculture
Accounting
Education
Manufacturing
all facing same issue –

- Tech adoption increased energy use

Collaborative buying and sustainability initiatives cut costs and carbon emissions



A Data Led Approach to Reduce **Carbon**, Reduce **Energy**, and Reduce **Cost**

How do you manage what you can't measure?

While not impossible, making data-backed decisions is significantly more challenging without the right information. Understanding consumption across a property portfolio offers valuable insights that enable the implementation of reduction strategies.

It is the single most cost-effective way to reduce your waste, operational expenditure, and carbon footprint.



A Data Led Approach

What data does the NHS have?

- Fiscal meters (electricity, gas, water).
- Submetering (including heat and cooling).
- Energy generation assets.
- Building management system.
- Scada/Production systems.

What do we use it for?

- Identification of energy waste.
- Cost Management.
- Carbon reporting.
- Maintenance strategies.

How to better harness?

This is the Lead Question



A Data Led Approach

Buildings contain a **wealth of data**, across multiple data pools, that is often **difficult to access**.



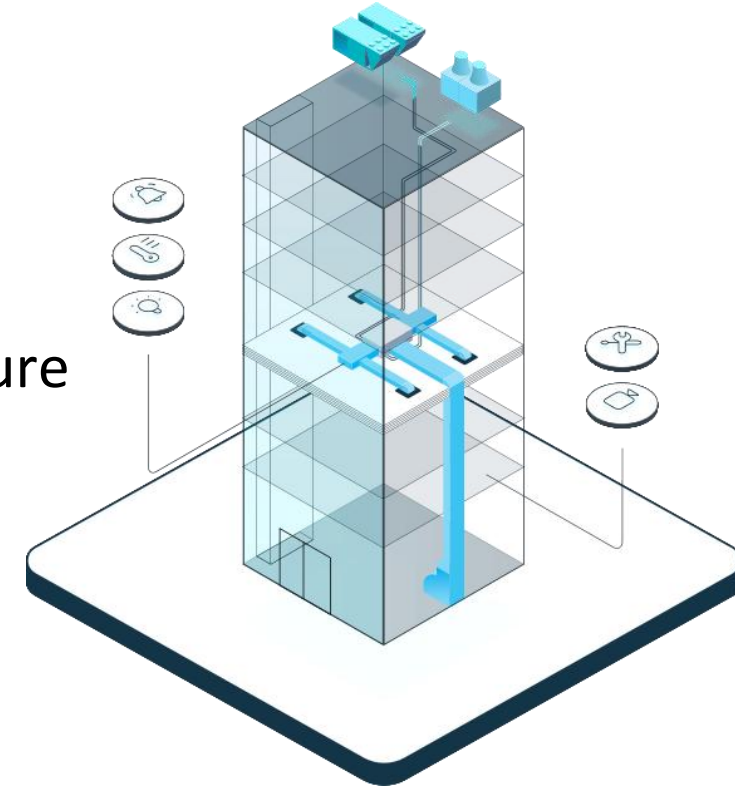
The NHS has invested significant capital to create data across its estate.



Once acquired, the data often lacks meaningful structure and is typically siloed in closed protocol applications.

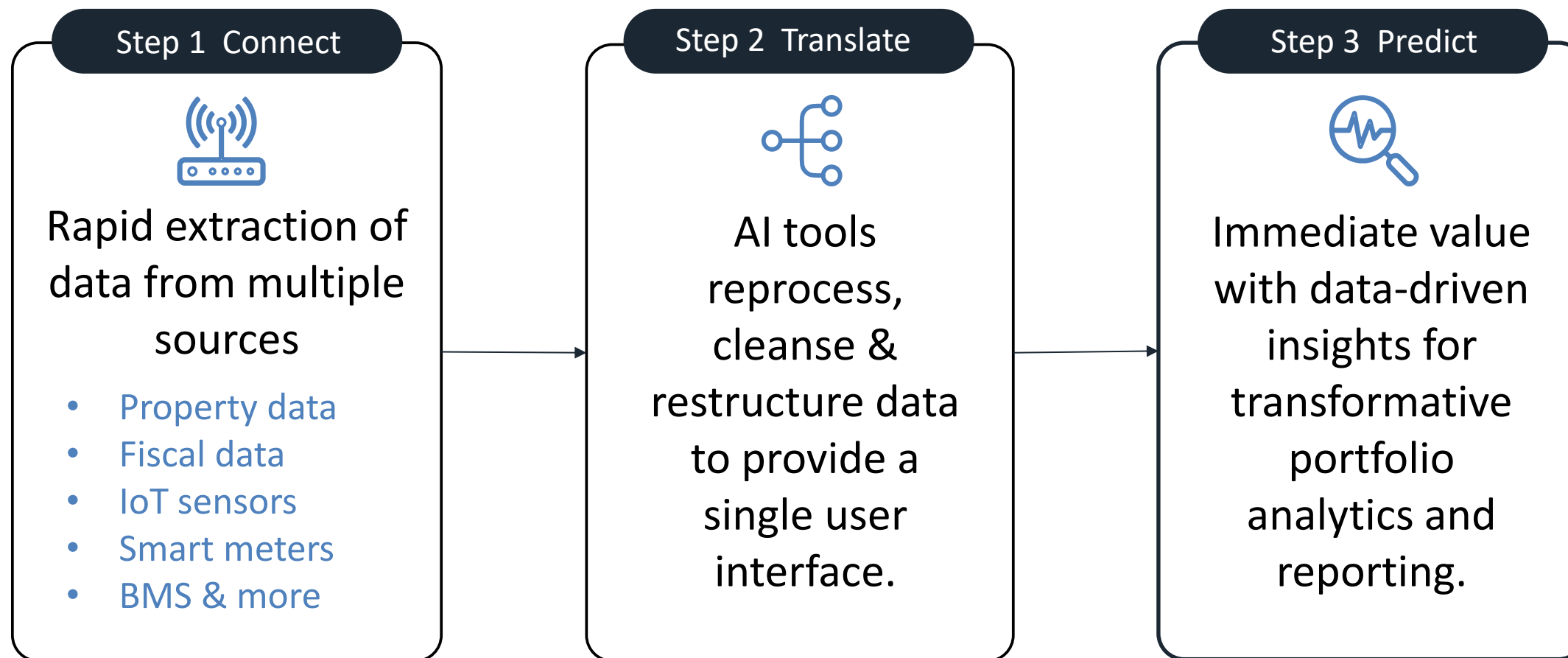


Aggregation of data into a single platform is required to provide applicable analytics .



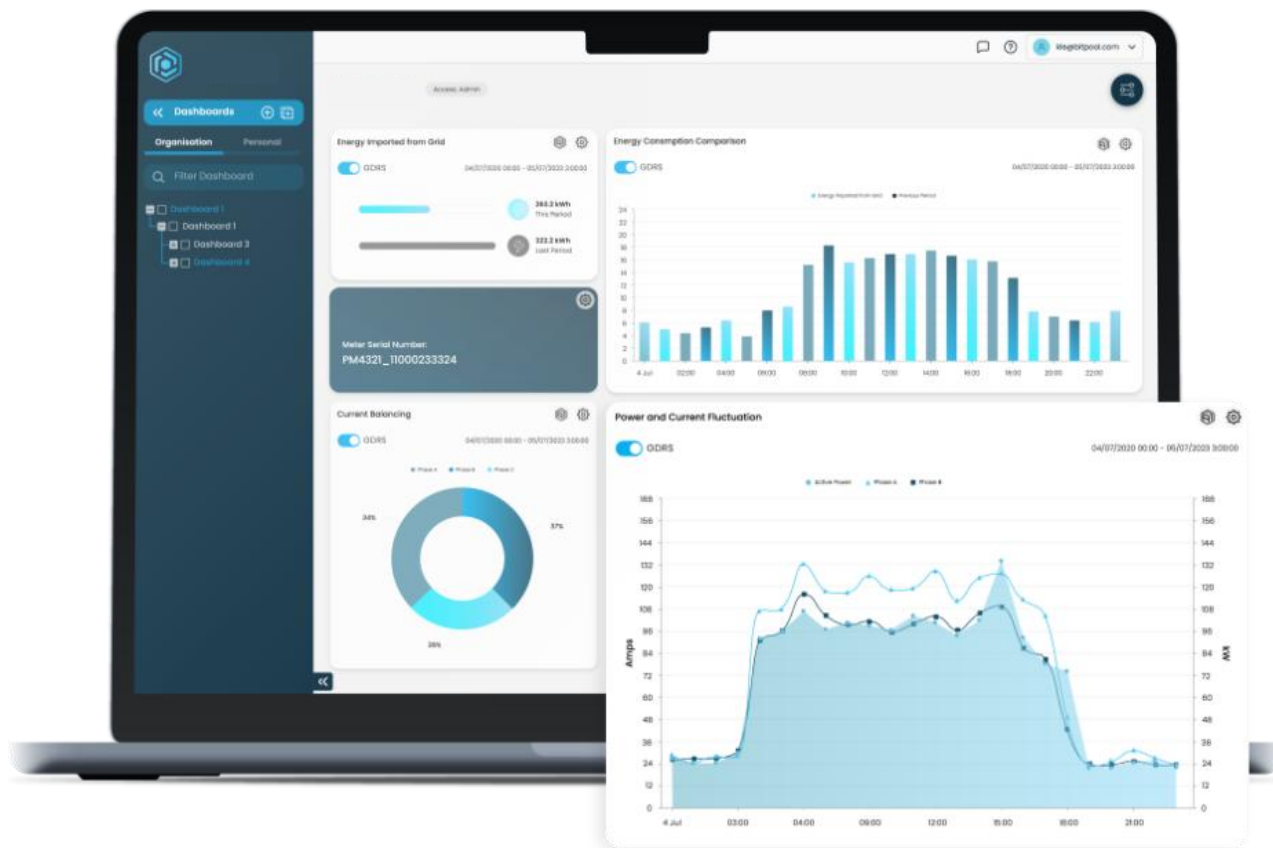
A Data Led Approach

There is a way to address this challenge, through new AI driven systems.



A Data Led Approach

Enable accurate, data-driven decisions - Not opinion-based guesses.



Shed light on hidden information and optimise building performance.

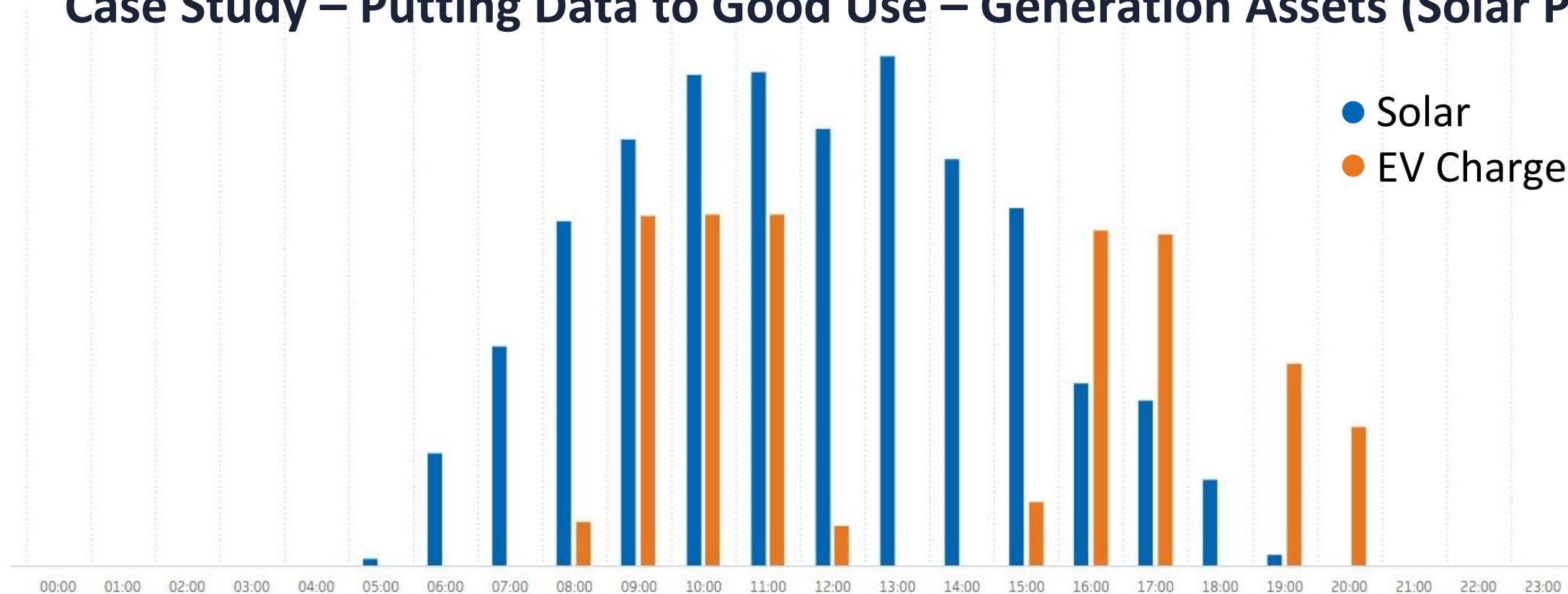


Insight into what's truly happening to safeguard asset value.



Equip facilities with real time insights through data analysis.

Case Study – Putting Data to Good Use – Generation Assets (Solar PV)



Problem

Wasted Solar Energy.

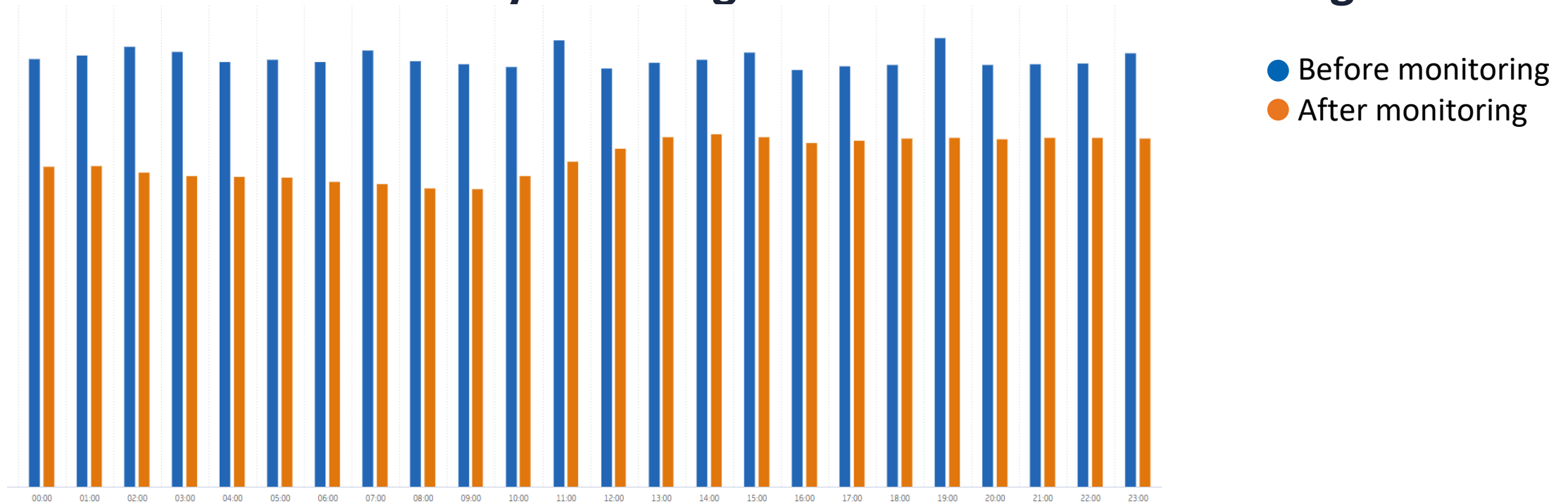
Solution

Behavioural Changes.

Result

Efficient use of generation assets (Solar PV).

Case Study – Putting Data to Good Use – Heating



Problem

Heaters running when not needed - wastage identified.

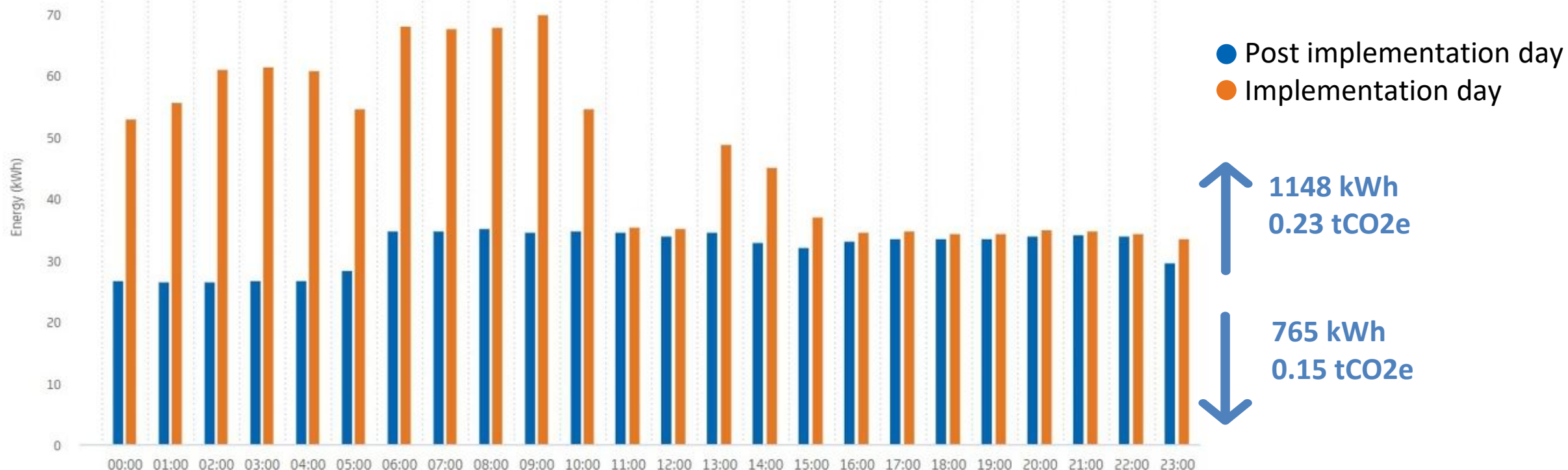
Solution

Evening/Weekend shutdown protocol implemented.

Result

Changes result in a clear reduction in consumption.

Case Study – Putting Data to Good Use – Air Handling Unit



Problem

Two compressors running simultaneously - wastage identified.

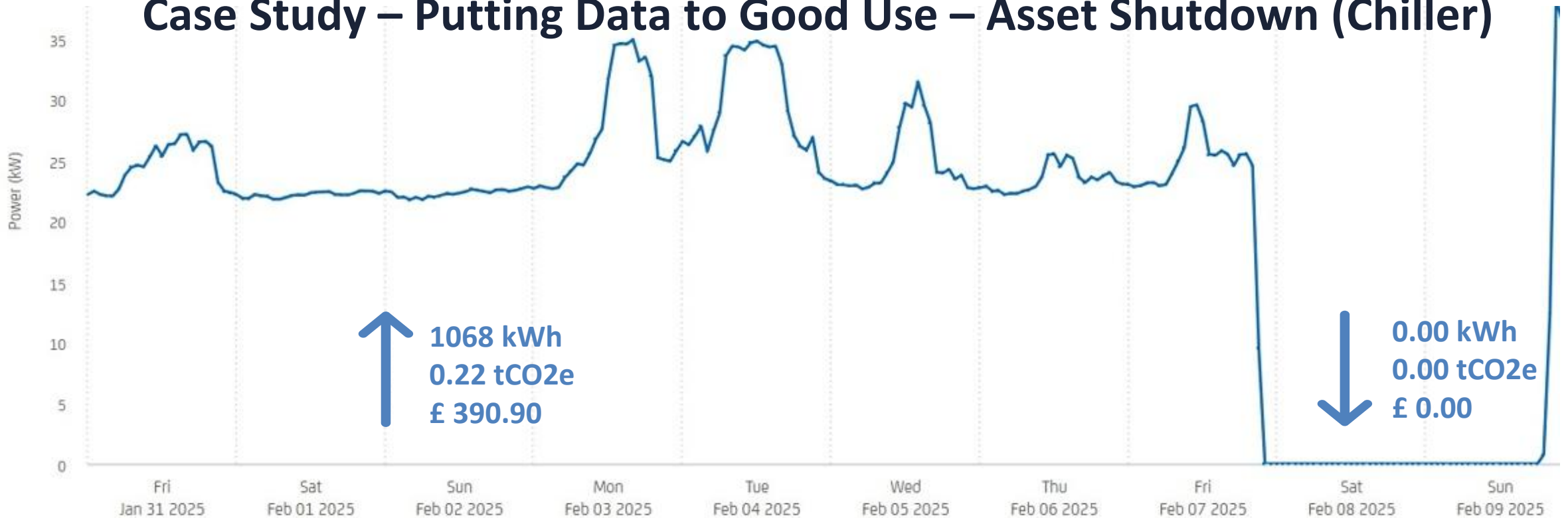
Solution

Lead-lag demand setpoint control strategy implemented.

Result

Changes result in a clear reduction in consumption.

Case Study – Putting Data to Good Use – Asset Shutdown (Chiller)



Problem

Chiller consumption outside of production hours identified.

Solution

Weekend shutdown protocol implemented.

Result

Changes result in a clear reduction in consumption.

Case Study – Putting Data to Good Use – LED Retrofit

A large NHS facility embarked on a net zero strategy to reduce its carbon footprint and making meaningful progress towards a Net Zero strategy.



Problem

Inefficient poor lighting identified.

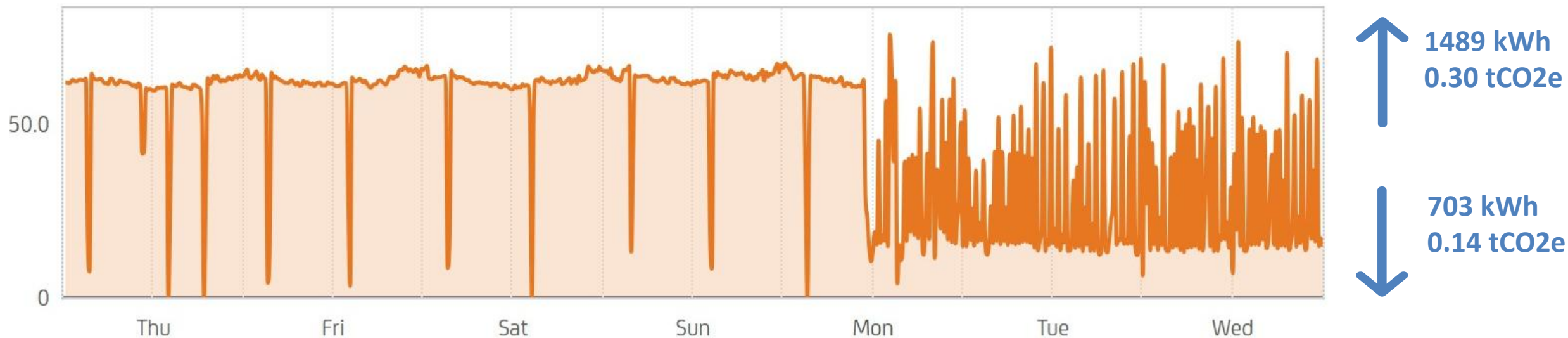
Solution

Retrofit lighting to LED's.

Result

Improved light intensity and reduction in baseload.

Case Study – Putting Data to Good Use – Asset Optimisation



Problem

High cooling costs.

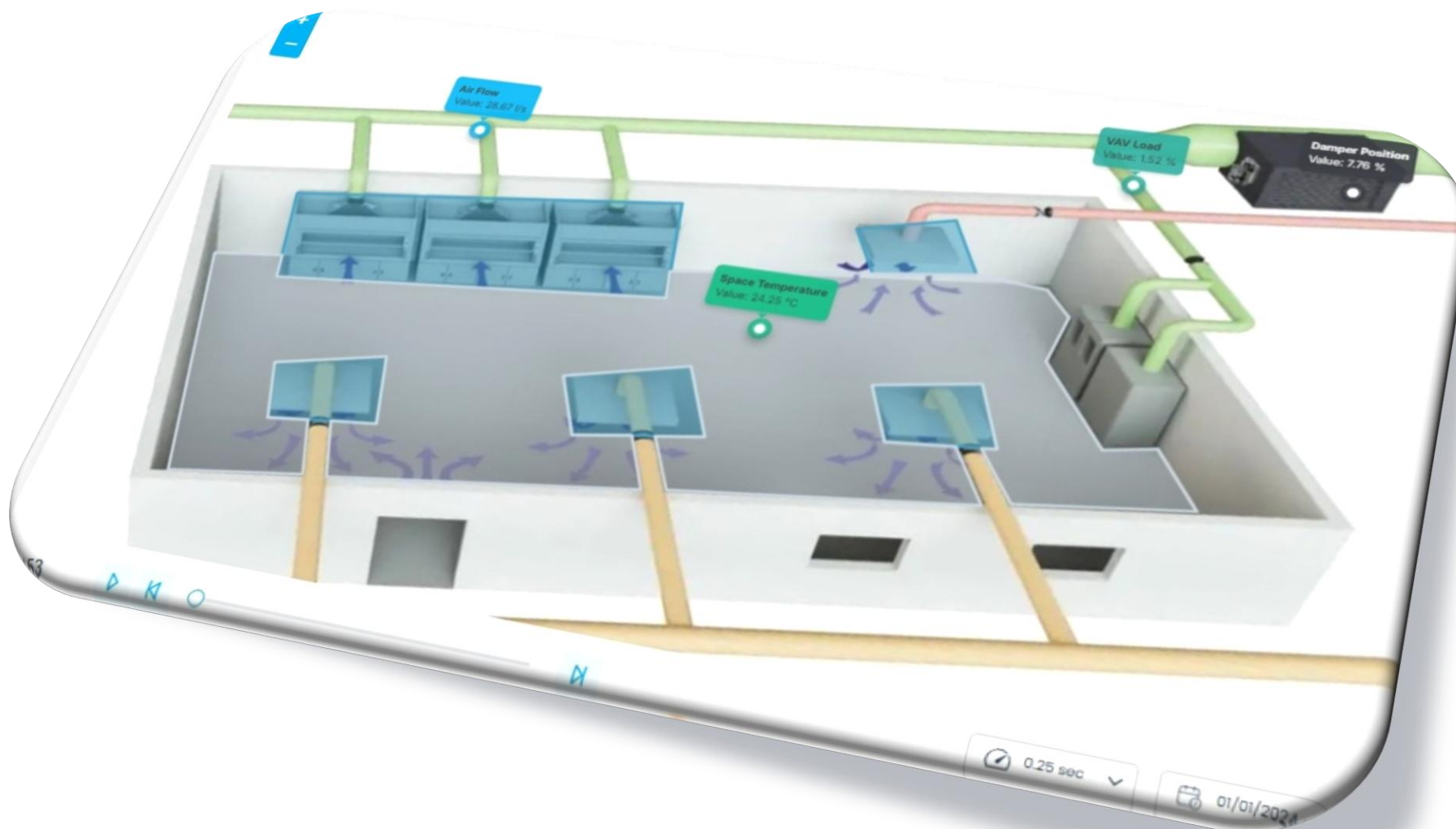
Solution

Implement a proprietary
chiller optimisation software.

