Climate Change, Energy & Data Centres

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Vice Chair BCS Green IT SG

BCS Elite/Institute of Directors

Virtual

7th October 2020

John Booth

- MD - Carbon3IT Ltd
- Technical Director – National **Data Centre** Academy

- Vice Chair BCS Green IT SG
- BSI TCT7/3 Committee – EN 50600 **Data Centre** Standards
- EU Code of Conduct for **Data Centres (Energy Efficiency)**
- Data Centre Alliance – Chair SIG **Data Centre Energy Efficiency & Committee Member Sustainability**
- DCD CEEDA (Certified **Energy Efficient Data Centre** Award) Global Lead Assessor
- ISO 50001 **Energy Management** Systems Lead Auditor
- ISO 22301 Business Continuity Management Systems Lead Auditor
- **Energy Saving Opportunities Scheme** (ESOS) Lead Assessor – Energy Management Association
- Certified **Data Centre Audit** Professional (CDCAP™)

- EU H2020 Projects
  - PEDCA - Pan European **Data Centre** Academy
  - EURECA – Green Procurement for Public Sector **Data Centre**
  - CATALYST – **Data Centres** as Flexible Energy Hubs (Renewables, Grid & Heat Services)
  - ECO-Qube – AI AC Close Control in “Edge” Data Centres

Agenda

- Data Centre Definition
- Background - Climate Change
- Background – Energy
- Data Centres Impact of Climate Change & Energy
- Data Centre – Energy Consumption UK, EU, Global
- EU Green Deal
- Mitigation Actions

- Questions & Answers

Firstly, what is a "Data Centre"?

- A home for "digital infrastructure"
- Servers, Networking & Storage
- An electrical system to provide "electrical energy"
- A cooling system?
- An Uninterruptible Power Supply (UPS) & Generators
- Telecommunications/Network Cabling Systems
- Building Integrity Systems
  - Fire/VESDA/Suppression Systems
  - Security
  - Access Control
- Policies, Procedures & Processes

To Deliver…

- "Digital Services" to….
  - Internal &
  - External Customers
- At the "lowest possible cost"
- Based on "Risk Profile"

- Logo http://ictanddigitalstrategy.org.uk/2014/08/delivering-digital-services/

Definition “Data Centre”

•For the purposes of the Code of Conduct, the term “data centres” includes all buildings, facilities and rooms which contain enterprise servers, server communication equipment, cooling equipment and power equipment, and provide some form of data service.

• (e.g. large scale mission critical facilities all the way down to small server rooms located in office buildings).

Climate Change Agreement "Data Centres" Definition

- A facility belongs to the standalone data centres sector if the business activity is the leasing or licensing of a data facility which is being used as a data centre.

- "data facility" means a room, or rooms sharing the same electricity supply circuit, occupied mainly or exclusively by computer equipment which is enabled to transfer data electronically, and where in respect of the room or rooms:

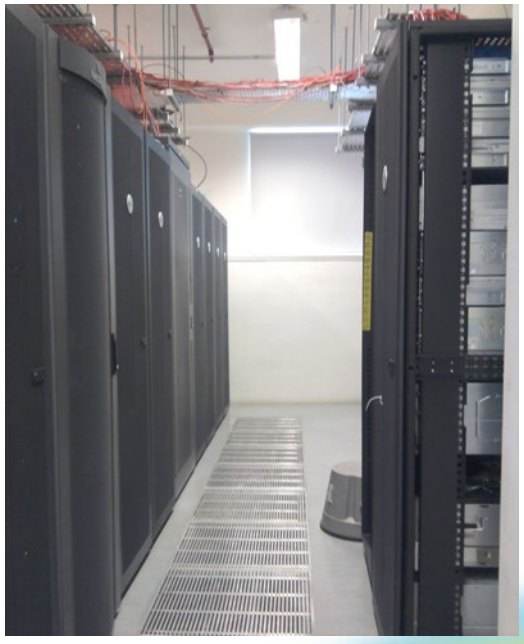
- (a) the temperature and humidity is regulated in connection with the operation of the computer equipment;

- (b) the electricity supply is at least 200kW; and

- (c) electricity is supplied by a back-up electricity supply when the mains supply is interrupted. (e.g. large scale mission critical facilities all the way down to small server rooms located in office buildings).

Is this a “data centre”?

this?



or this?

Carbon³IT

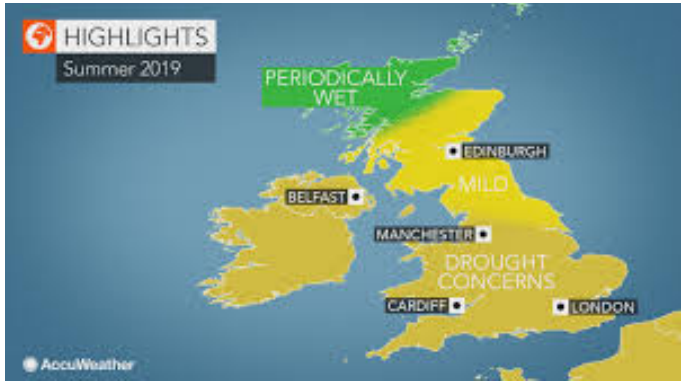
or perhaps this?

Carbon³IT

Well…..

