Green Energy Management & Procurement

Delivered by:

On behalf of:

Agenda

- 10.00: Introduction to Wardell Armstrong and the climate emergency
- 10.30: Current energy market
- 11.15: *Break*
- 11.45: **Workshop:** Energy procurement options and best practice
- 12.45: Energy efficiency
- 13.15: *Lunch*
- 14.00 **Workshop**: Energy management virtual walkthrough and introduction to solar PV
- 14.45: Onsite generation and technology change
- 15.15: **Workshop**: Technologies, costs and creating an action plan
- 16.00: *Finish*

Wardell Armstrong

- Multidisciplinary Environmental, Engineering and Mining consultancy
- 13 offices in the UK and one abroad
- The newest office opened in Bristol last year

550 staff

UK Office Locations

Services

- Air Quality
- Archaeology
- Civil & Structural Engineering
- Ecology
- Energy & Climate Change
- Environmental & EIA
- Ground & Environmental Engineering
- Health & Safety
- Landscape & Urban Design
- Planning & Master Planning
- Mineral Estate Management
- Noise & Vibration Monitoring

The Energy and Climate Change Team

Paul Evans

Simon Allen

Ian Gillard

Sarah Hodson

Gilly Slater

Mohamed Dama

Rupert Gale

Andi Sihota

Renewable Energy Projects

Wind Power

Solar Power

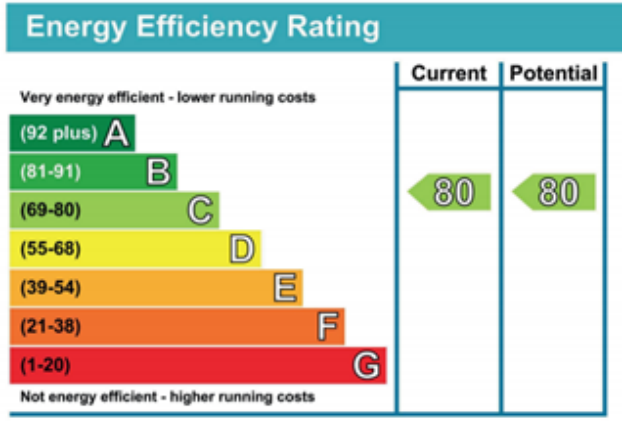
Worked on over 400 solar farms across the UK and Ireland to various levels of involvement, including securing consent for the first large scale PV farm in the country at Wheal Jane in Truro.

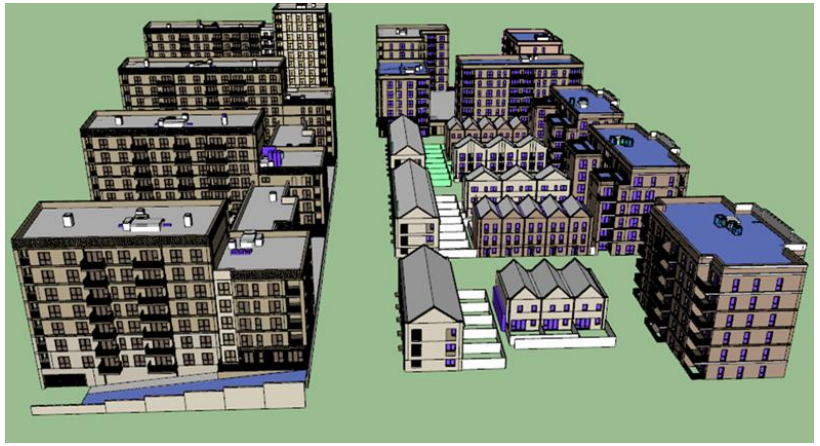
Deep Geothermal

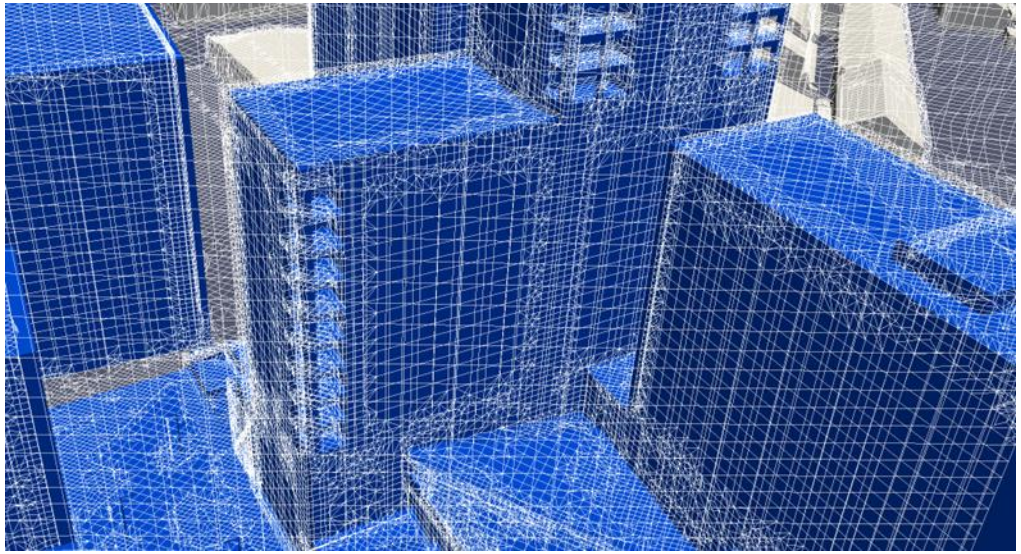
Consented the first commercial deep geothermal development in UK in 2010

Built Environment

- Energy Strategies
- Sustainability Statements
- Climate Change Chapters
- Wind microclimate







Selected Projects

- Keele University
- Alnwick Castle
- Peel Airports
- Spaceport Cornwall
- Gigafactory projects

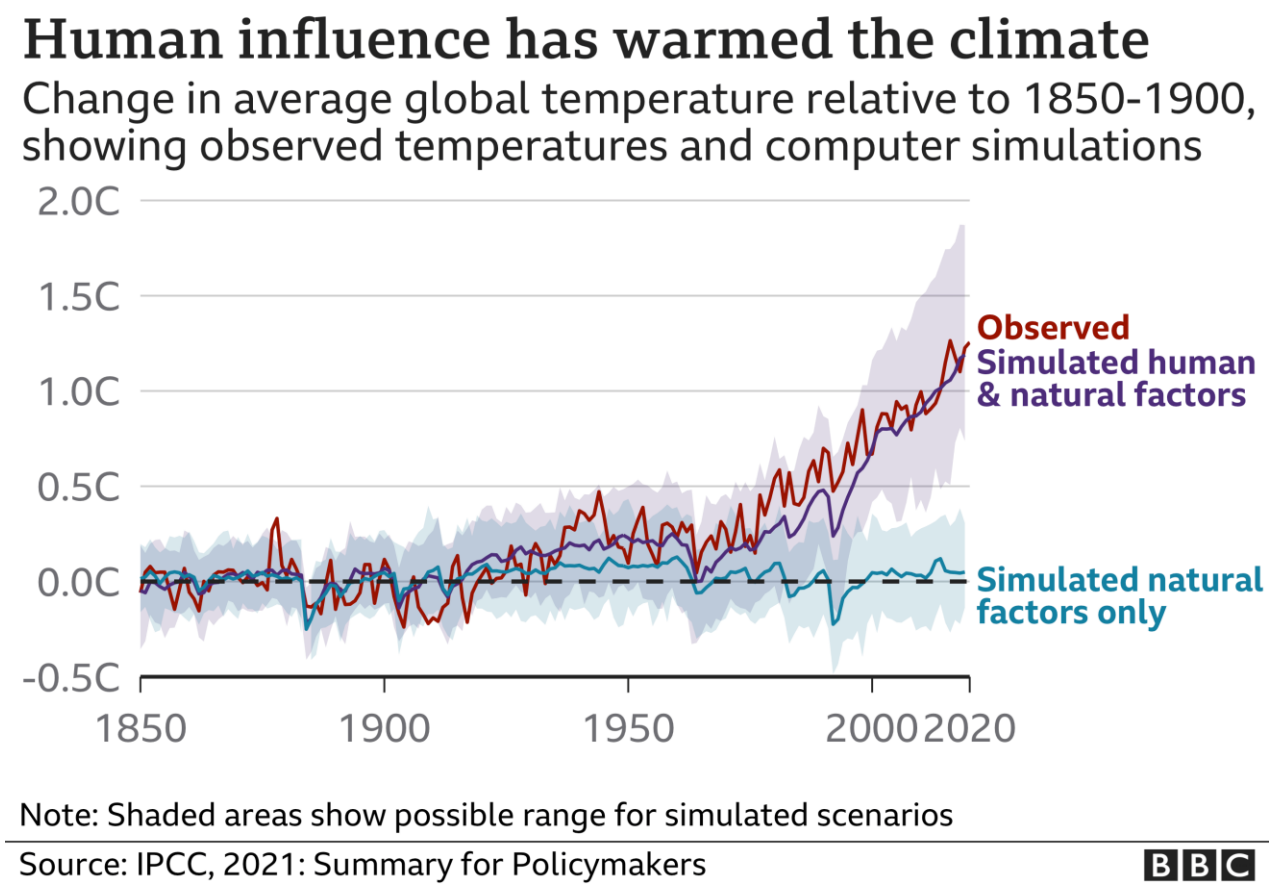
https://www.bbc.co.uk/news/uk-england-stoke-staffordshire-61249426

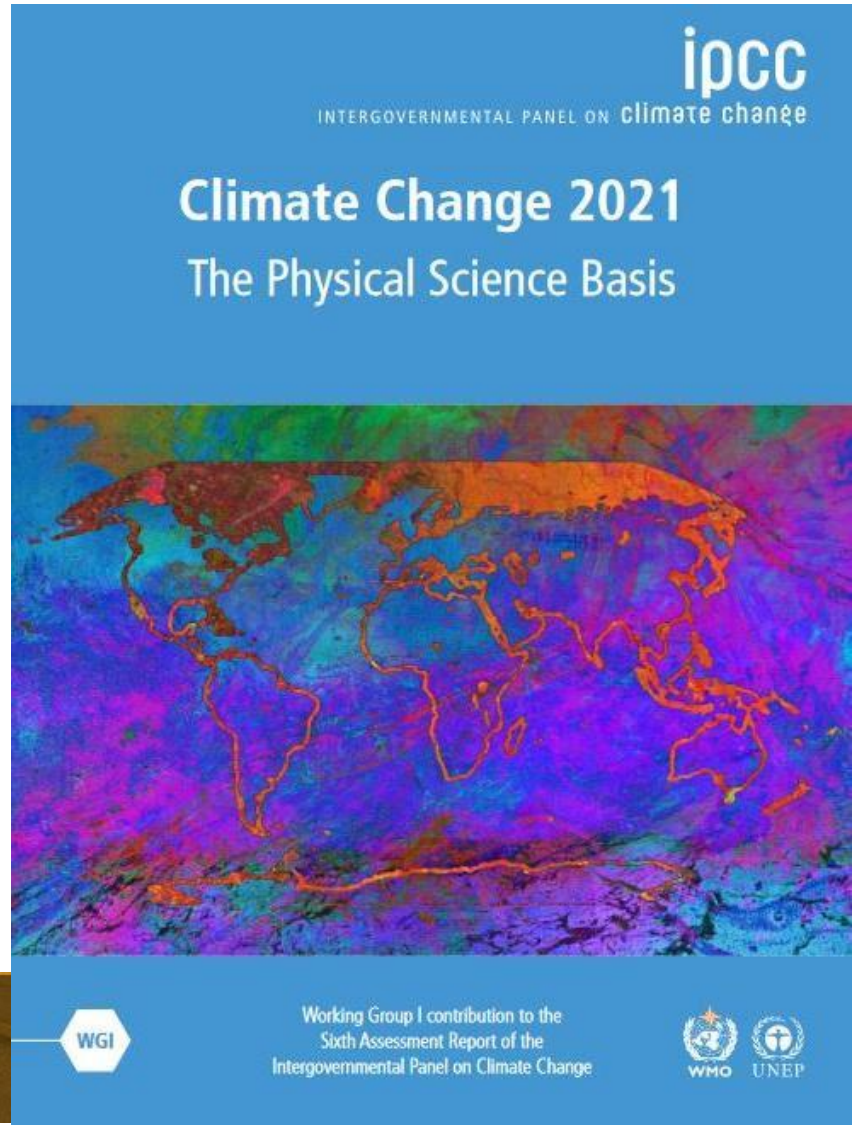
Introduction to the climate emergency

Delivered by: NatWest, UWE Bristol University of the West of England

On behalf of: European Union European Social Fund, WEST OF ENGLAND Combined Authority

Global Climate Change

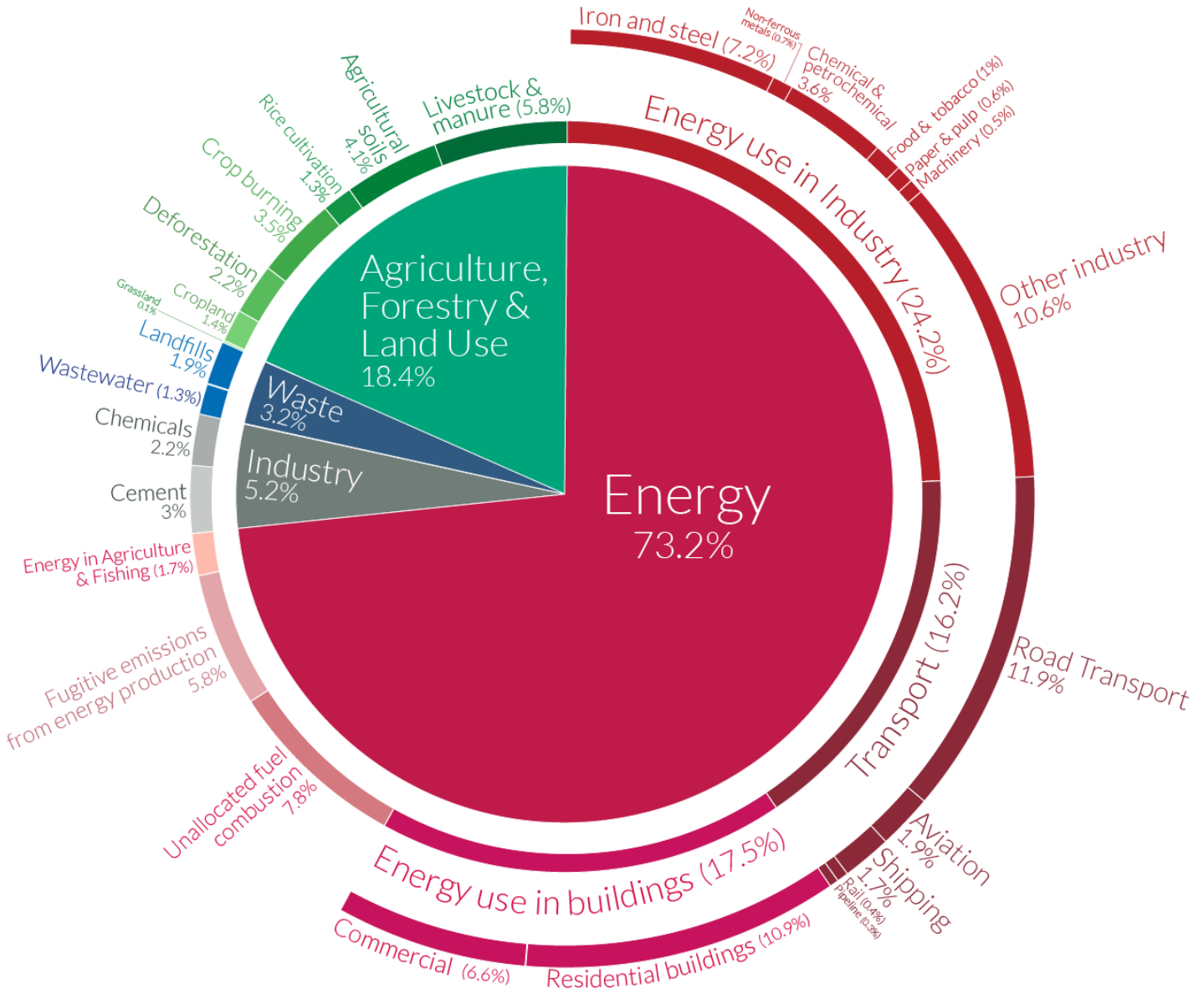




Global greenhouse gas emissions by sector

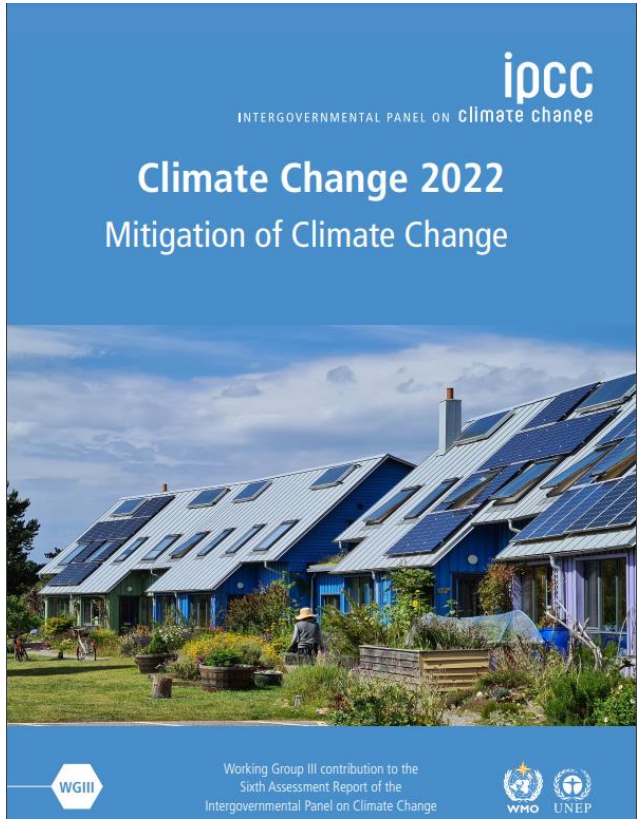
This is shown for the year 2016 – global greenhouse gas emissions were 49.4 billion tonnes CO_2eq.

Our World in Data



Global climate change

- **We have options in all sectors to at least halve emissions by 2030**
- Limiting global warming will require major transitions in the energy sector. This will involve a substantial reduction in fossil fuel use, widespread electrification, improved energy efficiency, and use of alternative fuels (such as hydrogen).