Result

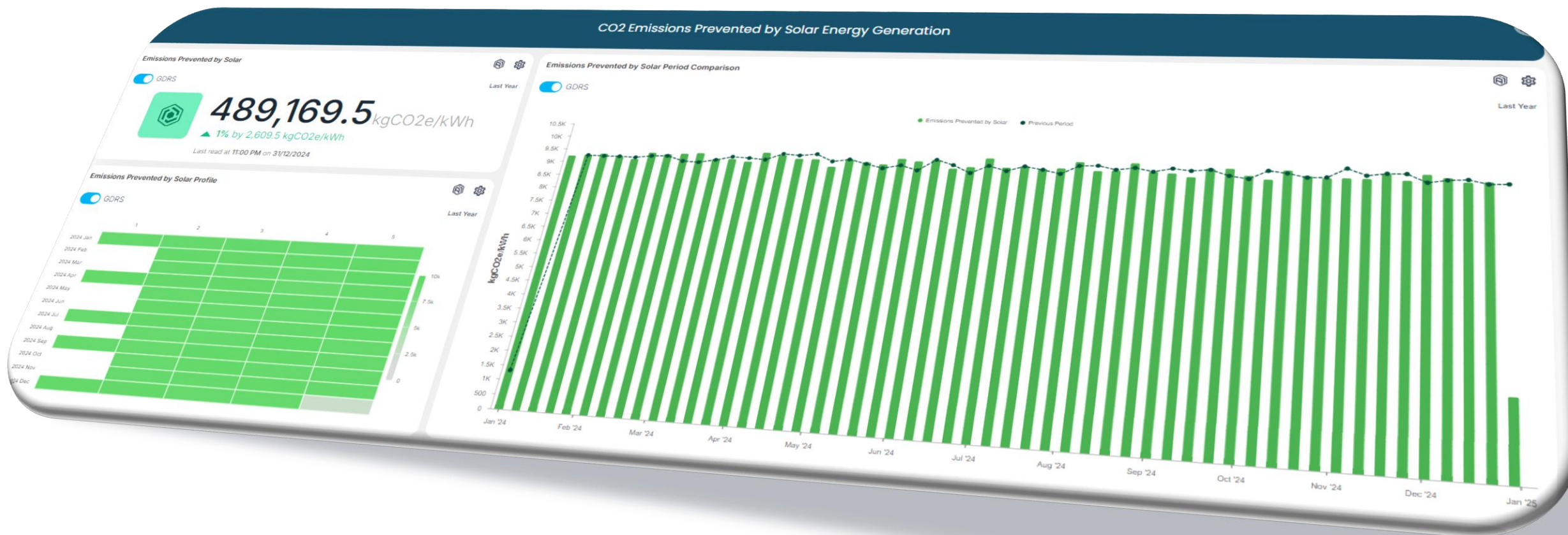
Changes result in a clear
reduction in consumption.

Putting Data to Good Use – Animation of Building HVAC





Putting Data to Good Use – Carbon Reporting





In Summary

Access to quality data and the tools necessary to interpret the information provides a distinct, intuitive path to understanding your energy estate / portfolio.

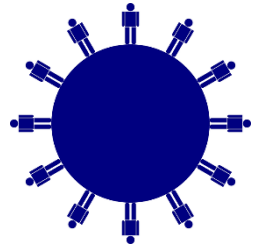
Applying meaningful data to Net Zero initiatives is shortest time-to-value from setup to ROI.



Lessons Learned



Innovation comes at an energy cost
Healthcare budgets are tight



Collaboration is essential
Sustainability must be a procurement priority



Data holds untapped potential



Three Pillars

1. Achieve Your **Net Zero Goal**

2. **Financial** Sustainability

3. Account **Management**



Carbon Offsetting

Offset your carbon footprint seamlessly, contributing to global environmental projects for a greener future.



REGO Contracting

Secure 100% renewable energy, verified by Renewable Energy Guarantees of Origin, aligning with sustainability goals.



Flexible Procurement

Adapt to market changes with flexible procurement options, optimising your energy costs and strategy.



Energy Monitoring

Gain detailed insights into your energy usage with precise monitoring, enabling targeted efficiency improvements.



Full Account Management

Experience hassle-free energy management, from procurement to bill analysis, with our comprehensive account services.



Legislation Control

Ensure compliance with energy legislation, avoiding penalties and enhancing your company's environmental reputation.

We also fund:



Solar power
& storage



EV
chargers



Voltage optimisation
& Power factor



Chillers, boilers
& HVAC



Water heating
& purification



Heat
pumps



Efficient
lighting



Power
generators



Smart
technologies

What **You** Can Do:

Get involved

Have a seat at the table when services are being reconfigured — energy and space efficiency must be built in, not retrofitted.

Factor

When planning upgrades or refurbishments, consider long-term energy efficiency and carbon impact, not just capital cost.

Own

Own the Green Plan - Make sure your estates plans actively support your organisation's Net Zero goals.

**NOW... TAKE A LOOK
AT THE BIGGER
PICTURE.**

Data-Driven Sustainability

- Data helps achieve both Net Zero and financial sustainability.
- **What else** could this data be used for?
- How can insights be applied **across industries**?



No Cost, No Commitment, No risk

www.energycoop.co.uk

- short contact form

info@energycoop.co.uk





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Refreshments & Networking



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Chair Morning Reflection



Rob Jepson

Group Director of Estates and Facilities
Manchester University NHS Foundation Trust



Case Study





Case Study



Stuart McGeary
Commercial Bids Manager
Group Nexus



Pioneering parking solutions for the NHS

NHS Estates and Facilities Conference

Presented by: Stuart McGeary, Commercial Bids Manager



Group**Nexus**[®]

GroupNexus began
with an encounter at
QEI hospital,
Welwyn Garden City
in 1991



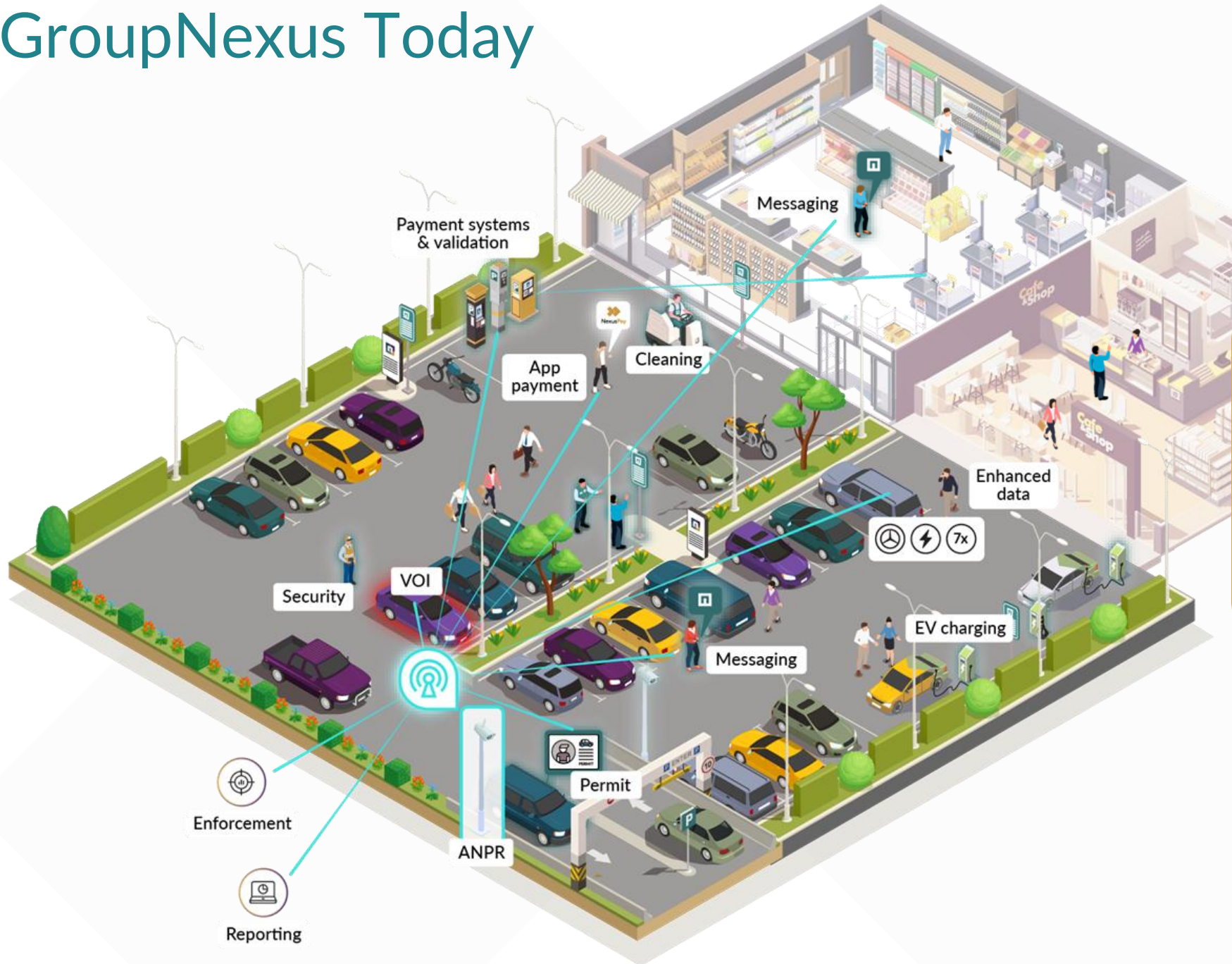
Ian Langdon, Founder, in 1991

We've been working with the NHS for over 30 years

During this time, there have been numerous developments and improvements of parking management and solutions.

However, many NHS Trusts and Hospitals are failing to introduce and capitalise fully from these innovations.
Why?

GroupNexus Today



NexusPeople

- Security
- Cleaning
- Landscaping
- Defect Reporting

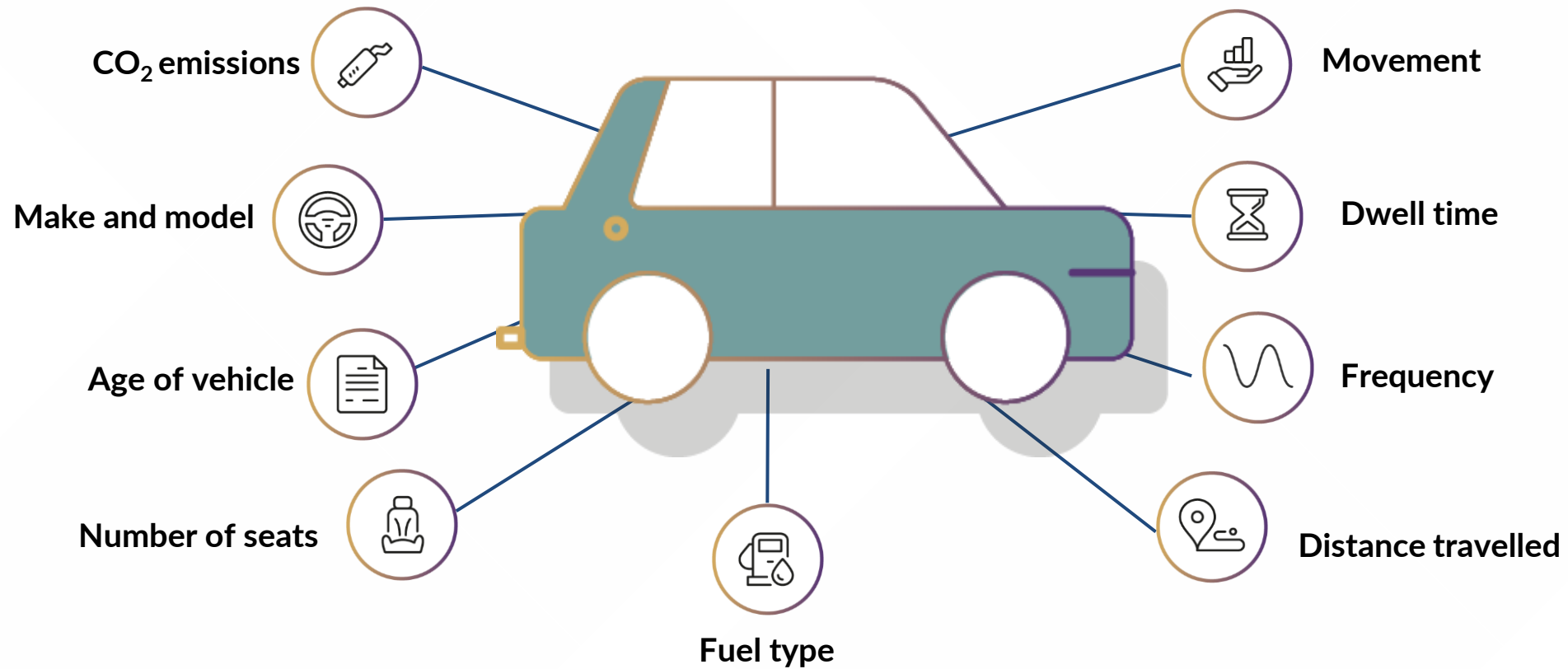
NexusPark

- ANPR
- Payment systems: app, terminals, online
- Permit system
- Parking Assistants
- Enforcement
- Vehicles of Interest (VOI)
- Parking Validation

NexusInsights

- Data Insight
- EV Insights & ICE Monitoring
- Customer Messaging
- Reporting

Examples of ANPR data insights







Nexus Platform / Enhanced Data Insights

It all begins with data insights, and a deeper understanding

- Combine ANPR with external third-party data
- Tailor bespoke reports supported by our inhouse analytics team
- Assists integration with and provision of benefits to wider range of stakeholders



Some of our innovative parking solutions

NexusPermit system	Blue Badge Portal & Monitoring	VOI Alerting	Bay Monitoring
			

NexusPermit - our permit management system

- **Online Portal:**

Comprehensive permit allocation and management via an online application and management portal.

- **Flexible Configuration:**

Users can create, view, and update permits at a group level, defining groups and configuring permit details, duration, timings, applicable dates, and assigned car parks.

- **Permission Management:**

Manage permit holders' permissions and access across clients, sites, and car parks.

- **System Compatibility:**

Compatible with existing ANPR or other parking management systems.

- **NHS Specific Features:**

Designed to help NHS clients meet manifesto commitments for free parking to designated groups, resulting in significant administrative cost savings.



Blue Badge Portal & Monitoring

How It Works:

- **One-Time Registration:** Blue Badge holders register once for all your locations.
- **Automatic Arrival Alert:** Our VOI system instantly notifies your staff when a registered driver arrives.
- **Protected Bays:** Bay Monitoring technology prevents misuse of designated parking spots by non-badge holders.

Benefits:

- **Reputation Enhancement:** Be known for outstanding accessibility and customer service.
- **Reduce Parking Abuse:** Ensure your accessible bays are available for those who need them.
- **Customisable:** You decide on the concessions for registered users.

The screenshot shows a mobile application interface for a 'New Permit Application'. The main form is titled 'Blue Badge Details' and includes the following fields and controls:

- Blue Badge Expiry:** A date input field showing '19/12/2025' with a calendar icon.
- Blue Badge Number:** A text input field containing 'NL9BNM01038X0722'.
- Upload Blue Badge:** A section with a file upload button showing 'IMG_2360.png', a 'Change File' link, and icons for file selection and deletion.
- File Information:** Text indicating 'Max File Size: 10MB | Accepted File Types: .pdf, .png, .jpg, .jpeg, .bmp'.
- Buttons:** 'Cancel' (red outline) and 'Upload' (blue solid) buttons are positioned below the file upload section.
- Navigation:** At the bottom, there are 'Previous' (grey) and 'Next' (blue) buttons, along with a 'Cancel' (red outline) and 'Save as Draft' (grey) buttons.

Real-time Vehicle of Interest (VOI) Alerting

- **Enhanced Security:**

Real-time alerts (SMS/Email) when VOI enters/leaves site.

- **ANPR Compatible:**

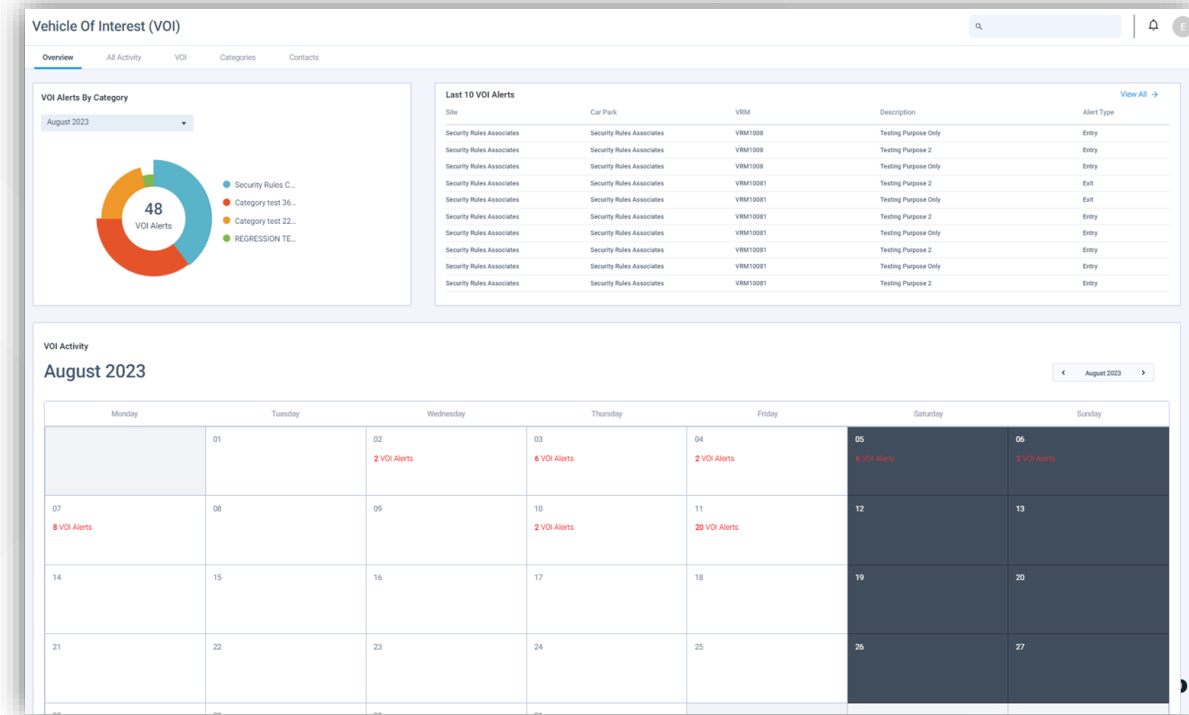
Configurable VOI lists by site, portfolio, or across the estate.

- **Instant Notifications:**

Notify security, NOC, and law enforcement.

- **Data Sharing:**

Share VOI data across sites, portfolios, and the entire estate.



VOI Arrives

Registered VOI arrives on site...



ANPR pick up

ANPR camera picks up the vehicle registration when the VOI arrives or leaves a site



Identify

ANPR camera communicates with the database and identifies the registration as belonging to a VOI



Alert

Designated team/individuals are alerted to the presence of a VOI, by SMS or email



Surveillance

On site team are aware of the VOI, the category (e.g. self-excluder or suspected criminal)



Reduction in theft

Theft is reduced as action can be taken to deal with the perpetrator, or deter them.

Bay Monitoring

Unlock valuable insights and improve efficiency

Option 1 - Smart Bay Occupancy Monitoring:

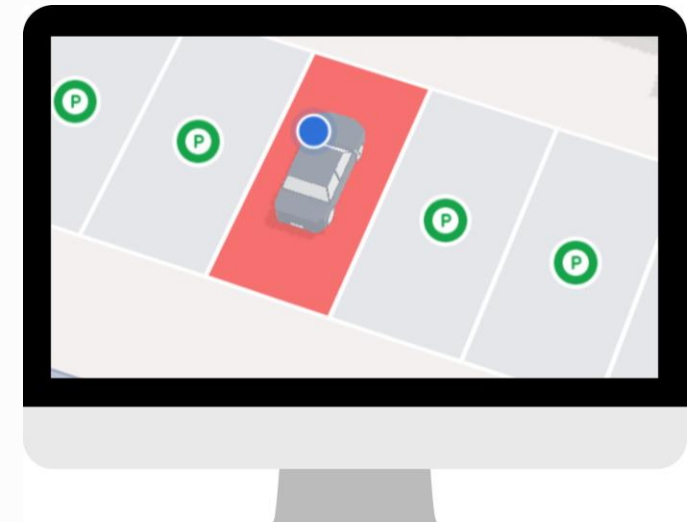
Ideal for a comprehensive understanding of general parking patterns and maximising space availability.

- **Broad Overview:** A single camera strategically placed can monitor up to 100 parking bays.
- **Actionable Insights:** Gain real-time data on bay availability, average dwell times, and potential queue formation. Understand traffic flow and optimise space utilisation.

Option 2 - Precision Bay ANPR Monitoring:

Best suited to provide granular data related to specific vehicles, enabling advanced analytics, security, and potential enforcement.

- **Targeted Vehicle Intelligence:** Monitors 4-5 bays, capturing vehicle number plates for detailed analysis.
- **Enhanced Data & Control:** Includes all Smart Bay Occupancy features, PLUS:
 - Identify vehicle type, fuel type, and country of origin.
 - Unlock potential for automated enforcement and personalised services.



Space and people counting / Activity alerts



Trusted partners

Frameworks & partners:

- Proud to be an SBS approved framework supplier
- Constellia Approved
- Work in partnership with Noviniti



CONSTELLIA
APPROVED



So, what's preventing Trusts from getting the service they deserve?

The Restrictions:

Parking solutions procured as a commodity

- Services are procured like a product, and fixed for the term

Suppliers often only engaged at point of tender going live

- No opportunity to enter into dialogue to fully understand requirements and make innovative suggestions

Specifications with little or no input from industry experts

- Specifications range from being vague and confused to being overly prescriptive.

Cost focused (encouraging enforcement to fund schemes)

- Most enforcement activity comes from genuine visitors or staff who are unable to find space

Who should I take advice from?

- Other Trusts / referrals?
- Equipment manufacturers?
- Consultants?
- Parking operators?

Procurement - A Better Way

- **Engage parking providers early**

10-12 months prior to releasing your tender is not unreasonable

- **Early engagement will save you time**

Tender response times can be reduced, evaluation is easier, and implementation is greatly simplified

- **Ensure all elements such as maintenance and servicing are included**

No hidden costs. When POs need to be raised for spares and repairs, service and revenue suffers

- **Avoid PCN lead schemes**

- **Keep commercial templates simple**

- **Utilise frameworks such as SBS**

Pop over to our stand for a chat

Thank you



Group**Nexus**[®]



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Case Study





Case Study



Simon Hayman
Regional Director
Equans UK & Ireland



Reimagining PFIs: Unlocking Net Zero in NHS Estates through Partnerships, Decarbonisation and Digital Innovation



Challenges in the current landscape

How Equans is redefining the possibilities of PFI estates - challenging outdated assumptions and showcasing collaborative, scalable solutions that align legacy assets with modern sustainability goals.



£27M
annual gas spend (C 600 boilers)



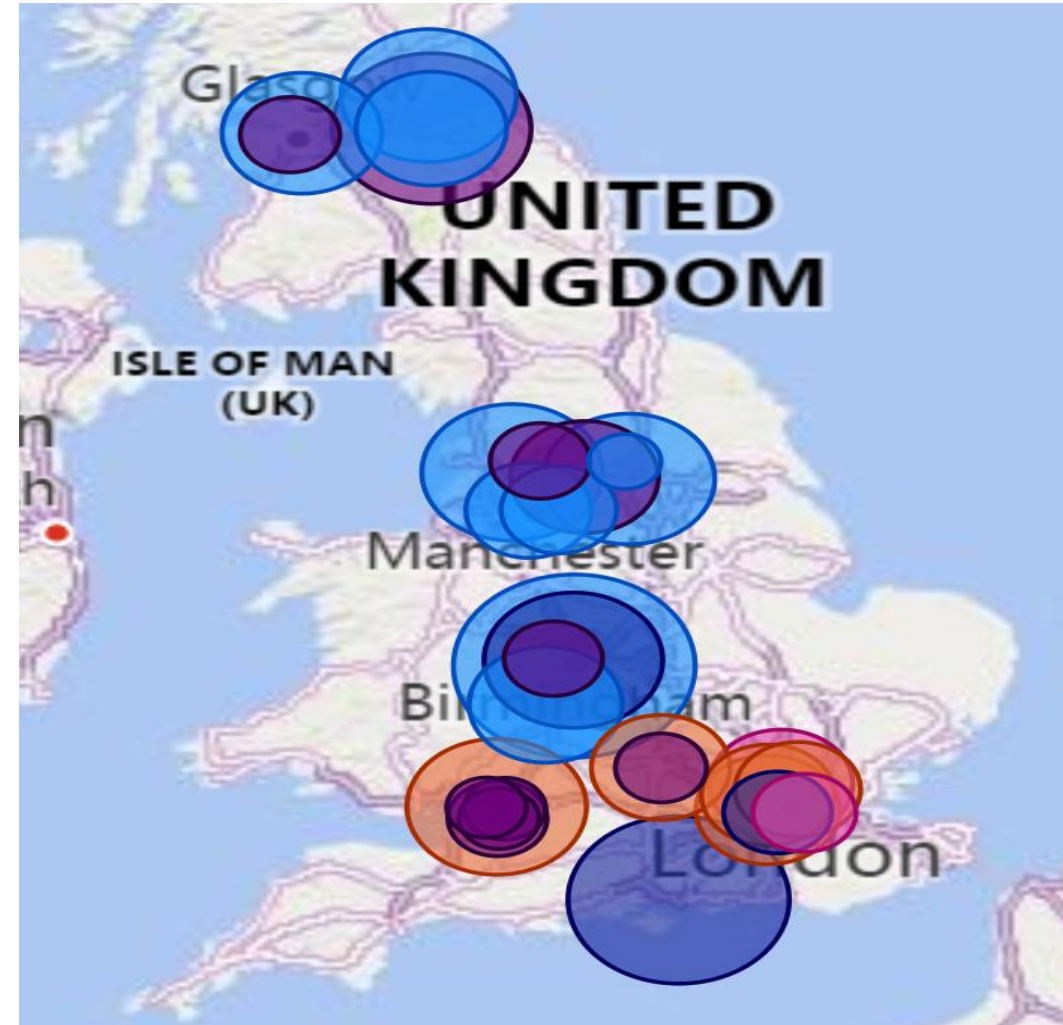
150kt CO2e
Equivalent to Sheffield City Council's annual emissions



£1.2B
Estimate to decarbonise Healthcare



*"The Trust expects that the [Hospital PFI] site will be handed over to Trust control in 2036. It is assumed that no decarbonisation works will be undertaken at this site prior to the hand back. **Therefore, the decarbonisation and cost modelling has been delayed until 2036 for this site.**"*



FM & Decarbonisation

5 Stage Strategy



Showcasing collaborative, scalable solutions



Patient care experience

Client proximity

Patient flow



Improved productivity

Room usage

Asset tracking



Digital

Smart hospitals

Cyber security

Data collection & analysis



Climate

Decarbonisation

Climate resilience

Smart Hospital: New & Old

- Improved productivity by improving patient flow
- Automating the Processes already in place
- Alarm blindness / Silent hospital

...But Existing Hospitals

- Improved productivity by Improved room usage
- Asset tagging
- Virtual sub-metering



Energy Interventions

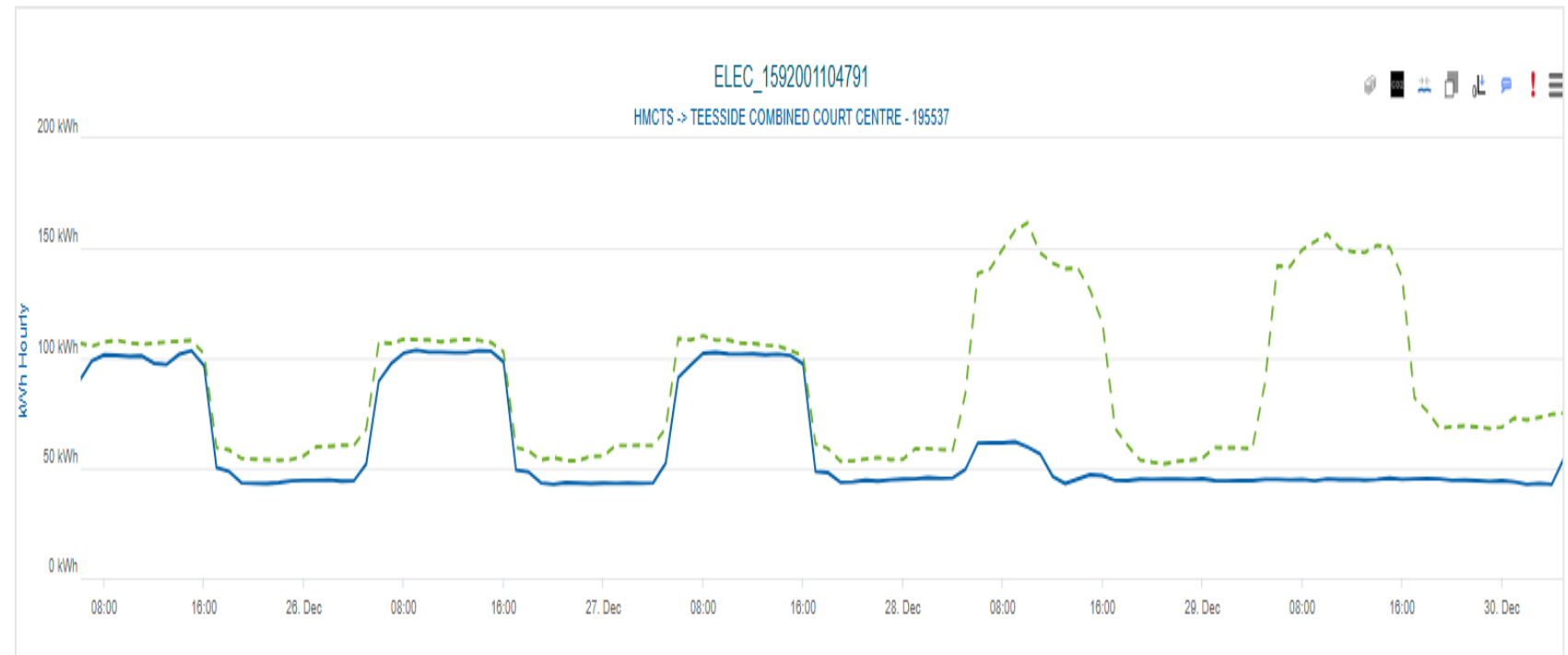
- ✓ Hundreds of everyday actions
- ✓ Raising awareness
- ✓ Everyone involved

240,000

Energy Interventions
to date across
participating sites

3 tonnes

Total estimated
carbon savings.