Background


90 DAYS:
123
RECORDS
BROKEN
AUSTRALIA
HOTTEST JANUARY
HOTTEST SUMMER
HOTTEST DAY
7 DAYS
39°C

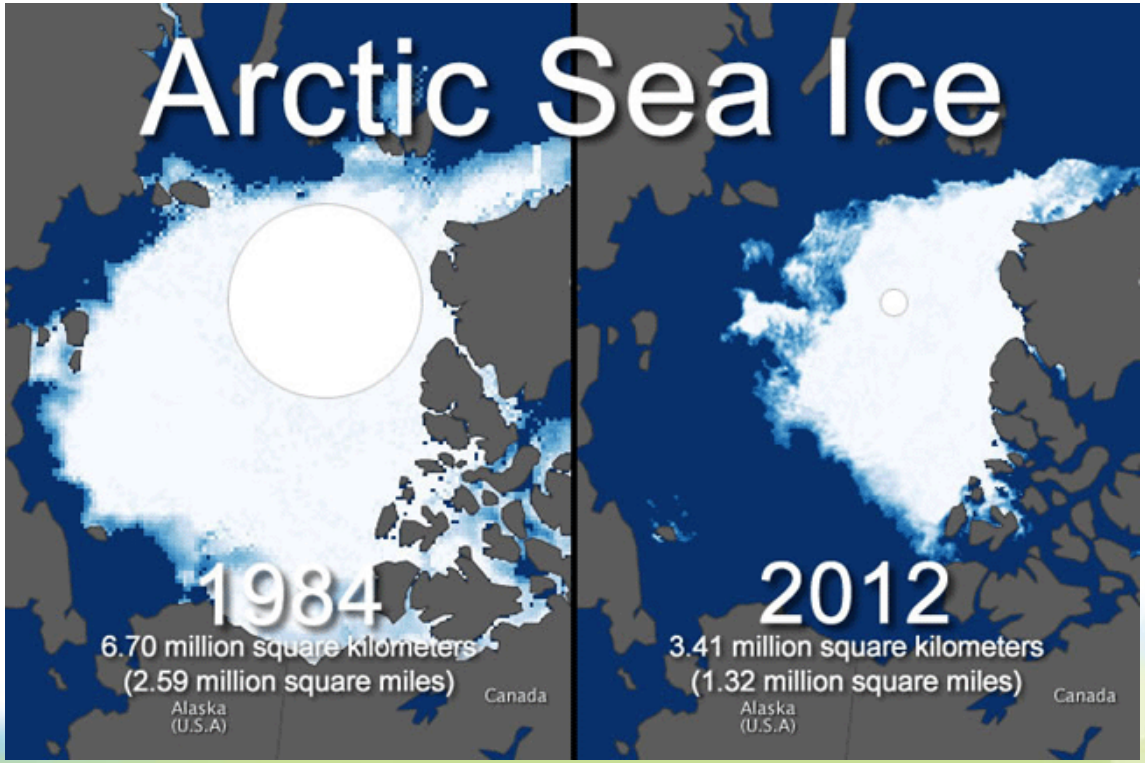

HIGHLIGHTS
Summer 2019
PERIODICALLY WET
EDINBURGH
MILD
BELFAST
MANCHESTER
DROUGHT CONCERNS
CARDIFF
LONDON
AccuWeather


CHALLENGES AHEAD

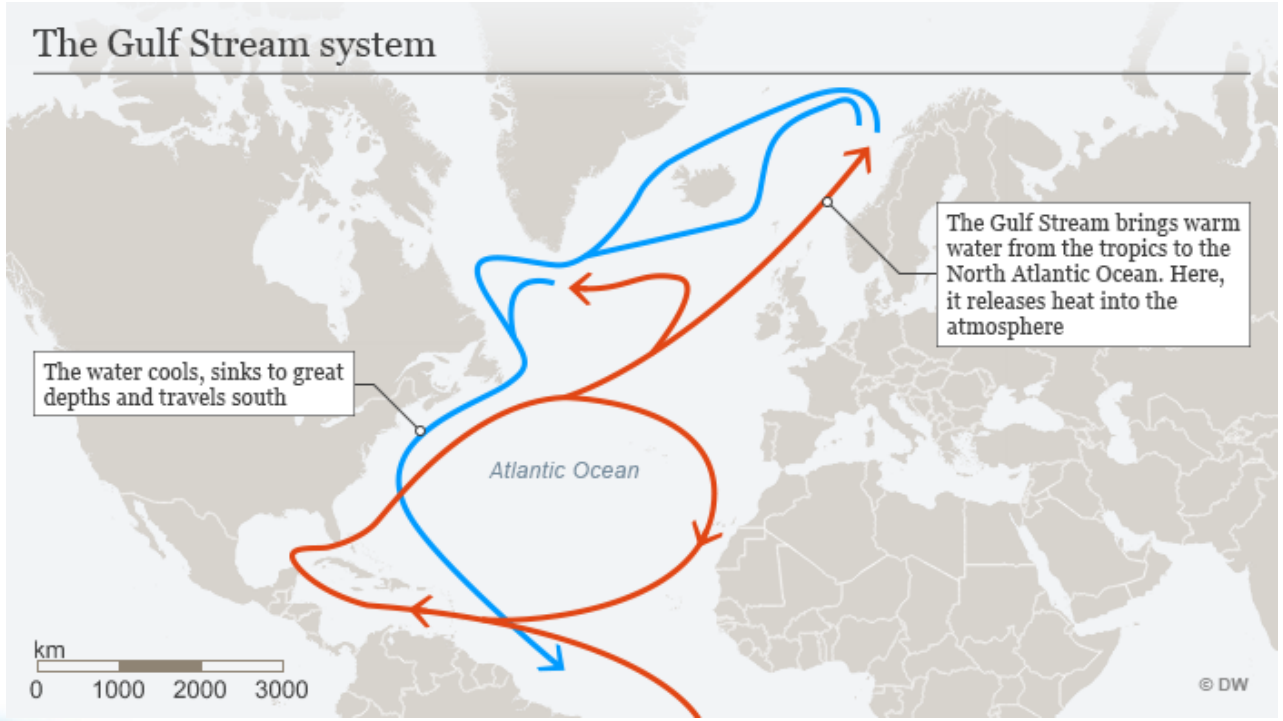
Background

Source: Climate Council Australia
https://www.climatecouncil.org.au/resources/2018-19-angry-summer-infographic/
Accessed 04/02/2020

Arctic Sea Ice 1984-2012



Background


The Gulf Stream system
The Gulf Stream brings warm water from the tropics to the North Atlantic Ocean. Here, it releases heat into the atmosphere
The water cools, sinks to great depths and travels south
Atlantic Ocean
km
0 1000 2000 3000
© DW

Background

Cause? **Greenhouse Gas Emissions?**

- Evidence that **CO2** emissions are the cause of global warming is very robust. Scientists have known since the early 1800s that greenhouse gases in the atmosphere trap heat.

- Global CO2 emissions from human activity have increased by over 400% since 1950. As a result, the concentration of CO2 in the air has reached more than 400 parts per million by volume (ppm), compared to about 280ppm in 1750 (around the start of the Industrial Revolution).

Cause? **Earths Natural Climate Cycle?**

- Over the last 800,000 years, there have been natural cycles in the Earth's climate, between ice ages and warmer interglacial periods. After the last ice age 20,000 years ago, average global temperature rose by about 3°C to 8°C, over a period of about 10,000 years.

- We can link the rises in temperature over the last 200 years to rises in atmospheric CO2 levels. Greenhouse gas levels are now well above the natural cycle of the last 800,000 years.

Cause? The Sun?

- The sun is the primary source of Earth's heat, so relatively small changes in solar output can affect our climate.

- Satellite observations since the late 1970s have shown a slight decrease in the sun's total energy output. However, instead of cooling, the Earth has warmed over this period.

- Also, warming from the sun would heat all of the atmosphere, including the lowest few kilometres (the troposphere) and the layer above (the stratosphere). Observations show that the stratosphere is in fact cooling while the troposphere warms. This is consistent with greenhouse gas heating and not solar heating.