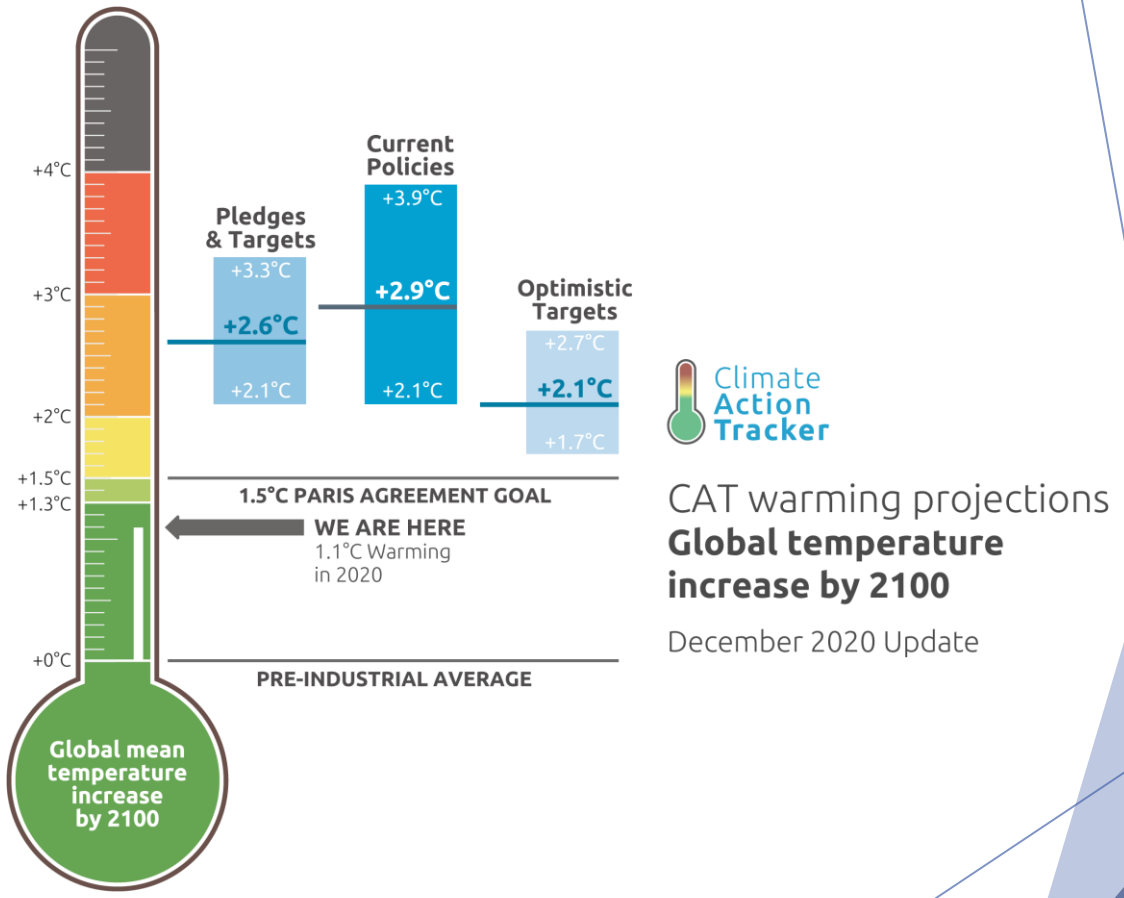


IPCC PRESS RELEASE

The evidence is clear: the time for action is now. We can halve emissions by 2030.

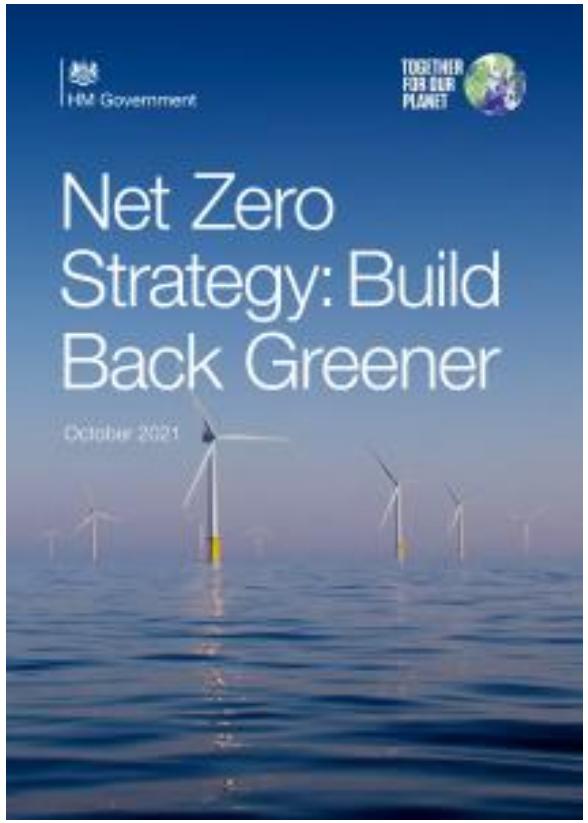
COP21 Paris Agreement

Substantially reduce global greenhouse gas emissions to limit the global temperature increase in this century to 2 degrees Celsius while pursuing efforts to limit the increase even further to 1.5 degrees.



UK Net Zero by 2050

- 2008 Climate Change Act
- Net Zero Strategy: Build Back Greener 2021

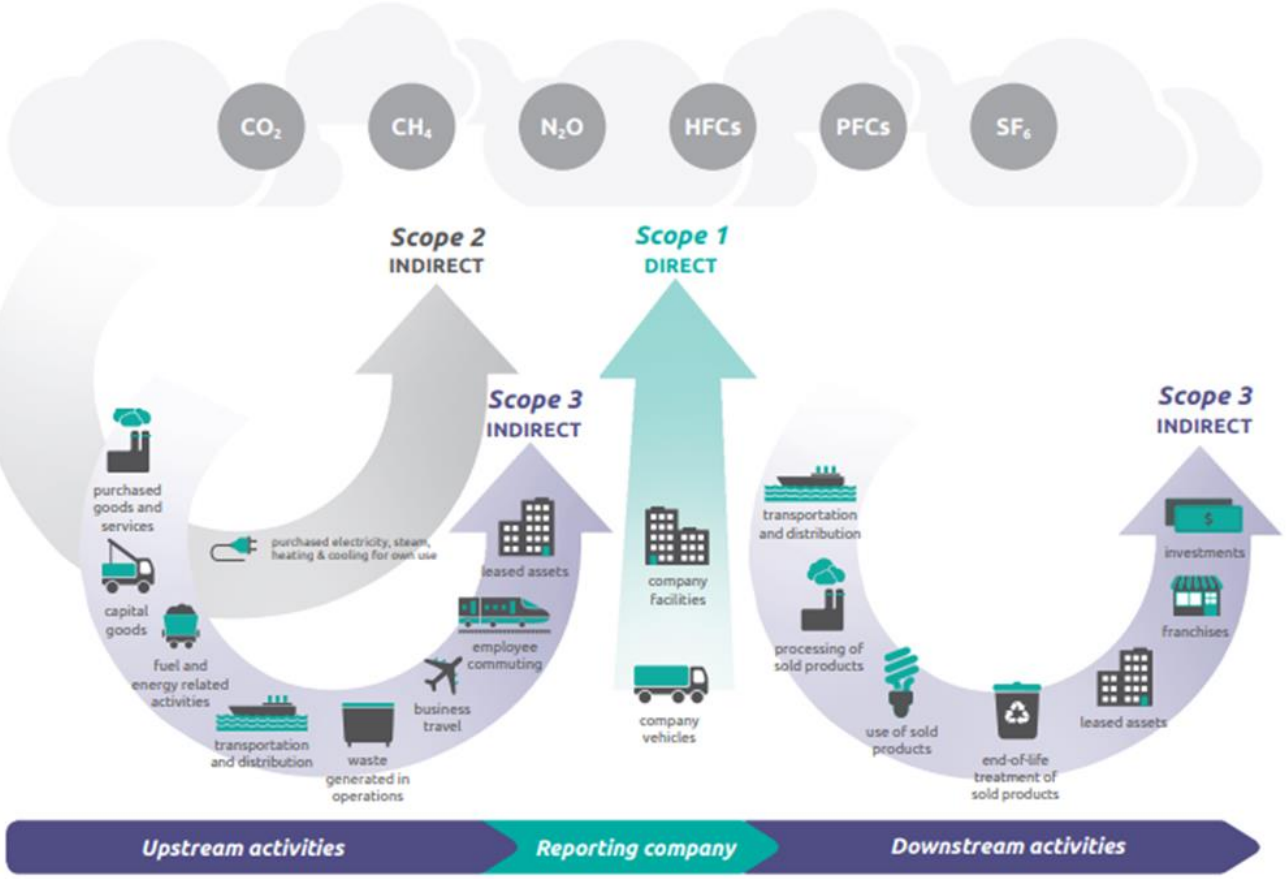


Carbon targets

- What is **Net Zero**?
- The IPCC defines net-zero as that point when "*anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period*". The Paris Agreement sets out the need to achieve this balance globally by 2050.
- For companies, net zero targets are being approached inconsistently.
- The Science-based Targets Initiative has released a set of standards for corporate net zero target setting.

Greenhouse Gas Protocol

Figure [1.1] Overview of GHG Protocol scopes and emissions across the value chain



Carbon neutral

	Carbon neutral	Net zero carbon – best practice
Defined by	*PAS 2060 standard*	*Standard developing*
Measurement: Scope 1 and 2	Required	Required
Measurement: Scope 3	**Not required**	Required
Carbon reduction target: Scope 1 and 2	Reduction plan required	Zero (Reduce as close to zero as possible)
Carbon reduction target: Scope 3	**Not required**	Reduce as close to zero as possible
Offsetting/GHGR	Buy offsets equivalent to total carbon footprint	Residual (Scope 3) emissions compensated by GHG removals

https://www.planetmark.com/the-difference-between-net-zero-and-carbon-neutral/

Press release

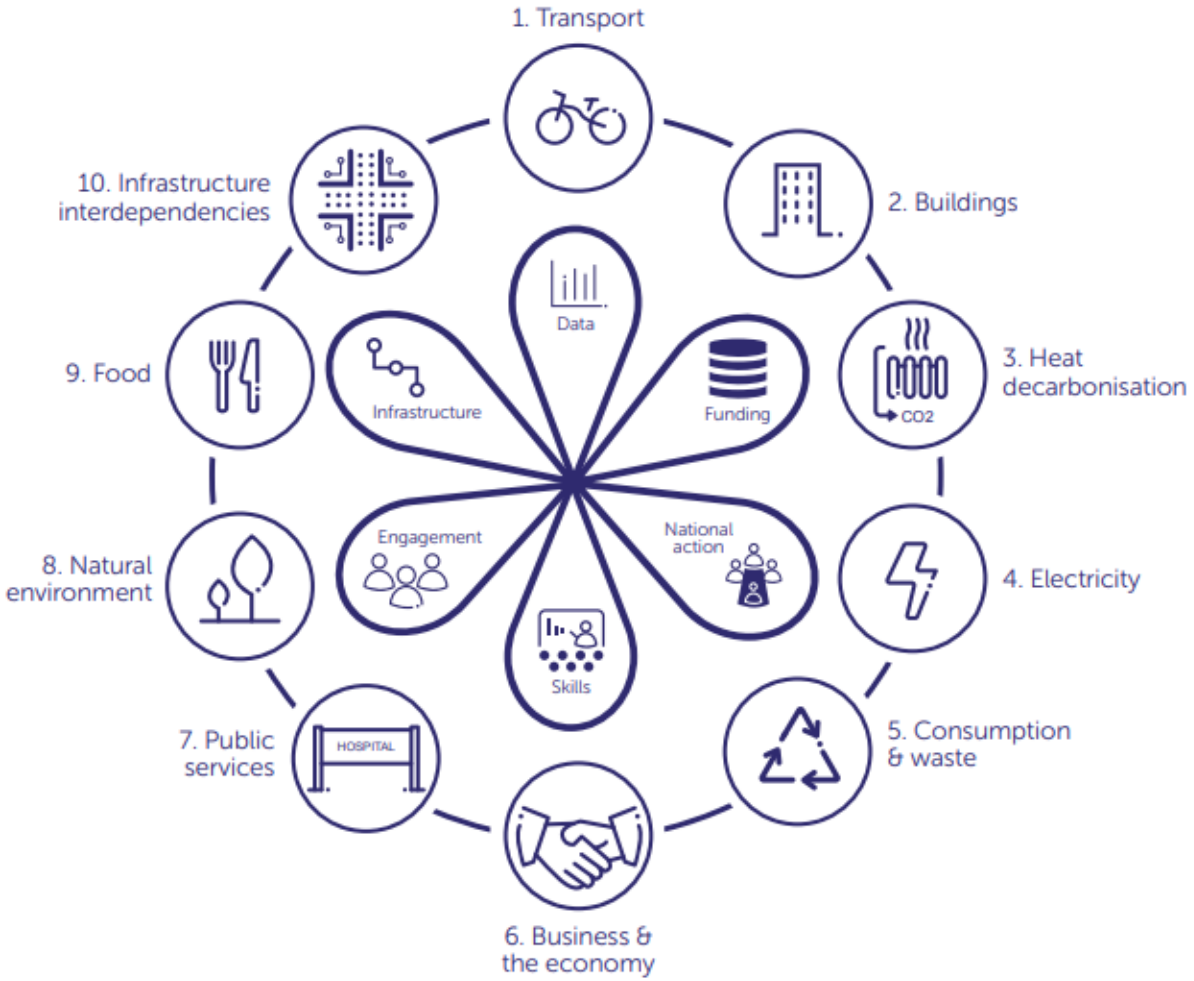
Firms must commit to net zero to win major government contracts

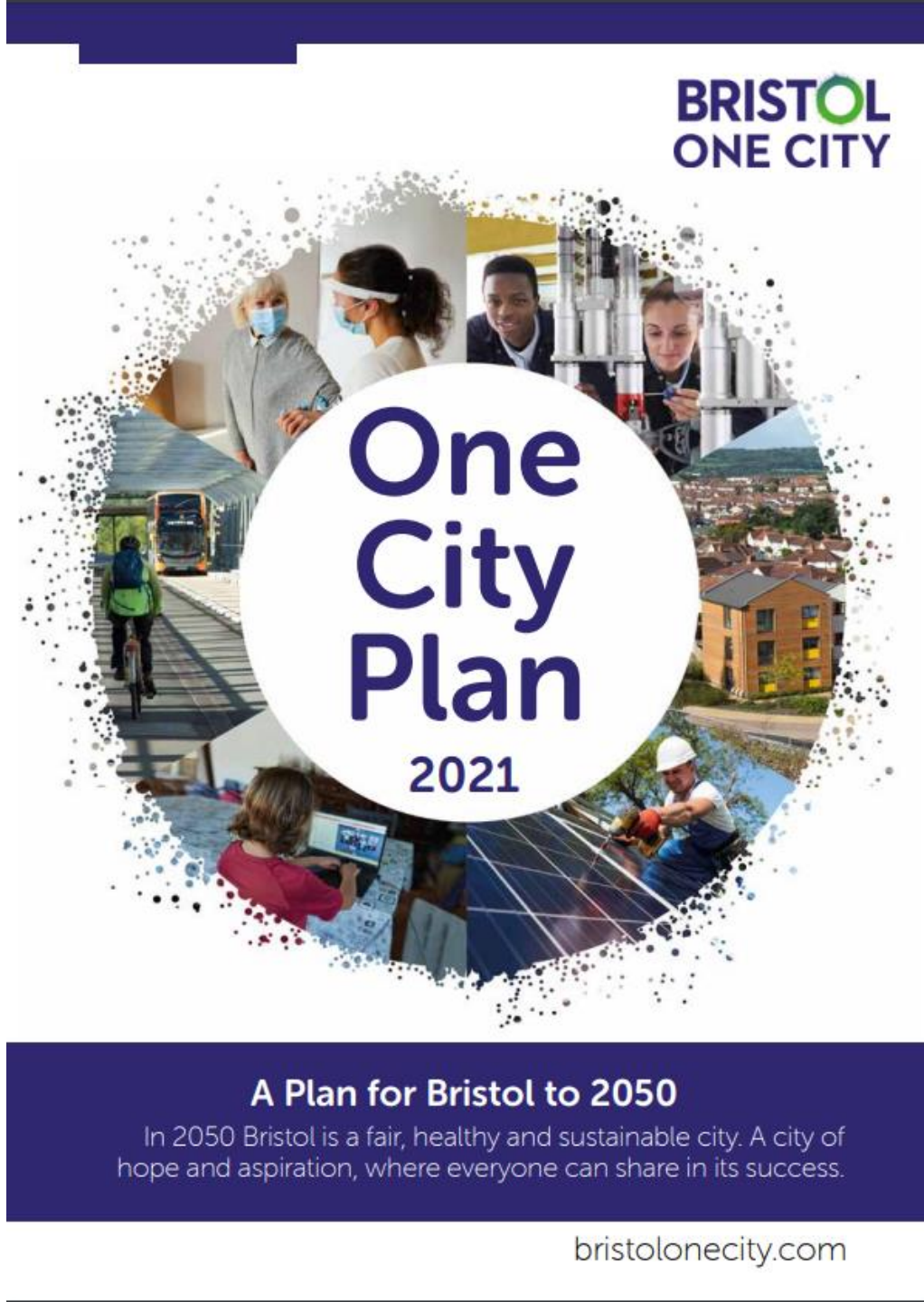
New measures will require businesses to commit to net zero by 2050 before they can bid for major government contracts

JLR urges suppliers to set science-based climate targets

Jaguar Land Rover (JLR) is inviting all of its global suppliers to develop new targets to reduce emissions in line with climate science, and has stated that having such targets will soon be a requirement for Tier 1 suppliers.

Bristol Net Zero by 2030





Good local organisations to get involved with

- Bristol Green Capital Partnership

- Future Leap

Summary

- Global climate change and main drivers
- Climate change mitigation in the energy sector
- UK net zero target
- Corporate carbon targets
- Bristol and the wider region’s climate targets
- Useful organisations to engage with

Any questions?

Energy Market

Delivered by: NatWest, UWE Bristol University of the West of England

On behalf of: European Union European Social Fund, West of England Combined Authority

Structure of session

Focus:

- Current Energy Market
  - European context
  - UK
- Market Forces
- Strategic Overview
- The Energy Marketplace

The current energy market

- 8 months on from COP26
- War has returned to Europe, energy prices and inflation are soaring, and governments are desperately trying to improve energy security.
- This section will be discussed in a European context then more specifically UK

The current energy market

Why are global wholesale prices increasing?	
Russia's invasion of Ukraine	Russia is the second-biggest exporter of crude oil, and the world's largest natural gas exporter, which is vital to heating homes, powering planes and filling cars with fuel.
The US, EU and UK placed restrictions on oil and gas imports from Russia after it invaded Ukraine	Costs were already high before that, due to a cold winter in Europe last year put pressure on supplies and, as a result, stored gas levels are much lower than normal. Hot weather in Asia saw more gas used for air-conditioning, while gas exports from Russia to north-west Europe were lower, even before the invasion.

https://www.bbc.co.uk/news/uk-northern-ireland-58558645

The current energy market

- EU countries get about 40% of their gas directly from Russia. The UK gets less than 5% of its gas from Russia but its gas prices are affected by fluctuations in the global markets.
- Consumers face rising energy and fuel bills as sanctions on Russian energy kick in.