Cyber-security

75% increase

Growth of cyber incidents in healthcare in 2024

Long detection and remediation lead times

Connected medical devices / technical systems

NHS England has announced the introduction of a Cyber Security Charter for suppliers to the NHS, in addition to CE+



Challenges in the current energy and sustainability landscape

Case studies on overcoming these challenges



District heating network to Central Middlesex Hospital.

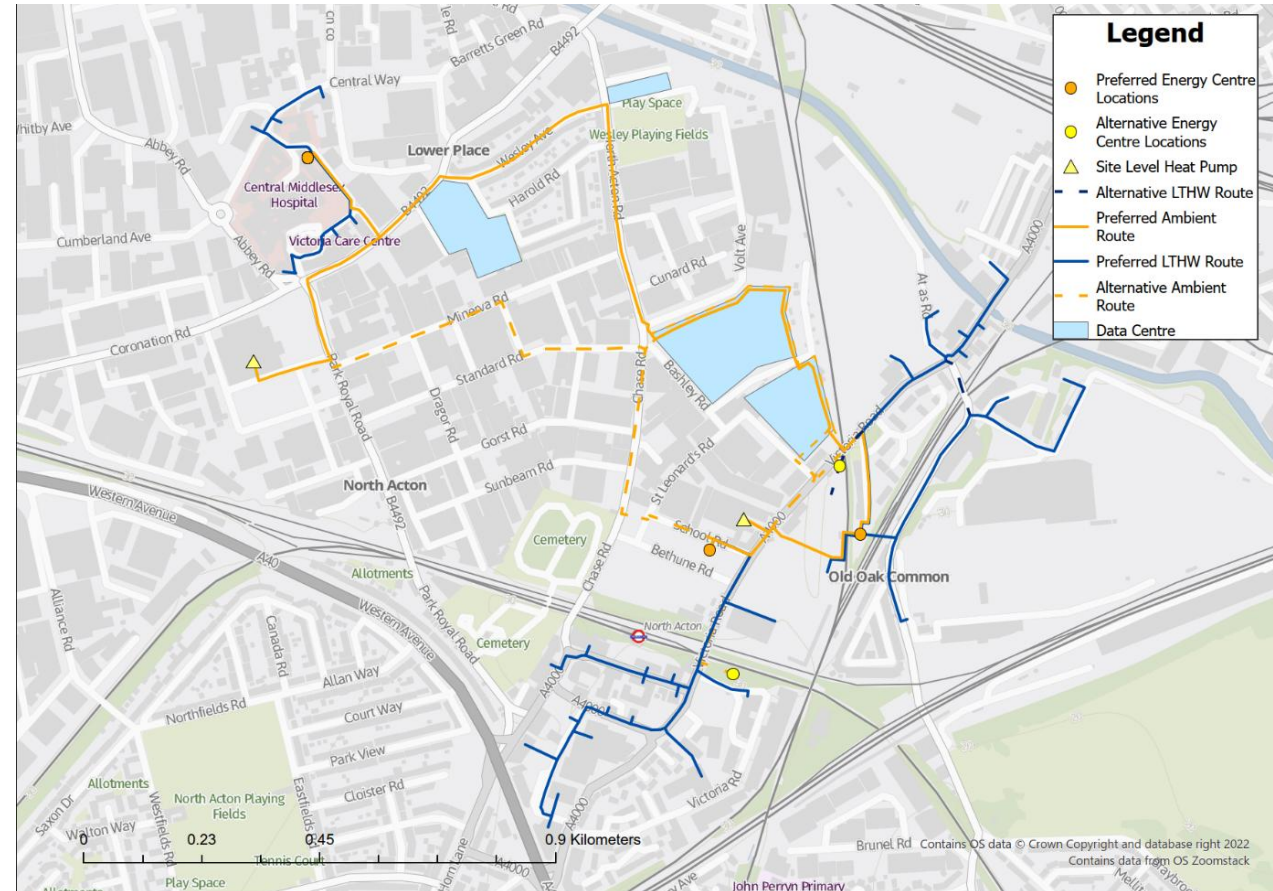


Waste heat from data centres



Development and funding partner has been awarded - HEMIKO.

3-way PFI partnership:



Challenges in the current energy and sustainability landscape

Case studies on overcoming these challenges

Cambridge University Hospital

Renewable Microgrid Power Purchase Agreement

Equans conceived, designed, developed and delivered a solar carport microgrid solution with a private wire connection to Addenbrookes Hospital.

A bi-directional Power Purchase Agreement between Cambridgeshire County Council and Cambridge University Hospital enables both parties to maximise revenues and reduce carbon emissions.

2.3MW

Solar Capacity

2km 11kV

Private Wire

Rapid Future expansion of EV
Chargers

Long-term Revenue to
Cambridgeshire

Energy Cost Reduction to
CUHT



Innovation: Hydrogen Solutions

DECARBONISE POWER

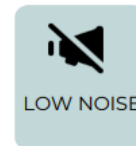
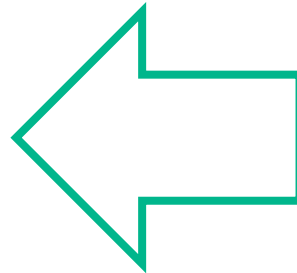
Primary power
Off-grid power

Emergency backup power

Electric grid support

EV charging station

Heating recovery







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Keynote Presentation



Jonathan Guppy
Head of Sustainability
South Central Ambulance Service NHS Foundation Trust



Sustainability & EV Adoption in the Ambulance Service

Jonathan Guppy
Head of Sustainability

The Future of Ambulances

eDCA
operated by
London
Ambulance
Service



Under the bonnet



68kWh battery

198kW motor

265HP

Why move to EVs?



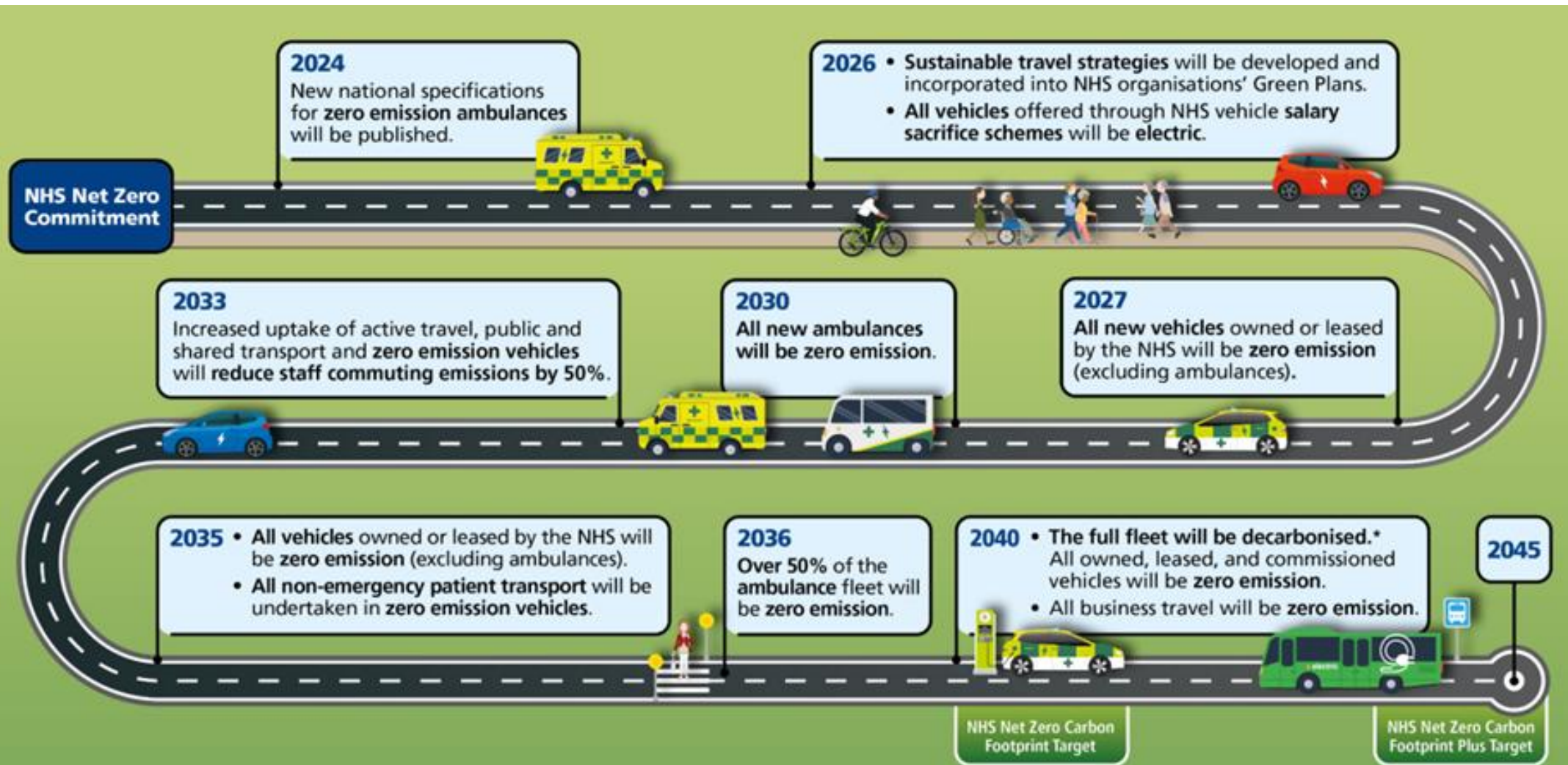
- 16,512 tonnes CO₂ equivalent emitted by SCAS 2024/25
- 80% from vehicles
- Toxic gases and particulate pollution – 40,000 UK deaths per annum

- Positives:
 - Lower running costs, especially maintenance
 - Reduced vehicles off road
 - Zero tailpipe emissions, particularly outside A&E
 - Ability to generate our own electricity from solar PV

Solar PV for EV charging



Roadmap to Net Zero 2040



^{*}subject to complete decarbonisation of the electricity grid, in line with government policy

The Challenge!



An EV Fire?



© BBC News
2024

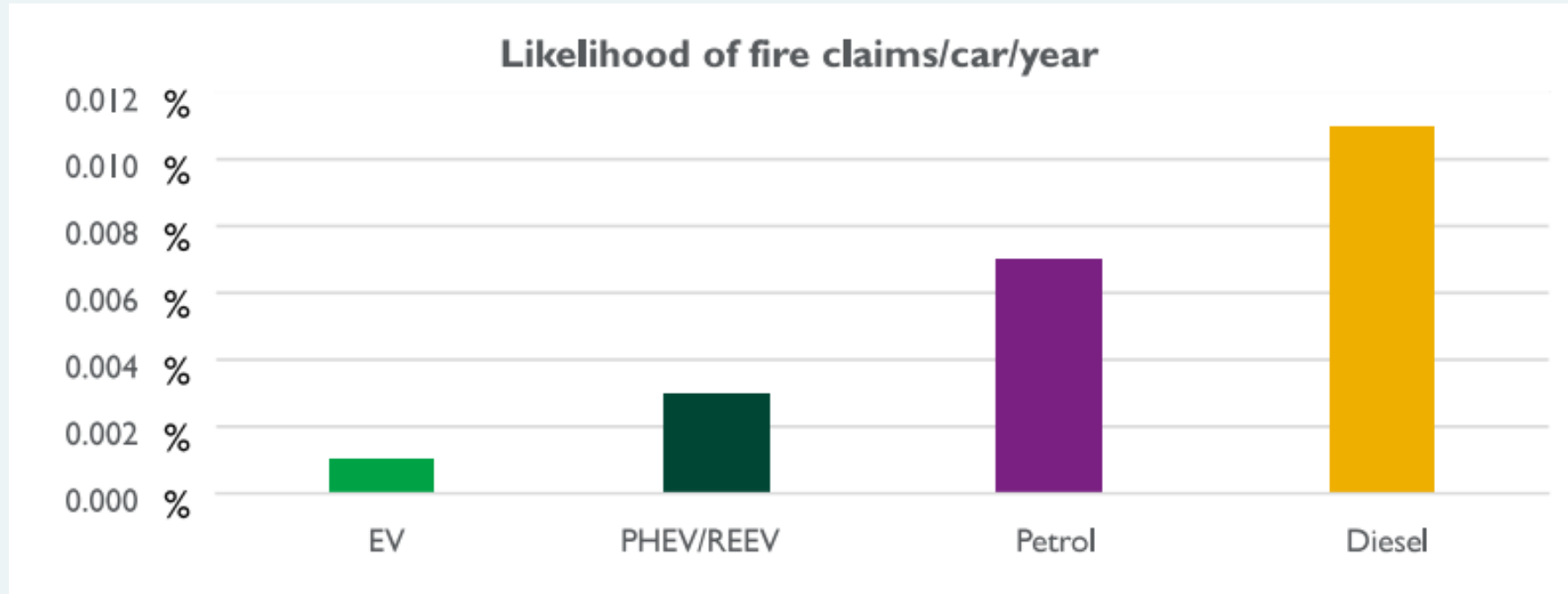
London Luton Airport Car Park Fire



“We can confirm the vehicle involved was a diesel-powered vehicle. To further clarify it was neither a fully electric vehicle (EV) nor a plug-in hybrid electric vehicle (PHEV).”

*Bedfordshire Fire & Rescue Service, London Luton Airport: Car Park 2
Incident Review, October 2024*

Perception vs Reality



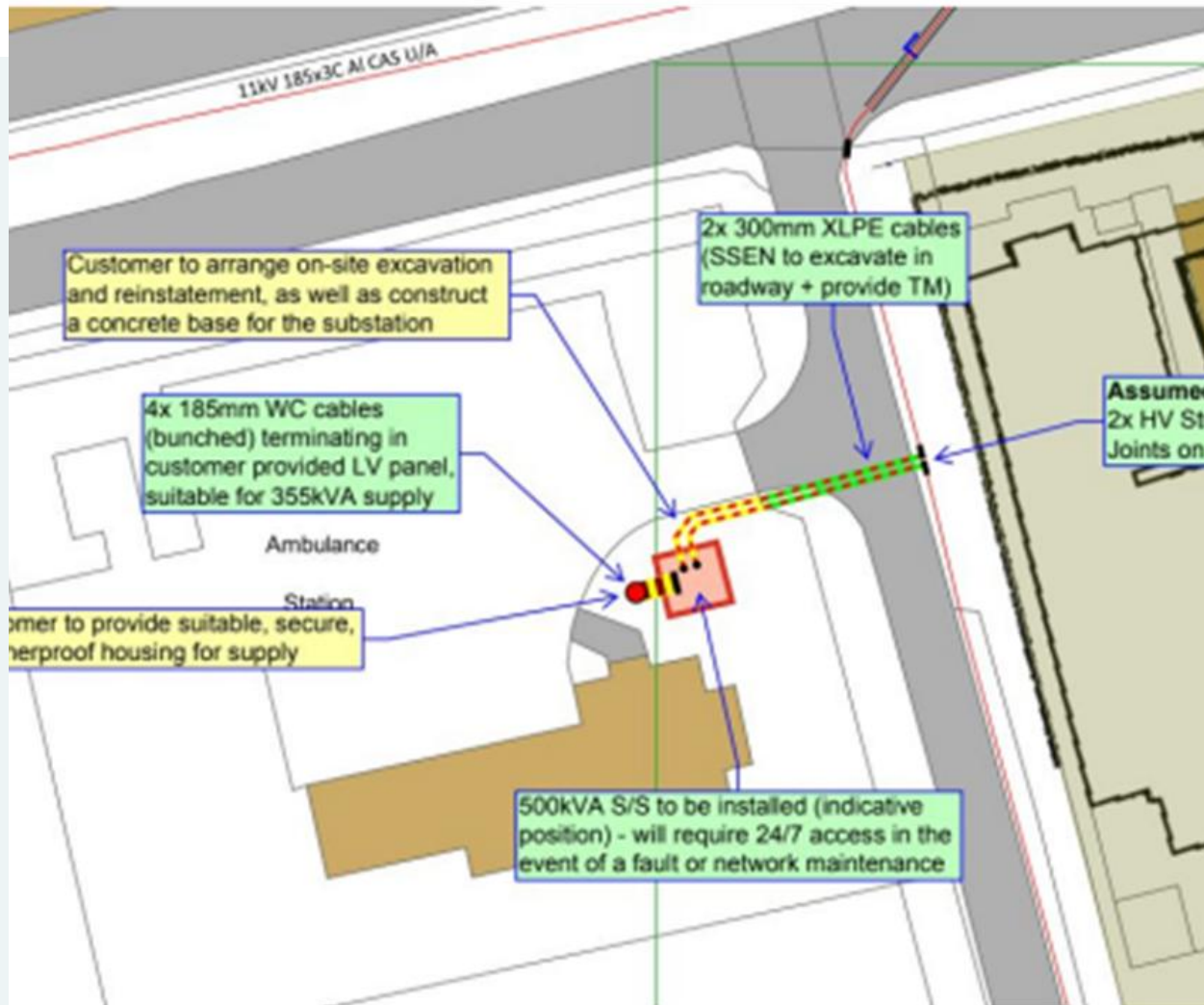
Source: Thatcham Research / Motor Insurance Anti-Fraud and Theft Register, October 2024

Will the ambulance reach me?



- Possible shift = 185 miles (95th percentile)
- Mean average = 92 miles (data from 5 trusts)
- EV range = 90 miles (existing tech)
- Solution: “Opportunistic” charging model
- Even busiest DCAs have ignition off for 15 hours per day
- EEAST study: Only 0.77% of journeys used more than 68 kWh
- 78% of stops could enable a return to 100% SOC with a 22kWh charger

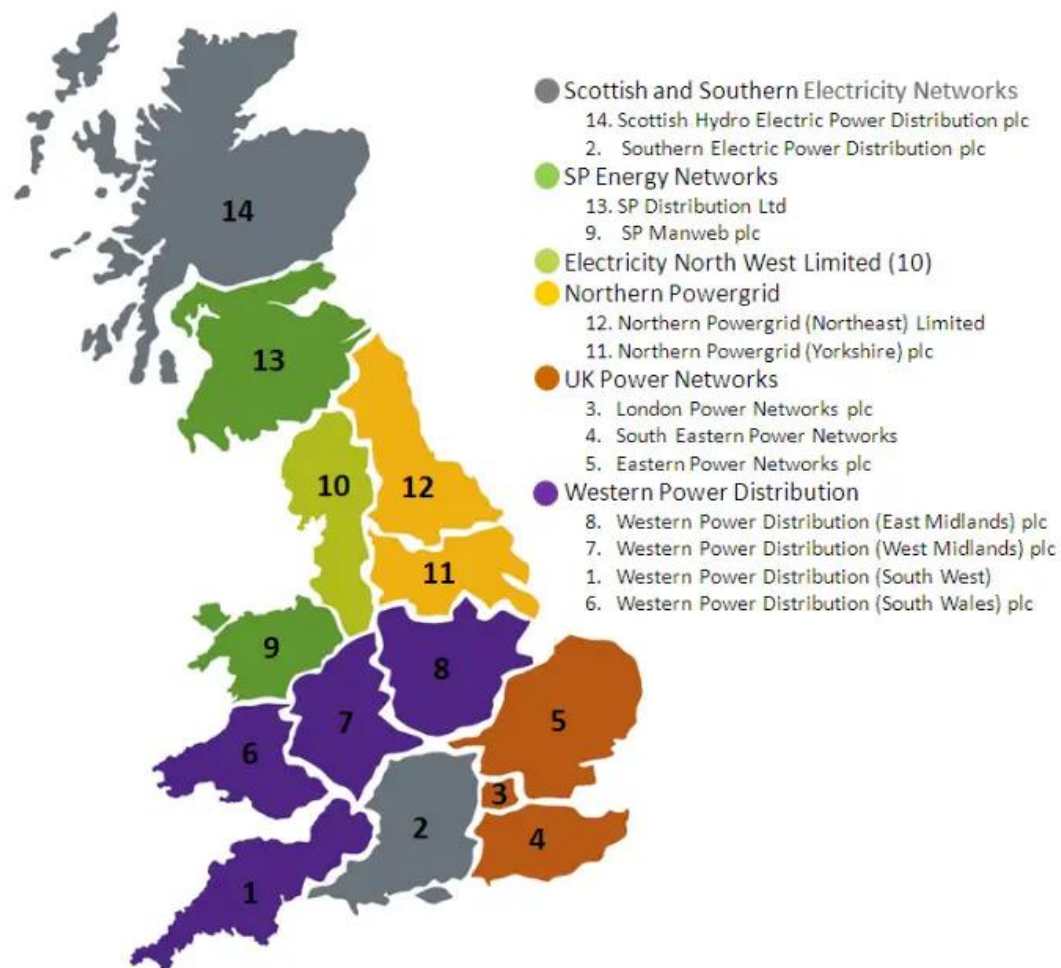
Building the Electrical Infrastructure



Massive cost and long timelines of DNO upgrades

Can be mitigated using IDNOs and independent connection providers

14 DNOs in UK



22 Independent DNOs

Ofgem issued first licences to IDNOs 2004

Ability earn money from share of Distribution Use of Service (DUoS) charges to cover “last mile” of delivery

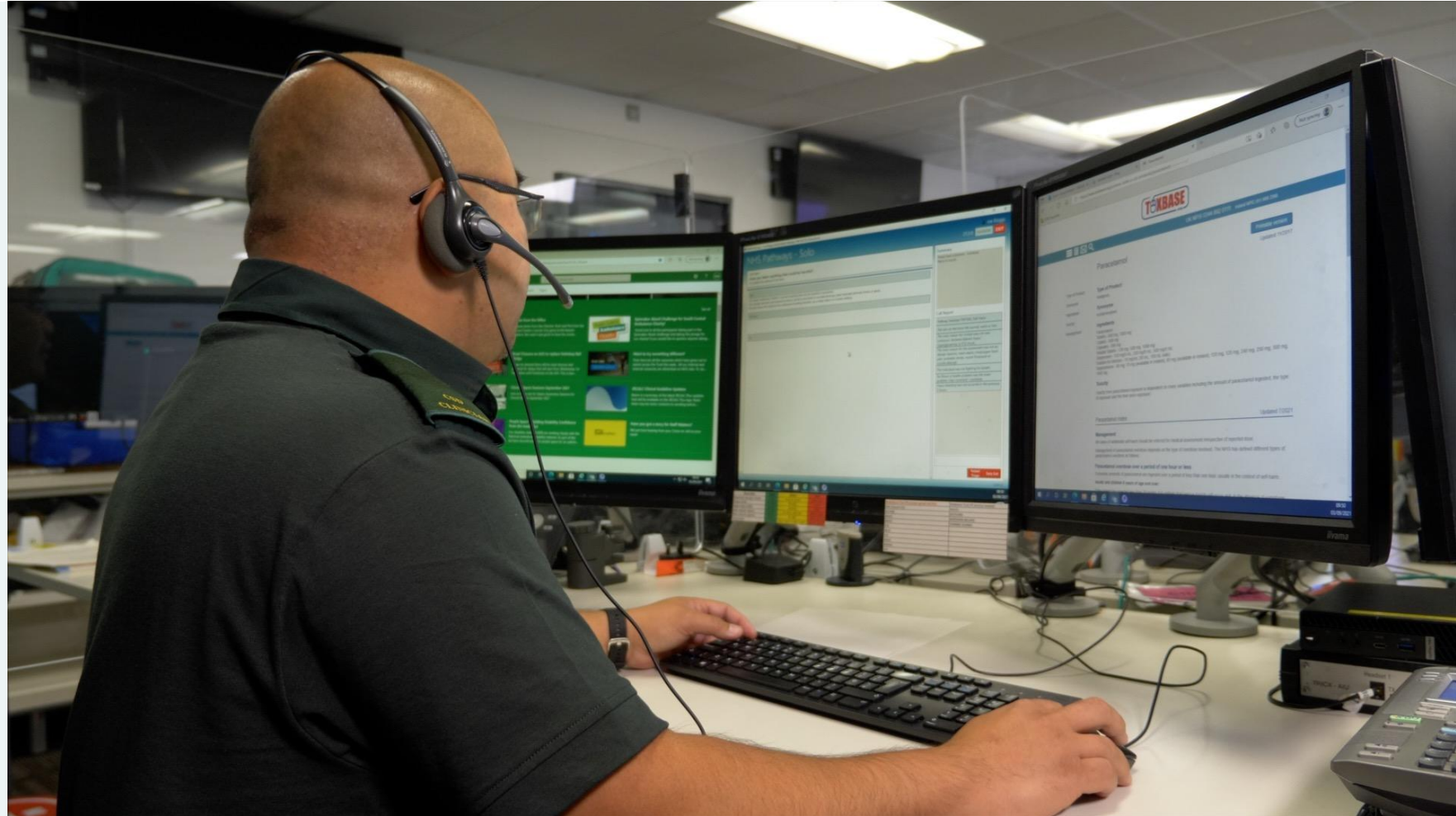
Installing new network supply capacity creates an asset

IDNOs will pay for this asset



Operating Models

- Internet of Things
- Data Analysis and AI
- Improved integration
- Real time visibility





Thank You!