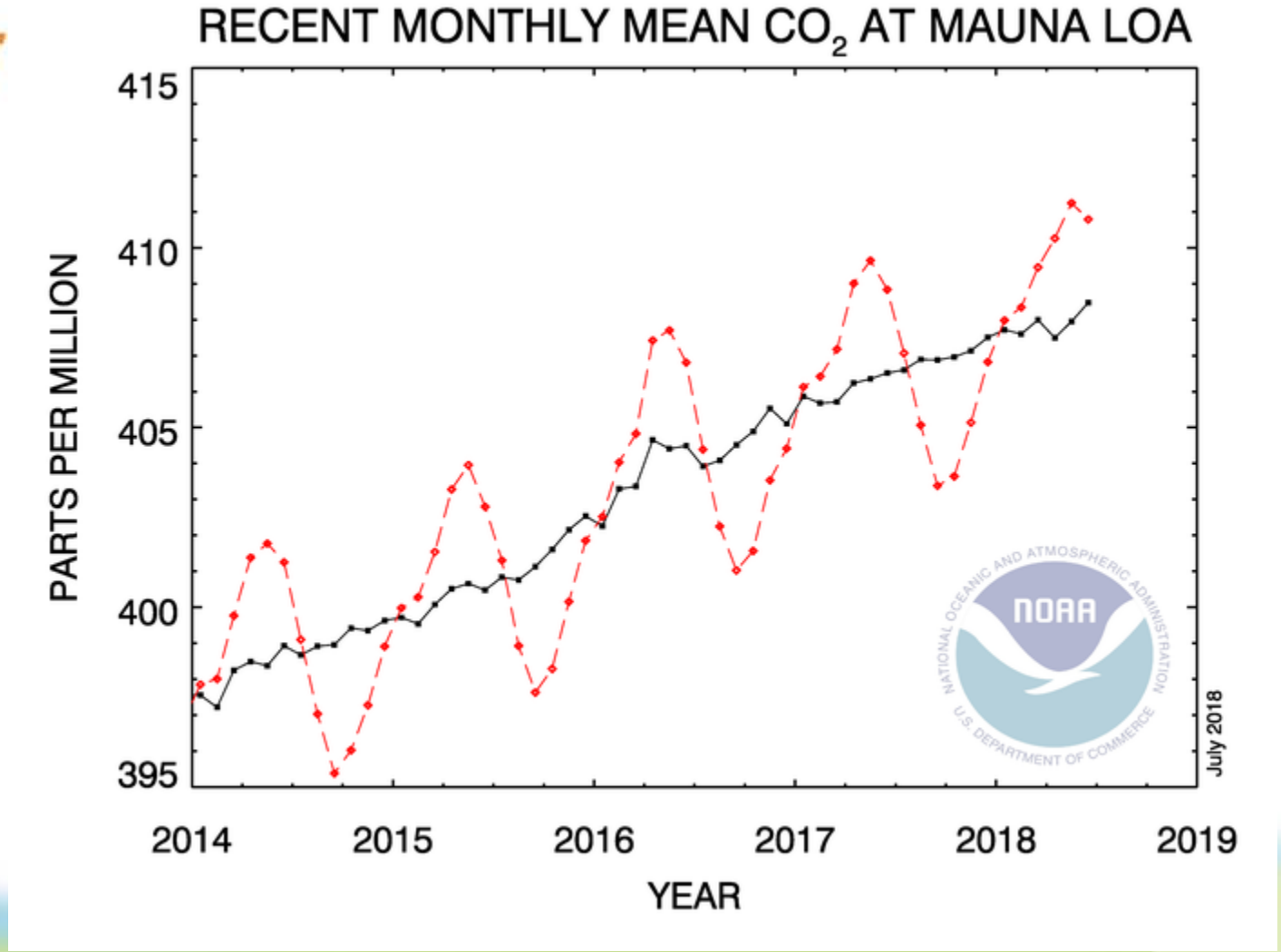
The Problem (2013)

- **Anthropomorphic Global Warming**. (AGW)
- Global warming caused by Humans!
- Lots of debate on both sides.
- Interpreted Data under attack.

- The probable results will be the melting of the ice sheets in Greenland & Antarctica with associated sea level rise.
- Current Weather patterns could change.
- Humanity must reduce levels of Greenhouse Gases released into the atmosphere soon to prevent or lessen effects.

"My Lords, the most reliable measurements we have of CO2 in the atmosphere are those of the Mauna Loa observatory in Hawaii. As of February 2011, those showed levels of CO2 to be still rising. It is up to 391.76 parts per million, compared with 389.85 parts per million last year. Not only are those rising, they are increasing at an accelerating rate from decade to decade. Because, as collective humanity, we are doing so little to change the situation, it is now unlikely that we will be able to confine global warming to an average to two degrees Celsius-as noble Lords will remember, the limit that most scientists regard as reducing risk to reasonably manageable dimensions."

Lord Giddens
Director, L.S.E House of Lords 24/3/11


RECENT MONTHLY MEAN CO_2 AT MAUNA LOA
PARTS PER MILLION
415
410
405
400
395
2014
2015
2016
2017
2018
2019
YEAR
NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE
July 2018