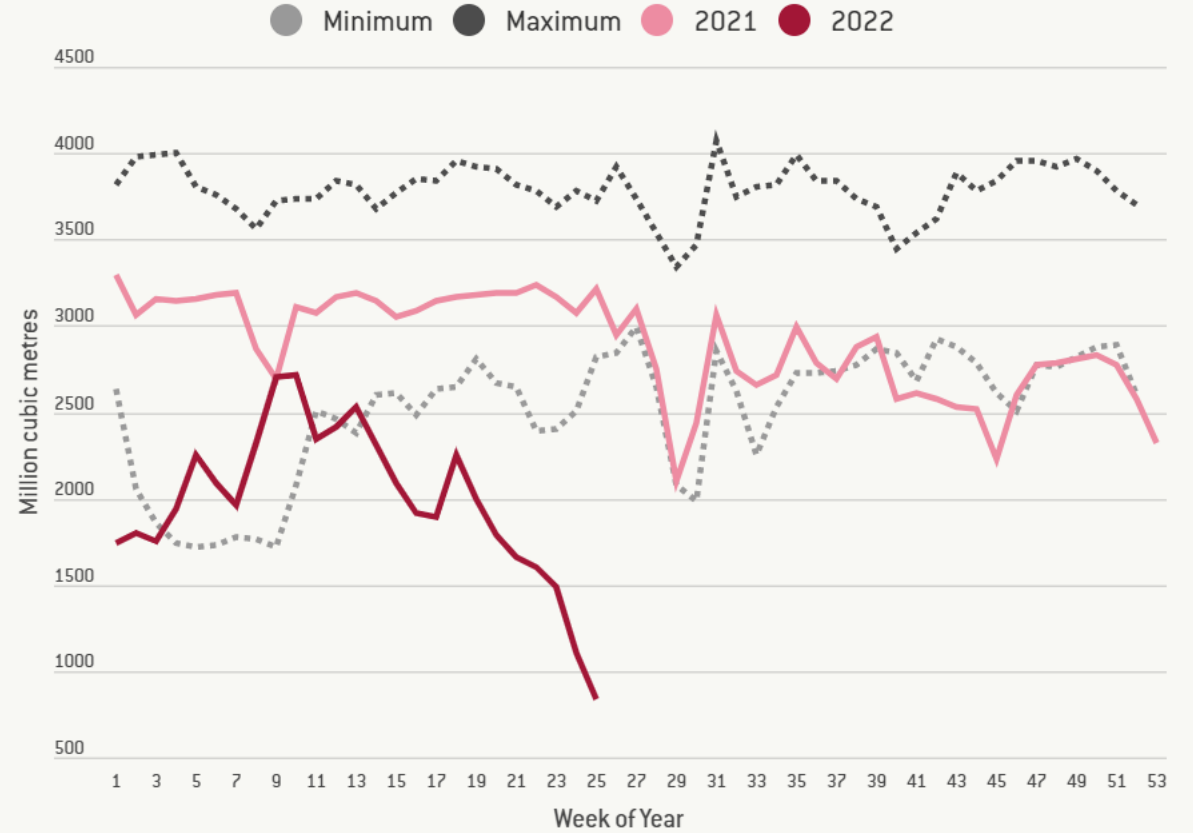
Europe told to prepare for Russia turning off gas

By Jonah Fisher
BBC Environment Correspondent

Russia blames sanctions for gas pipeline shutdown

5 September · Comments

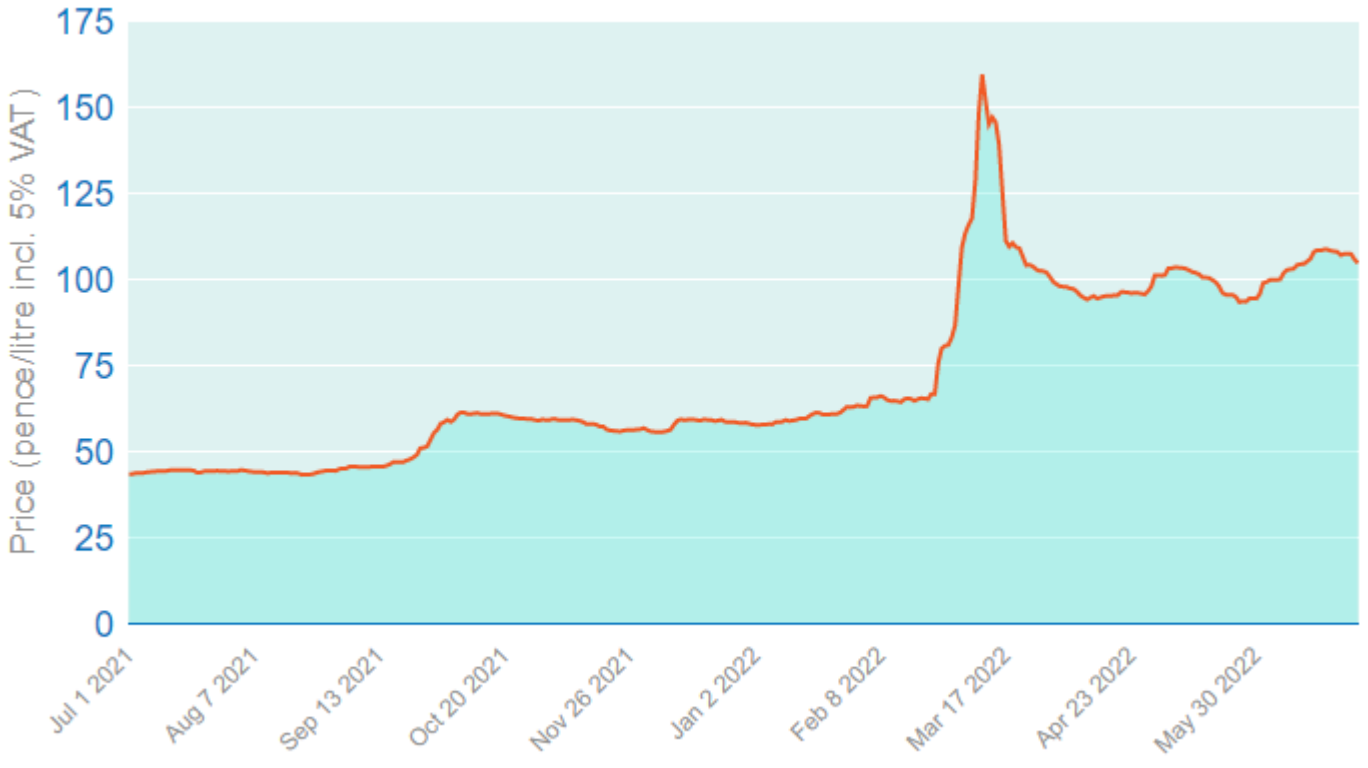
Russia has begun cutting off countries from supplies in an apparent move to hinder their efforts to fill their gas storage before the winter. Over the past week, Gazprom has cut supplies running through Europe's major natural gas pipeline, Nord Stream 1, by 60%.22 Jun 2022




Natural Gas EU Dutch TTF (EUR) 172.00 +24.22 (+16.39%)
200
172.00
150
125
100
75
50
25
2014
2016
2018
2020
2022
1D 1W 1M 6M 1Y 5Y 10Y All

The current energy market

UK Average Home Heating Oil Prices

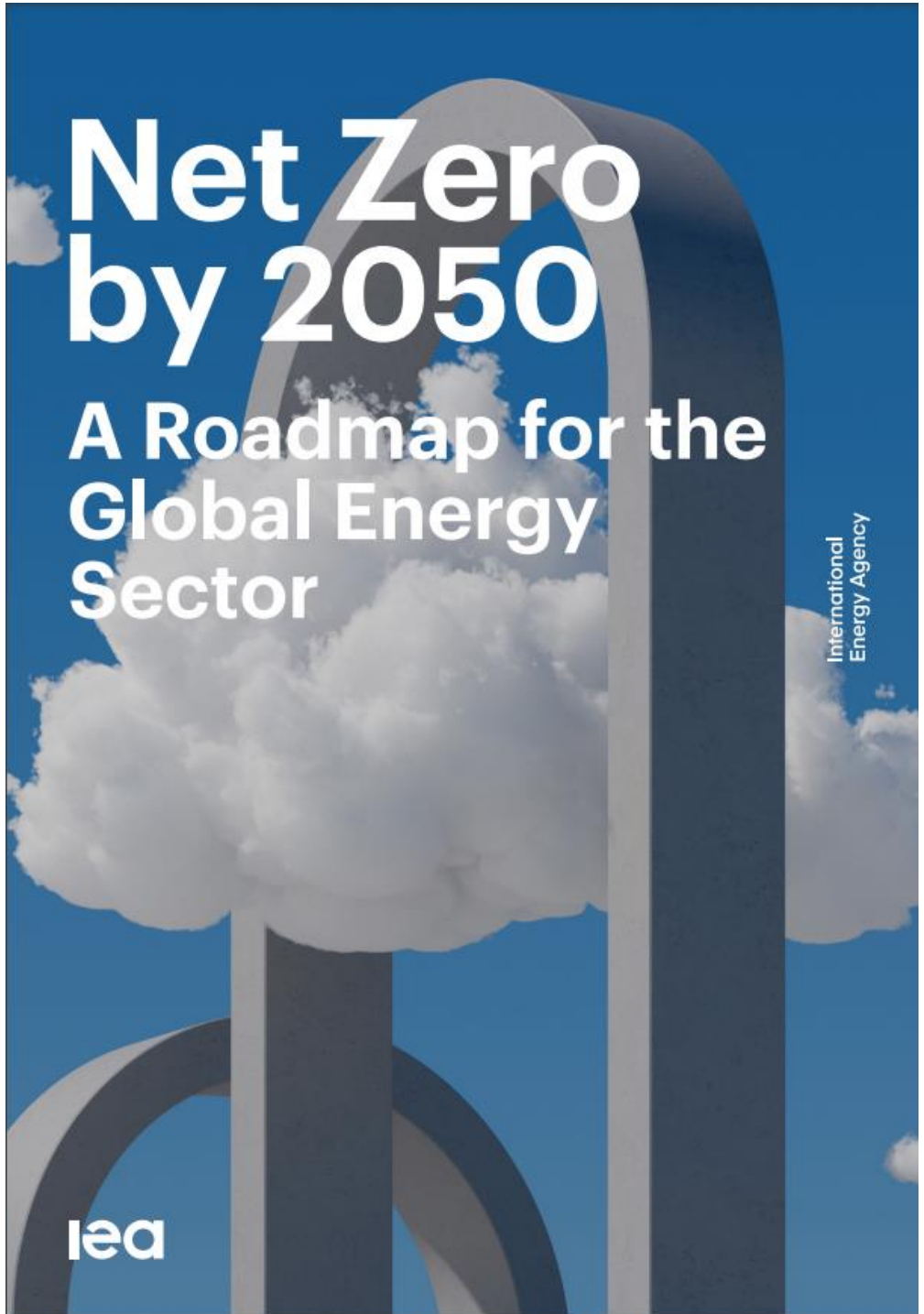


https://www.boilerjuice.com/heating-oil-prices/

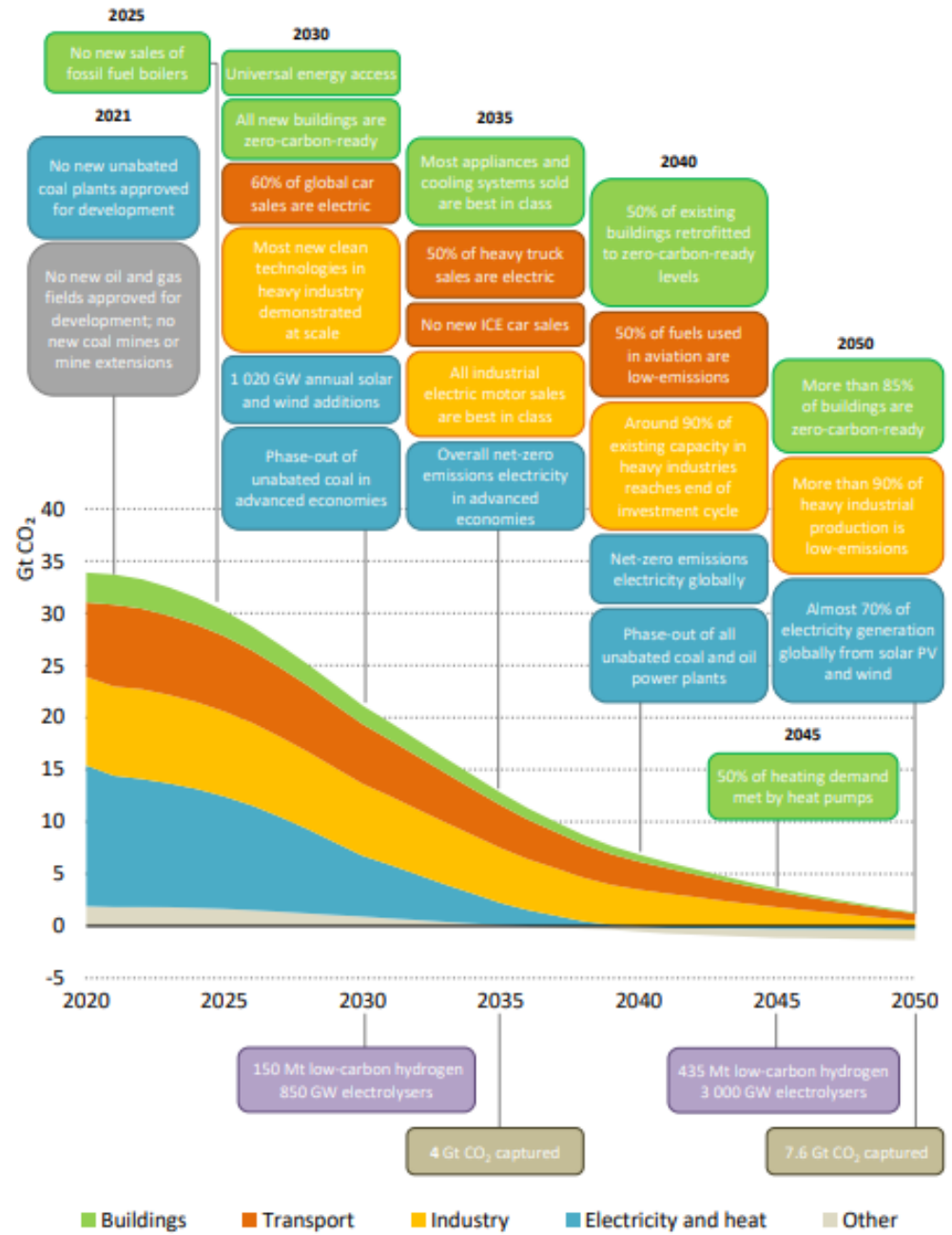
The current energy market

- In May, COP president Alok Sharma said…
- The good news is the opportunities for energy transition are as varied as they are intriguing.

"We see clearly the dangers of energy systems powered by foreign fossil fuels. We see the benefits of low cost, homegrown renewables, the price of which cannot be manipulated from afar. In short, we see that climate security is energy security, that we must break our dependency on fossil fuels."



Key milestones in the pathway to net zero



The current energy market

A 10-Point Plan to Reduce the European Union's Reliance on Russian Natural Gas

International Energy Agency

Measures implemented this year could **bring down gas imports from Russia by over one-third,** with additional temporary options to deepen these cuts to **well over half while still lowering emissions.**

Action 1

No new gas supply contracts with Russia

Impact: Taking advantage of expiring long-term contracts with Russia will reduce the contractual minimum take-or-pay levels for Russian imports and enable greater diversity of supply.

Action 2

Replace Russian supplies with gas from alternative sources

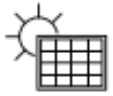
Impact: Around 30 bcm in additional gas supply from non-Russian sources.

Action 3

Introduce minimum gas storage obligations to enhance market resilience

Impact: Enhances the resilience of the gas system, although higher injection requirements to refill storage in 2022 will add to gas demand and prop up gas prices.

Action 4



Accelerate the deployment of new wind and solar projects

Impact: An additional 35 TWh of generation from new renewable projects over the next year, over and above the already anticipated growth from these sources, bringing down gas use by 6 bcm.

Action 5

Maximise generation from existing dispatchable low-emissions sources: bioenergy and nuclear

Impact: An additional 70 TWh of power generation from existing dispatchable low emissions sources, reducing gas use for electricity by 13 bcm.

Action 6

Enact short-term measures to shelter vulnerable electricity consumers from high prices

Impact: Brings down energy bills for consumers even when natural gas prices remain high, making available up to EUR 200 billion to cushion impacts on vulnerable groups.

Action 7

Speed up the replacement of gas boilers with heat pumps

Impact: Reduces gas use for heating by an additional 2 bcm in one year.

Action 8

Accelerate energy efficiency improvements in buildings and industry

Impact: Reduces gas consumption for heat by close to an additional 2 bcm within a year, lowering energy bills, enhancing comfort and boosting industrial competitiveness.