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Case Study



SFG20

DRIVING FACILITIES EXCELLENCE



Case Study



Marc Watkins
Sales Manager - Alliance
SFG20

How to secure extra maintenance budget to address the £13.8bn NHS backlog

Marc Watkins

SFG20

DRIVING FACILITIES EXCELLENCE



Yearly NHS Estate costs **£13.6_{bn}**

Cost to remove the backlog **£13.8_{bn}**

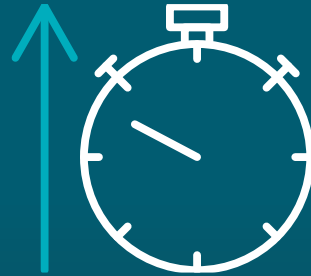
The impact of the backlog



Increase in
fines*



Legal
sanctions



Increased
downtime



Budget wastage
(delaying maintenance
can often cost 1.5x
more)

*Average fine of £150,000

The human cost



Missed
Appointments



Reputational
damage



Delayed
treatment



Negative Loop

How can you justify securing
additional maintenance budget?



Build out an ironclad business case
that key stakeholders **can't turn down**



Step 1: Understand your statutory obligations

Fire Doors

SFG20/Fire Protection Systems

The schedule covers the maintenance of fire doors, including hardwood fire-rated doors, door hinges, composite doorsets, emergency door release break glass units, an...

[Show more ▼](#)



4

[View tasks](#)

Statutory required tasks

Complete these tasks to ensure legal compliance. Mitigate risk, ensure safety and avoid penalties.



5

[View tasks](#)

Industry best practice tasks

Keep operations running smoothly, minimise costly downtime, and optimise asset performance.

Step 2: Evidence your maintenance costs

Oil Condensing Boiler – Forced Draught (Pressure Jet) #05-13 (View In Library)

Search • Oil Condensing Boiler – Forced Draught (L... ▾

← Back

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Custom Tags

Enter a tag...

Introduction

The essential feature of a condensing boiler is that to increase the efficiency the flue gases are cooled below their dew point with the result that condensate is produced which has to be removed from the flue via drainage pipework.

Boiler room ventilation should comply with current British Standards for boilers not exceeding 70kW and for boilers with a capacity between 70kW and 1.8MW.

Undetected CO is poisonous, life threatening and also causes energy waste. The burner should be quiet in operation, no excessive noise should occur when the burner ignites or shuts down.

In domestic premises, consider the installation of a CO detector that complies with current Statutory Requirements, Regulations and Manufacturers' Recommendations.

Please refer to the *overarching introduction* (SFG 00-01) to make sure you are of the correct skill level as indicated within the task schedule to carry out the described works. Ensure you have read and understood the manufacturer's recommendations, carried out risk assessment(s) on each item of plant to identify the correct frequency of maintenance, identified all safety procedures that need to be applied and recorded in order to carry out the work in a safe and reliable manner.

If this asset (item of equipment/system) is within the warranty or guarantee period, it is essential that you maintain it in full accordance with the specific manufacturer's or installer's maintenance requirements. If you are in any doubt about the maintenance requirements or the warranty or guarantee period please contact the manufacturer, installer or their representative to seek clarity.

NOTES

For information on oil storage and distribution refer to SFG 40-10, 45-15, 56-05, 56-06 and 87-18.

Summary References Timeline Codes >

Classification

Red

26 tasks

180 mins

Task criticality code

Timing

OU

0 mins

2 tasks

0 mins

6M

60 mins

20 tasks

120 mins

12M

60 mins

4 tasks

60 mins

Task frequency

Skill

Competent Person

2 tasks

0 mins

Mechanical

24 tasks

180 mins

Skill set required

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Step 3: Set out your future maintenance needs with a Forward Maintenance Register



How to use a Forward Maintenance Register

1. Conduct a Condition Survey
2. Determine the Risk Ranking of each asset
3. Use a Backlog Risk tool



Step 4: Step into the shoes of your stakeholders



Step 5: Clearly present your business case



What are you asking?



Why do you need it?



Why should they care?

Using SFG20, we were able to forecast actual cost requirements and **secure an additional £1 million of maintenance revenue for the future year.**

David Hemming, NHS Service Delivery Lead



Inaction could cost lives



Download your
Forward Maintenance Register to **today**





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Lunch & Networking



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below to register your interest for our
accredited training courses.

Register your Interest





Chair Afternoon Reflection



Rob Jepson

Group Director of Estates and Facilities
Manchester University NHS Foundation Trust



Case Study





Case Study



Michael Drayson
Product, Development & Strategy
Switchshop



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Keynote Presentation



Jonny Groome

Paediatric Anaesthetic Consultant
Barts Health NHS Trust and Nuffield Health

BUILDING A BETTER FUTURE

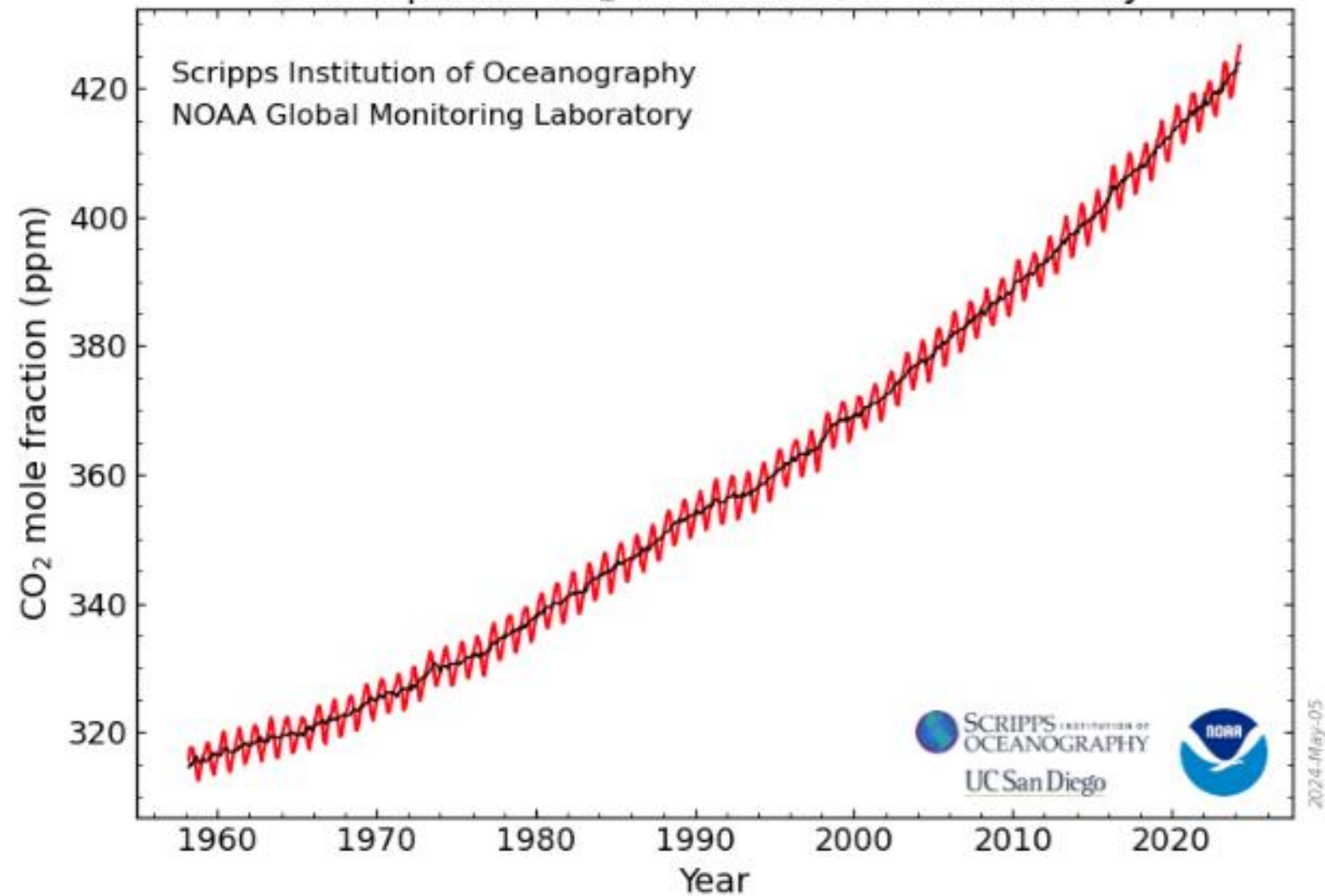
Dr Jonny Groome

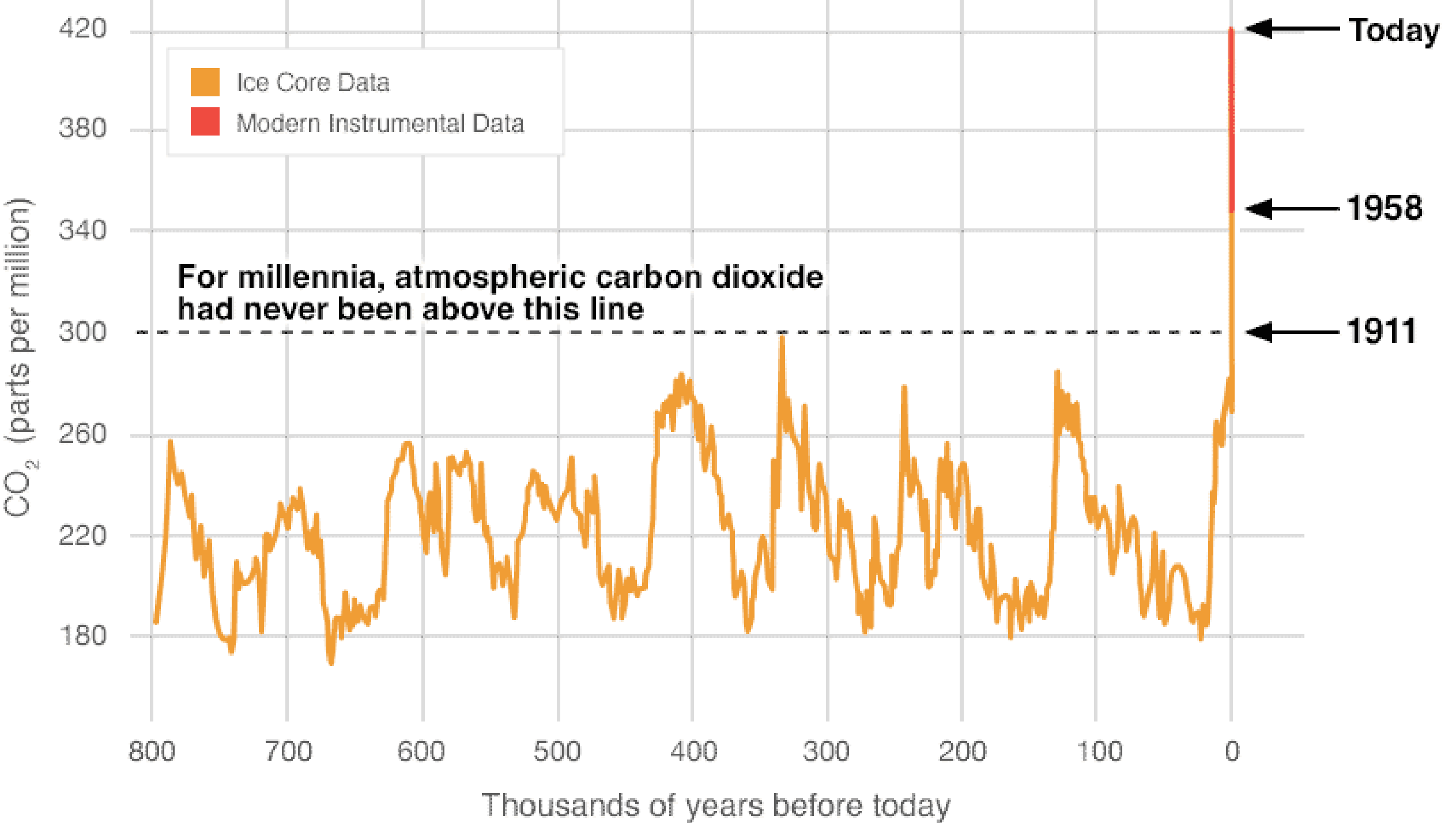
Paediatric Anaesthetic Consultant
Royal London Children's Hospital

Honorary Associate Professor of
Sustainability, UCL



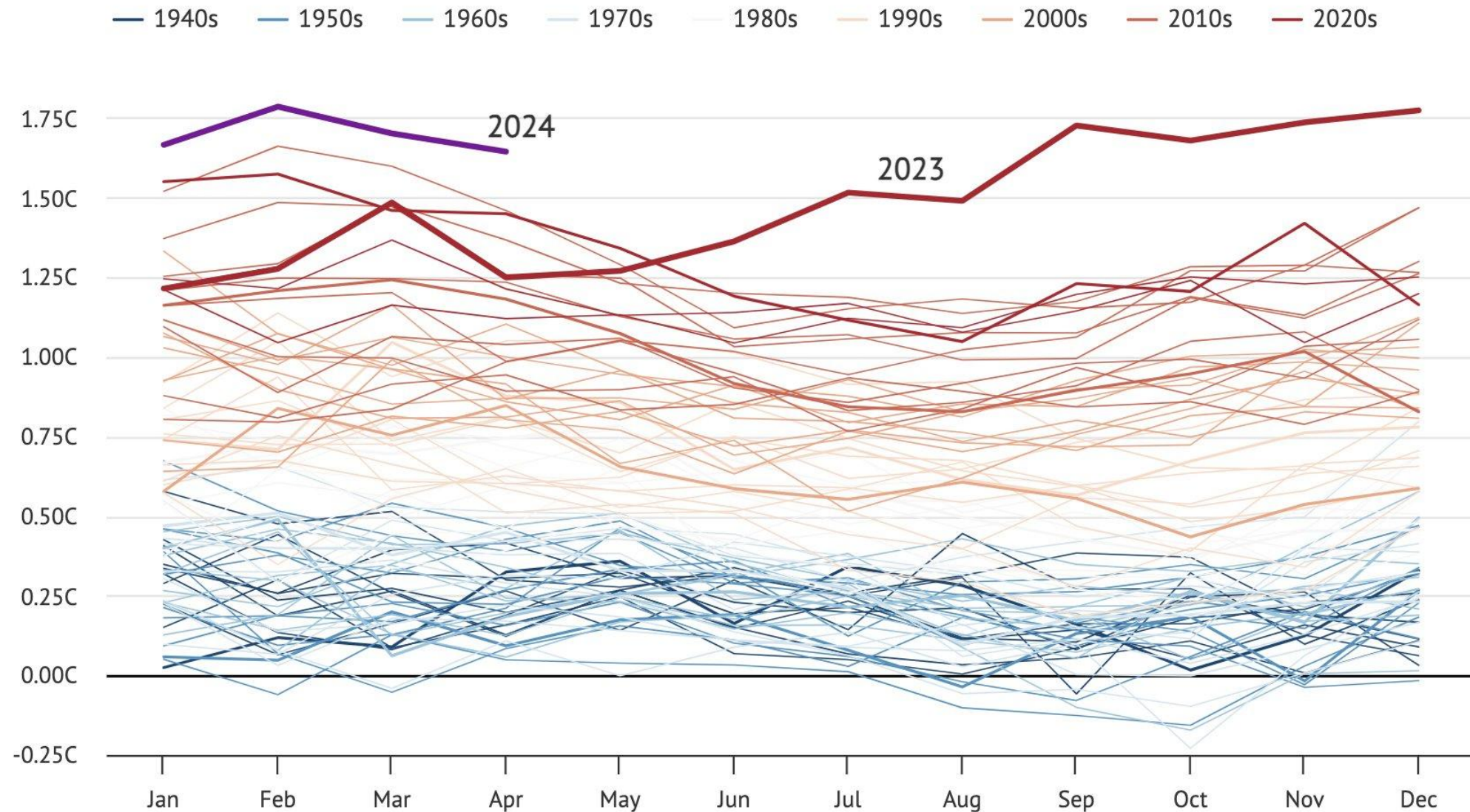
Atmospheric CO₂ at Mauna Loa Observatory





Monthly global average temperatures since June 2023 have set record highs

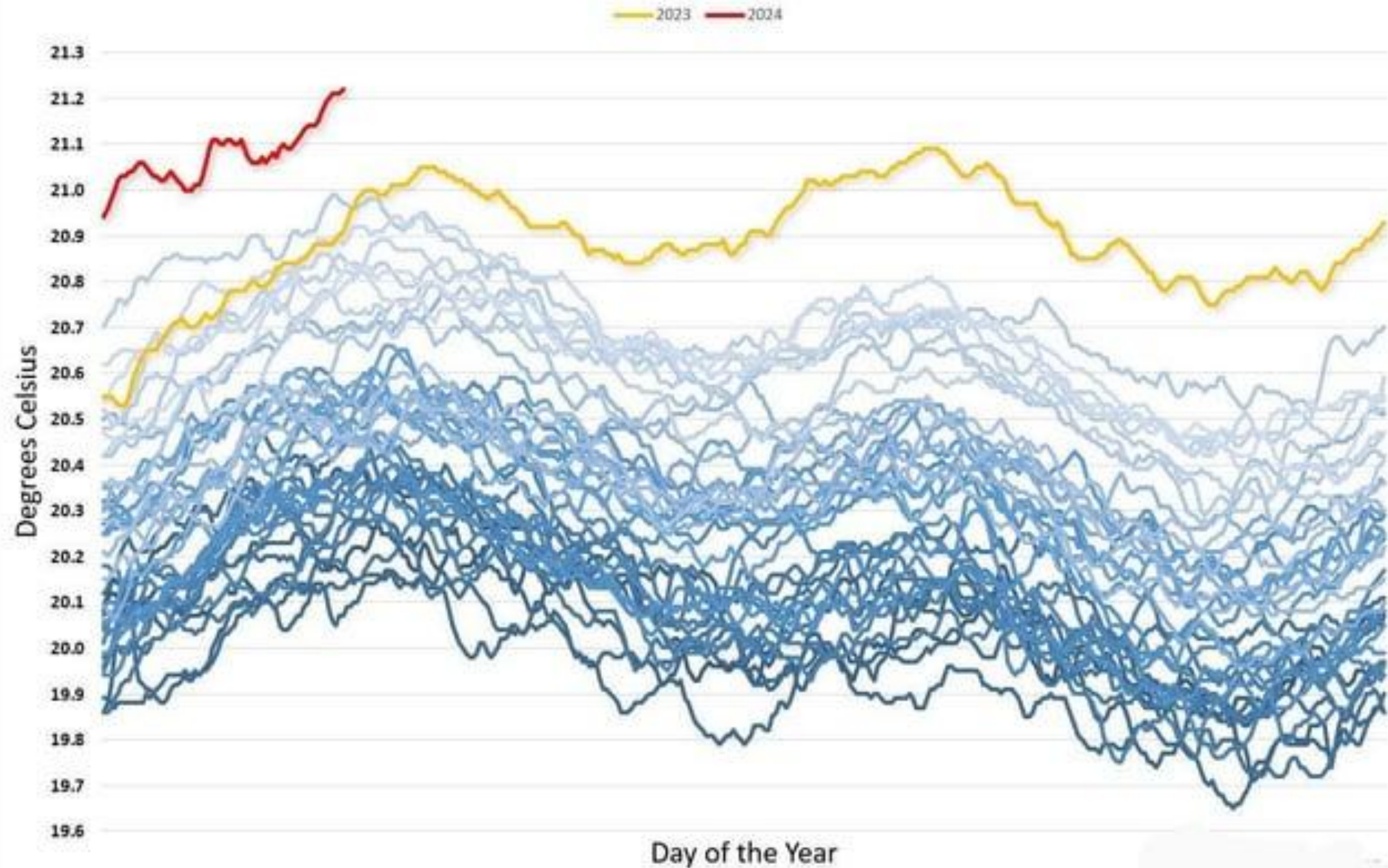
ERA5



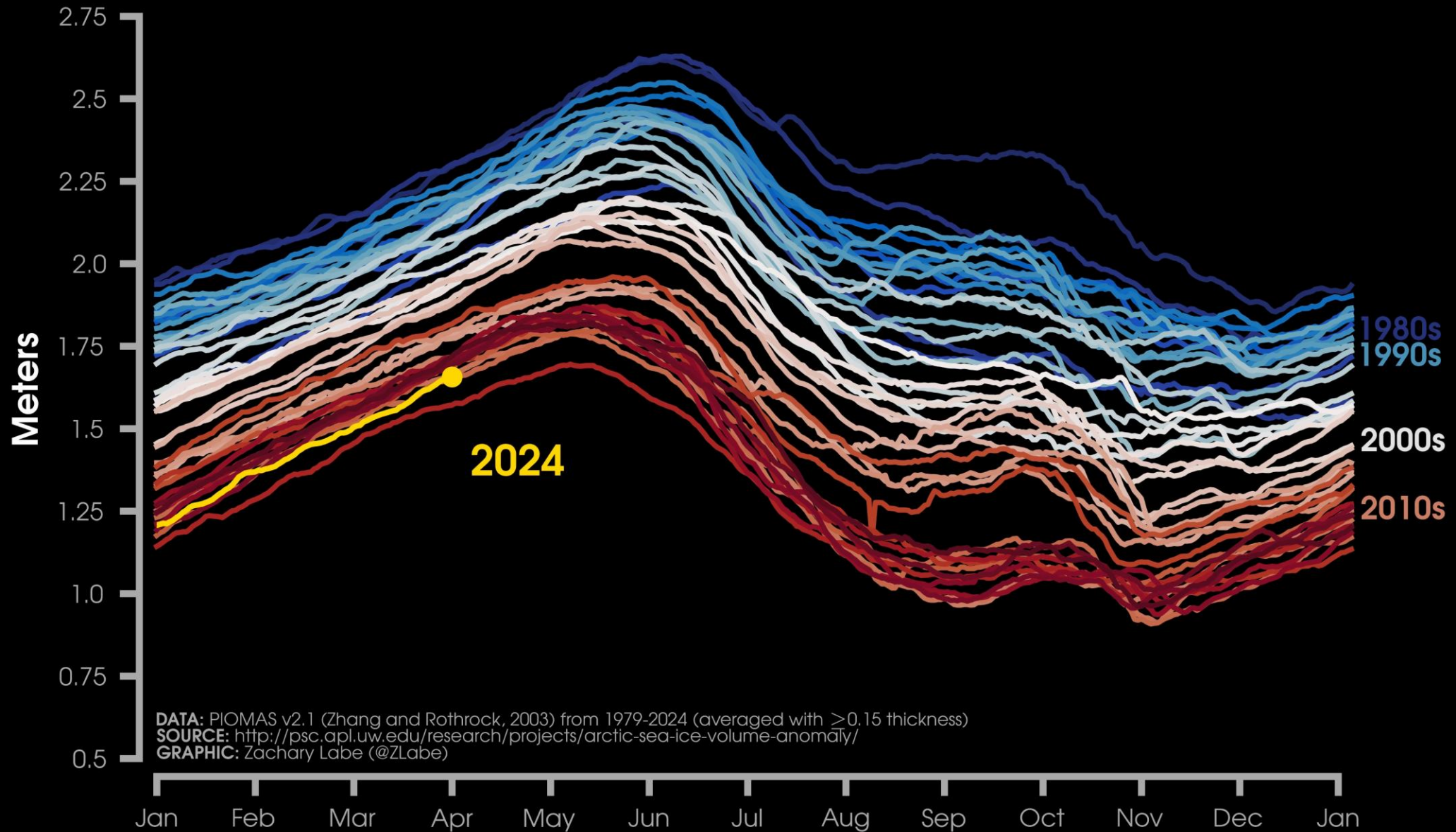
Source: Copernicus/ECMWF ERA5.

Global Sea-Surface Temperatures (60°S-60°N): 1982-2024

Data: https://climateanalyzer.org/clim/sst_daily/json/olsst2.1_world2_sst_day.json



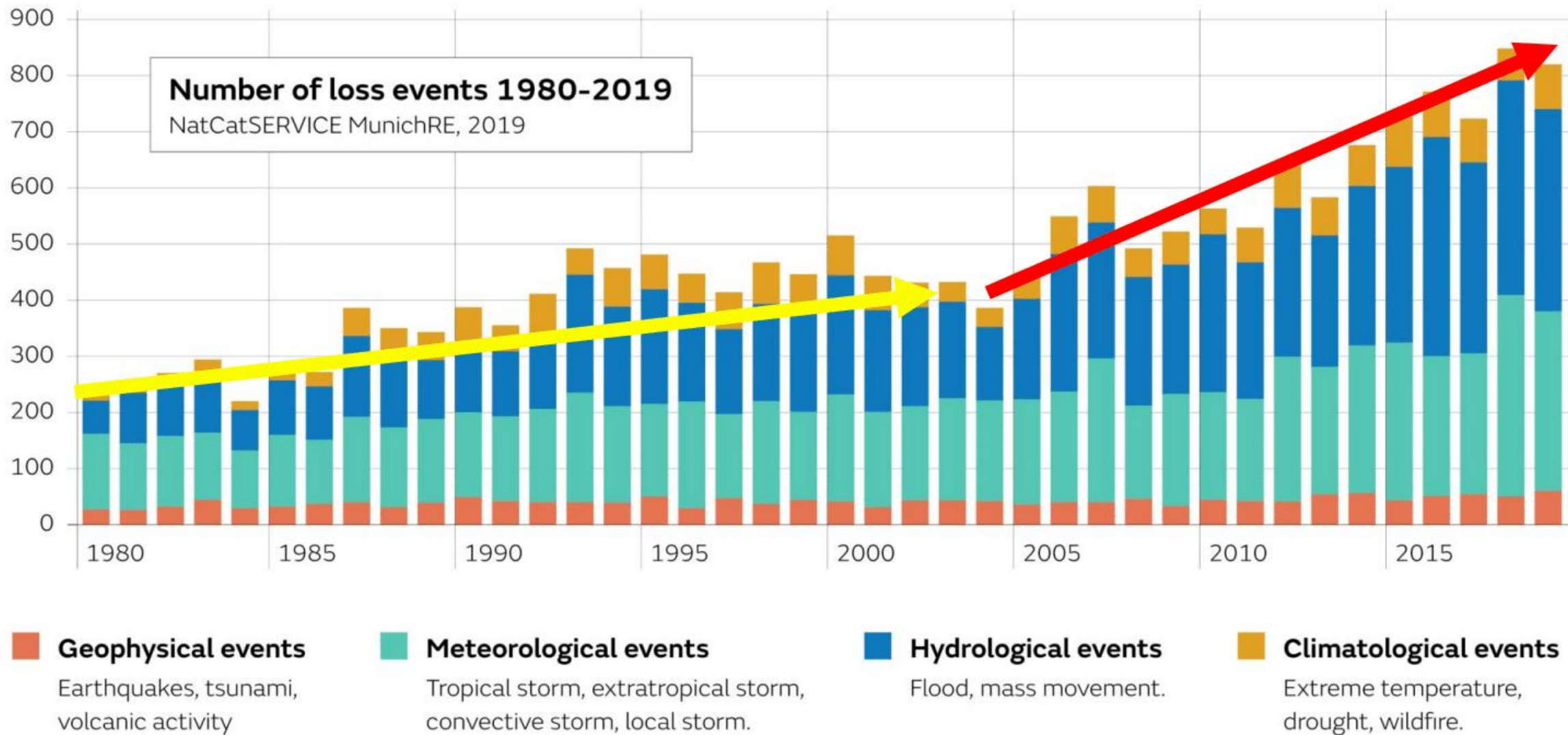
ARCTIC SEA ICE THICKNESS BY YEAR



13 Hiroshima
Bombs
PER SECOND



MORE FREQUENT EXTREME WEATHER



World Meteorological Organisation May 2023

Economic costs of weather-related disasters
soars

“Reported economic losses are
US\$4.3 trillion and rising ”

Inst and Faculty of Actuaries

Sept 2023

- “We have left it too late to tackle climate change incrementally. It now requires transformational change and a dramatic acceleration of progress”

“Our economy may not exist at all if we do not mitigate climate change.”