CO_2 2020 - April

- https://www.co2.earth/daily-co2

April 2020: 416.18 ppm

April 2019: 413.52 ppm

Last updated: 30th Sept, 2020

CO_2 - Daily

- https://www.co2.earth/daily-co2

29th Sept 2020: 411.16 ppm

29th Sept 2019: 408.22 ppm

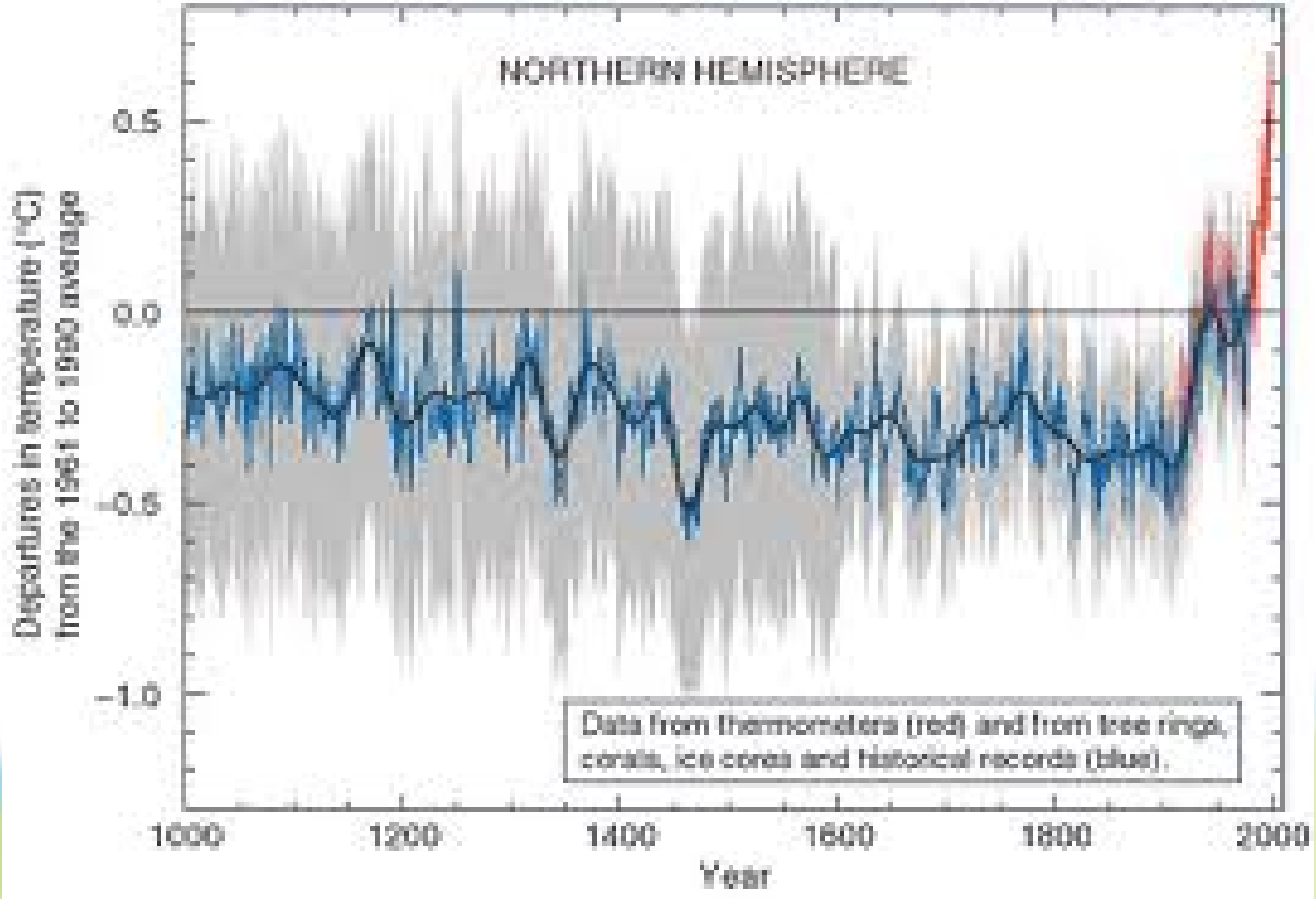
Last updated: 30th Sept, 2020

The Greenhouse Gases

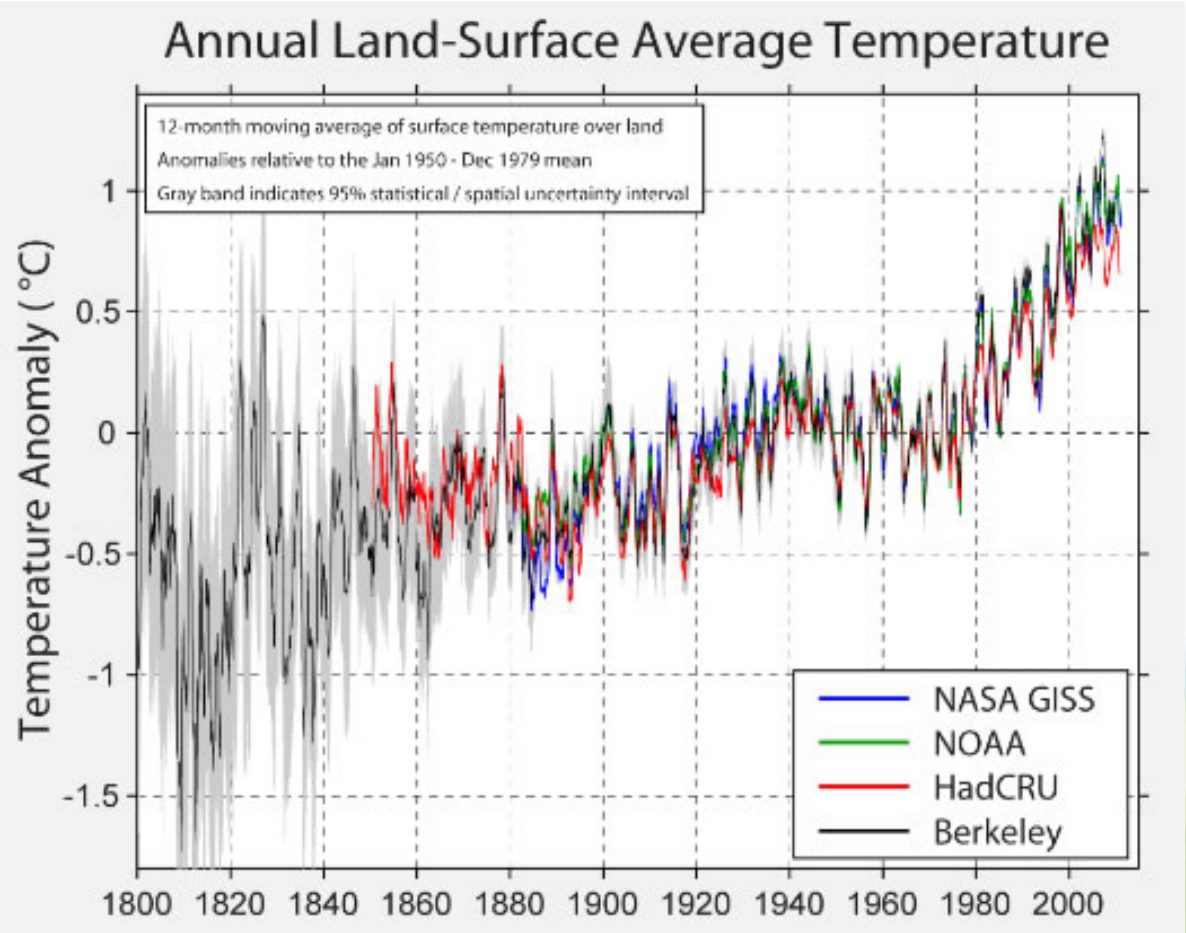
The Gases	DGWP* for 100 year horizon
Carbon Dioxide (CO2)	1
Methane (CH4)	25
Nitrous Oxide (N2O)	298
Hydrofluorocarbons (HFC's)	100-14,800 depending on gas
Perfluorocarbons (PFC's) gas	7390-12,200 depending on
Sulfur hexafluoride (SF6)	22,800

- Ref: P27, "Climate Change, From science to sustainability". Peake & Smith 2003
- Oxford University Press/Open University
- *Direct Global Warming Potential