Action 9

Encourage a temporary thermostat adjustment by consumers

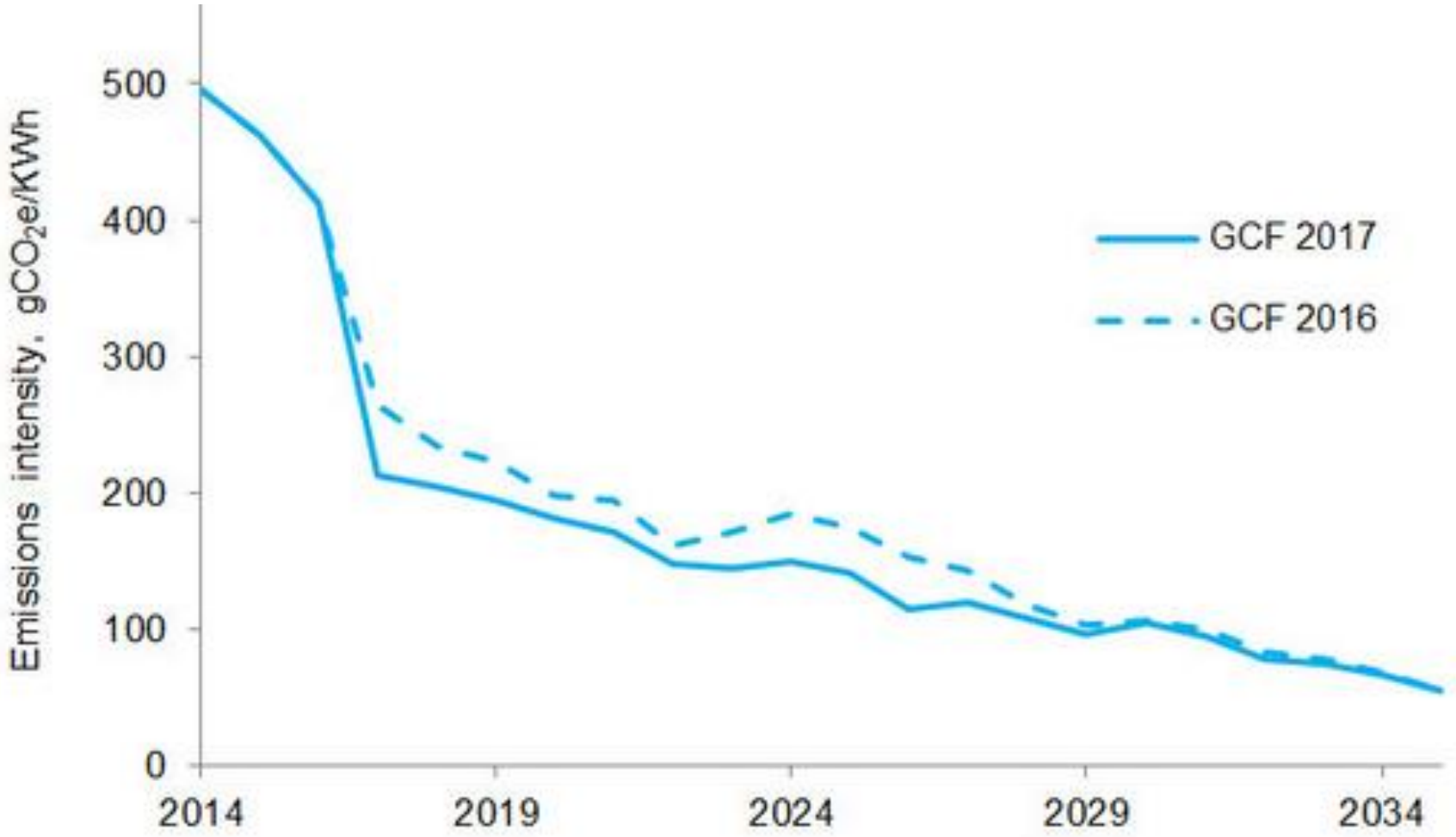
Impact: Turning down the thermostat for buildings' heating by 1°C would reduce gas demand by some 10 bcm a year.

Action 10

Step up efforts to diversify and decarbonise sources of power system flexibility

Impact: A major near-term push on innovation can, over time, loosen the strong links between natural gas supply and Europe's electricity security. Real-time electricity price signals can unlock more flexible demand, in turn reducing expensive and gas-intensive peak supply needs.

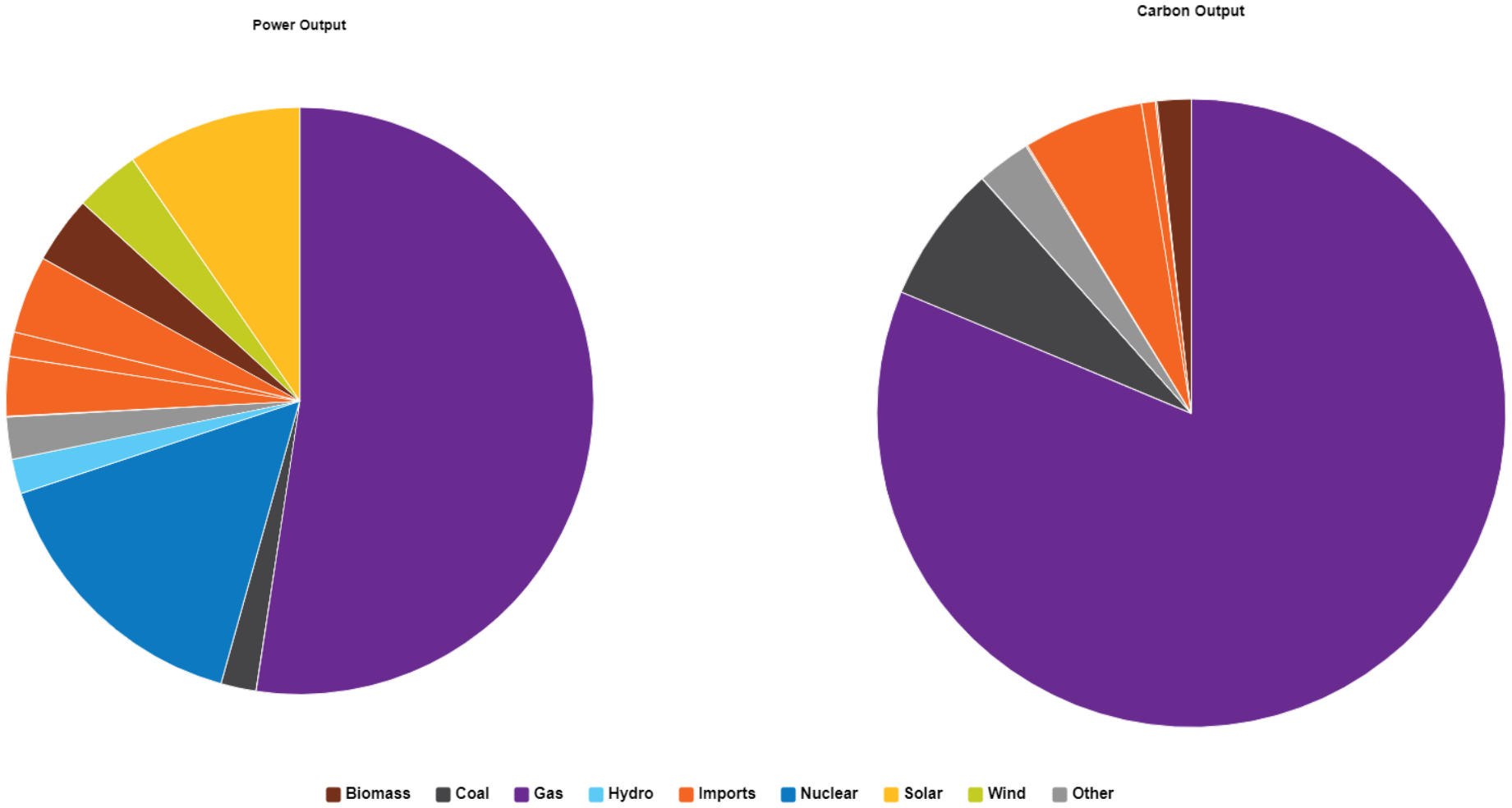
Emission Factors and Grid Decarbonisation



https://dashboard.nationalgrideso.com

National Grid ESO

Current Generation Mix and Carbon Emissions



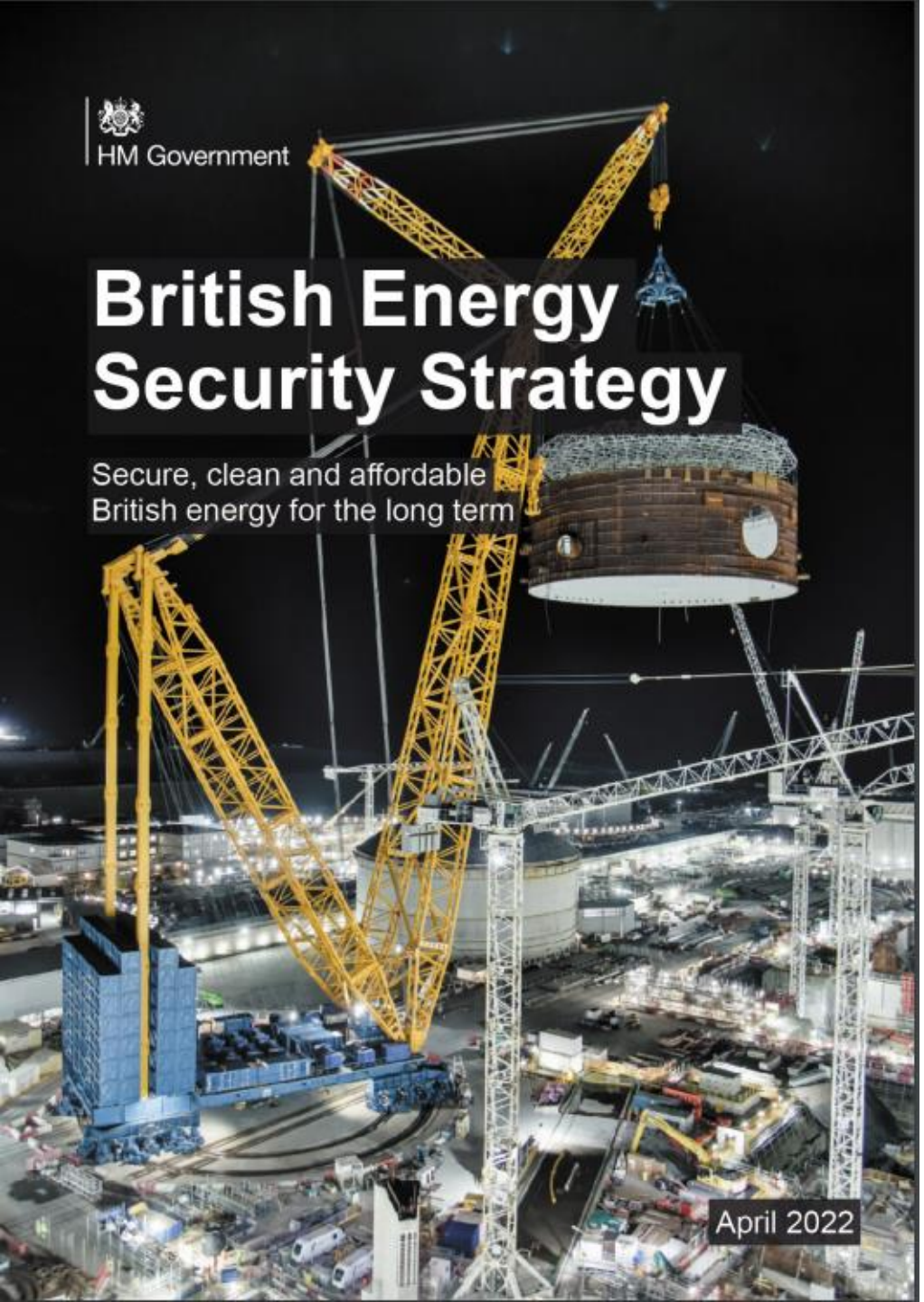
Market Forces

1) Likelihood of permanent reduction in Russian oil production
2) Increasing reliance on US shale, with potentially a strengthening dollar making imports more expensive
3) Geopolitical choices may have an extremely high impact on supply and therefore price
4) The re-introduction of coal may cause prices to rise, not fall

Net Zero and energy security needs are set to turbo-charge UK renewables

- Over the past five years, the UK Government has significantly increased its decarbonisation efforts. The UK has the ambition and potential to become a global leader, with national businesses taking a key role in global supply chains of renewable technologies.
- A key feature of the Energy Security Strategy was policy backing for nuclear, offshore wind and low carbon hydrogen. These technologies are expected to be critical in the UK's journey towards energy independence.

Solar power is expected to surpass fossil fuels by 2050 and become the world's main energy source. As demand grows, solar panels are set to become cheaper and more efficient.
https://zerocarbonbusiness.uk/get-solar-panels/

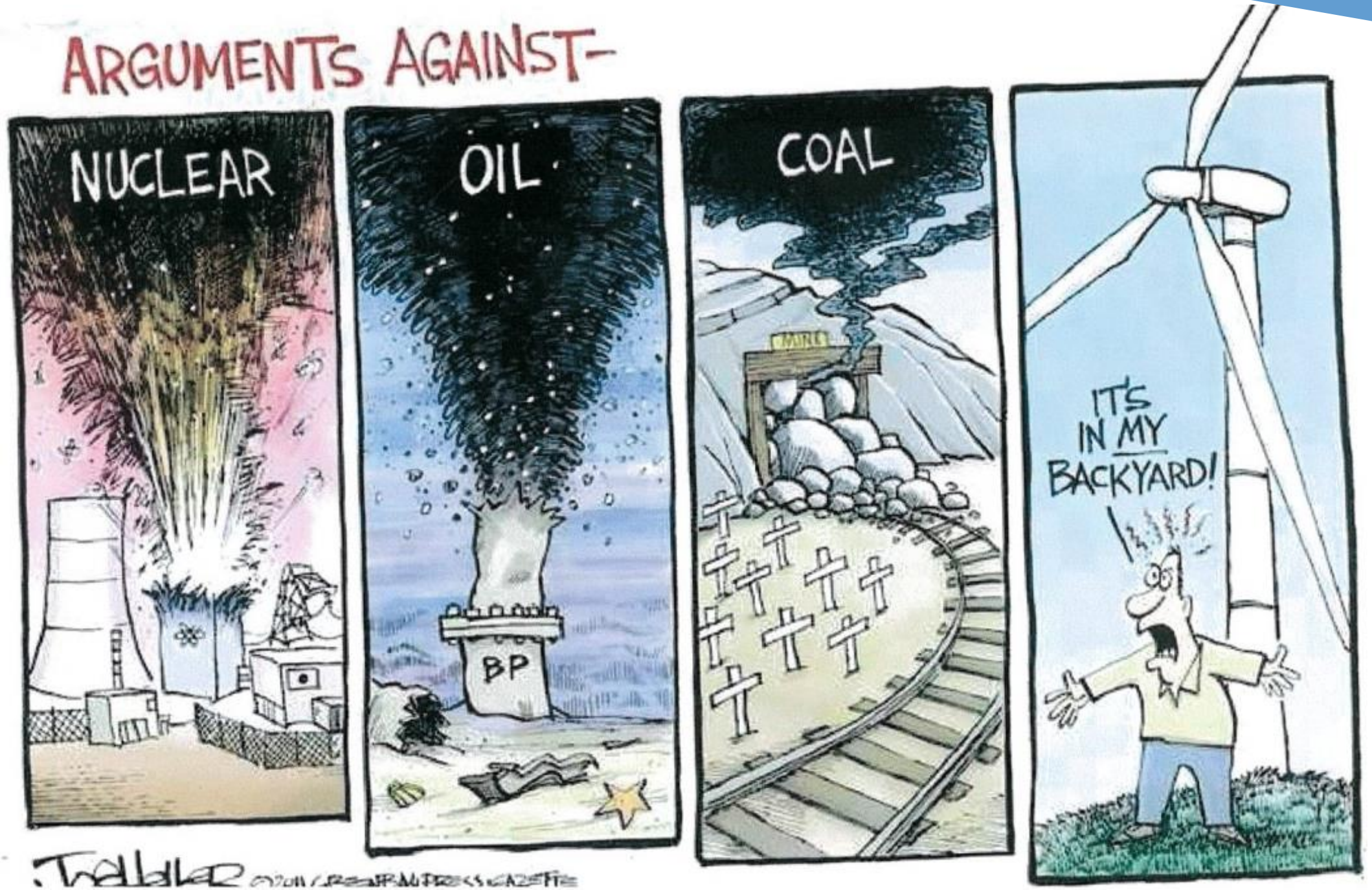


10 Point Plan

- Advancing offshore wind
- Driving the growth of low carbon hydrogen
- Delivering new and advanced nuclear power
- Accelerating the shift to Zero Emission Vehicles
- Green public transport, cycling and walking
- Jet zero and green ships

10 Point Plan

- Greener buildings
- Investing in CCUS
- Protecting our natural environment
- Green finance and innovation


ARGUMENTS AGAINST-
NUCLEAR
OIL
BP
COAL
IT'S IN MY BACKYARD!