Inst and Faculty of Actuaries Sept 2023



Air Pollution & Increasing Allergens

Asthma, allergies, cardiovascular and respiratory diseases

Extreme Heat

Heat-related illness and death, cardiovascular failure

Drought

Water supply impacts, dust storms, Valley Fever

Environmental Degradation

Forced migration, civil conflict, loss of jobs and income

Wildfires & Wildfire Smoke

Injuries, fatalities, loss of homes, cardiovascular and respiratory diseases

Degraded Living Conditions & Social Inequities

Exacerbation of racial and health inequities and vulnerabilities, loss of employment

Changes In Vector Ecology

Lyme disease, West Nile Virus, hantavirus, malaria, encephalitis

Food System Impacts

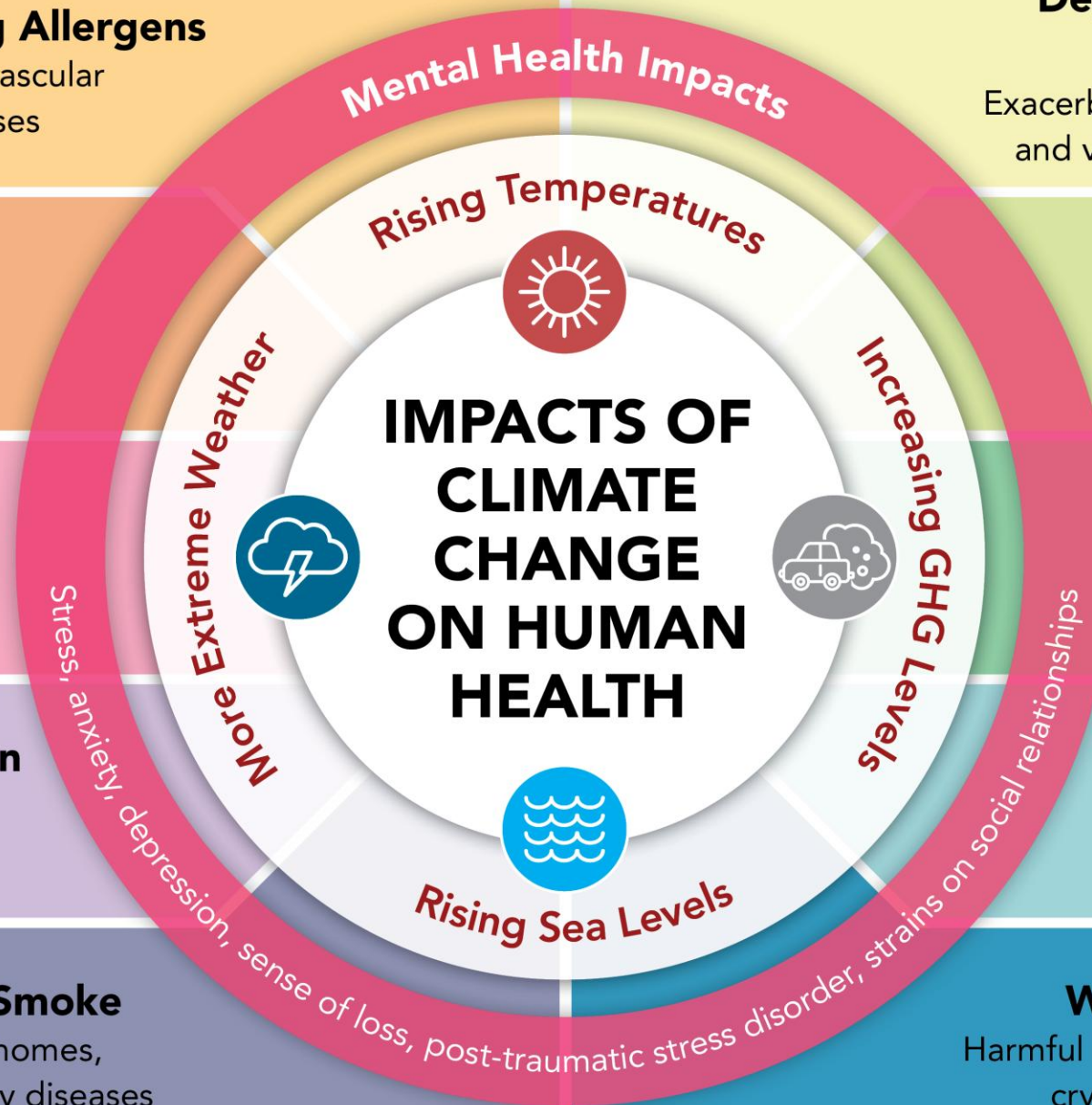
Malnutrition, food insecurity, higher food prices, foodborne illness

Severe Weather & Floods

Injuries, fatalities, loss of homes, indoor fungi and mold

Water Quality Impacts

Harmful algal blooms, campylobacteriosis, cryptosporidiosis, leptospirosis



CDPH (Adapted from CDC, J. Patz)

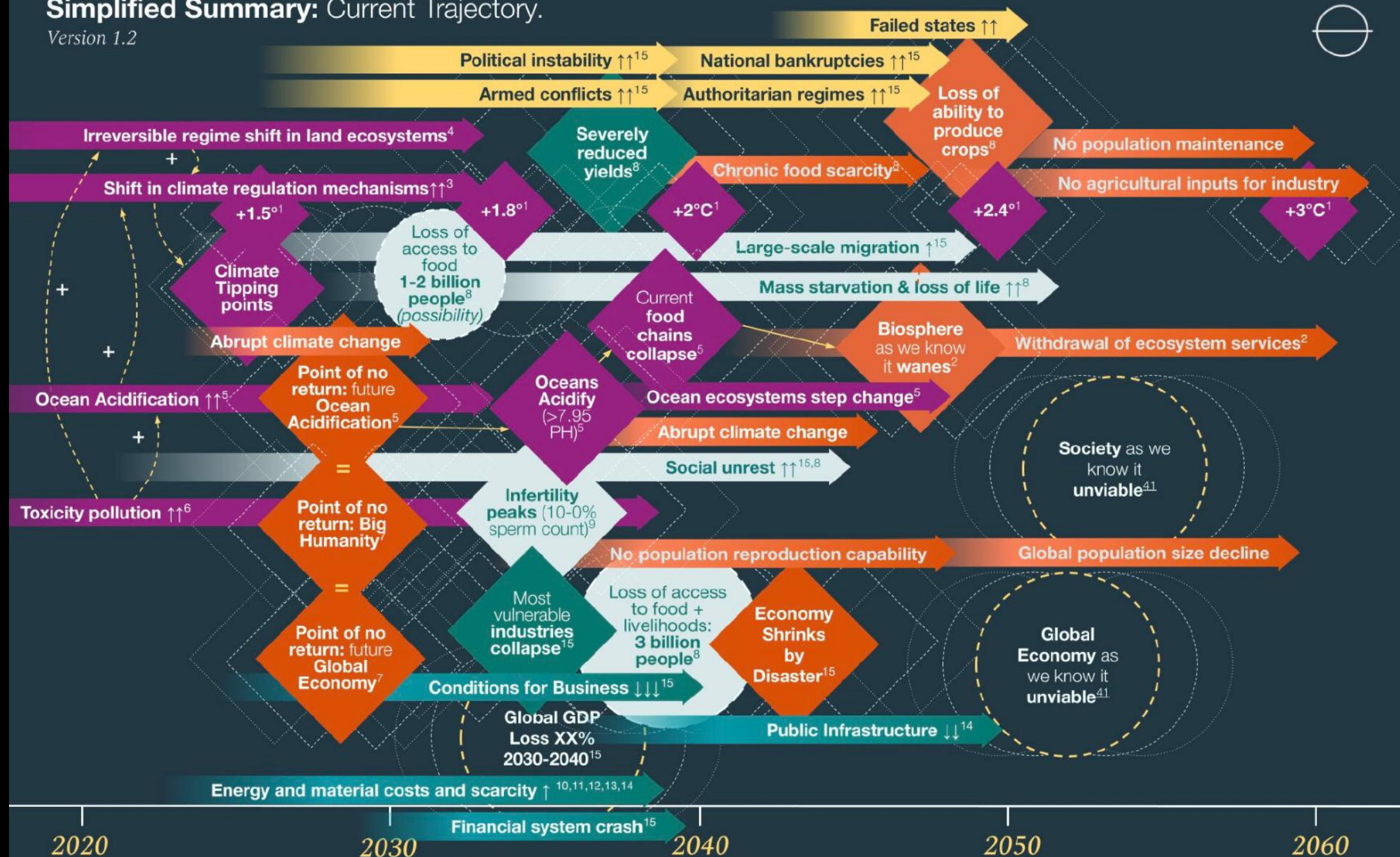
THE CLIMATE- CHANGED CHILD



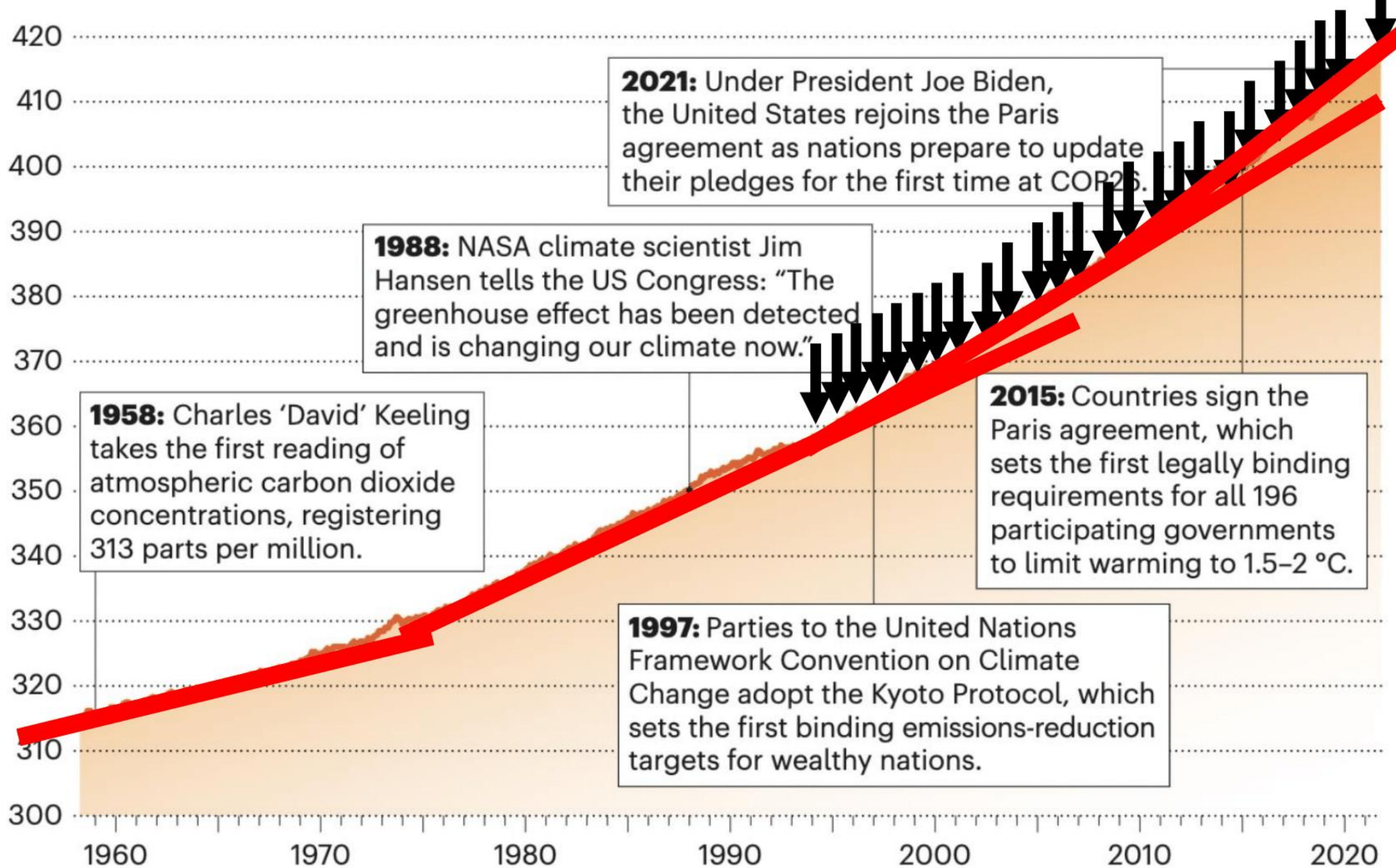
- **559 million children** are currently exposed to high heatwave frequency. This will rise to **2.02 billion by 2050**.
- Over the last 6 years there have been **20,000 child displacements per day** due to weather related disasters.
- Over **730 million children** are currently exposed to extremely high water scarcity.
- Every year, environmental factors take the lives of **1.7 million child under five**.

Simplified Summary: Current Trajectory.

Version 1.2



Atmospheric CO₂ at Mauna Loa Observatory
(parts per million, p.p.m.)

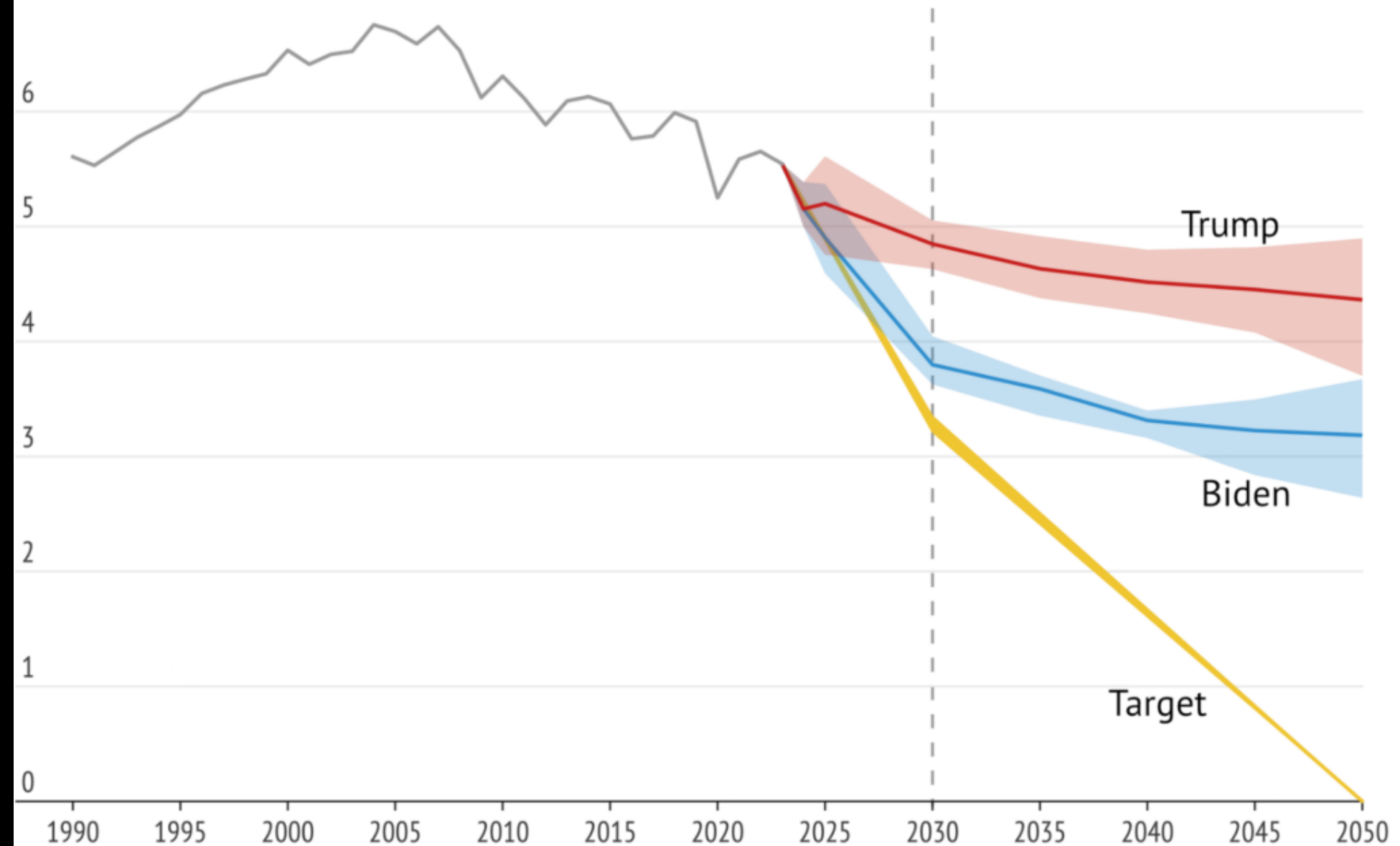


**DRILL,
BABY,
DRILL!**



A Trump election win could add 4bn tonnes to US emissions by 2030

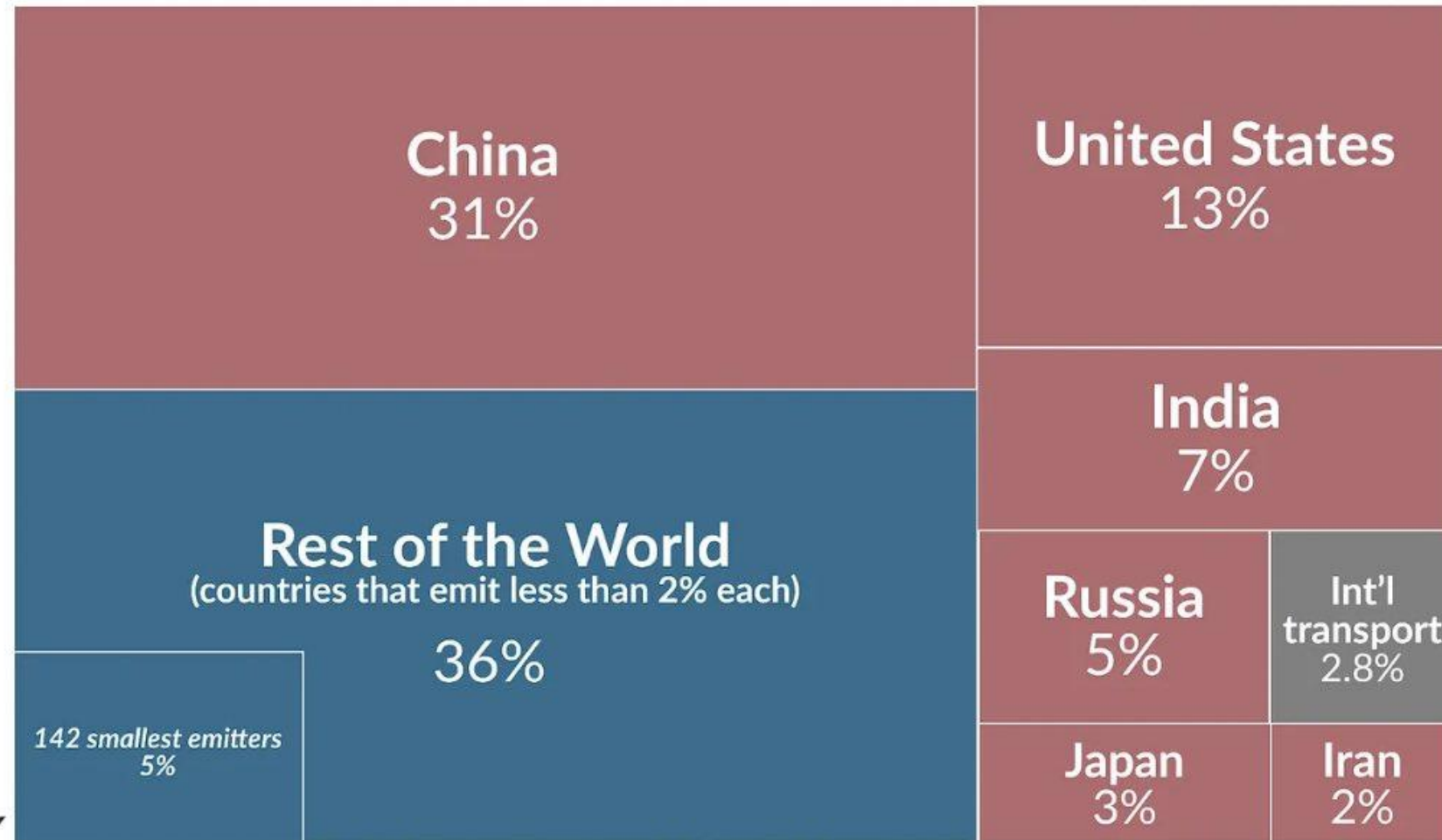
Greenhouse gas emissions, billion tonnes of CO₂e



Source: Carbon Brief analysis of Bistline et al (2023) and Rhodium Group (2023)

We can't solve climate change without countries with 'negligible' emissions taking action

Countries with national emissions that are less than 2% of the global total (those that might claim their emissions are 'negligible') account for more than one-third of global emissions combined.

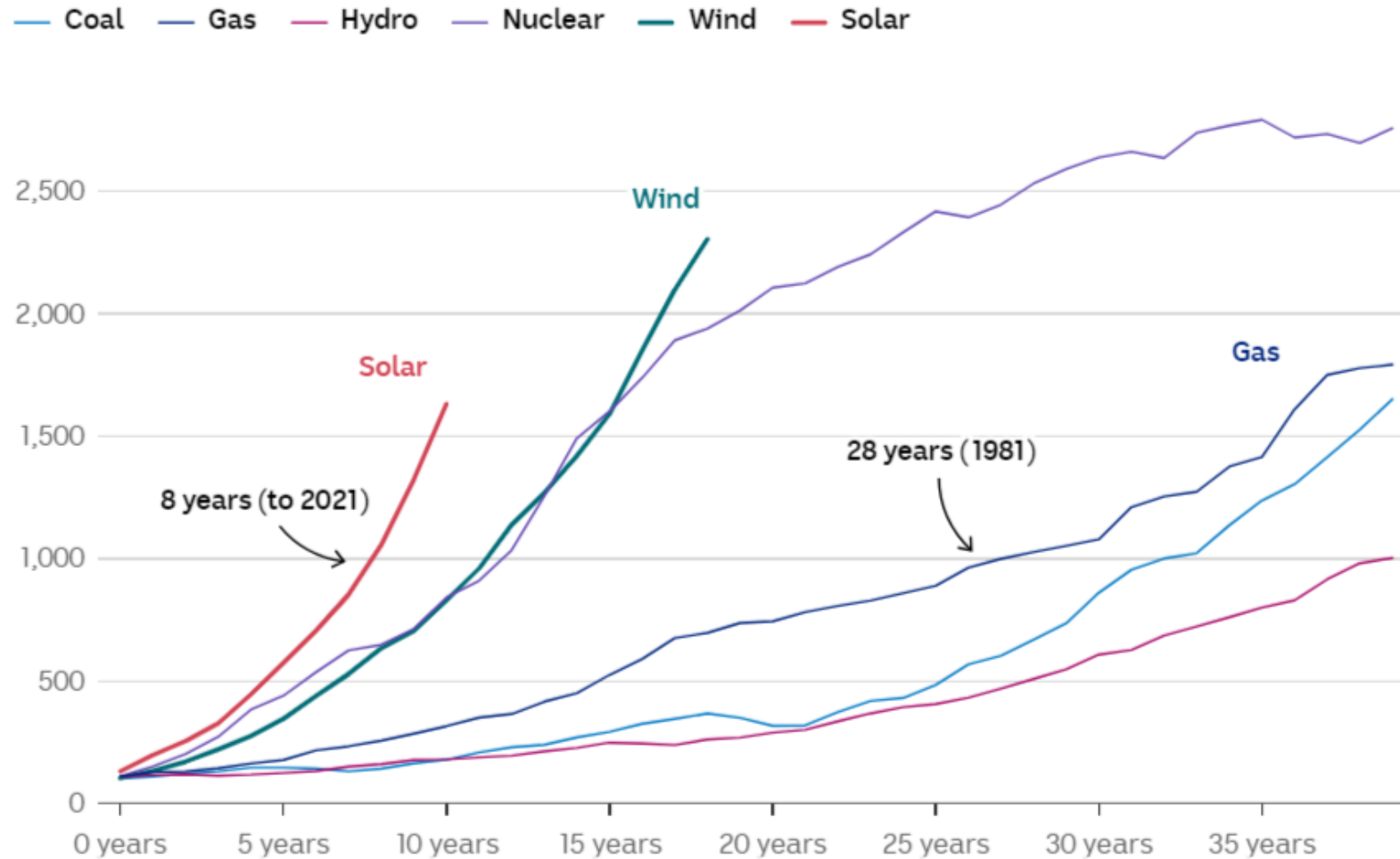


142 of the world's smallest emitting countries and territories emit just 5% of the total. These have very small emissions each.

Includes most of the world's richest countries, including the UK, Germany, France, Sweden, Australia, and Canada.

Wind, solar scale up faster than any other electricity source in history

It took gas 28 years to scale up to 1,000 terawatt-hours, while it was only eight years for solar and 12 for wind.

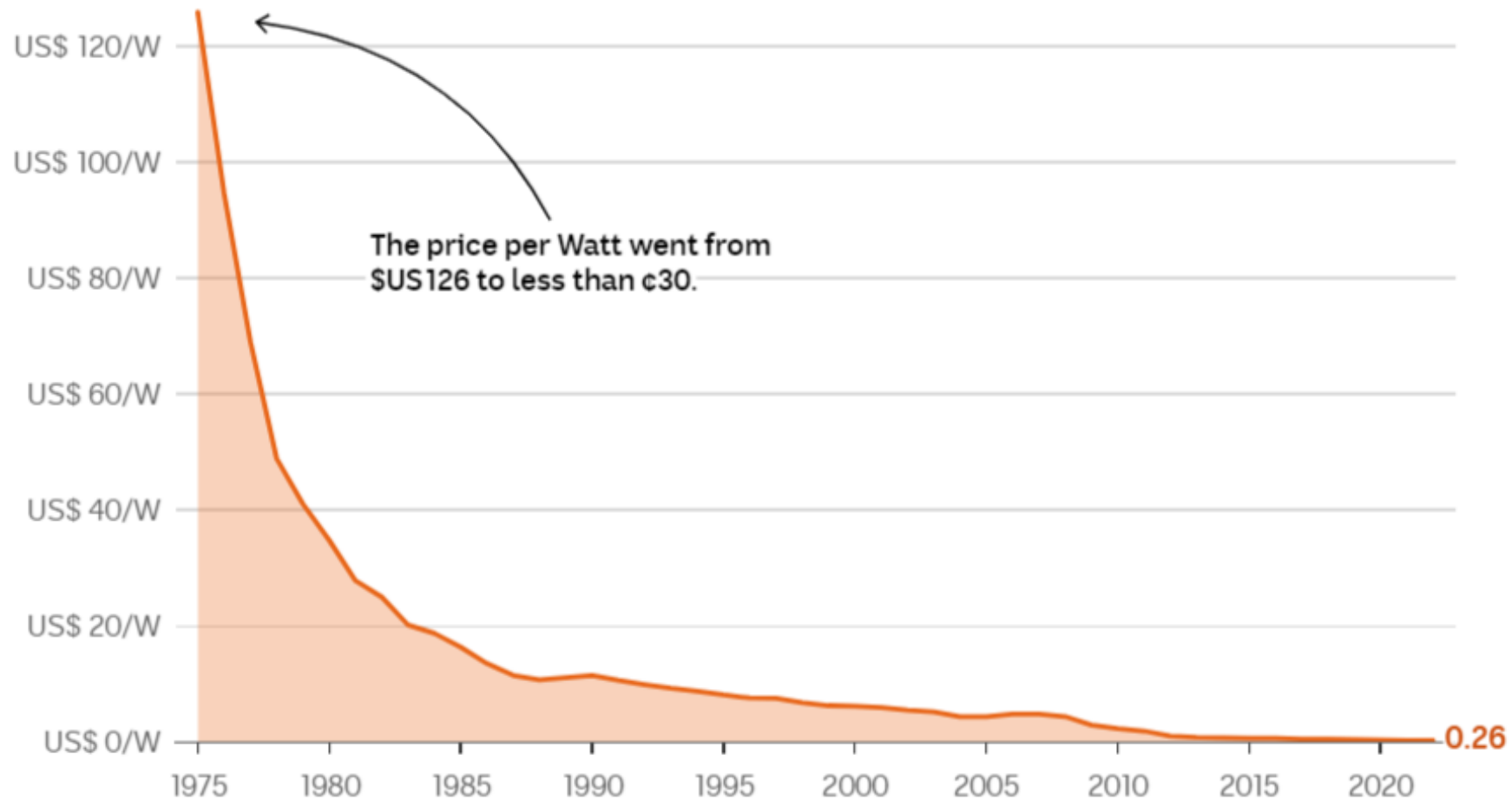


Increase in electricity generation in the years since reaching 100 terawatt-hours.