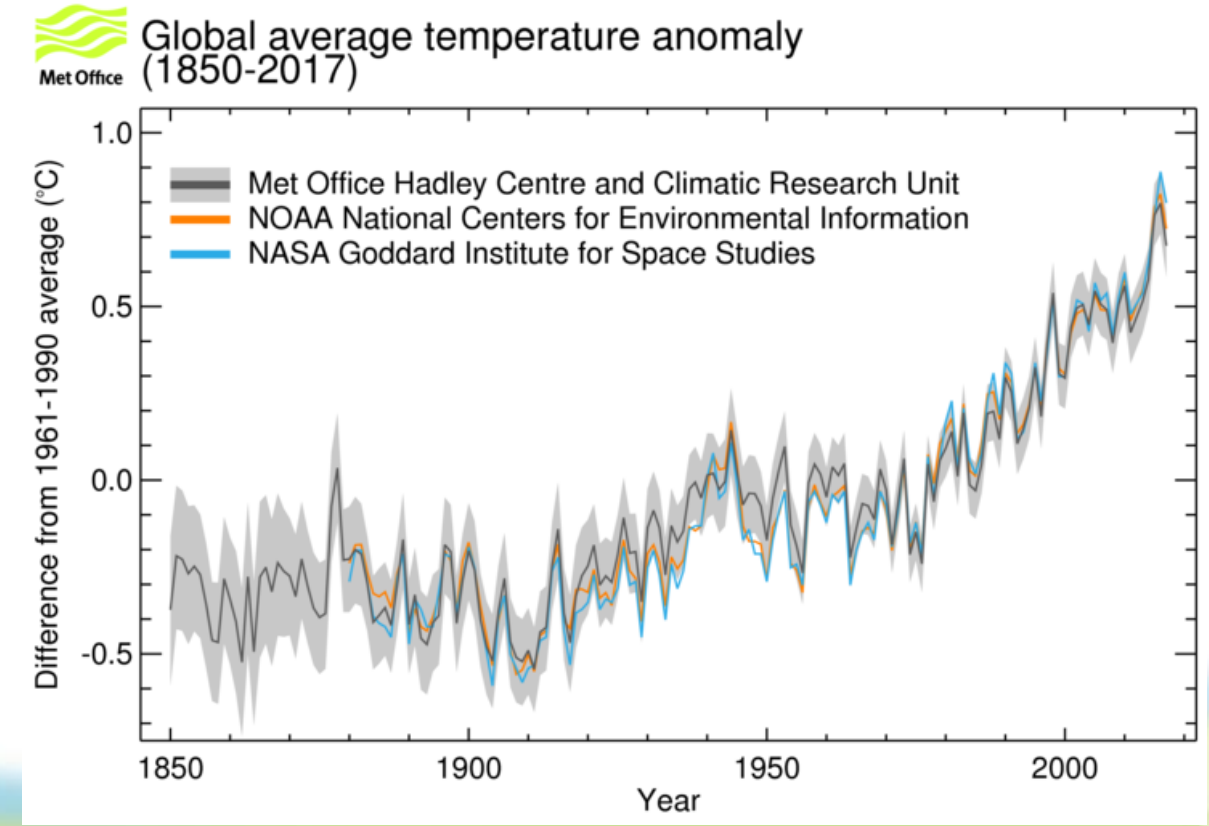
The “Hockey Stick” Graph



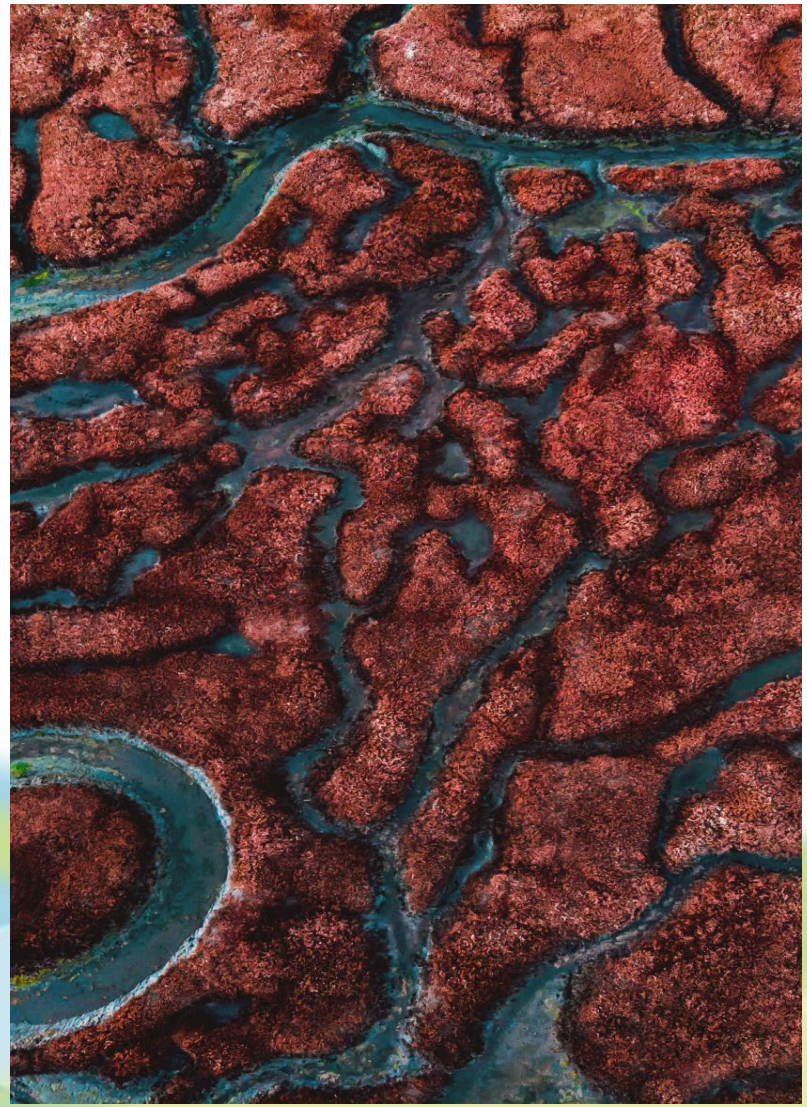
Latest Aggregated Data Sets



Latest Aggregated Data Sets



Climate Change Quotes



- *"On the island where I live, it is possible to throw a stone from one side to the other. Our fears about sea-level rise are very real. Our Cabinet has been exploring the possibility of buying land in a nearby country in case we become refugees of climate change".*
- **Teleke Lauti, Minister for the Environment, Tuvalu.**

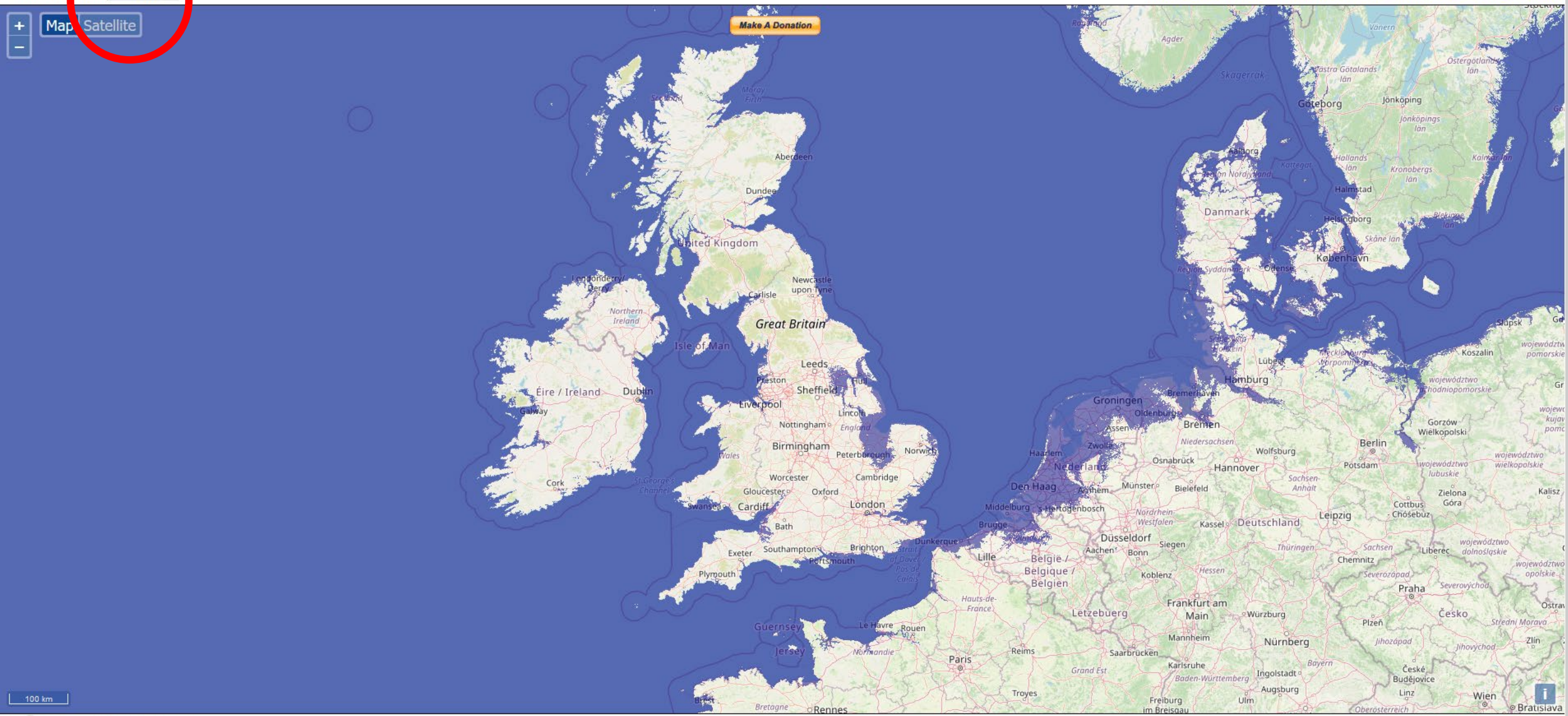
- *"Climate change is the most severe problem we are facing today, more serious even than the threat of terrorism"*

- **David King, UK Government Chief Scientific Advisor, Jan 2004**.