Market participants

- Big Six
- Challengers
- The problem for energy companies
- New pressures

Summary

- Very challenging times
- Uncertain future
- Large amounts of investment
- High risk
- High cost

Questions

Energy Procurement

Delivered by:

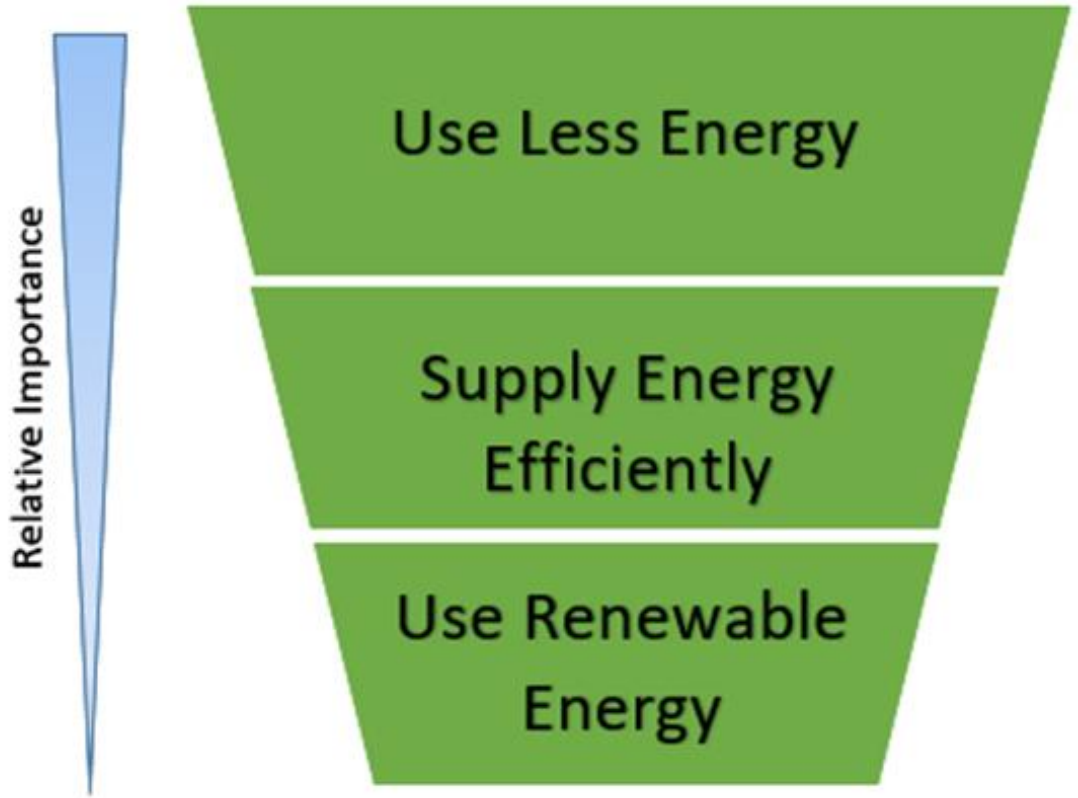
On behalf of:

Overview of session

Focus:

- Types of energy contracts
- Utility bills
- Green tariffs
- Hedging against price fluctuations
- Negotiating with landlords

The energy hierarchy



Be Lean

Be Clean

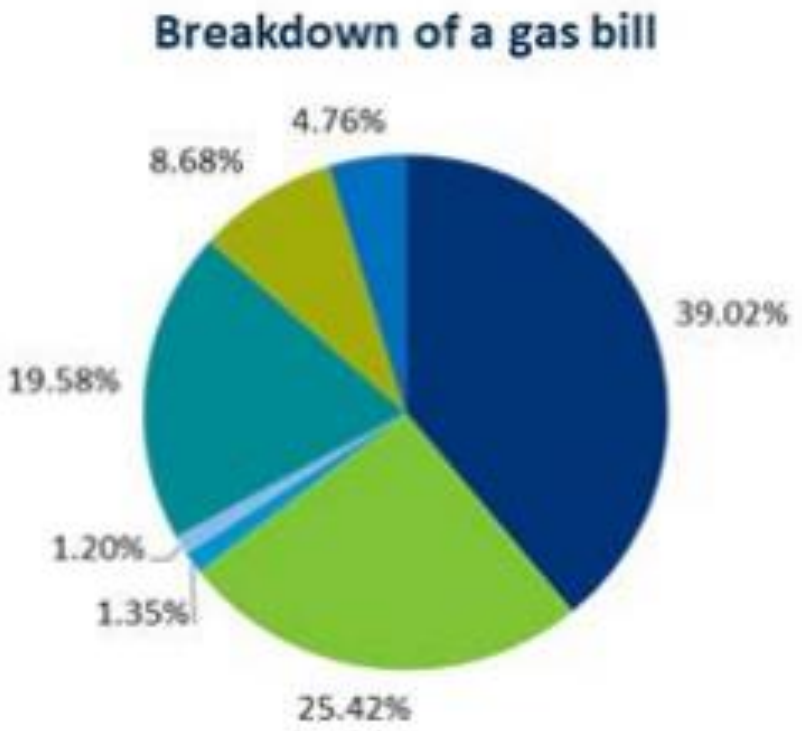
Be Green

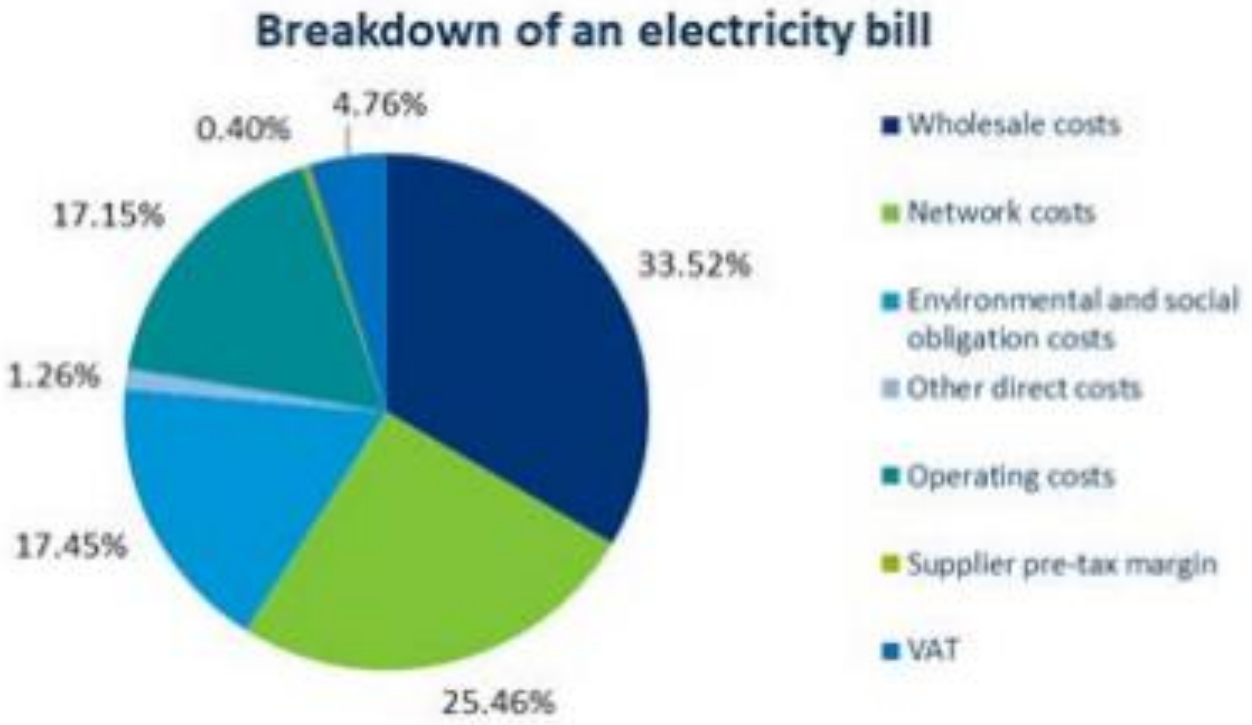
Types of contract

- Deemed and out-of-contract
- Fixed
- Variable
- Rollover

- https://www.ofgem.gov.uk/information-consumers/energy-advice-businesses/types-business-energy-contracts

Utility bills





Ref: Ofgem via Carbon Trust

Why choose a green tariff?

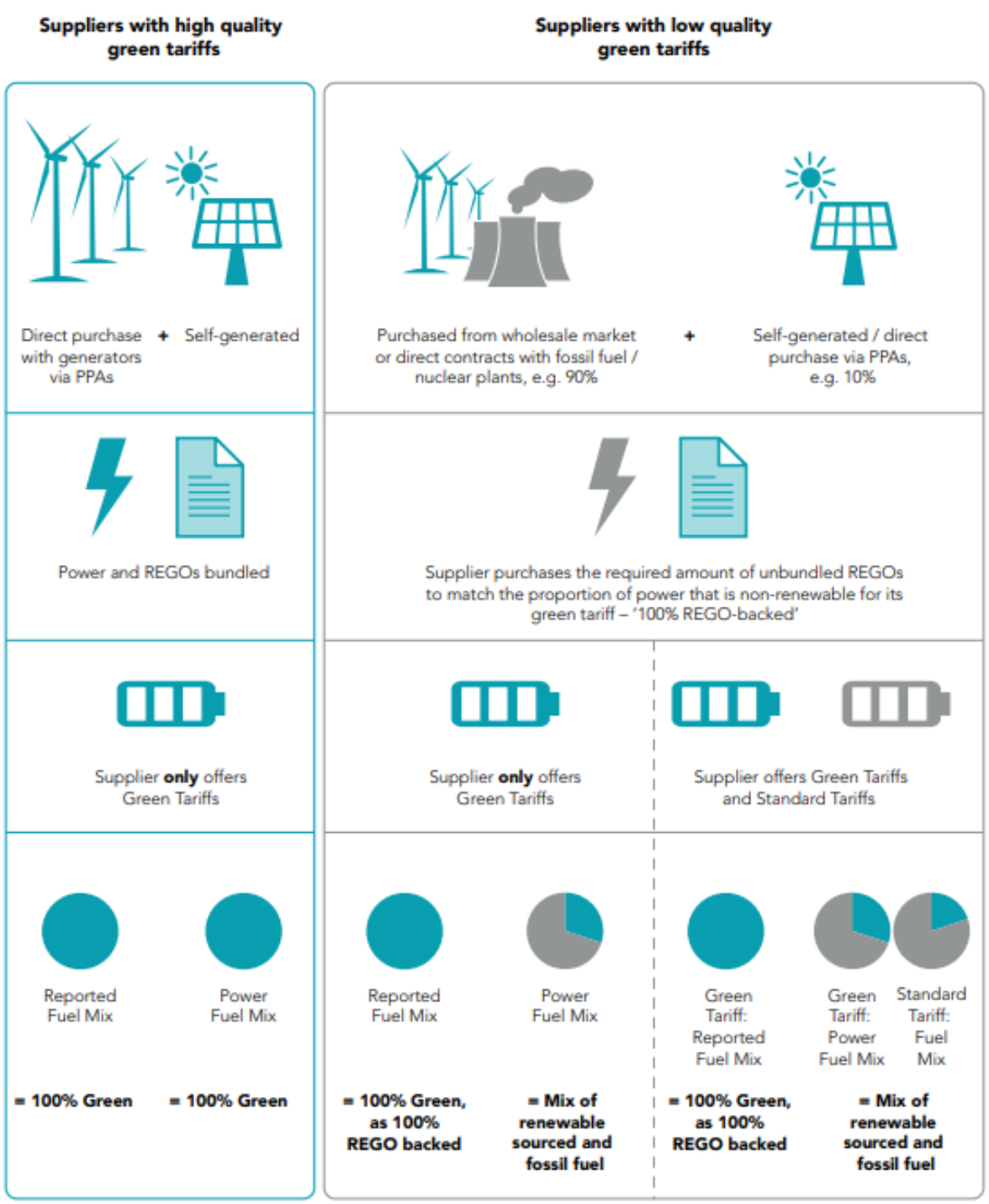
- Opting for a green tariff sends a message. Demand and supply are intrinsically linked.
- By switching to a green tariff, you are letting your supplier, the energy industry, and the government, know that your business wants to support renewable energy generation and avoid using fossil fuels.

https://bristolgreencapital.org/spotlight-on-green-energy-tariffs-for-businesses/

Green Tariff

- Almost every electricity supplier has a ‘green’ tariff aimed at customers who want to buy renewable energy.
- These tariffs are labelled as green if some or all of the units of electricity that the customer buys are 'matched' by units of energy that have been generated from a verified renewable energy source, like a wind farm, solar array or hydroelectric power station.
- But how green are they? The answer is they vary. Some are genuinely all-renewable, others are something of a half-way house, and others aren’t really green at all.

https://www.cse.org.uk/advice/advice-and-support/green-electricity-tariffs

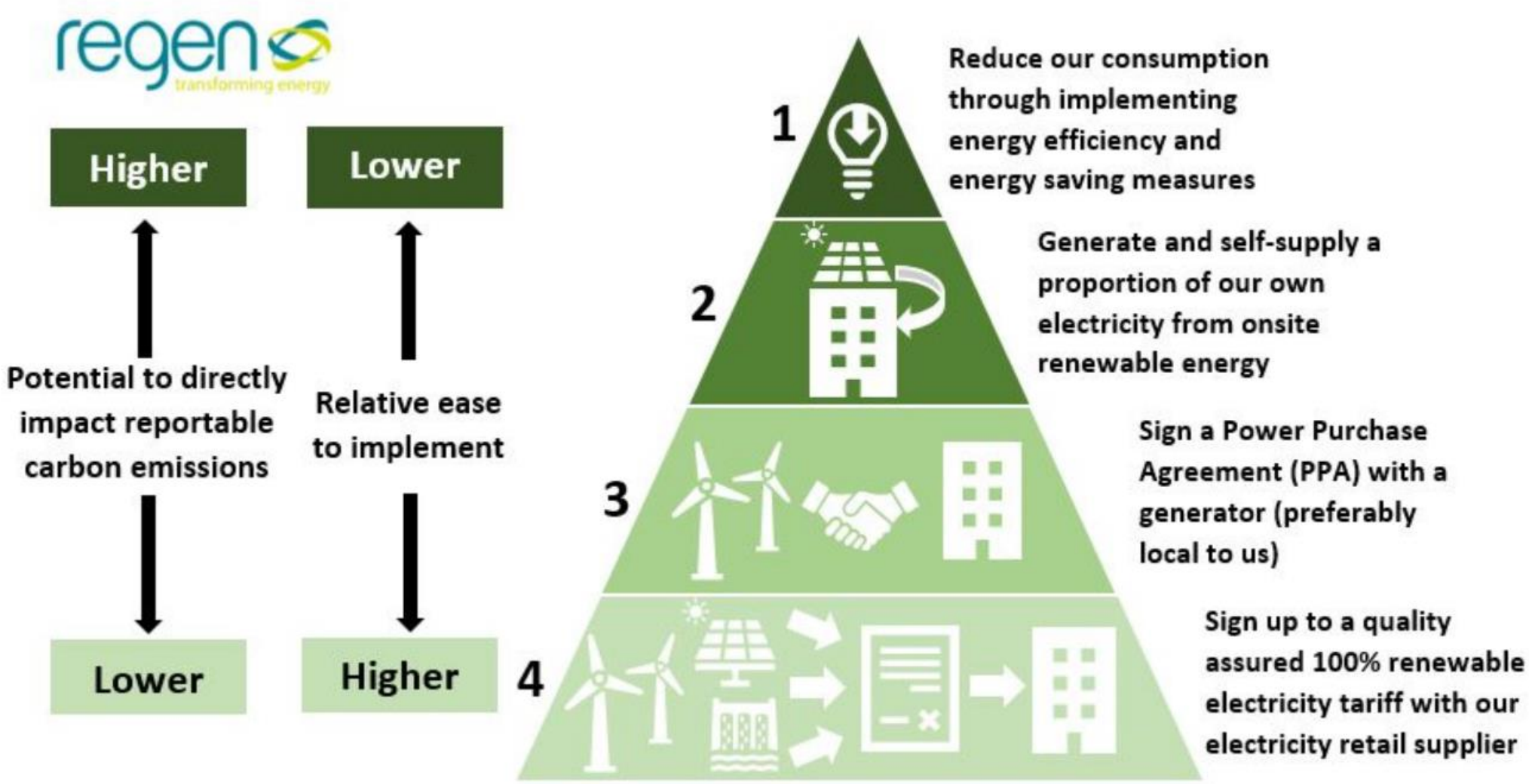


Ref UKGBC: https://ukgbc.s3.eu-west-2.amazonaws.com/wp-content/uploads/2021/03/05144141/Renewable-Energy-Procurement-Carbon-Offsetting-Guidance-for-Net-Zero-Carbon-Buildings.pdf

Greenest tariffs

- Green tariffs from suppliers that buy renewable electricity and its REGO certs directly from renewable generators:

1. GEUK
2. Good energy
3. Ecotricity


Higher
Lower
Potential to directly impact reportable carbon emissions
Relative ease to implement
Lower
Higher
1
Reduce our consumption through implementing energy efficiency and energy saving measures
2
Generate and self-supply a proportion of our own electricity from onsite renewable energy
3
Sign a Power Purchase Agreement (PPA) with a generator (preferably local to us)
4
Sign up to a quality assured 100% renewable electricity tariff with our electricity retail supplier

Matching tariff types to demand

Tariff	Pros	Cons
Fixed term	• Often cheaper than other tariffs • Protects you against any rises in energy prices	• You will not feel the benefit if energy prices are cut • Exit fees may be applied
Variable-rate	• Will increase or decrease depending on market value • Normally no exit fees	• Often more expensive than other tariffs • Will increase or decrease depending on market value
Time of use	• Rewards flexible energy use (e.g. running equipment overnight on lower tariffs)	• Higher peak tariffs mean that if you are unable to shift your energy consumption within periods of low energy cost, you may see your energy bills rise
Green	• Environmental benefits associated with lower carbon emissions from renewable energy sources and biomethane • Reputational benefits from choosing a low carbon fuel source for your business	• Sometimes more expensive than the cheapest fixed term tariff on the market

How to hedge against price fluctuations

- Stay aware of the market
- Engage with brokers / providers early
- Know your contract dates
- Minimise your demand
- Buying consortium?
- Consider flexible demand (e.g; DSR)

Talk to your suppliers

- Ask your suppliers how they are reducing their emissions. This could prompt them to take action and may give you new ideas. Try having a conversation about reducing environmental impact with each of your suppliers at least once in the next 3 months.
- How about factoring in environmental impact next time you are looking for a new supplier?

Purchasing power

- Good energy management starts with ensuring that your business is buying energy at the best possible price.
- If you're on a multi-rate tariff, make sure you schedule processes and operations to make best use of the cheaper electricity rates
- If you're on a maximum demand tariff or charged according to your supply capacity, check your bills to ensure your contracted availability isn't greatly in excess of your maximum demand.
- Request quotes for 100% renewable electricity and ask suppliers to detail how they can guarantee this.

Ref: Carbon Trust – Effective Energy Management for Business

Negotiating with landlords

- Negotiating a ‘green lease’
- Cost sharing for sustainability improvements
- Requiring minimum levels of energy efficiency
- Transparency of energy use
- A commitment to sourcing renewable energy
- Environmental commitments around water use, waste management, and biodiversity. Ask to see your landlord or building management company’s environmental policies.
- A climate related risk assessment

Summary

- Different tariffs are available
- Utility bills
- Green tariffs
- How to talk to suppliers
- Purchasing power
- Negotiating with landlords

Any questions?

Energy Procurement

Workshop

Delivered by: NatWest UWE Bristol University of the West of England

On behalf of: European Union European Social Fund WEST OF ENGLAND Combined Authority

What are the challenges facing your businesses?

- In groups, discuss the carbon targets as well as challenges your business is facing with rising energy costs and energy procurement
- *Does your organisation have a carbon target?*
- *What do you think are the benefits of your organisation in setting a carbon target?*
- *What are the challenges of setting a carbon target?*
- *What are your aims when you go out to procure energy?*
- *Do you feel confident buying in the current energy market?*
- *Who in your company is responsible for the energy bills?*
- *Has interest in energy procurement within your business changed given the current market?*
- Feed back the top challenges each group is facing

Common problems - data

- Lack of information on energy use
- Not sure about actual costs
- Not sure about what is the best kind of tariff

Types of meters

Types of meters

Data and information sources

- Your meters
- Your BMS
- Energy bureau services

sse Scottish Hydro

RECEIVED 12 APR 2021

12 APR 2021 2 of 2

WARDELL ARMSTRONG LLP
SIR HENRY DOULTON HOUSE
FORGE LANE
STOKE-ON-TRENT
ST1 5BD

Electricity
Your site reference / invoice number
201603951 / 0078

Manage your account online at
ssebusinessenergy.co.uk

Call us with any enquiries
0345 7252526

Invoice period from 1 Mar 2021 to 31 Mar 2021
Available capacity 230 kVA
VAT number 553 7696 03

H

Supply to: Sir Henry Doulton House, Forge Lane, Etruria, Stoke-On-Trent ST1 5BD

705557760

Invoice

Tax point date 8 April 2021
Meter Number(s) P07A20463
Recorded MD unrestricted **46.40**
Day/Night

	Units	Rate (pence)	Amount (£)
Day units	12810.80	15.5340	1,990.03
Night units	3659.60	11.4050	417.38
Available capacity	230.00	156.0000	358.80
Monthly charge			75.52
Meter operator charge			48.00
Reactive power adjustment			0.11
Feed in tariff charge	16470.40	0.6790	111.83
CCL on 16470.4 units at 0.8110p			133.57
VAT at 20.00% on charges of £3,135.24			627.04
Total this invoice			**3,762.28**

M 003343 008175 SEV3271A 9210273350

The current contract for this supply ends on 30 September 2021. You can terminate this Agreement by giving us written notice no later than 31 August 2021. Please email us at businesscontracts@sse.com so that we can look into your future contract options.