ABC / Source: [Ember Global Electricity Review 2024](#) / [Get the data](#)

The price of solar is now a small fraction of what it was 50 years ago

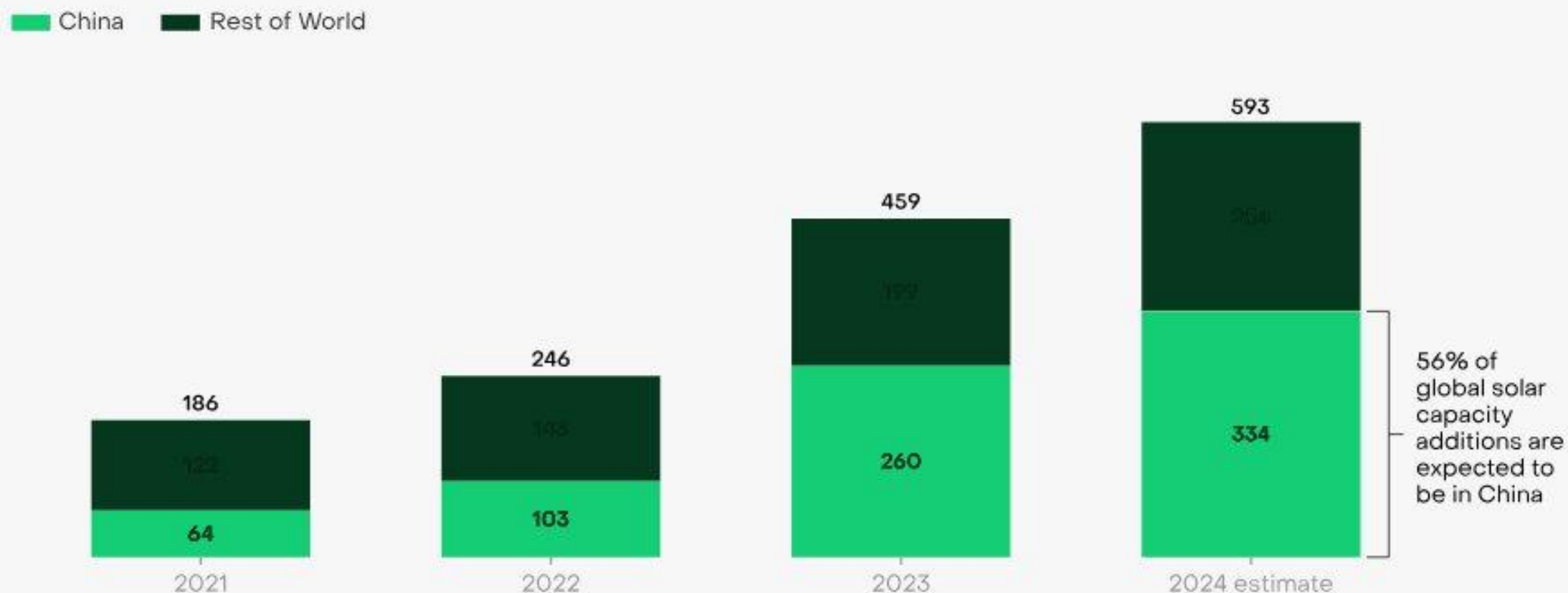
Annual solar photovoltaic module prices from 1975 to 2022 in \$US per Watt.



ABC / Source: [International Renewable Energy Agency \(2023\)](#); [Nemet \(2009\)](#); [Farmer and Lafond \(2016\)](#) via [Our World in Data](#) / [Get the data](#)

In 2024, China will again account for more than half of global solar capacity installations

Annual solar capacity additions (GW)

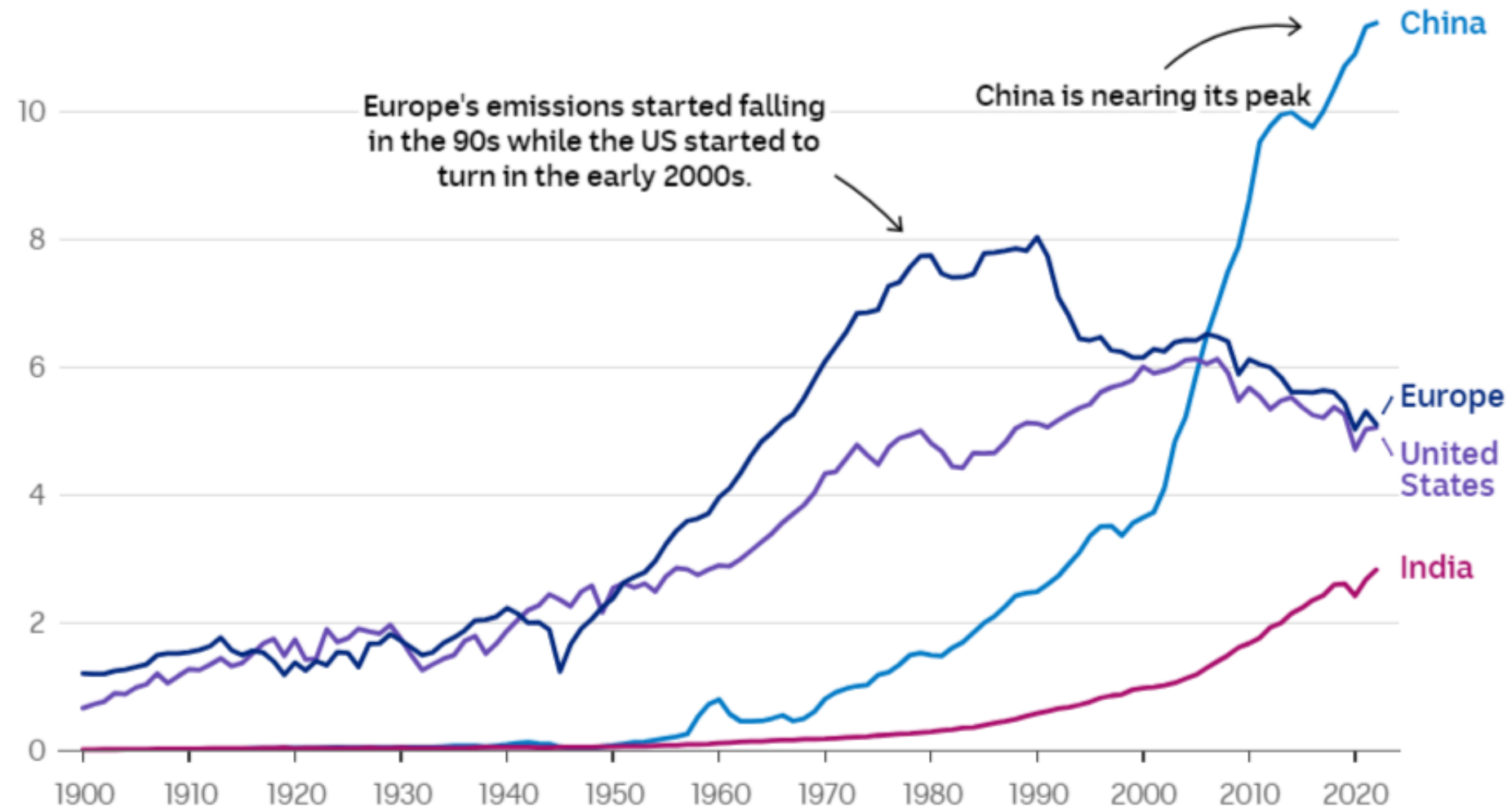


Source: Ember analysis of available national reporting on installed solar capacity.

World estimate includes estimates based on Ember's China solar PV export data for other countries. Data for some national sources including China have been converted from GW(AC) to GW(DC)

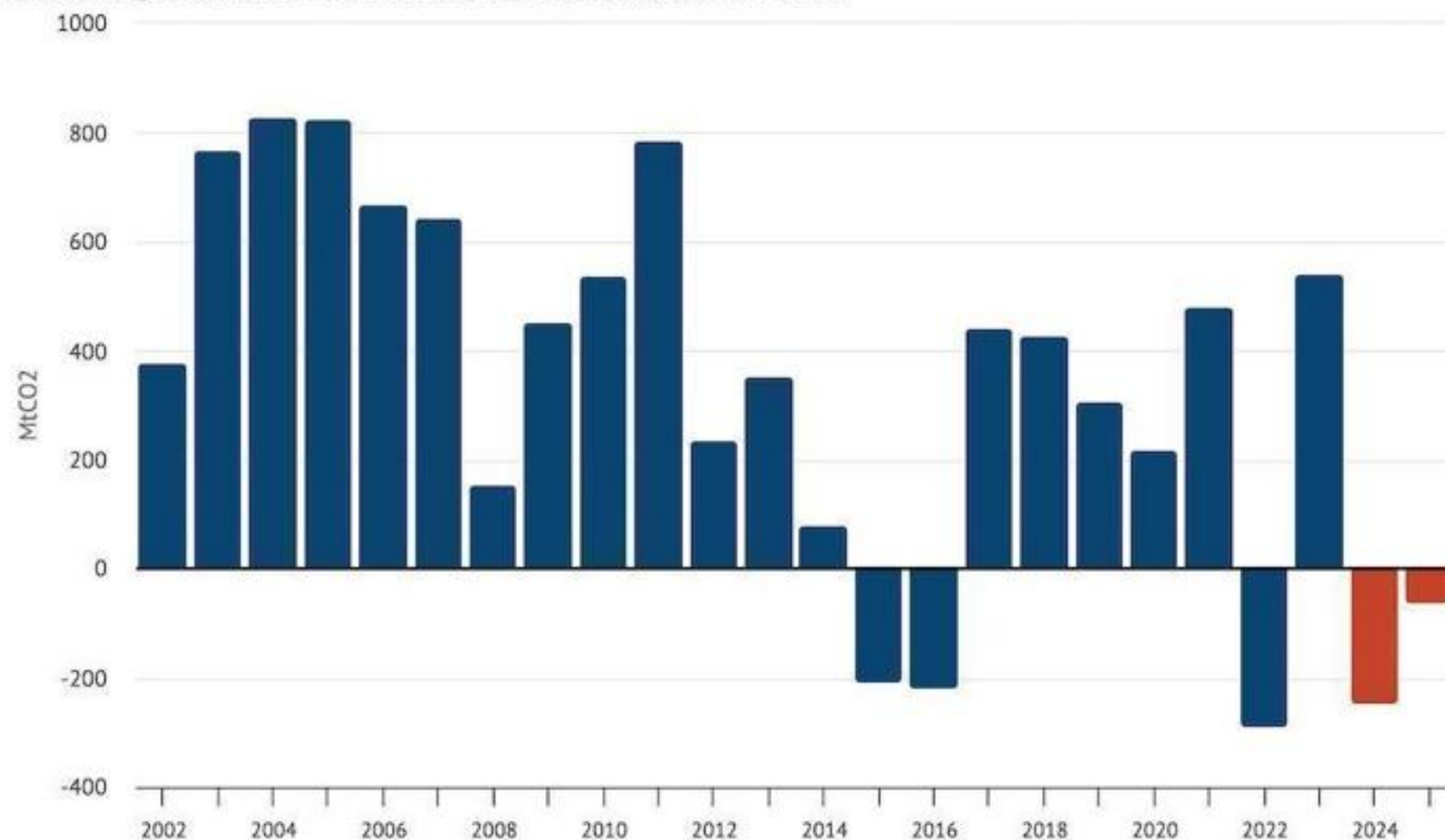
China's annual emission growth is slowing

Most big economies have already changed the trajectory of their emissions from fossil fuels and industry, measured in billion-tonnes of CO₂.



China's CO2 emissions could enter structural decline from 2024

Annual change in emissions from fossil fuels and cement, million tonnes of CO2



Source: CREA.



Climate Capital **Renewable energy**

+ Add to myFT

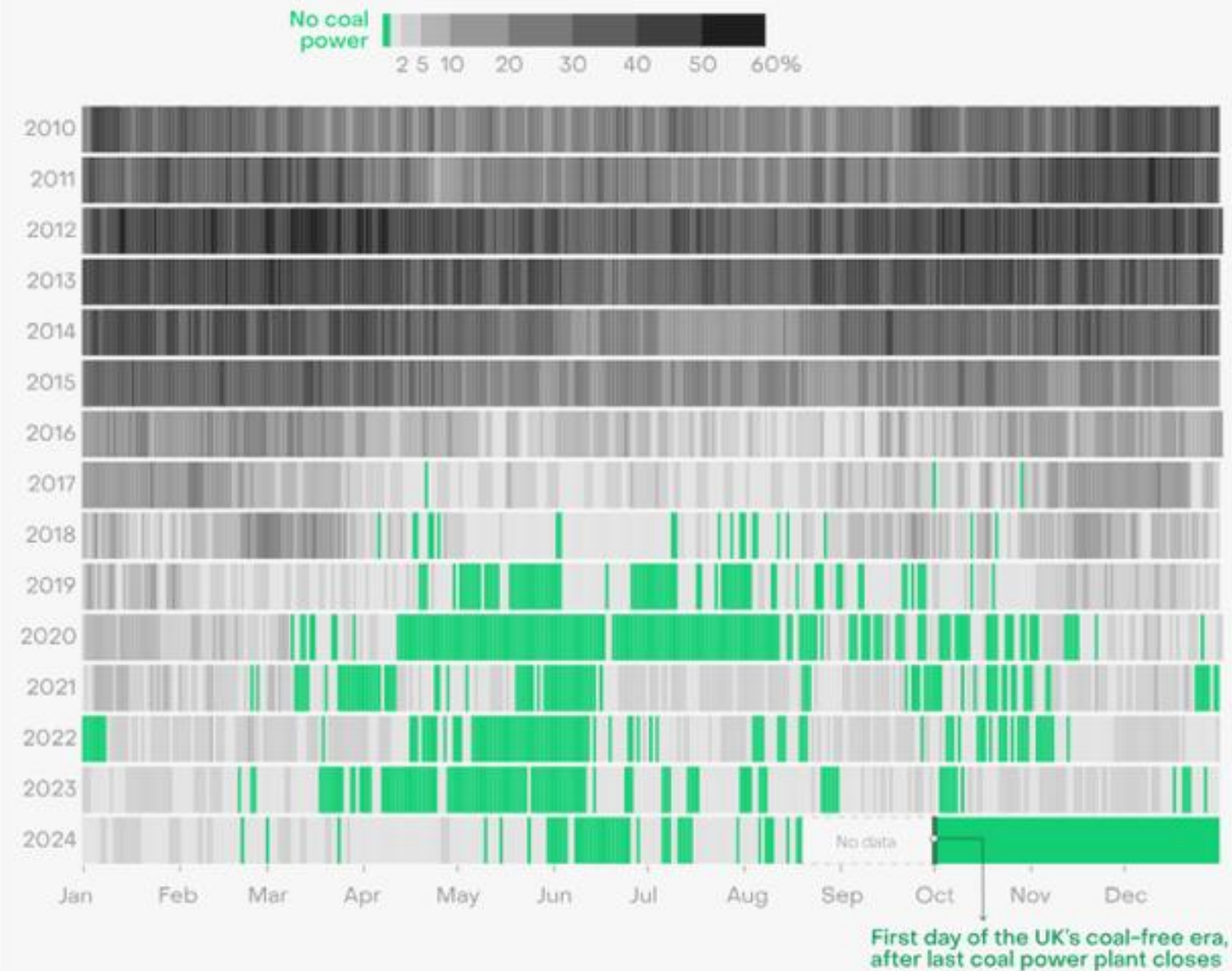
Chinese solar panel boom threatens Pakistan's debt-ridden grid

Industry rushes to switch to clean energy as cost of state power network becomes crippling



The UK's coal-free days are now set to stay

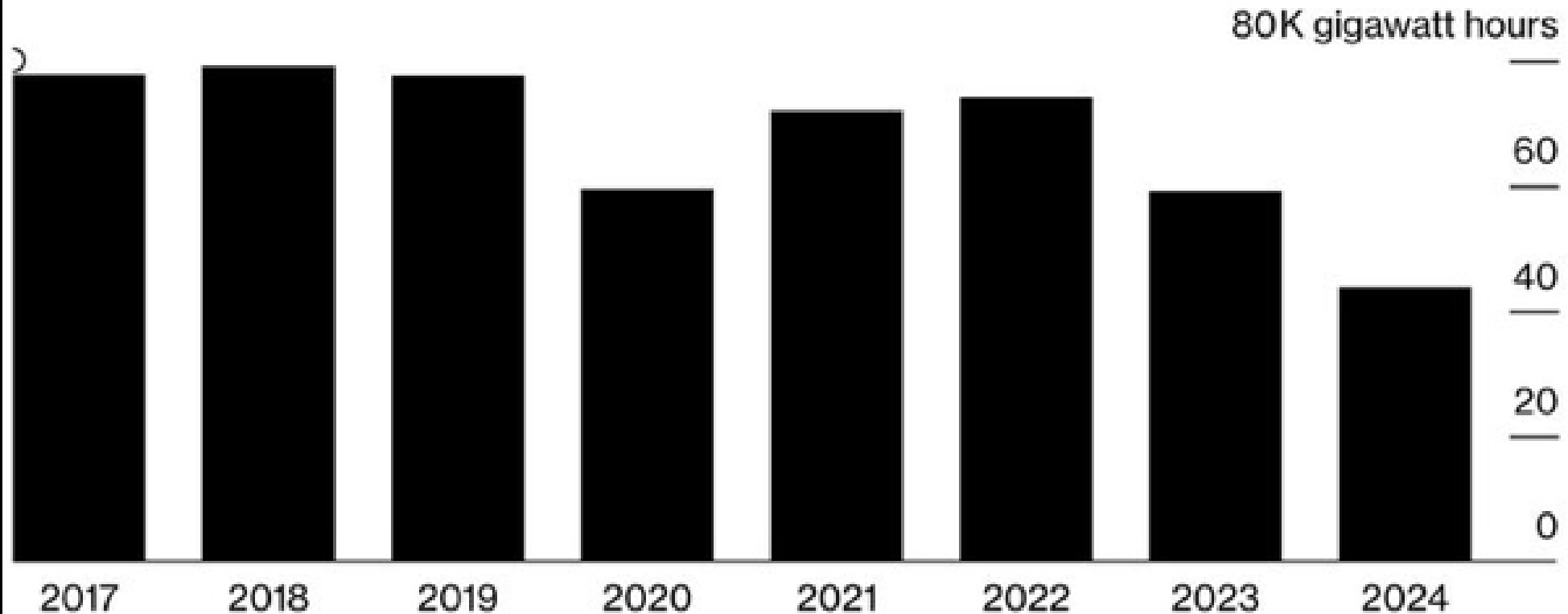
Share of electricity generation from coal (%)



Gas Power Generation in UK Is in Decline

Gas power generation from January to August

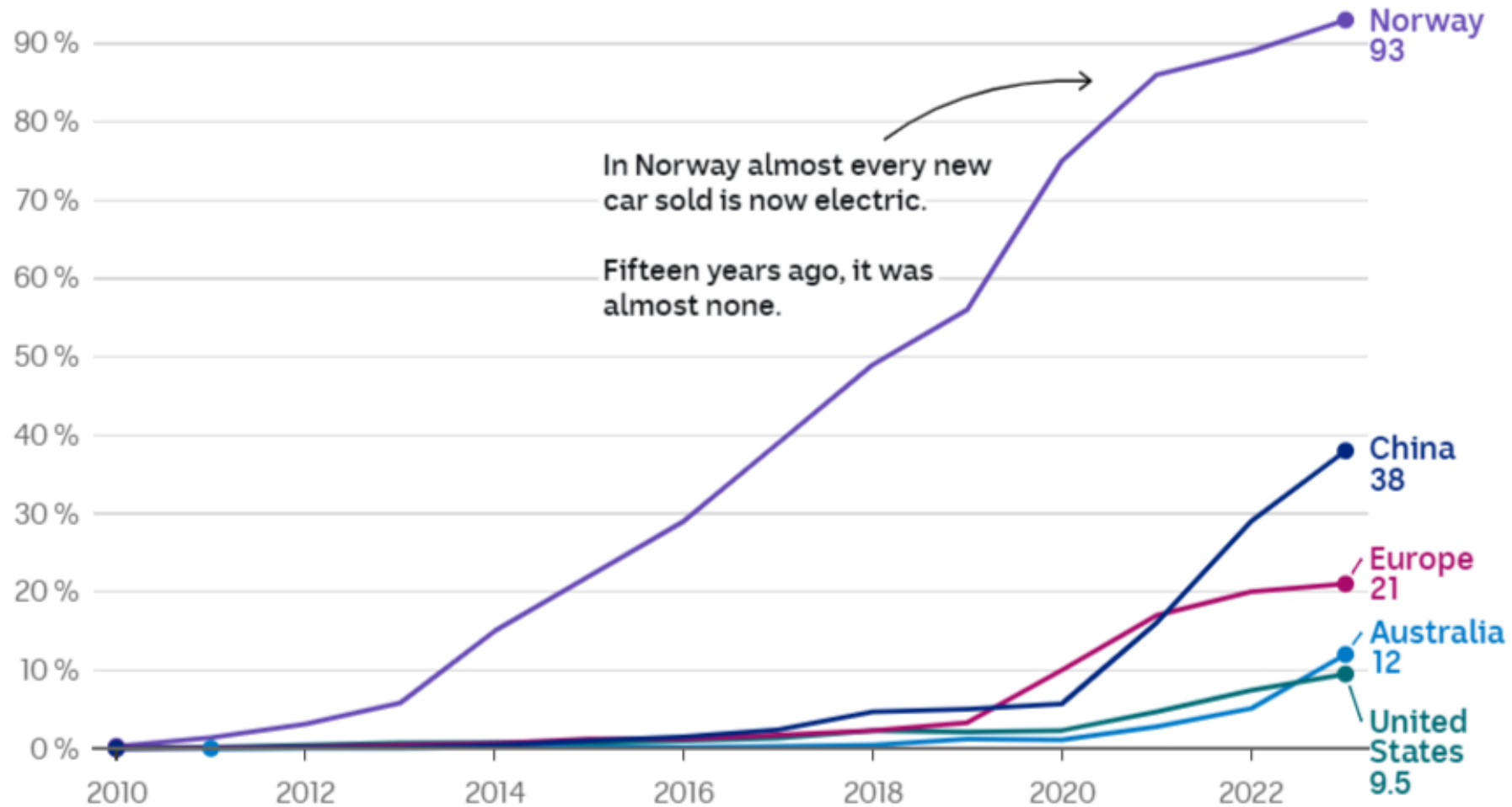
■ Gas power generation



Source: National Grid ESO

EVs take up a larger share of new cars sold around the world

Globally, around one in four new cars sold were EVs in 2023.

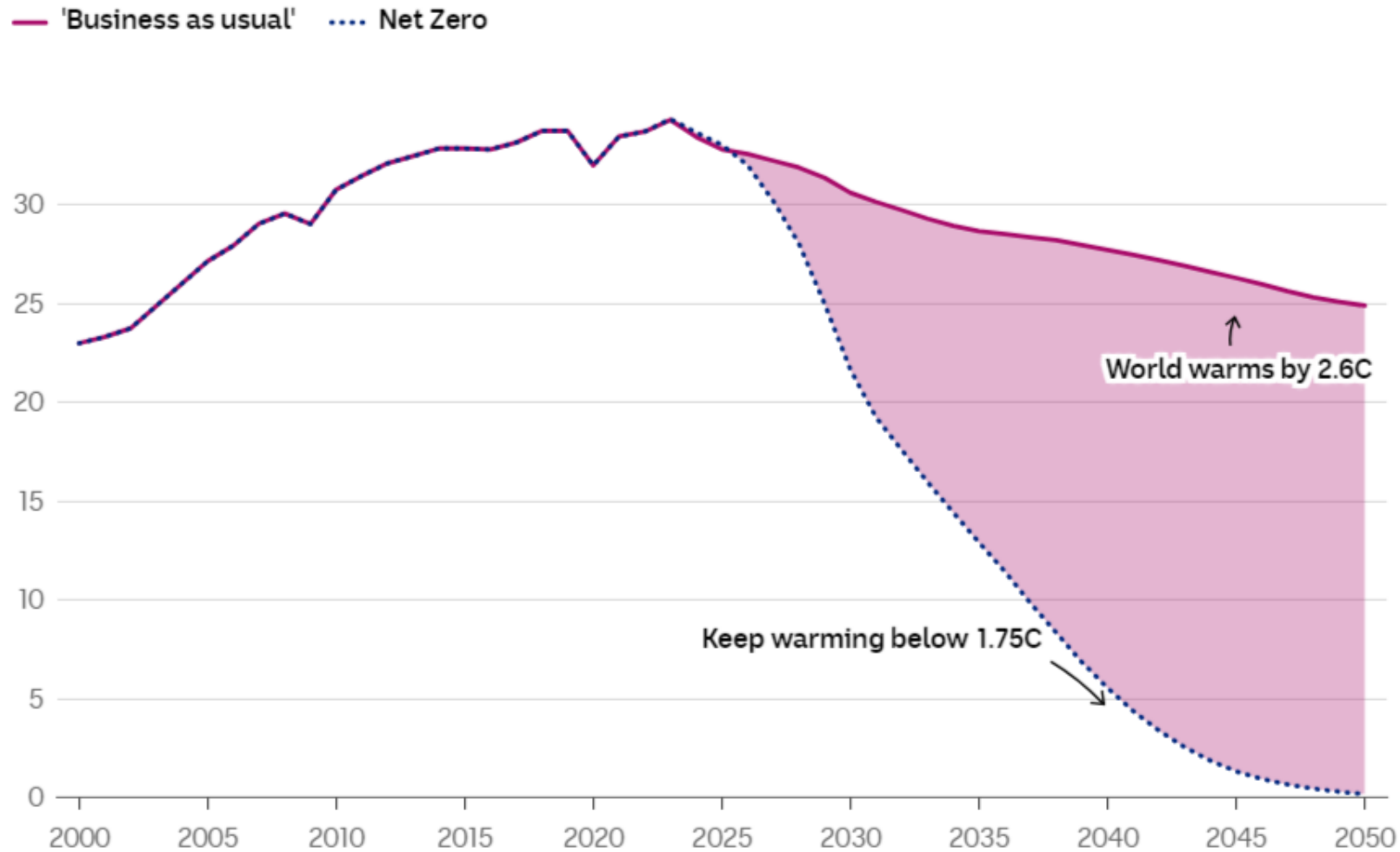


The percentage of electric car sales share includes fully battery-electric and plug-in hybrids.