- *"How could I look my grandchildren in the eye and say I knew about this and did nothing?*

- **David Attenborough, 2006.**

Sea level rise: +7 m



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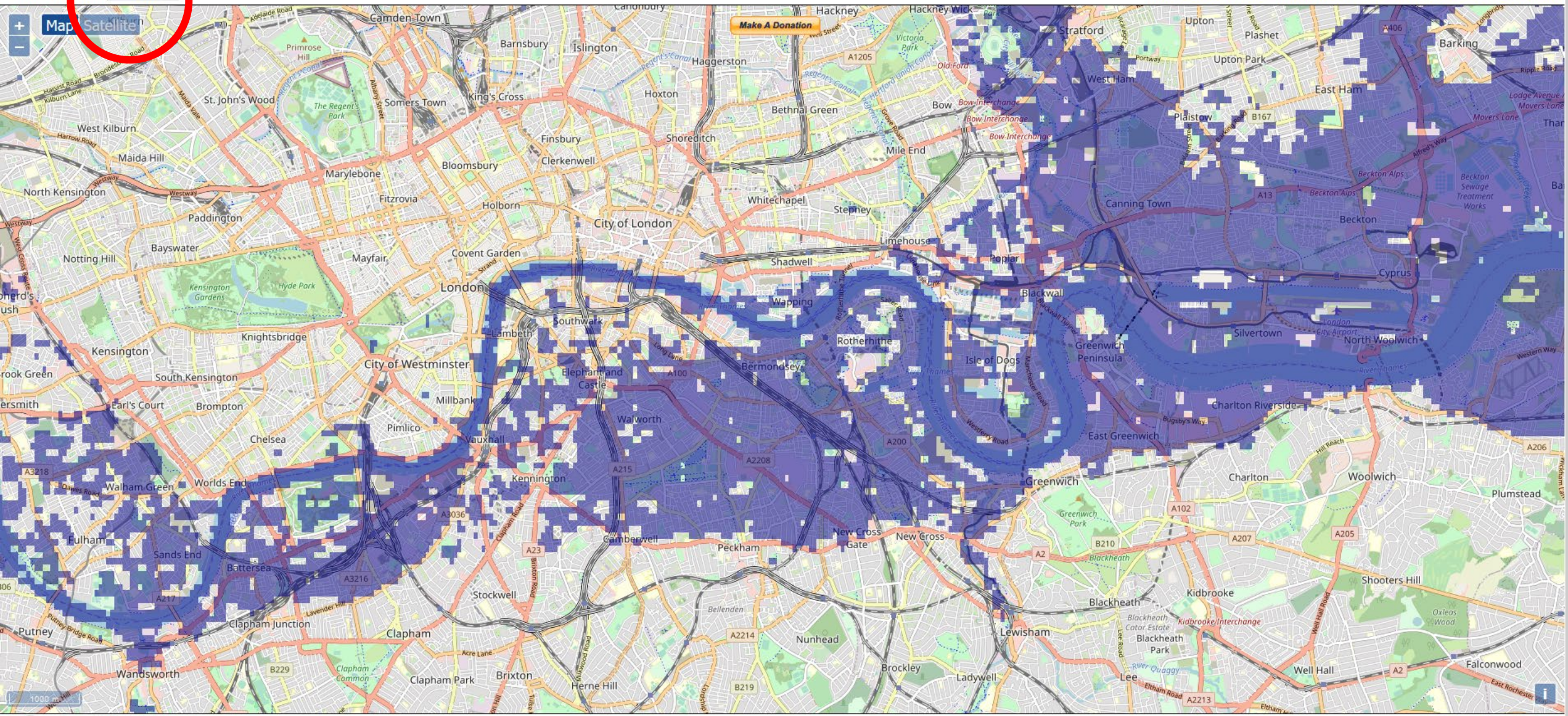
Data provided by NASA

flood.firetree.net/#null

18:10
30/09/2020



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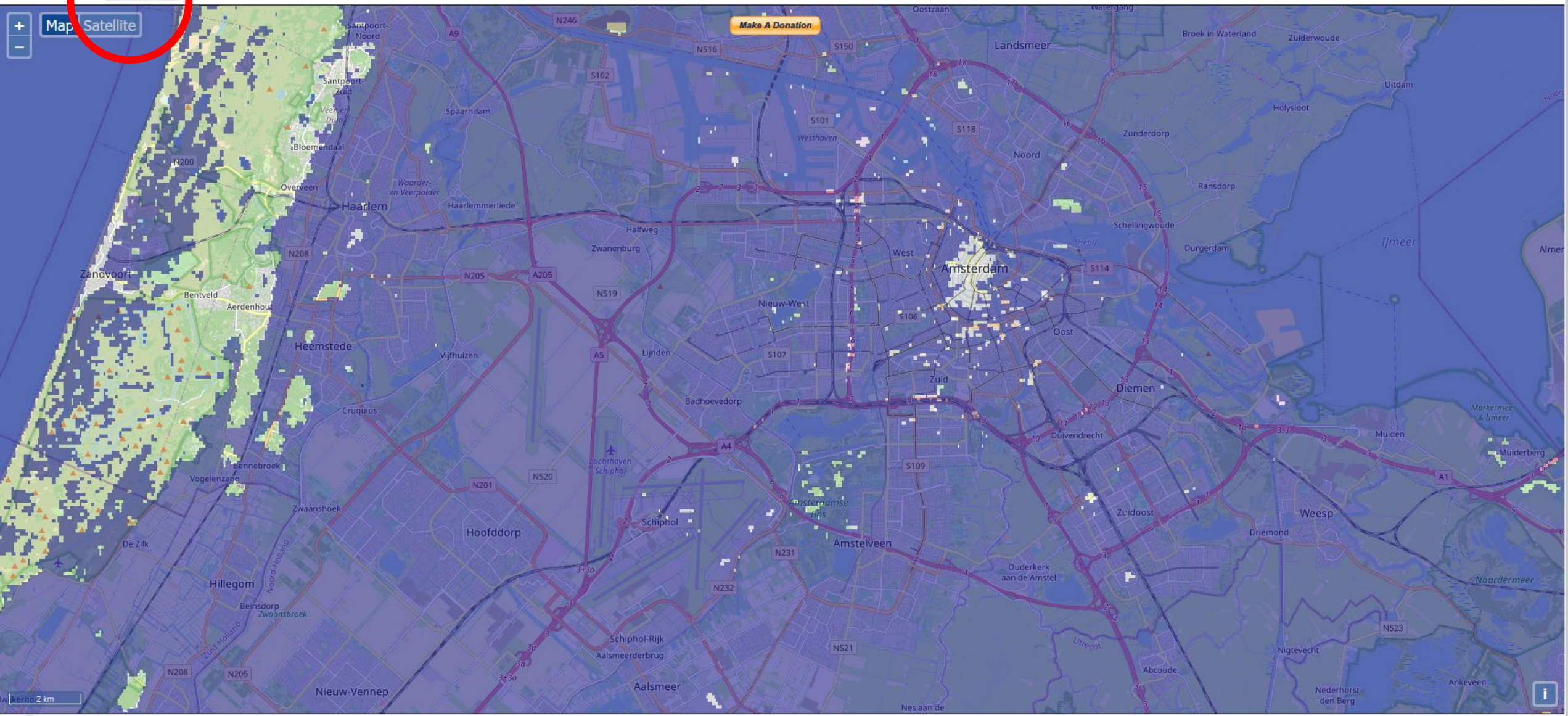
Sea level rise: +7 m