S 00 846 365
14 1727 7213 000

We're becoming SSE Energy Solutions; your route to affordable renewable energy and Net Zero carbon solutions.

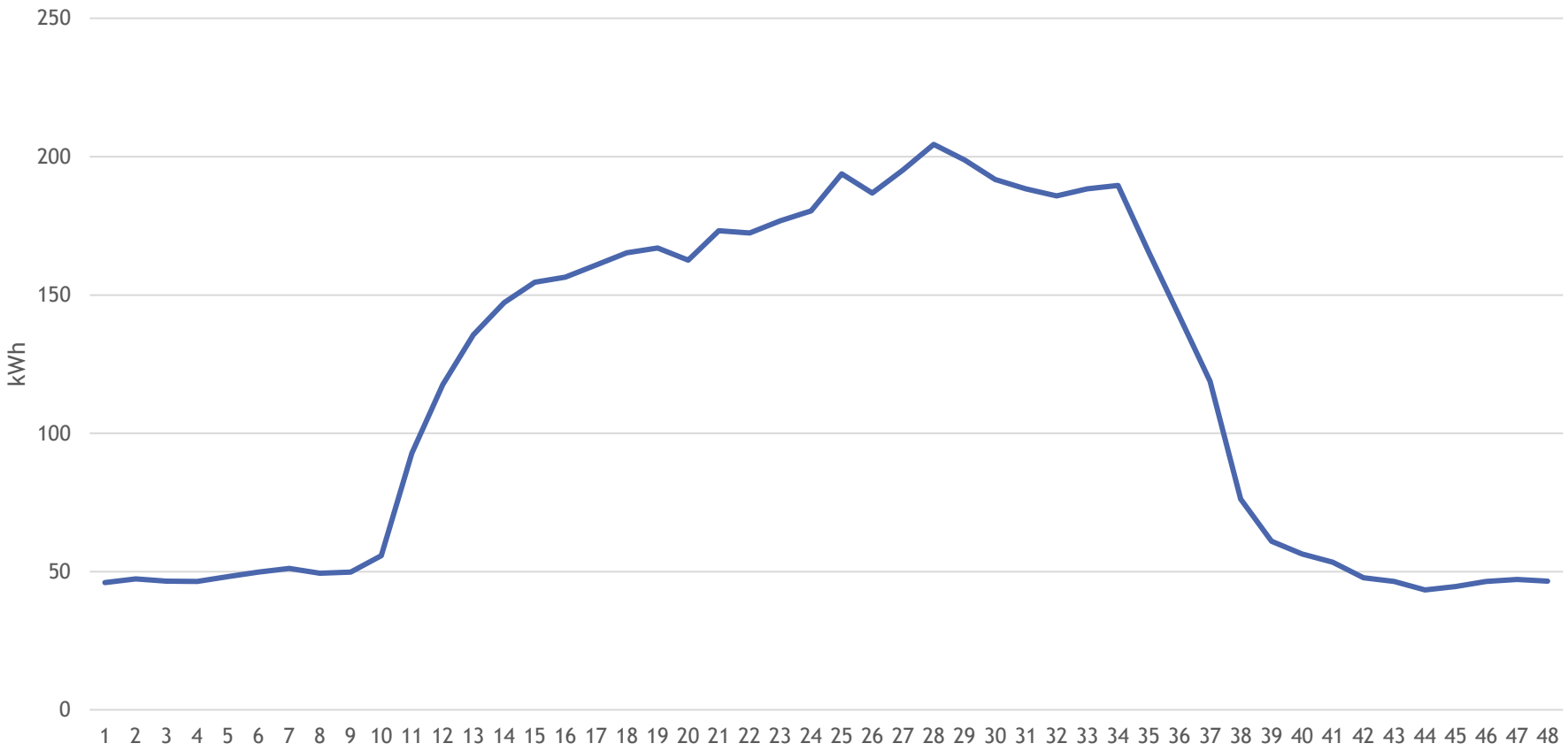
Wardell Armstrong LLP
Approved for Payment

Signature
Name
Date

108901

ACCT	Sec4YD
VAT	627.04
NOM 4215/ST	3135.24
JOB NO	NIC
O/N	

Analysis


250
200
150
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50
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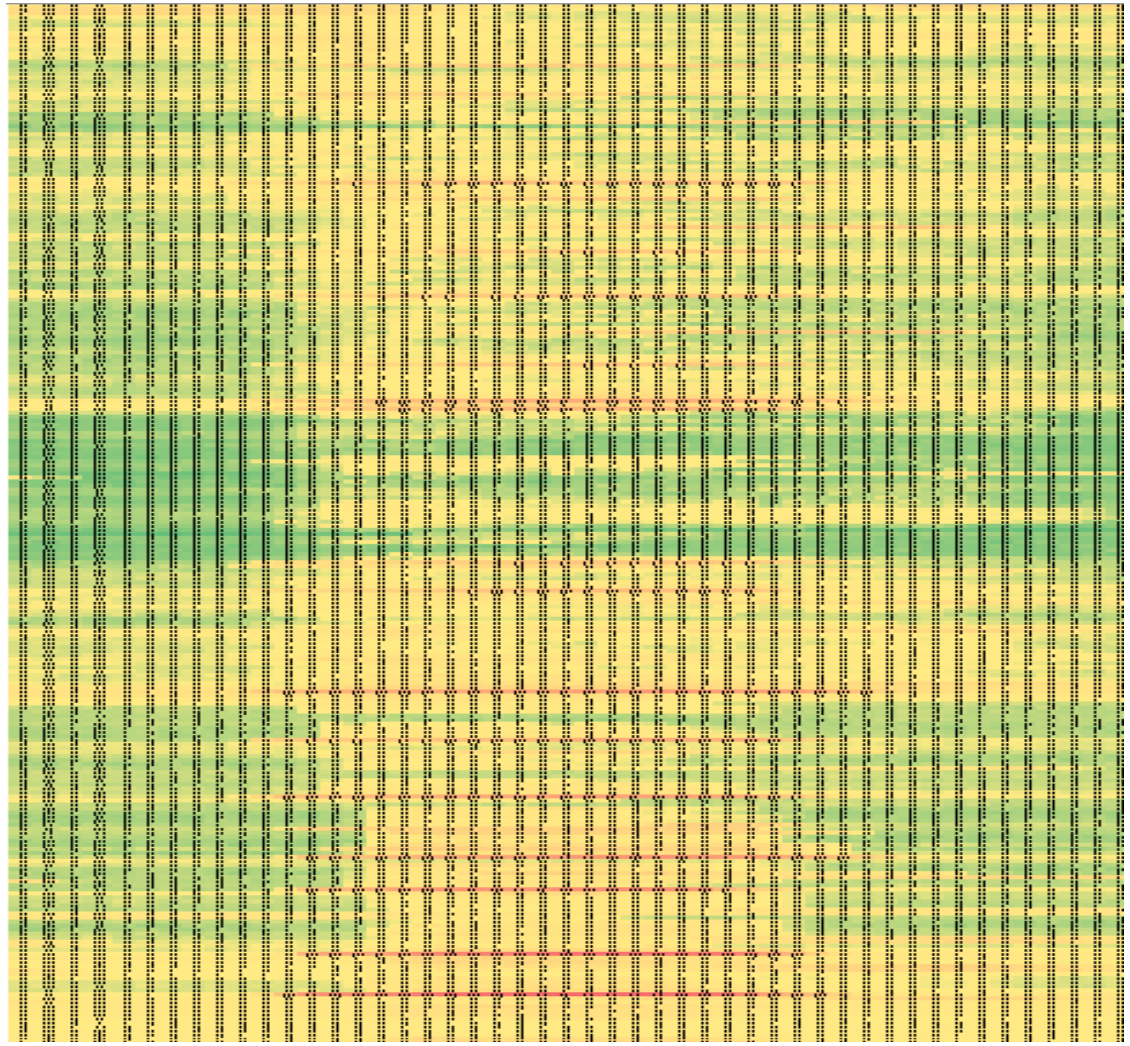
kWh
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48

Analysis



Commercial gas and electricity bill

- https://www.britishgas.co.uk/business/help-and-support/billing-and-payments/how-to-read-my-bill

Energy efficiency

Delivered by: NatWest, UWE Bristol University of the West of England

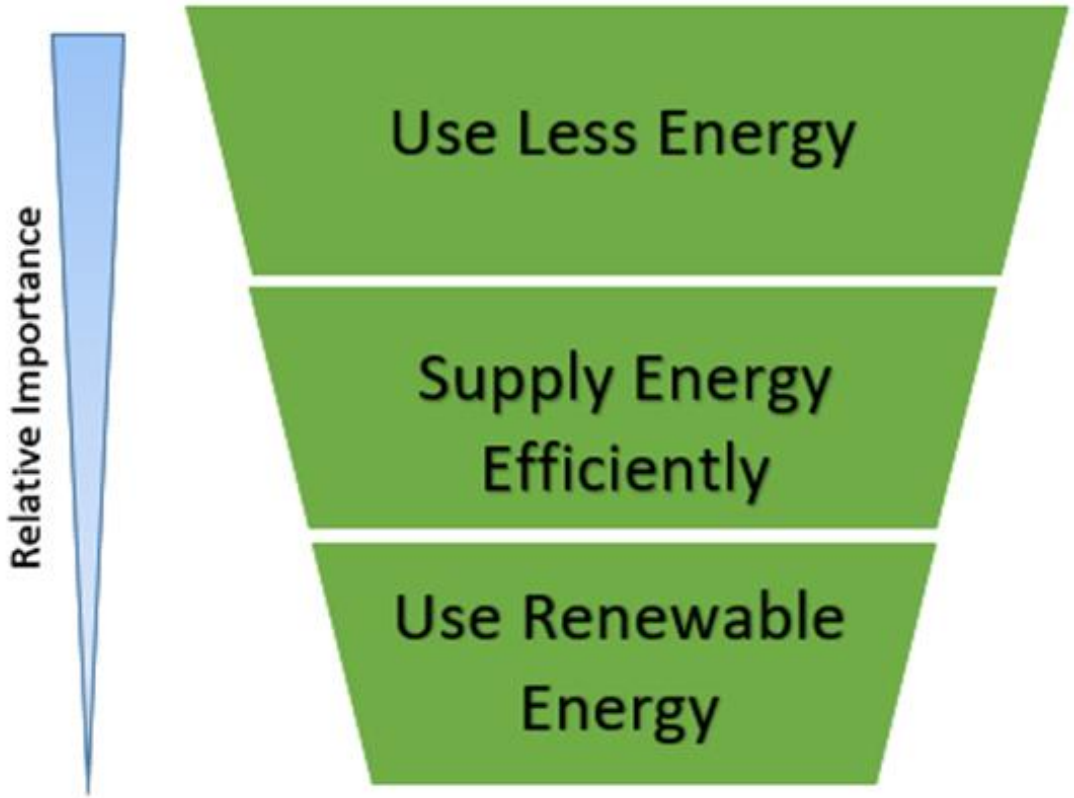
On behalf of: European Union European Social Fund, West of England Combined Authority

Overview of session

Focus:

- What is energy efficiency
- Why take action
- How to start
- What to consider
- Where to get further information

The energy hierarchy



Be Lean

Be Clean

Be Green

Energy efficiency

1) Behaviour, monitoring and control
    - Training
    - Process / requirement is optimised
    - Data and oversight
    - User and management control

2) Efficient equipment
    - Kit is efficient
    - Efficient equipment is functioning properly (condensing boilers, etc.)

Making the case for action

- Energy costs will remain high
- Higher costs increase budgeting risk
- The competition will become more competitive
- Clients will increasingly expect action on carbon
- Efficiency is the first step in decarbonisation

Making the case for action

80% of SMEs are taking action on energy efficiency

51% of SMEs want to do more on energy efficiency

The installation of LED lighting is the number one energy efficiency measure taken by SMEs, with 50% having upgraded

SMEs and energy efficiency

- SME's account for roughly 90% of global businesses and more than half of employment.
- They play a critical role in economic growth, innovation and job creation.
- If we are to achieve net zero, it will be crucial that SMEs reduce their carbon emissions

Carbon Trust: https://prod-drupal-files.storage.googleapis.com/documents/resource/public/GBF%20SME%20research.pdf

- SMEs employ 16.6 million people (25% of UK population)
- Business and industry is 25% of UK territorial emissions (source: BEIS), with just under half of these emissions from SMEs

Cambridge Institute for Sustainability Leadership

Challenges

- Limited resource / time in a day
- Lack of information on options
- Lack of data on performance
- Limited capital
- Lack of buy-in

Where to start

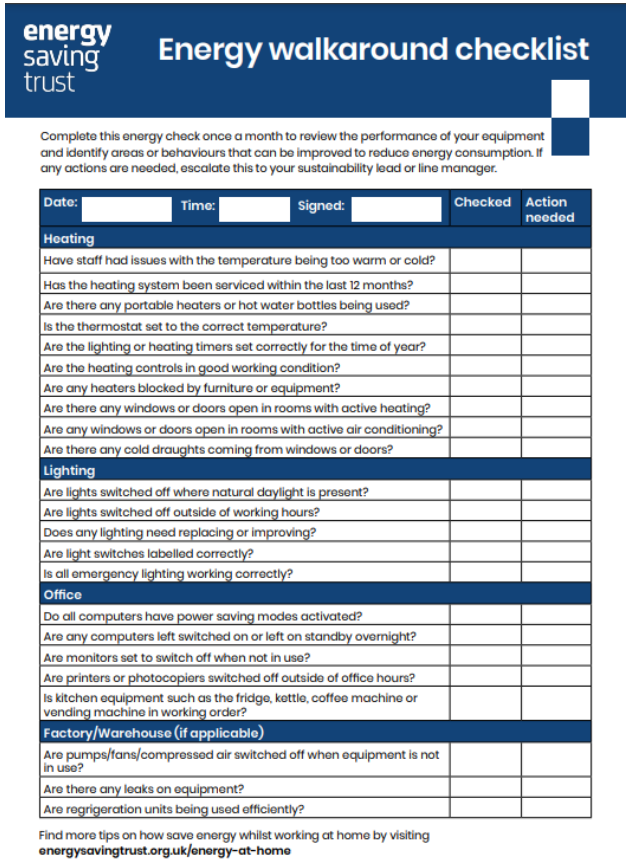
- Leadership support
- Responsible person
- Goal / objective(s)
- Action plan

Create a plan

- Senior management oversight
- Employee engagement (champions?)
- Aims and reporting on performance
- Measurement of progress / realistic metrics
- Specific goals - do I need a formal system? (ISO 50001)
- Scope – continual improvement vs market leading

Identifying opportunities

- Ask a lot of questions
- Group the solutions:
- Behaviour change
- Improvements
- Investments



energy saving trust

Energy walkaround checklist

Complete this energy check once a month to review the performance of your equipment and identify areas or behaviours that can be improved to reduce energy consumption. If any actions are needed, escalate this to your sustainability lead or line manager.

Date:	Time:	Signed:	Checked	Action needed
Heating				
Have staff had issues with the temperature being too warm or cold?				
Has the heating system been serviced within the last 12 months?				
Are there any portable heaters or hot water bottles being used?				
Is the thermostat set to the correct temperature?				
Are the lighting or heating timers set correctly for the time of year?				
Are the heating controls in good working condition?				
Are any heaters blocked by furniture or equipment?				
Are there any windows or doors open in rooms with active heating?				
Are any windows or doors open in rooms with active air conditioning?				
Are there any cold draughts coming from windows or doors?				
Lighting				
Are lights switched off where natural daylight is present?				
Are lights switched off outside of working hours?				
Does any lighting need replacing or improving?				
Are light switches labelled correctly?				
Is all emergency lighting working correctly?				
Office				
Do all computers have power saving modes activated?				
Are any computers left switched on or left on standby overnight?				
Are monitors set to switch off when not in use?				
Are printers or photocopiers switched off outside of office hours?				
Is kitchen equipment such as the fridge, kettle, coffee machine or vending machine in working order?				
Factory/Warehouse (if applicable)				
Are pumps/fans/compressed air switched off when equipment is not in use?				
Are there any leaks on equipment?				
Are regrigeration units being used efficiently?				

Find more tips on how save energy whilst working at home by visiting **energysavingtrust.org.uk/energy-at-home**

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Behaviour change

- You could significantly lower your energy consumption and emissions by turning your heating down by just one degree.
- Other changes you can make right now include:
- setting your thermostat correctly
- making sure systems are turned off when the building is unoccupied
- turning air conditioning off if you have a window or door open
- keeping radiators free from obstructions
- Install a smart meter

Understand your consumption

- Record monthly meter readings
- Half-hourly meters and smart meters
- Energy bills – provide actual meter readings for more accurate data

Case Study: Wogans Coffee

- https://www.youtube.com/watch?v=wEfeIzFCZNA&t=6s

Common areas where efficiency can be improved

- Lighting
- Heating controls
- Pipework insulation
- Point of use water heater
- Aerated taps
- Solar film on windows
- Server room cooling
- Fridge use
- Safety and maintenance

Heating

- Make a calendar reminder to set timers to the right date and time, and remember to include daylight savings. Make sure you consider weekends and bank holidays when setting controls.
- Ensure thermostats are set correctly. Set the heating in offices to 19°C and cooling at 24°C or higher. The temperature in corridors, storerooms and areas of higher physical activity can be set lower than 19°C.
- Ensure air conditioning is turned off in meeting rooms when people leave. Air conditioning in IT server rooms should be set as recommended by the manufacturer.
- Ensure that radiators are free from obstructions.
- Check that employee desks aren’t too close or too far from radiators and air conditioning.

Draughts

- Identify sources of draughts and fit appropriate draught proofing.
- Ensure employees are aware of the cost of wasted heat and air conditioning costs.
- Make sure unused doors and windows are securely sealed (excluding emergency exits).
- Inform employees that the thermostat should be turned down before opening windows.

Further resources

https://www.carbontrust.com/resources

https://bristolgreencapital.org/projects/resources/#Energy

https://bristolgreencapital.org/wp-content/uploads/2022/05/Guide-to-Reducing-Emissions-from-Energy.pdf

https://energysavingtrust.org.uk/how-to-engage-your-employees-with-sustainability/

DECC_advice_guide.pdf (publishing.service.gov.uk)

Consultancy – where we fit in!