ABC / Source: [International Energy Agency](#). Global EV Outlook 2024 via Our World in Data / [Get the data](#)

The gap between the current and a more aggressive pathway to cut back on emissions will dictate how much the world warms

The trajectory of global greenhouse gas emissions post peak adopting a 'business as usual' and a more ambitious net zero approach.



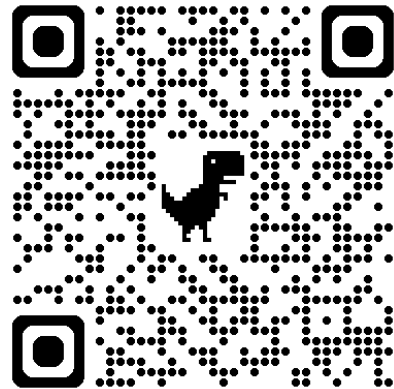
Emissions in gigatons of CO₂.

ABC / Source: BloombergNEF / [Get the data](#)

REAL
ZERO

7 ACTS

TO SAVE THE WORLD



1. MOVE YOUR MONEY

TO A BANK THAT DOESN'T INVEST IN FOSSIL FUELS

2. MOVE YOUR ENERGY

TO A 100% RENEWABLE SOURCE

3. MORE PLANT-BASED

FOOD; SEASONAL & LOCAL WHERE POSSIBLE

4. MORE GREEN TRAVEL

WALKING AND CYCLING

5. MORE PRE-LOVED,

LOCAL AND LOW-CARBON BRANDS

6. MEASURE YOUR CO₂

FOOTPRINT AND CUT WHERE YOU CAN

7. MOTIVATE YOUR LOVED ONES

TO PERFORM THEIR 7 ACTS TO SAVE THE WORLD



Move your money!

Bank League Table

We rank the major banks based on how much £10,000 in a current account contributes in carbon emissions.

#	Bank	tCO2 per £10k in account
1	Barclays	2.376
2	HSBC	2.170
2=	First Direct	2.170
4	Chase	1.897
5	Santander	1.742
6	NatWest	1.295
6=	RBS	1.295
8	Monzo	1.088
9	Lloyds	0.704
9=	Halifax	0.704
11	Metro Bank	0.694
12	Starling	0.610
13	Virgin Money	0.517
14	Nationwide	0.432
15	The Cooperative Bank	0.328
16	Triodos	0.317

£10k deposit
with a bad performing
bank is equivalent to:



11 Return Flights
London to Rome

Or



Driving 10,732
Miles

Or



Carbon absorbed by
108 Trees
per year

Move your energy!

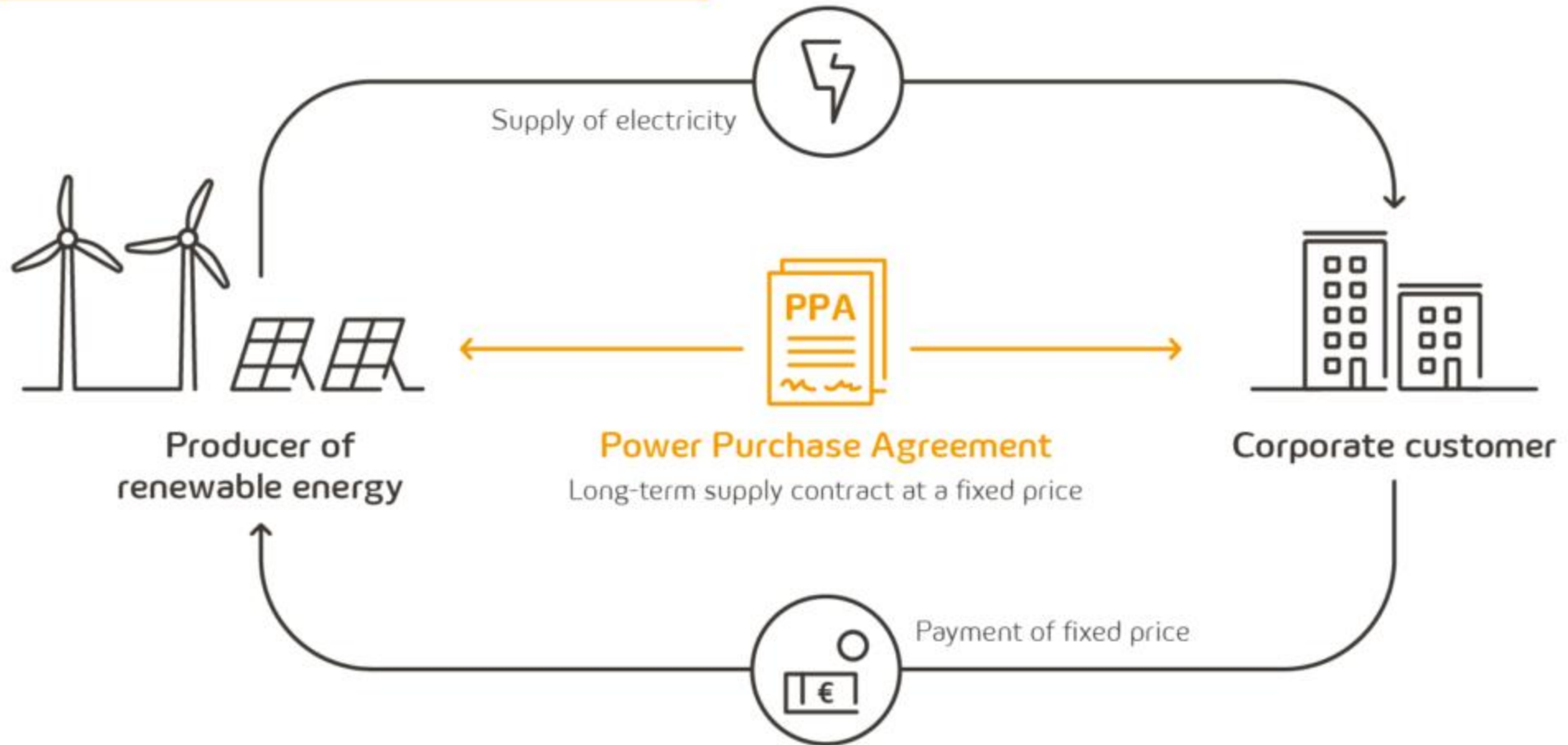
- Save >£100 this year
- Receive £50 credit
- 100% renewable



Power Purchase Agreements – the principle

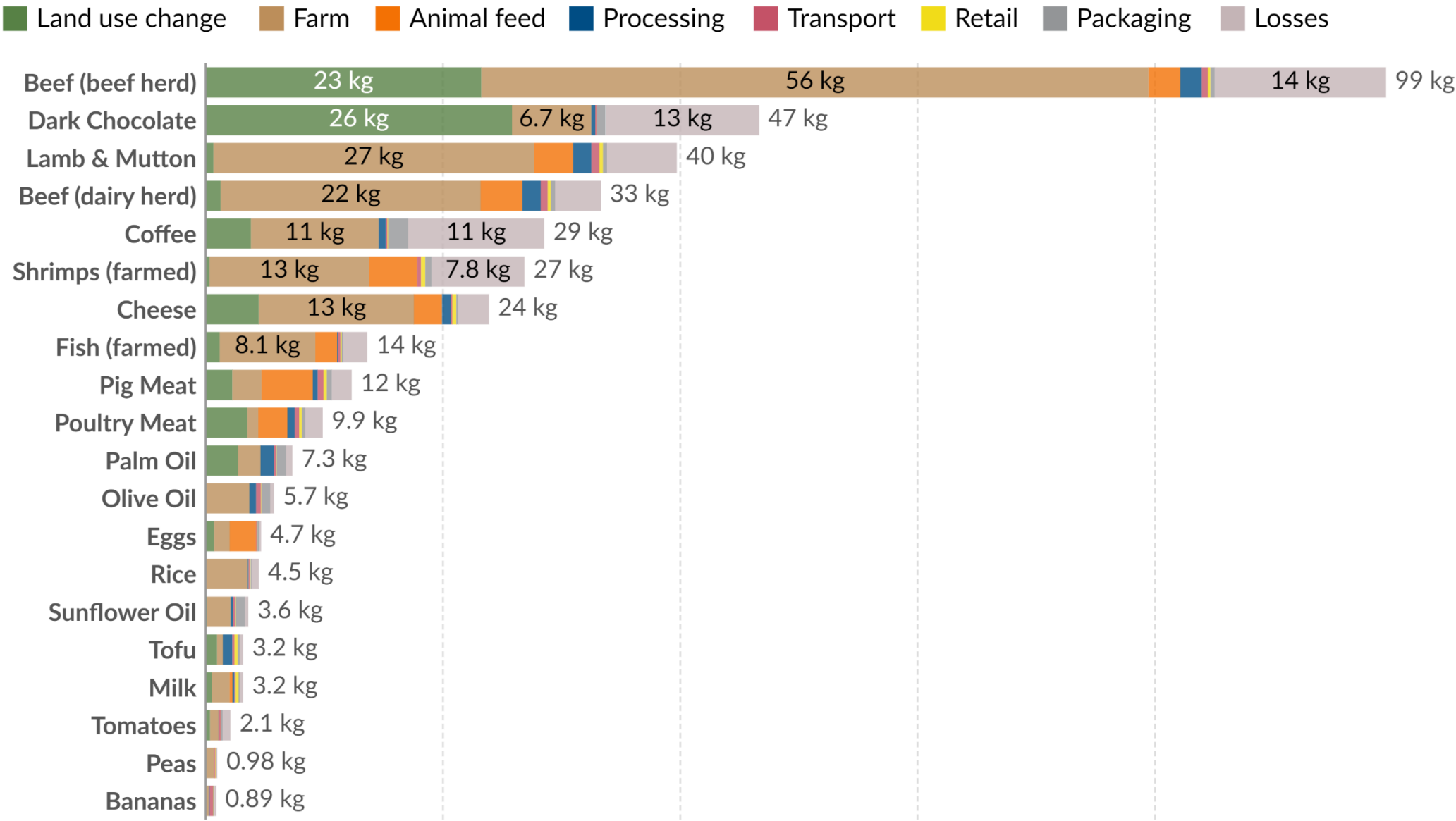
A long-term contract between the purchasers and the producers of renewable energy has mutual benefits.

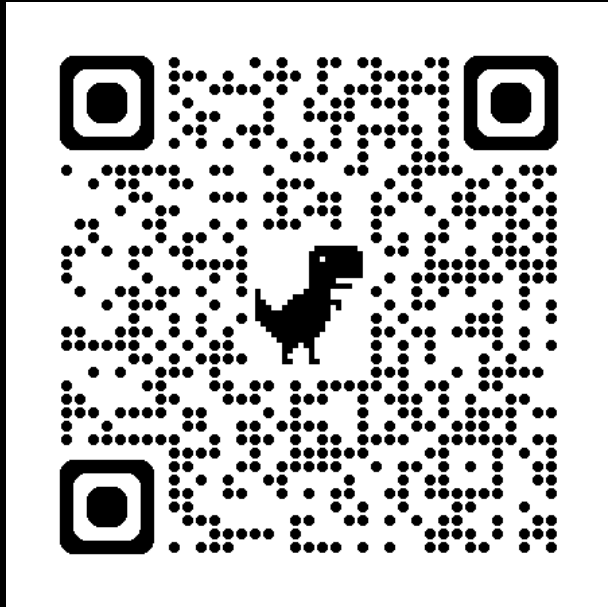
Fixed prices make for a win-win situation: companies can budget more efficiently. Electricity producers gain more scope for investments. And ultimately, the climate benefits as well.



Food: greenhouse gas emissions across the supply chain

Greenhouse gas emissions¹ are measured in kilograms of carbon dioxide-equivalents (CO₂eq)² per kilogram of food.





The New York Times

How New York's Public Hospitals Cut Carbon Emissions: More Vegetables

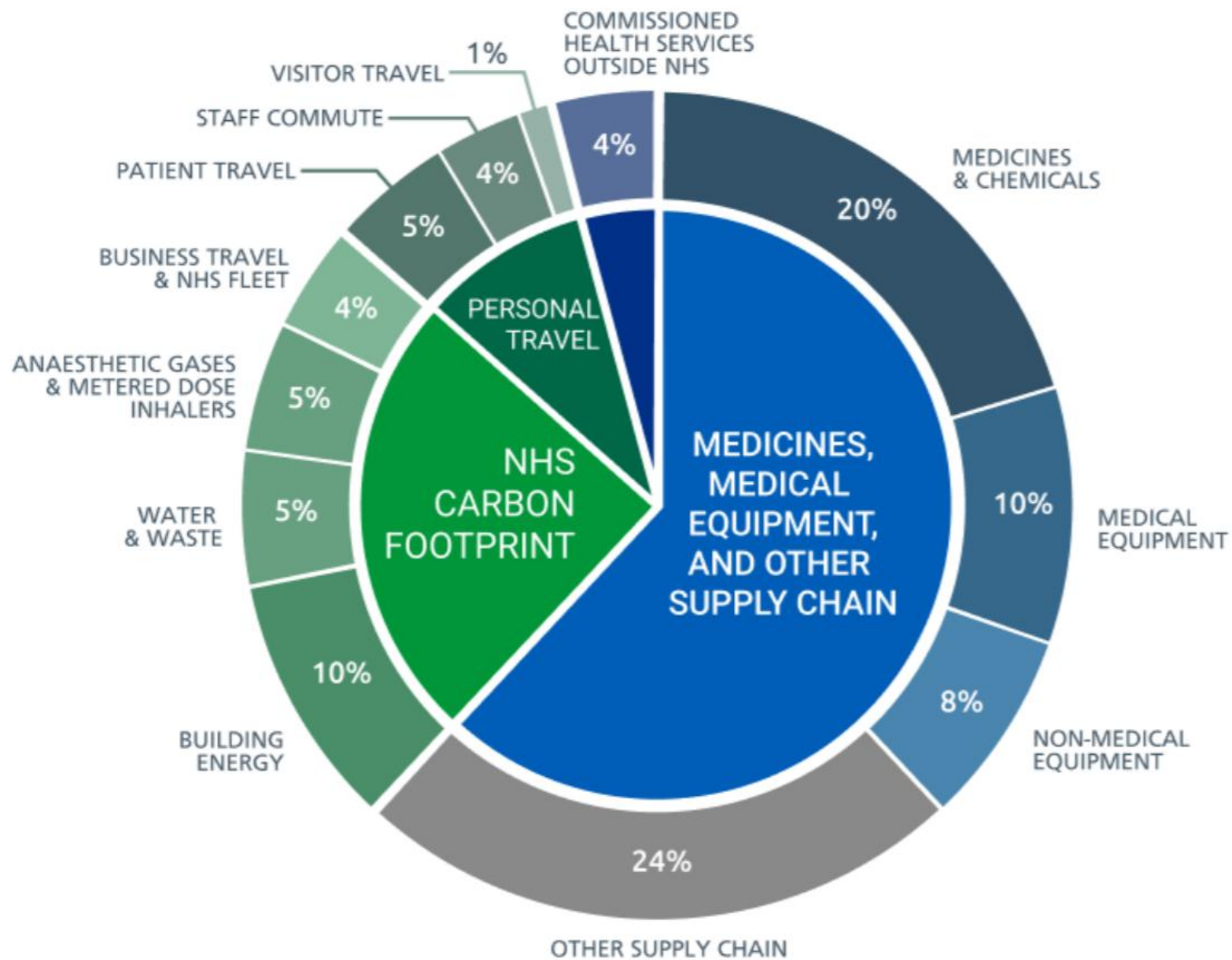
Making plant-based meals the default has reduced food-related greenhouse gas emissions by 36 percent, the mayor's office said. Just don't say "vegan."

[Share full article](#) [179](#)



***STICK TO THE
BRIEF!!!!!!***

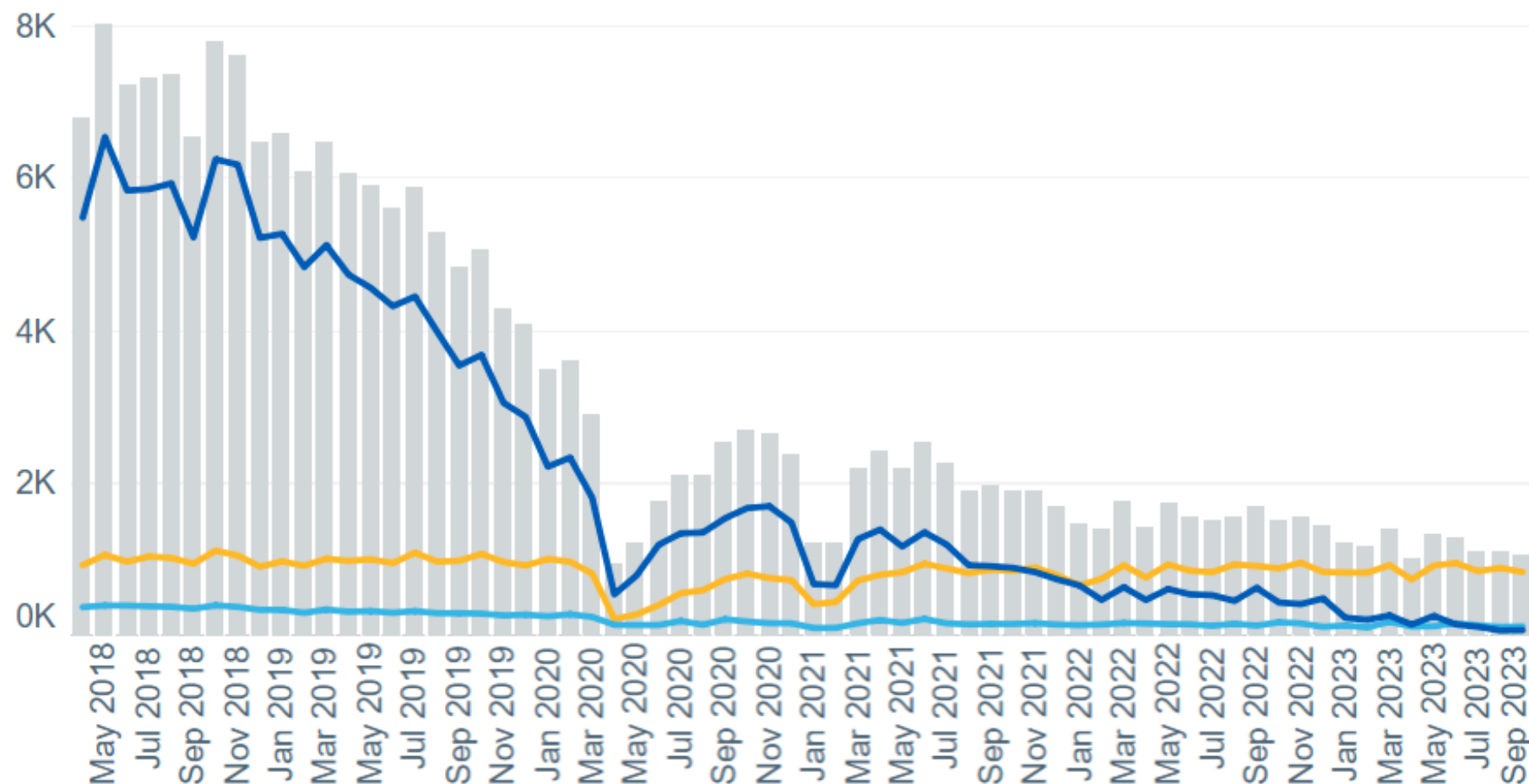




Delivering a Net-Zero-NHS: 2020 (NHS England)

Emissions from volatile anaesthetic gases (tCO₂e)

Carbon equivalent emissions (tCO₂e) of volatile gases issued by trust pharmacy system (Note: this includes waste and returns), split by desflurane, isoflurane and sevoflurane. Bars show the total of the lines selected on the dropdown above.





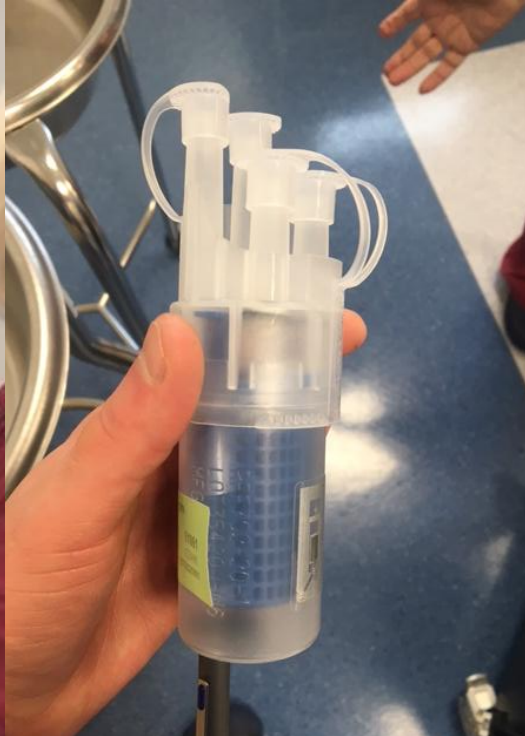
$1\text{L/min} \times 60 \times 24 \times 365 =$
 $525,600\text{L/year}$

294 tonnes CO₂



- Oxygen
- Medical air
- Nitrous Oxide
- Surgical air
- Suction
- AGSS



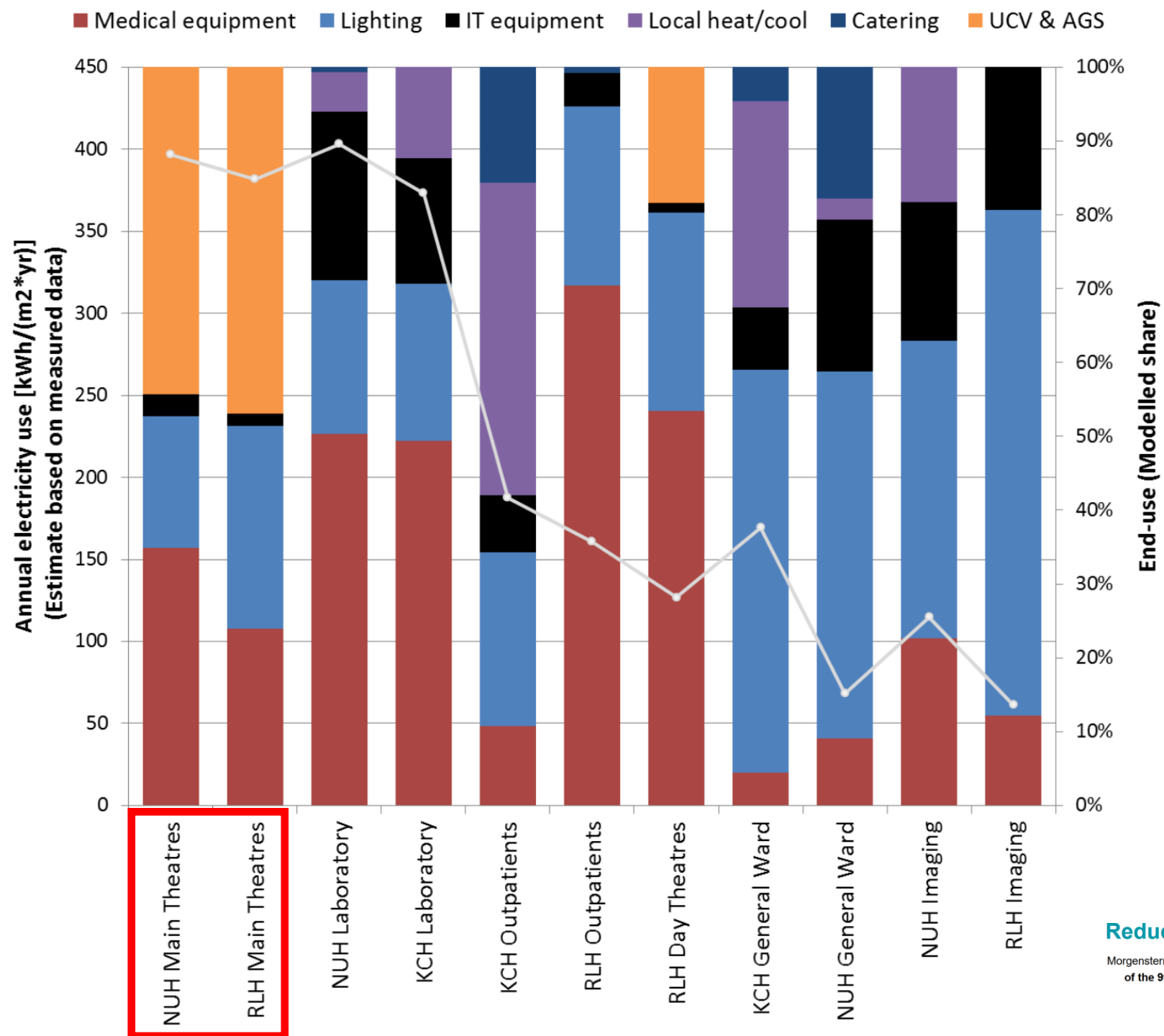






Energy makes up 10% of the National Health Service's (NHS) emissions footprint, and with rising prices has led to NHS England having to set aside £1.5 billion to cover a £485 million increase in energy costs for 2022-23.





Reducing hospital electricity use: an end-use perspective

Morgenstern, P; Raslan, R; Ruyssevelt, P; (2016) Reducing hospital electricity use: an end-use perspective. In: Bertoldi, P, (ed.) **Proceedings of the 9th International Conference on Improving Energy Efficiency in Commercial Buildings and Smart Communities**. (pp. pp. 509-522). Publications Office of the European Union: Frankfurt, German.