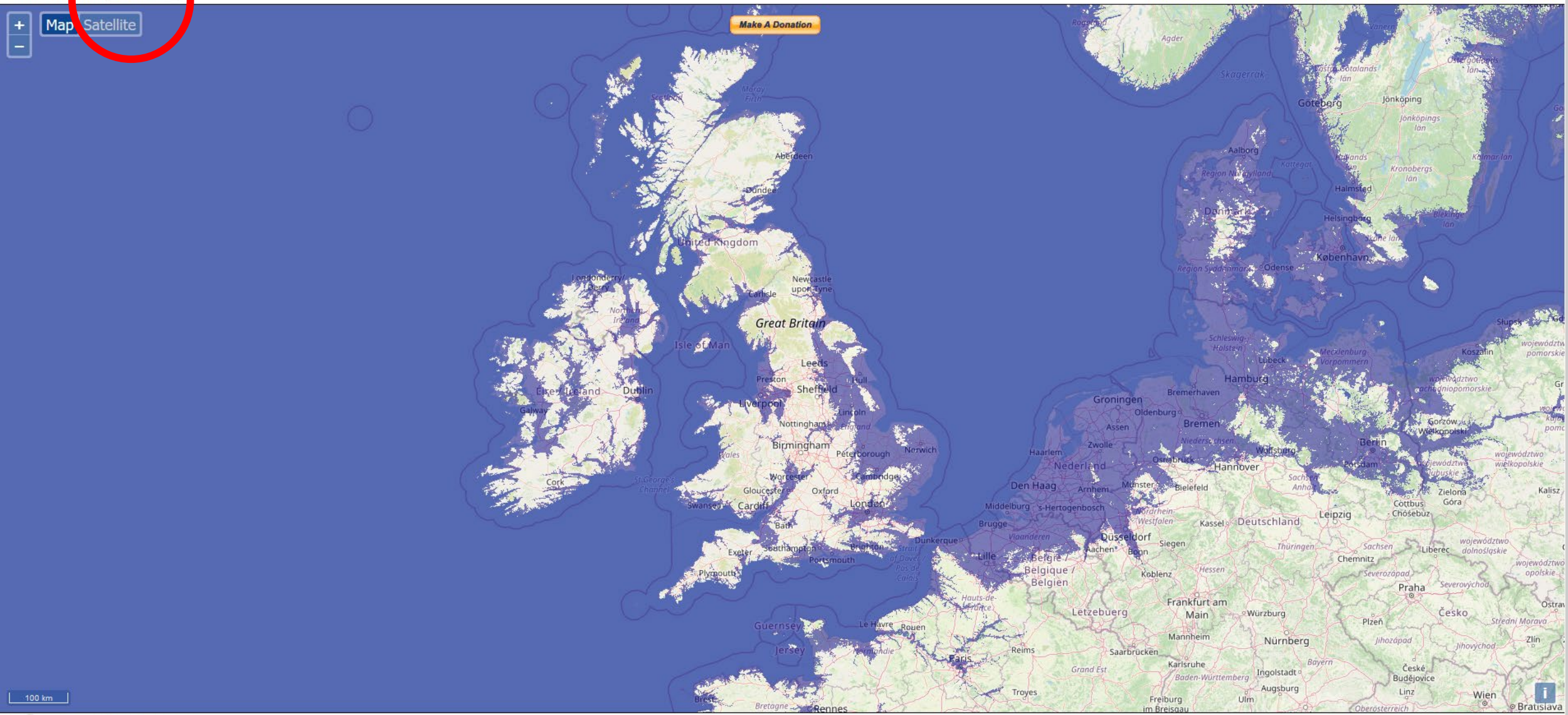


Sea level rise: +60 m

Europe N. America S. America Africa SE. Asia China & Japan Australia

Map Satellite

Make A Donation



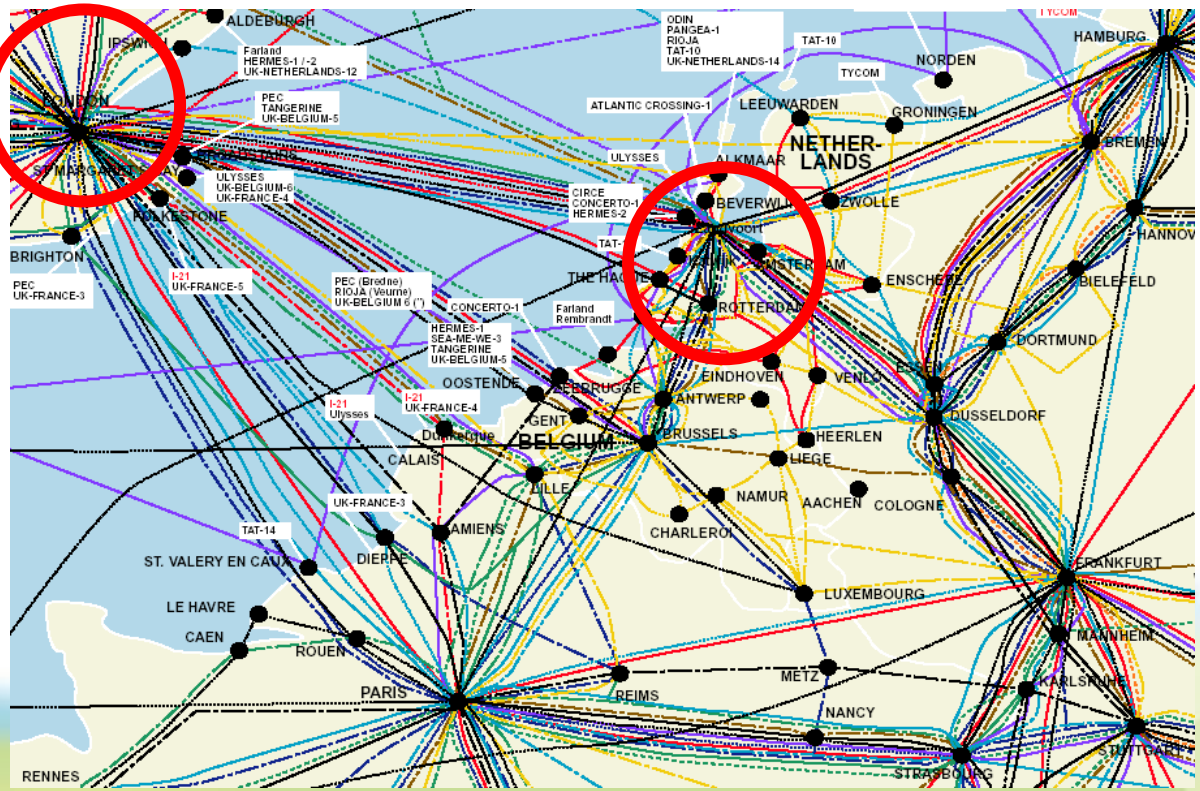
Link to this page:
http://flood.firetree.net/?ll=54.0000,-2.4000&m=60

my flood map | about | privacy
Data provided by NASA

flood.firetree.net/#null

18:11
30/09/2020

Network Connections – European Core



Energy!