Any questions?

Technology, solutions and best practice

Workshop

Delivered by: NatWest, UWE Bristol University of the West of England

On behalf of: European Union European Social Fund, West of England Combined Authority

Agenda

10.00: Introduction to Wardell Armstrong and the climate emergency

10.30: Current energy market

11.15: *Break*

11.45: **Workshop:** Energy procurement options and best practice

12.45: Energy efficiency

13.15: *Lunch*

14.00 **Workshop**: Energy management virtual walkthrough and introduction to solar PV

14.45: Onsite generation and technology change

15.15: **Workshop**: Technologies, costs and creating an action plan

16.00: *Finish*

Virtual Tour

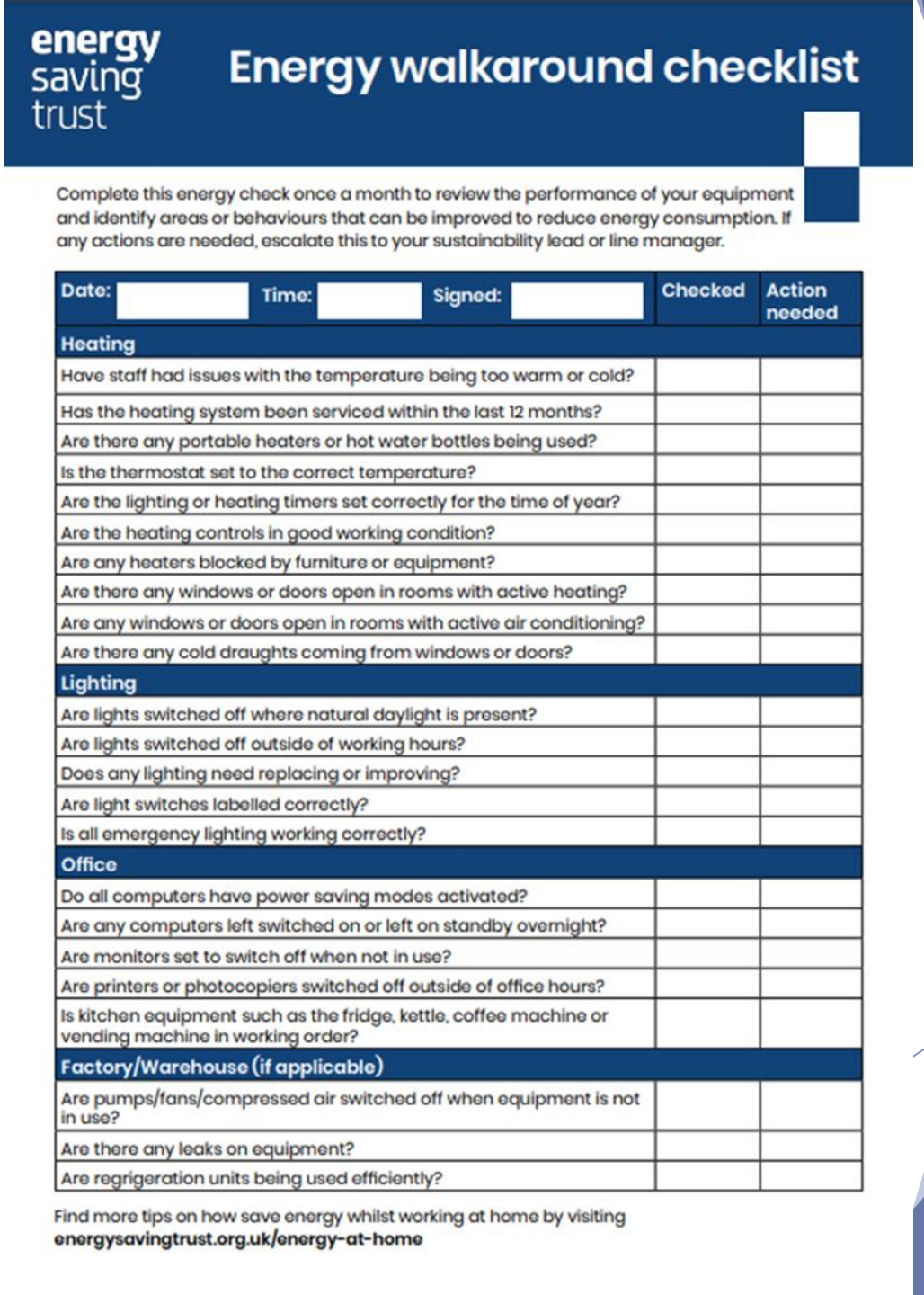
- https://www.templestudiosbristol.co.uk/

Energy Efficiency

Think of your work premises.

From the energy checklist are there any areas which might be improved?

Discuss the possible areas for improvement at your workplaces.



energy saving trust

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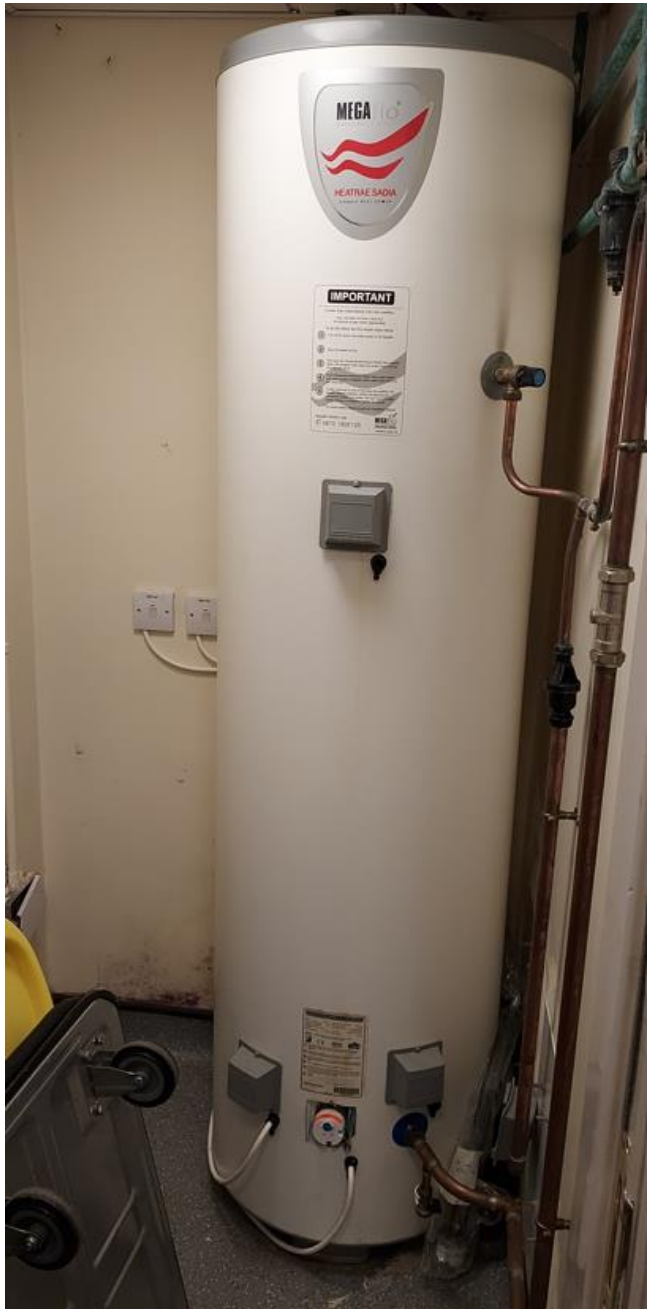
Plant


A.O.Smith
BFC


TOSHIBA
SHRM
TOSHIBA
SHRM
TOSHIBA
SHRM

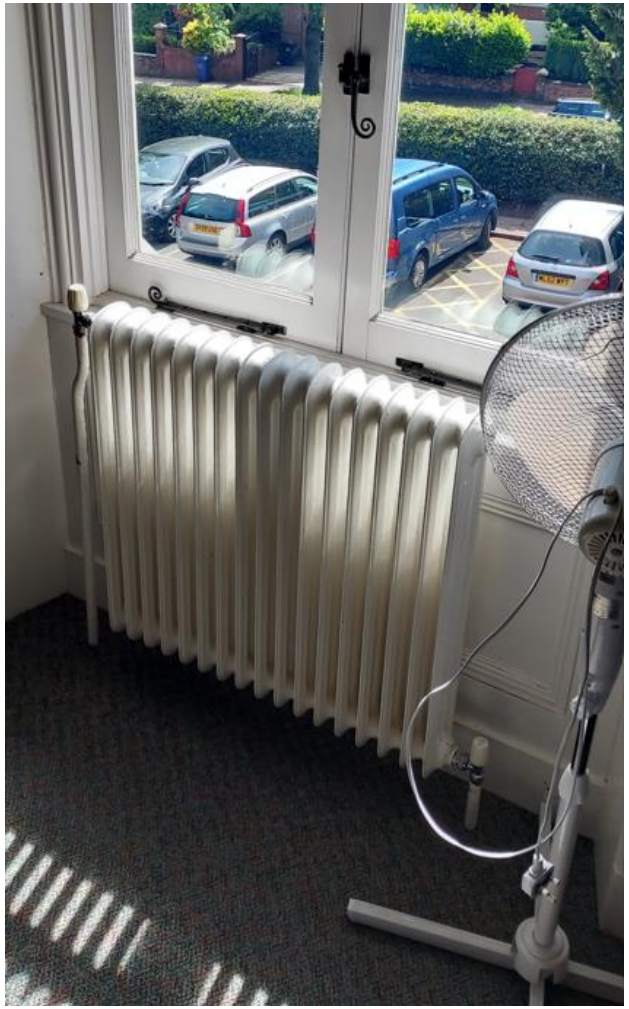

MEGA
HEATRAE SADIA
IMPORTANT


UNVENTED DIRECT CYLINDER
MODEL
DOD300HE
MAX. MAINS PRESSURE
18 bar
OPERATING PRESSURE
3 bar
EXPANSION RELIEF VALVE SETTING
8 bar
RATED PRESSURE
7 bar
T&P RELIEF VALVE SETTING
80°C/10 bar
STORAGE CAPACITY
300 litres
ELECTRICAL RATING
3 x 3kW @ 240Vac
3 x 2.7kW @ 230Vac
HEAT LOSS
2.25 kWh/day (at 65°C)
WEIGHT (FULL)
358 kg
A PRESSURE REDUCING VALVE (SUPPLIED) MUST BE FITTED TO ALL INSTALLATIONS
CE
BEAB Approved
BBA
HEATRAE SADIA

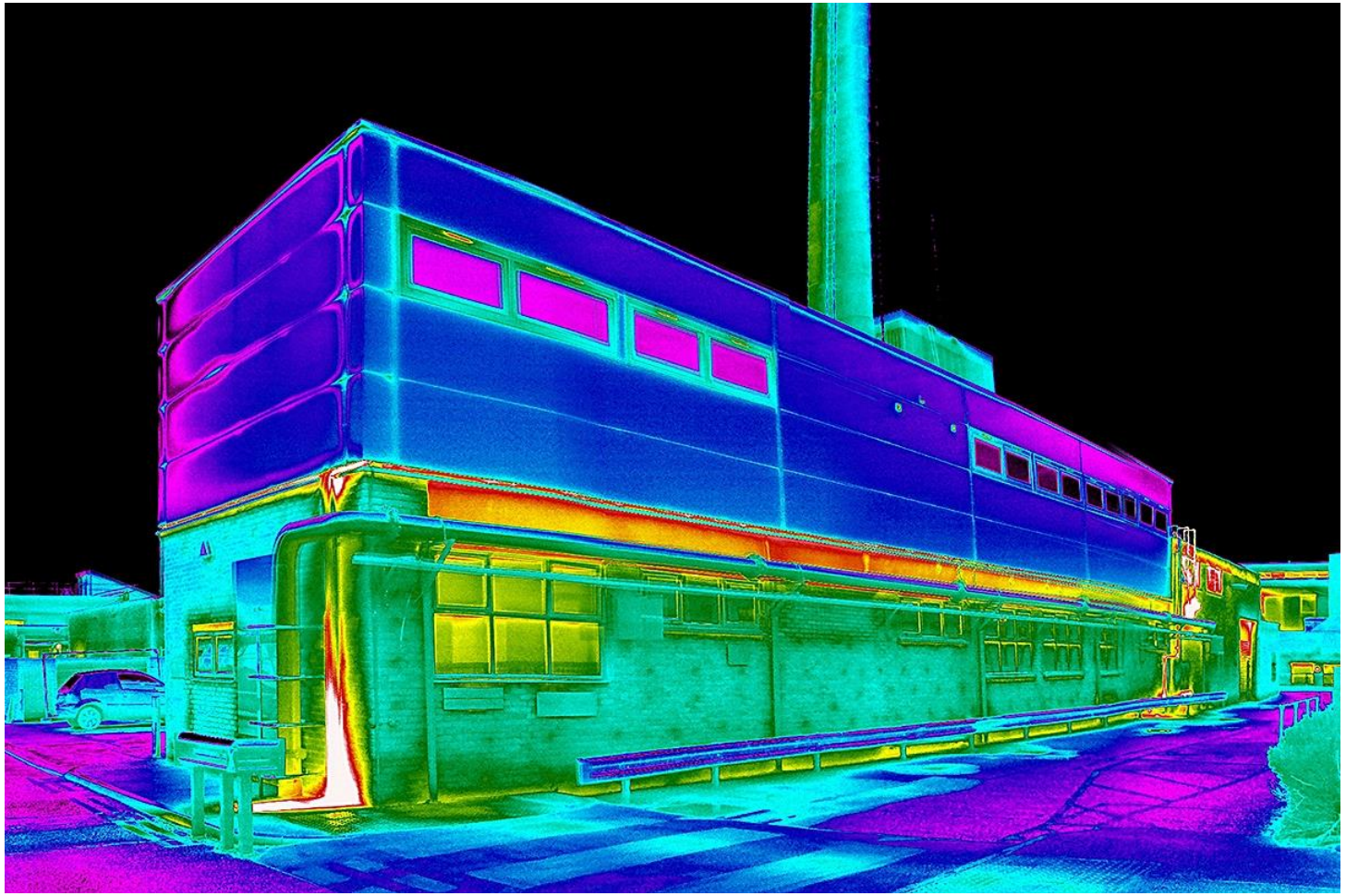
Controls


Satchwell
Boiler 1
Boiler 2
Pump
Hot Water
Alarm
Set
Service
Schneider

Fabric



Thermal imaging



Solar PV Suitability

- This tool can be used to locate workspaces to identify potential suitability of roofs.
- https://opendata.bristol.gov.uk/explore/dataset/solar-potential/information/

Onsite generation and technology change

Delivered by: NatWest, UWE Bristol University of the West of England

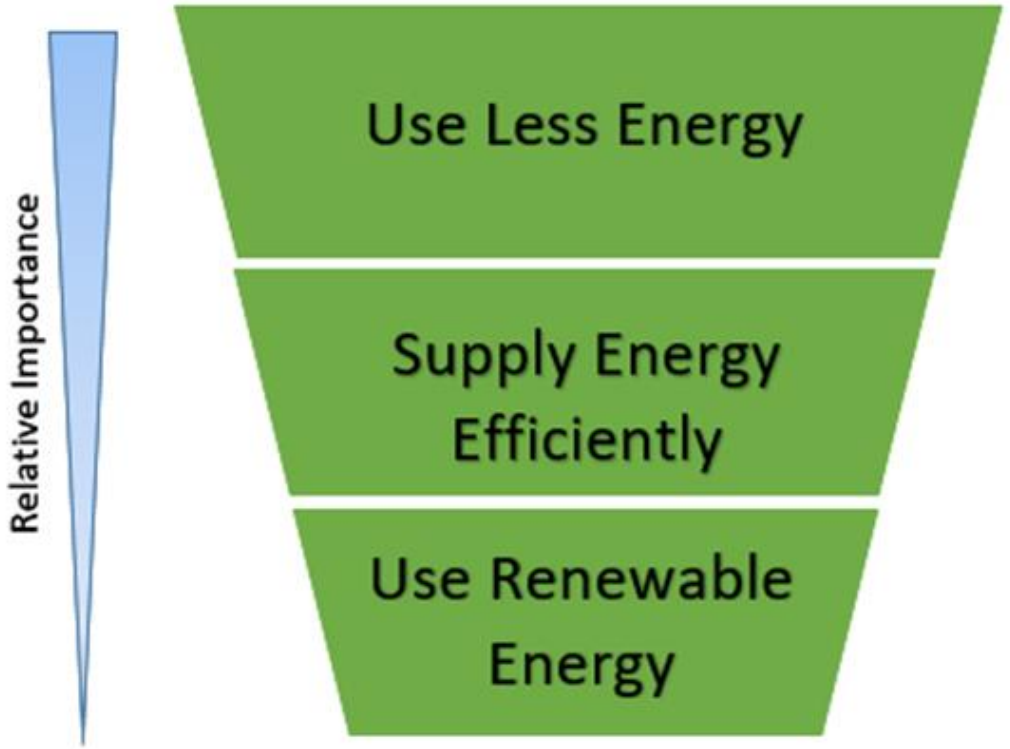
On behalf of: European Union European Social Fund, West of England Combined Authority

Overview of session

Focus:

- Benefits of onsite energy generation
- Things to consider
- The steps you can take
- Technologies
- Costs

The energy hierarchy



Be Lean

Be Clean

Be Green

Benefits

- Generate your own energy
- Lower your emissions
- Reduce your energy bills

Benefits of renewable energy generation

Benefits to businesses
Lower energy bills
Increased consumer and investor confidence in your brand
More attractive to buyers as they seek a greener supply chain
Preparation for future laws and regulations

https://zerocarbonbusiness.uk/get-solar-panels/

Things to consider

- Business size – can you afford it
- Energy needs – how much does your business use
- Location – might you need planning permission
- Your premises – do they belong to you or are they rented?

Step 1: Find an installer

- **Find a reputable installer**
- We recommend that you choose a certified installer and system that are both accredited through the Microgeneration Certification Scheme (MCS).
- The MCS is a quality assurance scheme supported by the UK Government, which certifies products and installers. To find an accredited installer in your local area, use the search function on the MCS website.

Step 2: Get a quote

- Will the installer project manage the whole job, or will you need to arrange and pay for other trades such as electricians, plumbers or groundwork contractors?
- Do the prices cover the distribution system (radiators and associated pipework) and the safe removal and disposal of any existing equipment, for example your old boiler?
- Do prices cover the cost of commissioning the system? All accredited installers are certified to commission systems once fully installed to ensure that they are fit for purpose.
- Available options, including size, fuel type, hot water storage, and maintenance cycles.
- The efficiency values of the system.
- Payment options. Your deposit should not be more than 25 per cent of the full cost. You should check that this will be protected with insurance.
- For heating systems, ask whether the cost of integration with your home's heating system, or a proposed heating system, is included.