Theatre Shutdown Checklist



Operating theatre

Switch off and plug in:

- ☐ Infusion pumps
- ☐ Anaesthetic machine
- ☐ Anaesthetic monitor

Switch off:

- ☐ Lights
- ☐ Computers

Switch off and unplug:

- ☐ Bairhugger
- ☐ Diathermy

Surgical panel – turn off:

- ☐ "Room in Use"
- ☐ "PACS station"
- ☐ "X-ray in Use"
- ☐ "Laser in Use"
- ☐ AGSS
- ☐ TV screen

Follow shutdown procedure:

- ☐ Stack (switch off at machine only)
- ☐ Microscope (Neuro theatres)

Anaesthetic room

Switch off and plug in:

- ☐ Infusion pumps
- ☐ Anaesthetic machine
- ☐ Anaesthetic monitor

Switch off:

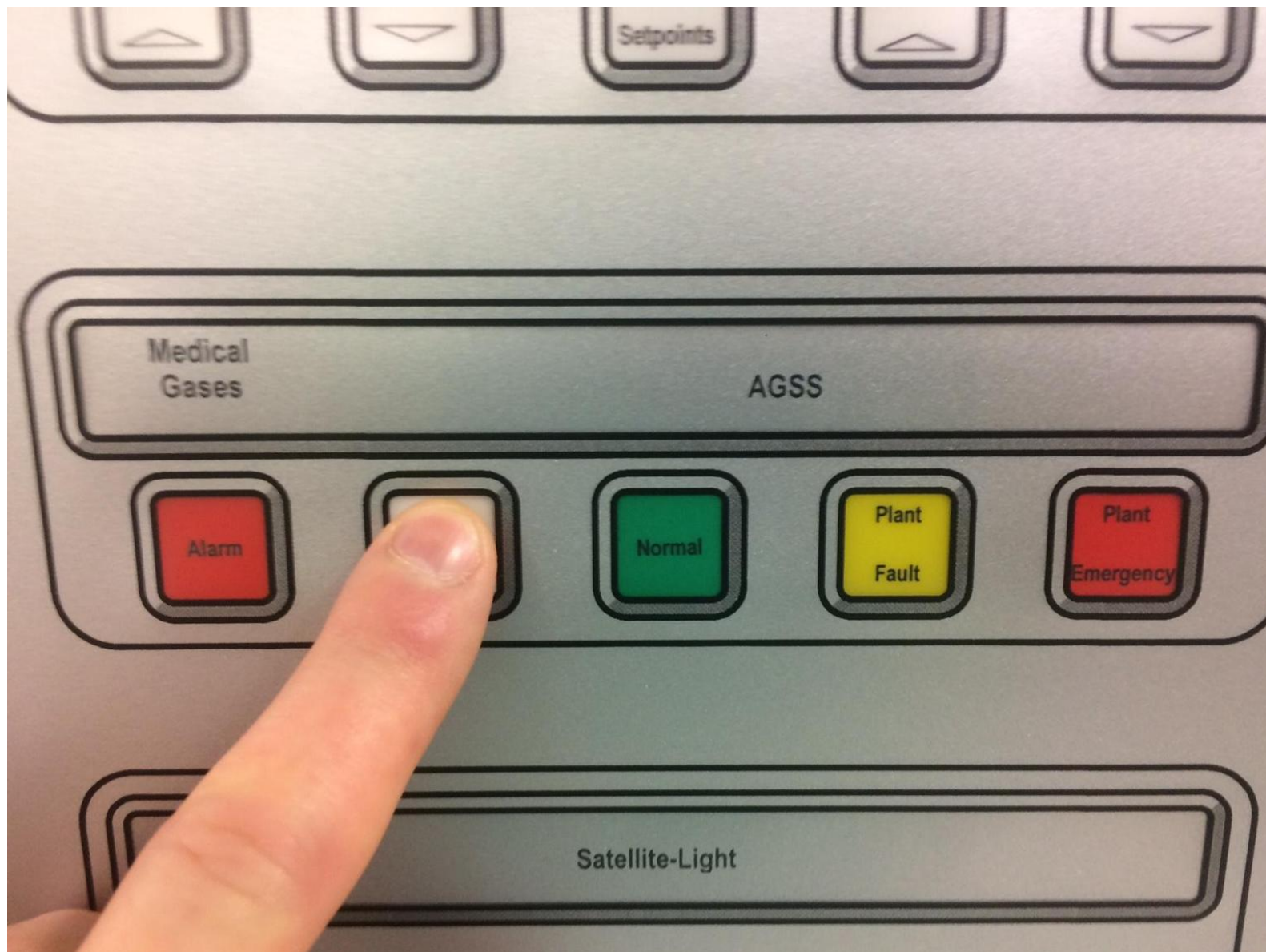
- ☐ Lights

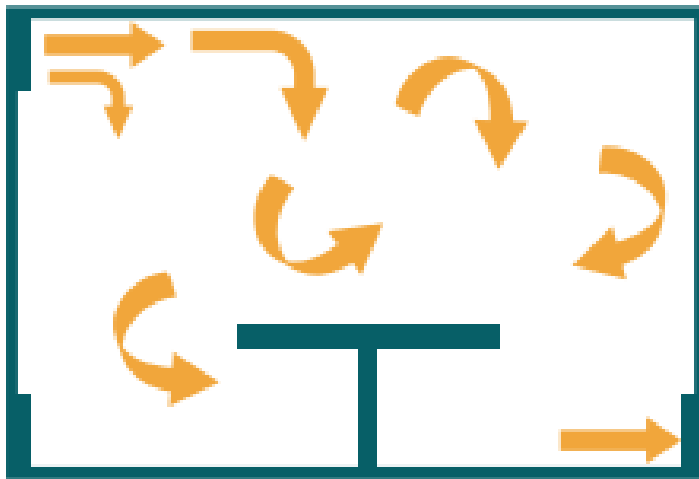
Complete online checklist via QR code



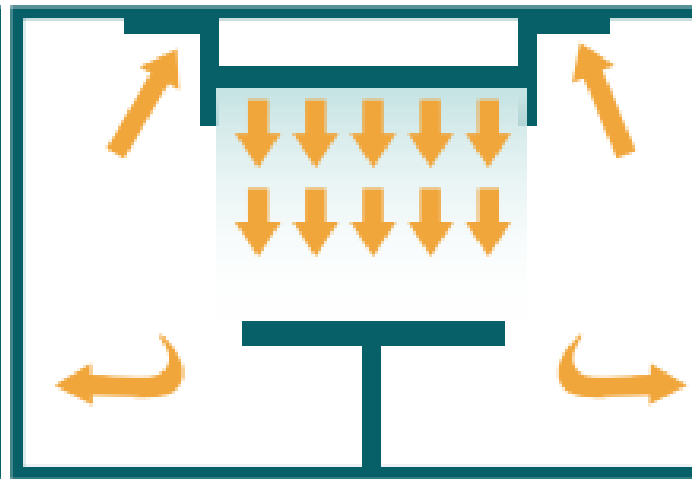
Have questions? Contact jonathan.groome@nhs.net

Created as part of 'Project Shutdown': a QIP by Team Code Green, 2022

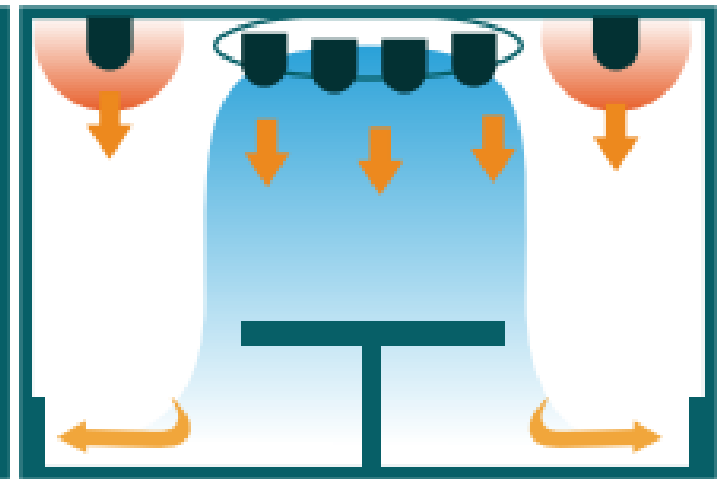




(A) Turbulent Mixing Airflow



(B) Laminar Airflow

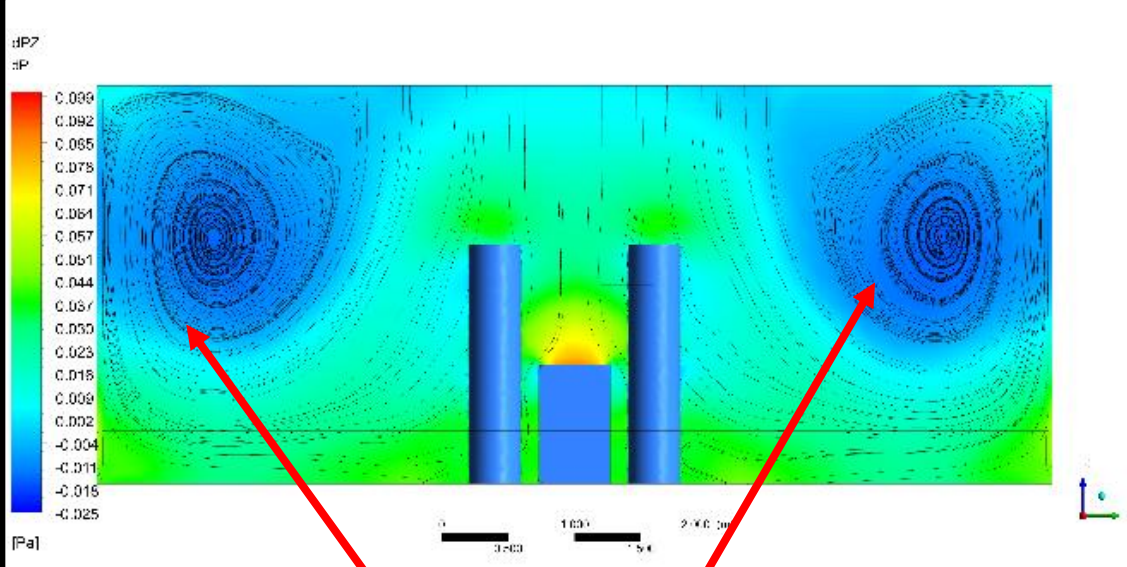


(C) Temperature-Controlled Airflow



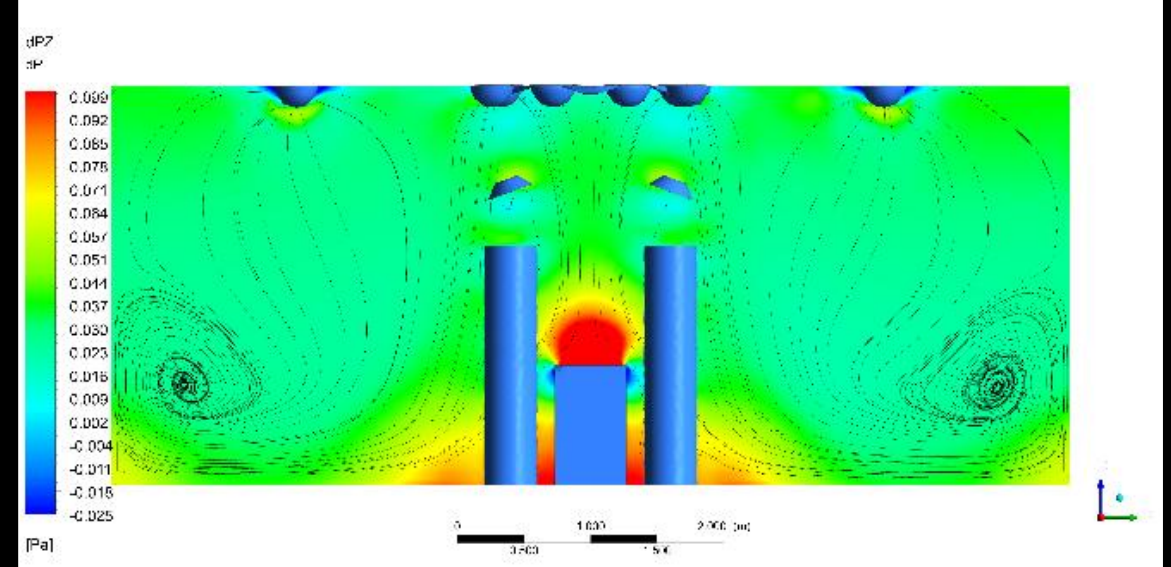
Laminar air flow is challenged by vortices

Laminar flow



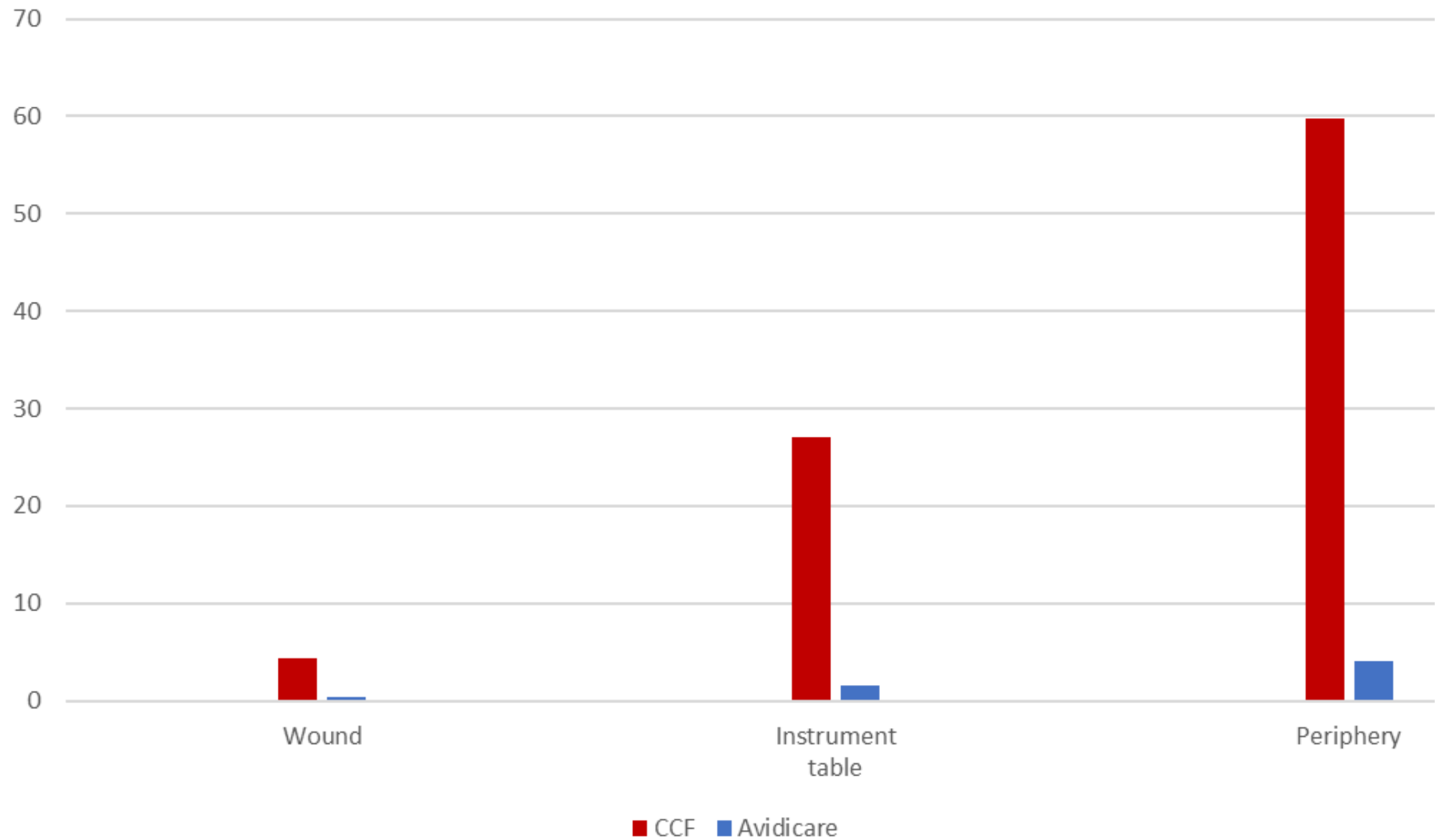
Vortices bring bacteria back!

Temperature controlled



CFD simulations from Royal Institute of Technology, Stockholm

Bioburden; Avidicare vs top US hospital





Classification: Official

Publications approval reference: PAR38



Health Technical Memorandum 03-01 Specialised ventilation for healthcare premises Part B: The management, operation, maintenance and routine testing of existing healthcare ventilation systems

Monday to Friday 5 days a week, implies 71% operational use

Monday to Friday, 5 days a week from 8.00am to 8.00pm equals **35.5% actual operational use**

Monday to Sunday, 7 days a week from 8.00am to 8.00pm equals **50% actual operational use**

Towards NetZero for Hospital Operating Theatres

I. Eames¹, A. Symons², D. Wilson³, Y. Rawas Kalaji³,
L. Muirhead⁴, J. Groome^{5,6}

¹Faculty of Engineering Sciences, University College London, Torrington Place, WC1E 7JE, UK
²Bartlett School of Sustainable Construction, University College London, 1-19 Torrington Place, WC1E 7HB, UK
³Centre for Advanced Spatial Analysis, University College London, 90 Tottenham Court Road, London, W1T 4TJ, UK
⁴UCL Hospital, 235 Euston Road, London NW1 2BU, UK
⁵Barts Health NHS Trust, Executive Offices Ground Floor, Pathology and Pharmacy Building The Royal London Hospital, 80 Newark Street London E1 2ES, UK
⁶Nuffield Health, Epsom Gateway Ashley Avenue, Epsom, Surrey, KT18 5AL, UK

Reducing the carbon footprint within the health sector presents a significant challenge due to the necessity of maintaining patient safety. Hospital operating theatre suites are particularly resource and energy intensive. In this paper, we apply a multidisciplinary methodology to investigate and assess various strategies aimed at reducing the carbon footprint in hospital theatres. The strategies evaluated include (a) the duration of theatre ventilation operation, (b) the efficiency of the ventilation strategy, and (c) heat recovery systems and technologies. These approaches are assessed using a combination of theatre space monitoring (via BMS systems), computational air-flow modeling, and mathematical models. We develop a robust methodology that applies these modeling techniques to general hospital suites, enabling the estimation of reductions in CO_2e .

Ventilation Type	Electric/Gas	Heat recovery	Cost	CO_{2e} (tonnes)	reduction
TFV - full power	Mixed	0	43	70	
TFV - setback evenings	Mixed	0	28	45	
TFV - off evenings	Mixed	0	19	29	
TFV - setback evenings and w/e	Mixed	0	13	21	
TFV - full power	Mixed	0.5	32	43	
TFV - off evenings and w/e	Mixed	0.5	11	13	
TFV - full power	Electric	0.5	34	24	
TFV - setback evenings	Electric	0.5	23	16	
TFV - off evenings and w/e	Electric	0.5	11	8	
LFV - full power	Mixed	0	51	76	
LFV - setback evenings	Mixed	0	34	49	
LFV - off evenings and w/e	Mixed	0	17	23	
LFV - off evenings	Mixed	0.5	14	15	
TCV - full power	Electric	0.8	35	25	
TCV - setback evenings	Electric	0.8	35	25	
TCV - off evenings and w/e	Electric	0.8	12	8	

Table 2. The pressure differentials between the rooms and the hospital bay (taken as a proxy for corridor pressure) is shown as a function of time for Theatre 11 at Whipps Cross Hospital; the legend identifies the pressure differential in the theatre, dirty utility and preparation room. In (a), the pressure differential on 18th March 2024, shows a normal process of operation with $t = 0$ corresponding to midnight. In (b), the effect of turning the AHU for Theater 11 off and then on is identified.





- NAP7 79% of hospitals reported using anaesthetic rooms as a default location to induce anaesthesia in elective patients in June 2021.
- The “monitoring gap” - NAP- 7
 - + 33% of patients transferred without monitoring (400,000/year)
 - + High risk patients to be anaesthetized in theatre
- The “anaesthesia gap” – NAP 5
 - + Risk of awareness reduces with uninterrupted anesthesia



- Anaesthetic rooms were used in 393 (63%) of 627 cases of perioperative cardiac arrest reported to the Seventh National Audit Project (NAP7) that occurred in a theatre suite.
- In 136 cardiac arrests, an anaesthetic room was used and the patient arrested before the start of surgery, accounting for 35% of cases where the anaesthetic room was used and 22% of all cases in the theatre suite.
- Of these 136 cardiac arrests, 63 (46%) happened in the anaesthetic room, 10 (7%) on transfer to the operating room and 56 (41%) after induction but before surgery has started.
- *The NAP7 panel review commented on the inappropriate use of an anaesthetic room in 14 cases and in 3 that a lack of patient monitoring during transfer from the anaesthetic room to the operating room contributed to the cardiac arrest.*



“The
operating
theatre is
an
environment
that
promotes
anxiety,
especially
in
children...”

Soni and Thomas reported no difference in subjective and objective indices of anxiety when patients were randomised to induction of anaesthesia in an anaesthetic room or operating room (Soni 1989)

Anaesthesia, 1989, Volume 44, pages 651-655

Comparison of anxiety before induction of anaesthesia in the anaesthetic room or operating theatre

J. C. SONI AND D. A. THOMAS

Summary

Anxiety before induction of anaesthesia was studied in 100 patients who were allocated randomly to one of two groups. Patients in one group were anaesthetised in an anaesthetic room and those in the other group were anaesthetised inside the operating theatre. Both subjective and objective indices of anxiety were used in the comparison. Other factors that contributed to anxiety were assessed by a simple questionnaire. There was no significant difference in the level of anxiety between the two groups. The site of induction did not emerge as a major contributory factor to anxiety. The advantages and disadvantages of anaesthetic rooms are discussed.

Key words

Induction; anaesthesia.
Complications; anxiety.

- 100 patients shown AR and OR.
- 55 – no preference
- 22 – OR
- 23 – AR

Anaesthesia
Peri-operative medicine, critical care and pain

Correspondence |  Free Access

Anaesthetic rooms and patient anxiety

C. Frerk  A. Pinder

First published: 11 February 2016 | <https://doi.org/10.1111/anae.13390> | Citations: 1

No external funding and no conflicts of interest declared.

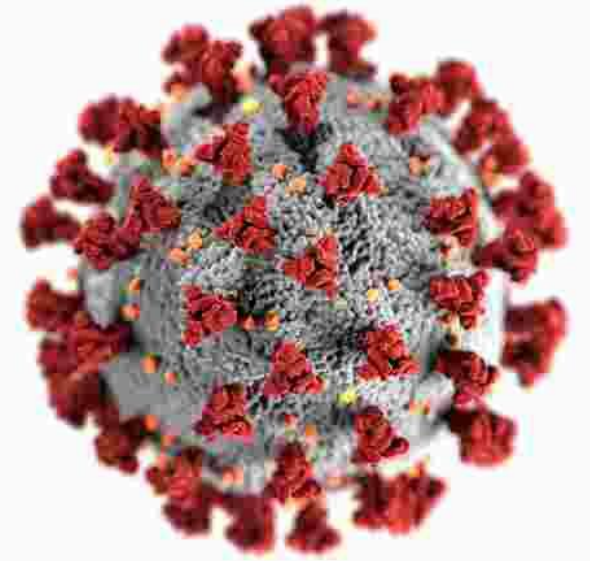
 SECTIONS

One of the recommendations in the NAP5 report was that anaesthetists should regard transferring an anaesthetised patient from the anaesthetic room to the operating theatre as a period of risk for accidental awareness under general anaesthesia 1-3. Since then, we have been inducing anaesthesia for patients in theatre, with a view to changing practice throughout our department 4. When discussing the advantages and disadvantages of this with colleagues, patient anxiety was frequently cited as a reason to continue using anaesthetic rooms.

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COVID AR use

- Pre covid – 86% adults and 84% children
- COVID – 8% adults and 18% children
- Post COVID – 79% adults and children





Case for

AR

Efficiency

Case against AR

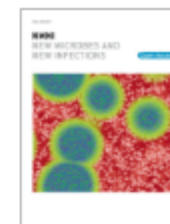
- Duplication of kit and drugs
- Energy use (10% reduction in energy consumption from ventilation alone)
- Transfer safety
- Anaesthetic rooms are smaller than operating rooms with the potential for overcrowding and may provide insufficient space in an emergency when help arrives. Communicating to other staff that a patient is deteriorating may be harder in an anaesthetic room and may even occasionally require sending a vital member of the team away to summon help (Chapter 13 Reported cases summary).







Water








Original article

Scrub sink contamination and transmission to operating room personnel

C. Ta¹  , G. Wong¹, W. Cole¹, G. Medvedev¹

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There was significant scrub sink contamination with primarily Gram-negative organisms, such as [Delftia acidovorans](#) and [Sphingomonas paucimobilis](#).



Sinks in patient rooms in ICUs are associated with higher rates of hospital-acquired infection: a retrospective analysis of 552 ICUs

G-B. Fucini ^{a b}  , C. Geffers ^{a b}, F. Schwab ^{a b}, M. Behnke ^{a b}, W. Sunder ^c, J. Moellmann ^c,
P. Gastmeier ^{a b}

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In total, 552 ICUs (NSG $N=80$, SG $N=472$) provided data about sinks, total HAIs and HAI-PA. The incidence density per 1000 patient-days of total HAIs was higher in ICUs in the SG (3.97 vs 3.2). The incidence density of HAI-PA was also higher in the SG (0.43 vs 0.34). The risk of HAIs associated with all pathogens [incidence rate ratio (IRR)=1.24, 95% confidence interval (CI) 1.03–1.50] and the risk of lower respiratory tract infections associated with *P. aeruginosa* (IRR=1.44, 95% CI 1.10–1.90) were higher in ICUs with sinks in patient rooms. After adjusting for confounders, sinks were found to be an independent risk factor for HAI (adjusted IRR 1.21, 95% CI 1.01–1.45).

ORAL PRESENTATION


Open Access

Reduced rate of MDROs after introducing 'water-free patient care' on a large intensive care unit in the Netherlands

J Hopman^{1*}, R Bos¹, A Voss¹, E Kolwijck², P Sturm³, P Pickkers⁴, A Tostmann¹, HVD Hoeven⁴

From 3rd International Conference on Prevention and Infection Control (ICPIC 2015)
Geneva, Switzerland. 16-19 June 2015

The removal of sinks from the patient rooms and the introduction of 'water-free patient care' resulted in a significant reduction of colonization with MDR Gram-negative bacteria. The effect on colonization is most evident in patients admitted for longer periods at the ICU.

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The sink as a correctable source of extended-spectrum β -lactamase contamination for patients in the intensive care unit

[I. Wolf](#) ^a  · [P.W.M. Bergervoet](#)^a · [F.W. Sebens](#)^a · [H.L.A. van den Oever](#)^b · [P.H.M. Savelkoul](#)^c · [W.C. van der Zwet](#)^a[Affiliations & Notes](#)  [Article Info](#) 

Between December 2010 and April 2012, intensive care unit (ICU) patients in our hospital were infrequently colonized with extended-spectrum β -lactamase-positive bacteria (ESBLs). We hypothesized that these ESBLs originated from patients' room sinks, and this was prospectively investigated by weekly culturing of patients and sinks during a 20-week period. ESBLs were isolated from all 13 sinks. Four patients became colonized with ESBLs that were genetically identical to ESBLs that had previously been isolated from the sink. One of these patients died of pneumonia caused by the ESBL. Transmission from sinks to patients was stopped by integrating self-disinfecting siphons to all sinks on the ICU.


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FULL LENGTH ARTICLE · Volume 148, P77-86, June 2024

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Epidemiology of healthcare-associated *Pseudomonas aeruginosa* in intensive care units: are sink drains to blame?

[C. Volling](#) ^a  · [L. Mataseje](#)^b · [L. Graña-Miraglia](#)^c · ... · [A. McGeer](#)^a · [D.S. Guttman](#)^{c,l} · [M.R. Mulvey](#)^b ... [Show more](#)



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Conclusion

Nearly half of PA causing HAI appeared to be acquired in ICUs, and 7% of PA-HAIs were associated with sink-to-patient transmission. Sinks may be an under-recognized reservoir for HAIs.

Review

Surgical hand rubbing versus surgical hand scrubbing: Systematic review and meta-analysis of efficacy

Weili Feng^{a 1}, Shiyuan Lin^{c 1}, Daoqiang Huang^{a b 1}, Jian Huang^a, Luyao Chen^a, Weiwei Wu^a,
Shiqiang Hu^a, Zhantu Wei^a, Xiaoping Wang^a  

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Seven clinical trials met our inclusion criteria, with a total of 764 healthcare workers analyzed. We found no statistically significant differences between the two methods with regards to CFU counts and logarithmic reduction of CFU after hand antisepsis and surgery, as well as antisepsis and surgery times.

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4. MORE GREEN TRAVEL

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5. MORE PRE-LOVED,

LOCAL AND LOW-CARBON BRANDS

6. MEASURE YOUR CO₂

FOOTPRINT AND CUT WHERE YOU CAN

7. MOTIVATE YOUR LOVED ONES

TO PERFORM THEIR 7 ACTS TO SAVE THE WORLD





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Keynote Presentation



Katie Fozzard
Senior Economist, NHS Productivity Commission
The Health Foundation



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Panel Discussion



Jonny Groome
Paediatric Anaesthetic
Consultant
Barts Health NHS Trust
and Nuffield Health



Jonathan Guppy
Head of Sustainability
South Central Ambulance
Service NHS Foundation
Trust



David Stevens
Director of Estates, Facilities
& Capital Development
East London NHS
Foundation Trust



Jasmina Choukair
Strategic Head of Facilities & Property
Services
PAHT



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