Step 3: Check planning permissions

- Depending on the kind of property and installation, you may also need to get planning permission or a building warrant from your local planning authority. Make sure you have the right permissions in place before beginning installation.
- If your office or workspace is a listed building, you will almost certainly require consent from your local authority. You should always check with your local planning department to find out if planning permission or building warrants are required.

Boiler Upgrade Scheme

What is the Boiler Upgrade Scheme?

The Boiler Upgrade Scheme (BUS) supports the decarbonisation of heat in buildings. It provides upfront capital grants to support the installation of heat pumps and biomass boilers in homes and non-domestic buildings in England and Wales.

Acting on behalf of property owners, installers can apply for:

- £5000 off the cost and installation of an air source heat pump
- £5000 off the cost and installation of a biomass boiler
- £6000 off the cost and installation of a ground source heat pump, including water source heat pumps

£450 million of grant funding is available over three years from 2022 to 2025.

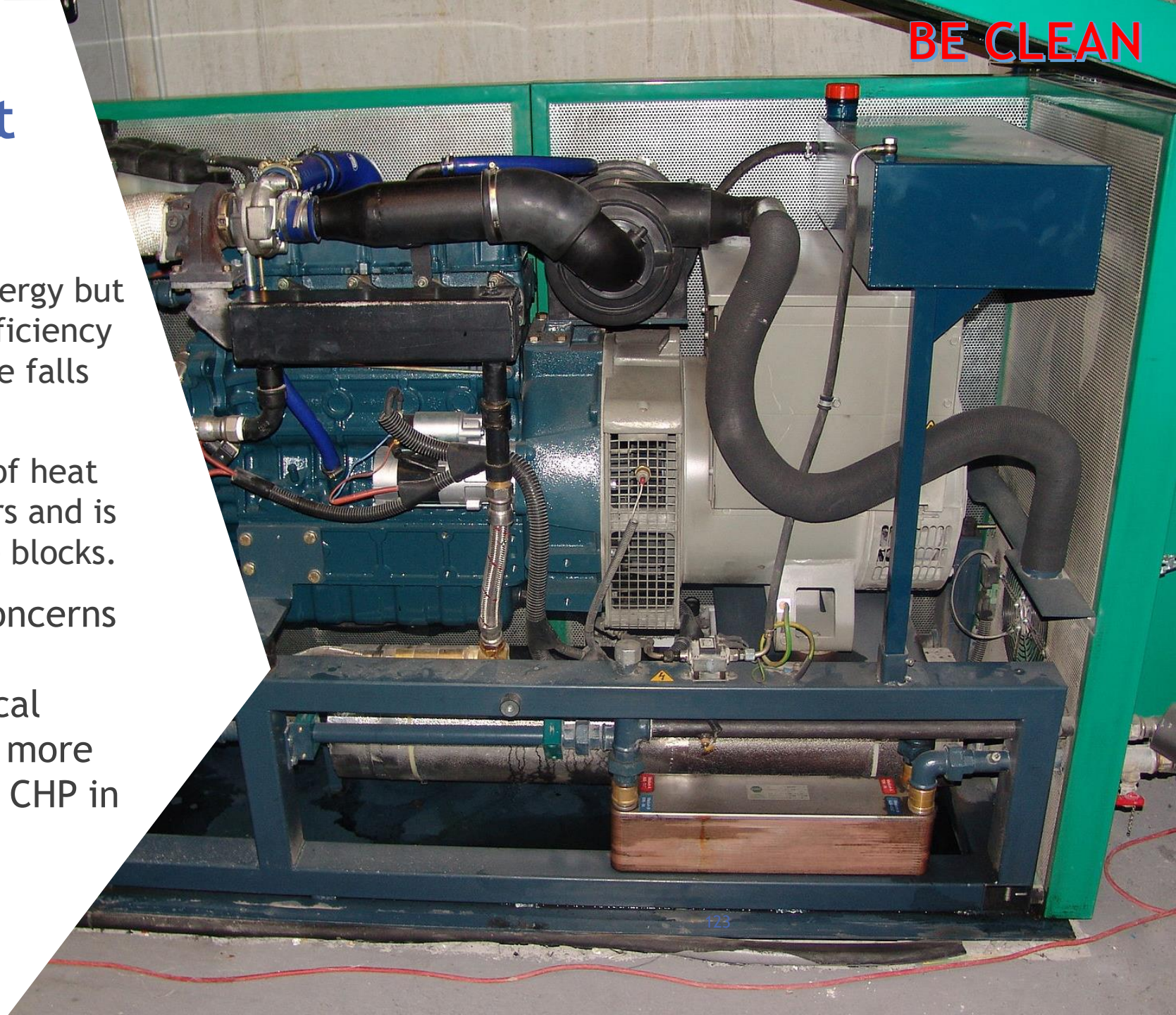
- Government-funded studies by the Energy Systems Catapult have recently shown that there is no property type or age that is unsuitable for a heat pump.

Solar PV

- Solar PV works by converting incident sunlight on solar cells into electricity.
- PV is relatively easy to install and can be used to generate electricity whenever the sun is shining.
- One of the key considerations is where the PV panels will be located – will they be subject to shading.
- PV is one of the easiest and cheapest technologies to install and is a very popular choice for domestic renewable energy right now but it's relative benefits will be eroded by changes to the carbon emission factors and grid decarbonisation.
- Potential to gain income by selling energy back to the National Grid
- **Smart Export Guarantee (SEG)**

Combined Heat & Power (CHP)

- Gas CHP is not a renewable energy but can be lower carbon due to efficiency savings in co-generation, hence falls into the BE CLEAN category.
- Gas CHP has been a mainstay of heat networks for the past few years and is especially common in high rise blocks.
- In response to air quality concerns as well as carbon emission reduction policies, some local guidance has made it much more difficult to justify using gas CHP in new development.



Solar Thermal

- Solar Thermal technologies (flat plate collectors and evacuated tubes) provide a means of producing DHW.
- Collectors will need to compete for roof space with solar PV/ASHPs and potentially other sustainability features such as green/brown/blue roof space as well as other roof mounted infrastructure.
- Further immersion heaters would be required for times when solar thermal could not meet demand.
- Greatest DHW generation would be mid-summer when demand is low.

BE GREEN

Solar thermal hot water system

Evacuation tube

Pros:

- Very efficient

Cons:

- Need a backup heater for the winter months
- Have to be regularly maintained

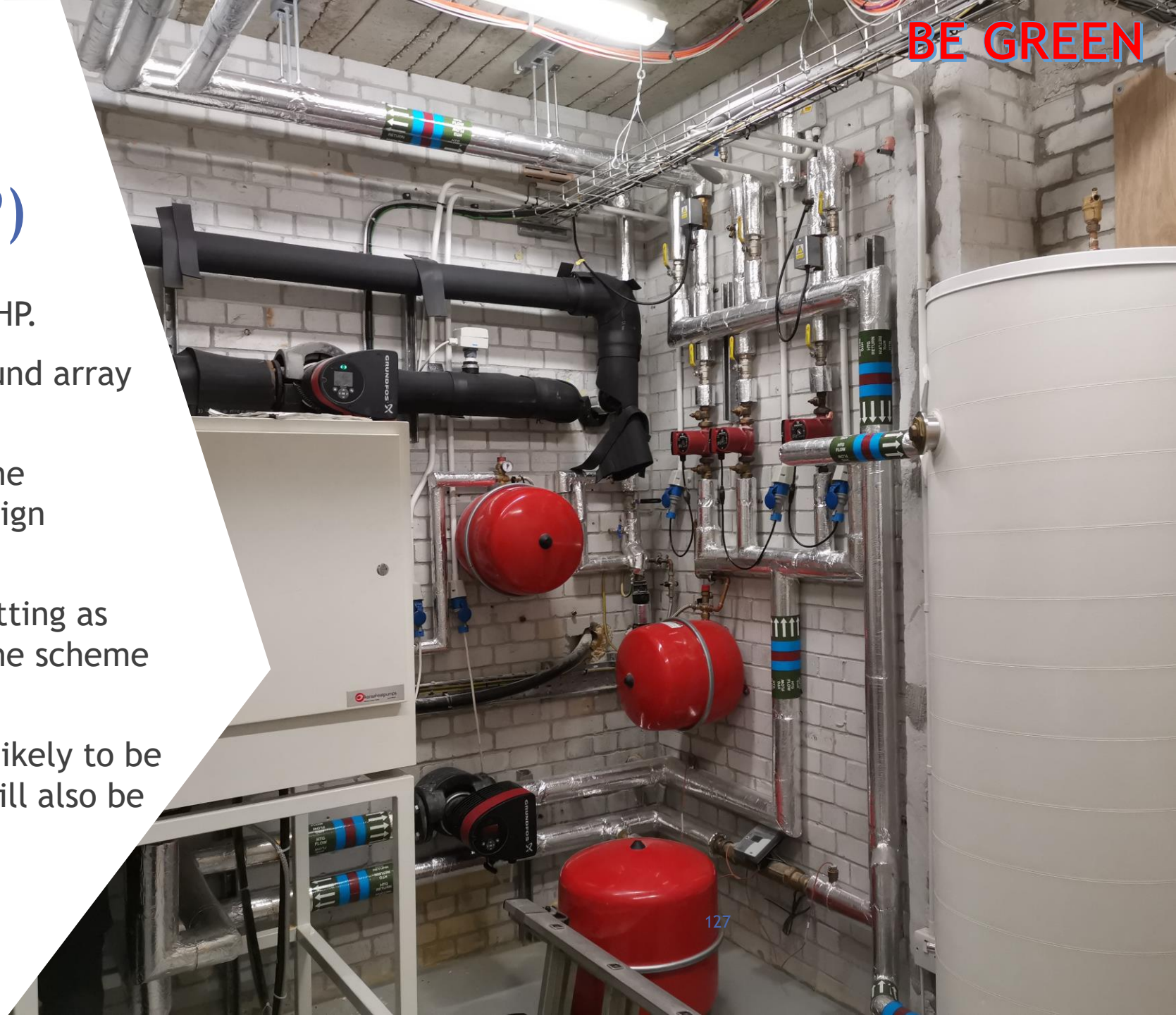
Flat plate

Air Source Heat Pumps (ASHP)

- Works in same way as a refrigerator to move heat from one location (the surrounding air) to another (interior).
- Considered renewable energy because it absorbs energy from the environment so for every one unit of electrical input you typically gain three units of heat energy.
- Can be used directly on individual buildings or as part of a site-wide district heating scheme, esp. low temp.
- Not subject to specific permitting – just normal planning consent (or PD).
- ASHPs are proven technology with good supply chain for parts.

Ground Source Heat Pumps (GSHP)

- Work in a very similar way to ASHP.
- Requires either a horizontal ground array or boreholes to be established.
- Underlying geology can determine suitability and will influence design options.
- Potential requirement for permitting as well as planning depending on the scheme design and location.
- A well-designed GSHP system is likely to be more efficient than ASHPs but will also be more expensive to install.



Renewable energy generation costs

- These projects have higher upfront costs and you may need planning permission before starting work, so will work best if you are planning on remaining in your current premises for the next few years allowing you to recoup the costs.
- According to CDP data, businesses who installed their own renewable electricity or heating on average made their costs back in 1-10 years. Solar PV is the most common type of installation, which on average took businesses between 4 and 10 years to recover costs.

The Wave / Ecotricity

- https://www.youtube.com/watch?v=yasW1FJfyTk&t=7s
- 2.41 minutes

Technology change

- EV charging points
- Battery storage
- Demand side response

Any questions?

Technologies, costs and creating an action plan

Delivered by: NatWest, UWE Bristol University of the West of England

On behalf of: European Union European Social Fund, West of England Combined Authority

Renewable Energy

- In groups, discuss which renewable technologies might be suitable to your site.
- *Would your roof space be suitable for solar PV? Why?*
- *What would the benefits of a solar PV installation be?*
- *What are some of the barriers to installing solar PV?*
- *Would your site benefit from solar thermal?*
- *Would your premises be suitable for a heat pump? Which heat pump do you think might be appropriate for your premises?*
- *Are there any other technologies that would be suitable at your site?*
- Feed back the top challenges each group is facing

Bristol Bears Rugby Club

Failand, Somerset, South West UK

Technology: Solar PV
System size: 53.64 kWp
Annual Output: 52,725 kWh
Annual CO2 savings: 14,605 kg

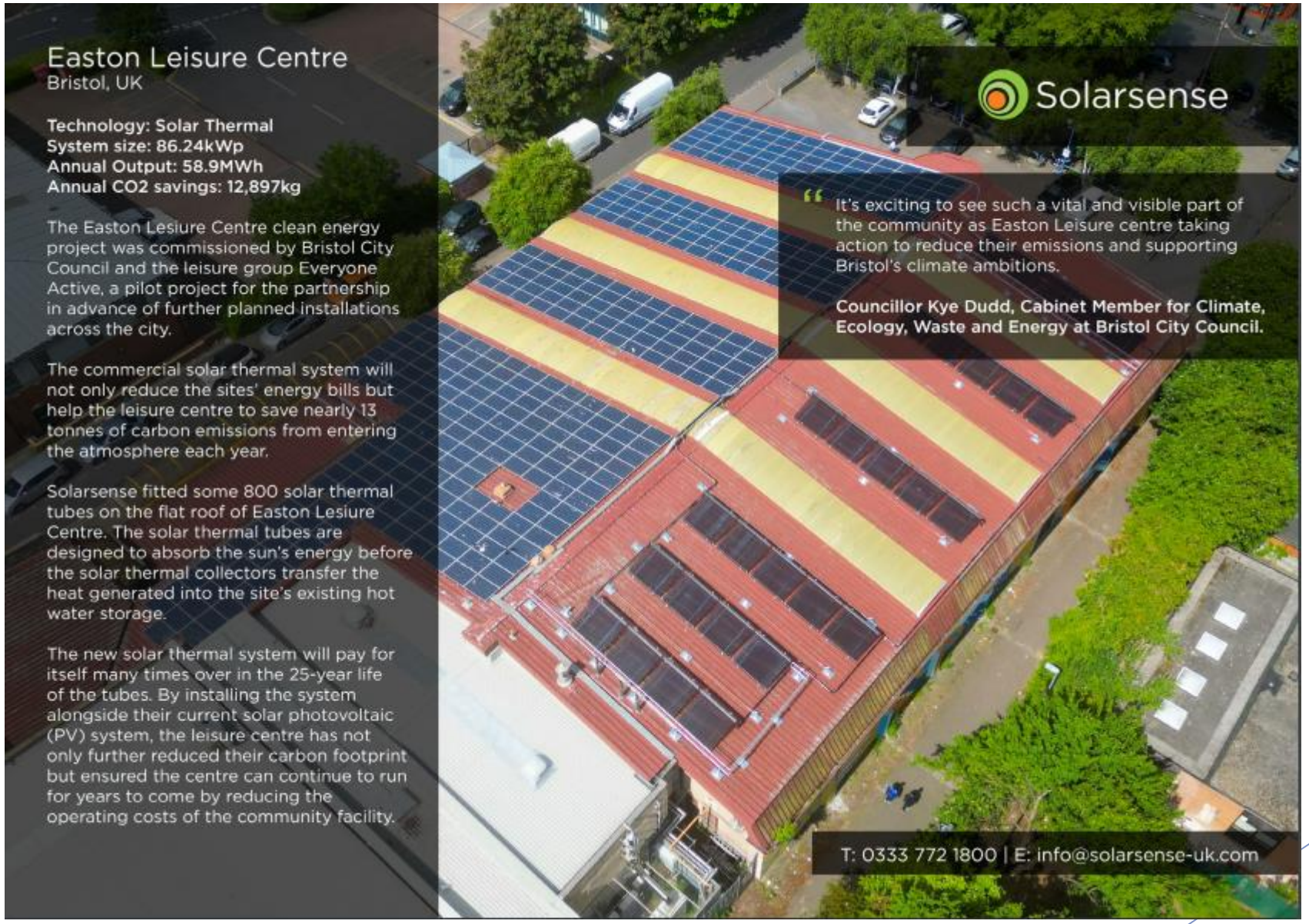
Professional rugby club, Bristol Bears has invested in a new state-of-the-art training facility on land at Kingcott Farm, between Failand and Abbots Leigh on the edge of Bristol.

The club placed a strong emphasis on the sustainability of the facility to match the high-specification of the training facilities for the players. The pavilion building was therefore fitted with a dedicated PV array to reduce the club's consumption of electricity as part of their focus on reducing carbon and to achieve a lower running cost for the club in the long-term.

Solarsense worked with the main contractor; Beard Construction and and the M&E contractor; David Fear Electrical Contractors to provide a flat roof solar panel array, consisting of 149 modules.

After careful consideration, SunPower PV modules were specified due to their high efficiency and extended product warranty; allowing for more power generation and financial savings per square metre.

A specialist team completed the installation of the 53.64kWp solar PV system in less than a week, with the dual challenge of coordinating with other contractors and moving materials onsite while the roads and surrounding areas were still under construction.


Easton Leisure Centre
Bristol, UK
Technology: Solar Thermal
System size: 86.24kWp
Annual Output: 58.9MWh
Annual CO2 savings: 12,897kg
The Easton Lesiure Centre clean energy project was commissioned by Bristol City Council and the leisure group Everyone Active, a pilot project for the partnership in advance of further planned installations across the city.
The commercial solar thermal system will not only reduce the sites' energy bills but help the leisure centre to save nearly 13 tonnes of carbon emissions from entering the atmosphere each year.
Solarsense fitted some 800 solar thermal tubes on the flat roof of Easton Lesiure Centre. The solar thermal tubes are designed to absorb the sun's energy before the solar thermal collectors transfer the heat generated into the site's existing hot water storage.
The new solar thermal system will pay for itself many times over in the 25-year life of the tubes. By installing the system alongside their current solar photovoltaic (PV) system, the leisure centre has not only further reduced their carbon footprint but ensured the centre can continue to run for years to come by reducing the operating costs of the community facility.
Solarsense
"It's exciting to see such a vital and visible part of the community as Easton Leisure centre taking action to reduce their emissions and supporting Bristol's climate ambitions.
Councillor Kye Dudd, Cabinet Member for Climate, Ecology, Waste and Energy at Bristol City Council.
T: 0333 772 1800 | E: info@solarsense-uk.com

Technologies and costs Q&A

Action plan

- Write down your next steps into an action plan
- Speak to your landlord?
- Efficiency measures?
- Onsite generation?

Any questions?

Contact details

- Ian Gillard

igillard@wardell-armstrong.com

- Rupert Gale

rgale@wardell-armstrong.com