Jaenschwalde (DE) (Lignite)

Grand Maison Dam (FR) (Pumped Storage)

Drax (UK) (Co-Fire Biomass/Coal)

Lubmin (DE) (Nuclear)

Borssele (NL) (Nuclear)

Centralised Generation

Local Generation

Inbox (131) - john.booth | Edit entry | My entries | Buffer Publish | Google Calendar - Octo | Campaign Builder - Tem | Sea level rise in Northern | G. B. National Grid status | electricityMap | Live CO | Daily CO2

https://www.gridwatch.templar.co.uk

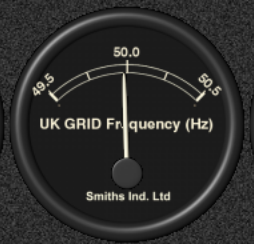
Donate | Download | Links | Info | Stats

New! Please Help Gridwatch

G.B. National Grid Status

Data courtesy of Elexon portal and Sheffield University

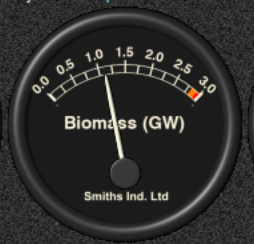
Demand 34.34GW



Frequency 49.985Hz

CCGT 15.96GW (46.48%)

Nuclear 5.85GW (17.04%)



Biomass 1.12GW (3.26%)

Wind 8.06GW (23.47%)

Pumped 0.14GW (0.41%)

Hydro 0.17GW (0.50%)

Solar 1.06GW (3.09%)

Coal 0.30GW (0.87%)

OCGT 0.00GW (0.00%)

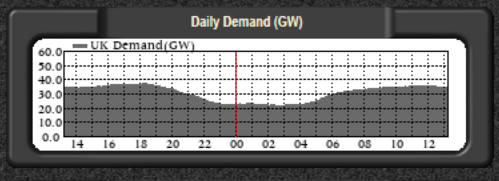
French ICT 0.25GW (0.73%)

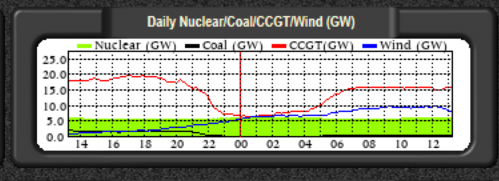
Dutch ICT 0.74GW (2.15%)

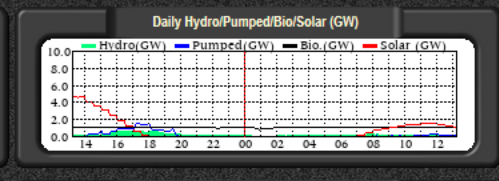
Irish ICT -0.46GW (-1.34%)

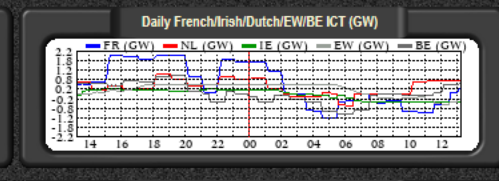
E-W ICT -0.25GW (-0.73%)

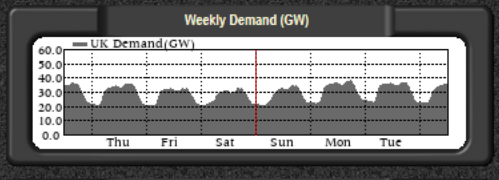
NEMO ICT 0.55GW (1.60%)

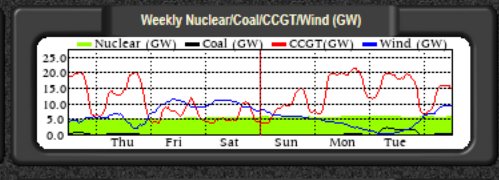


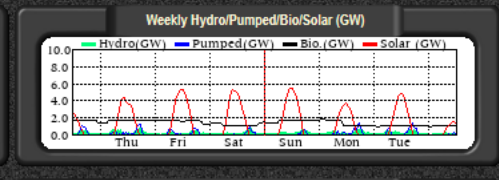


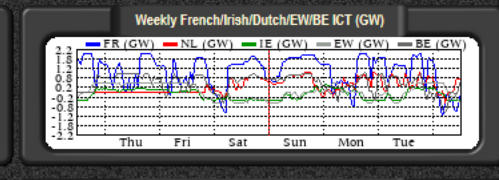


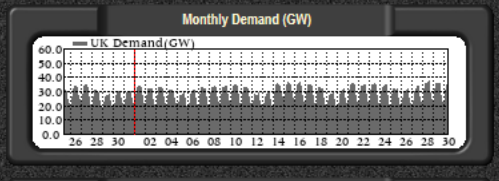


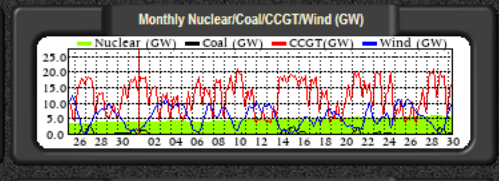


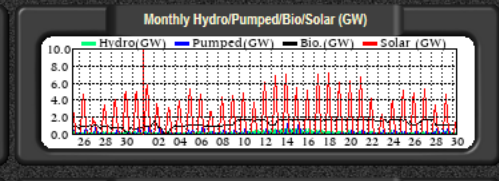


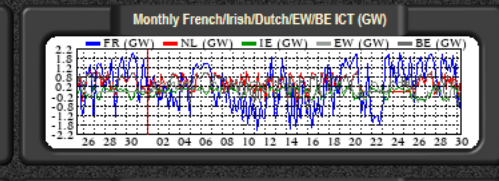


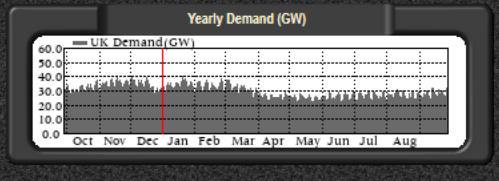


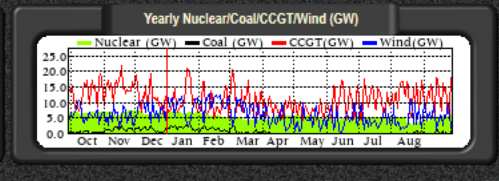


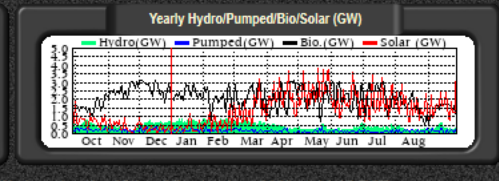


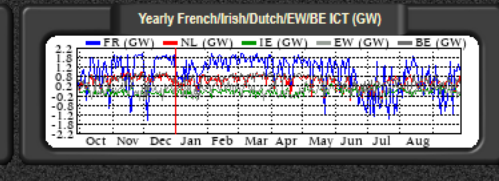












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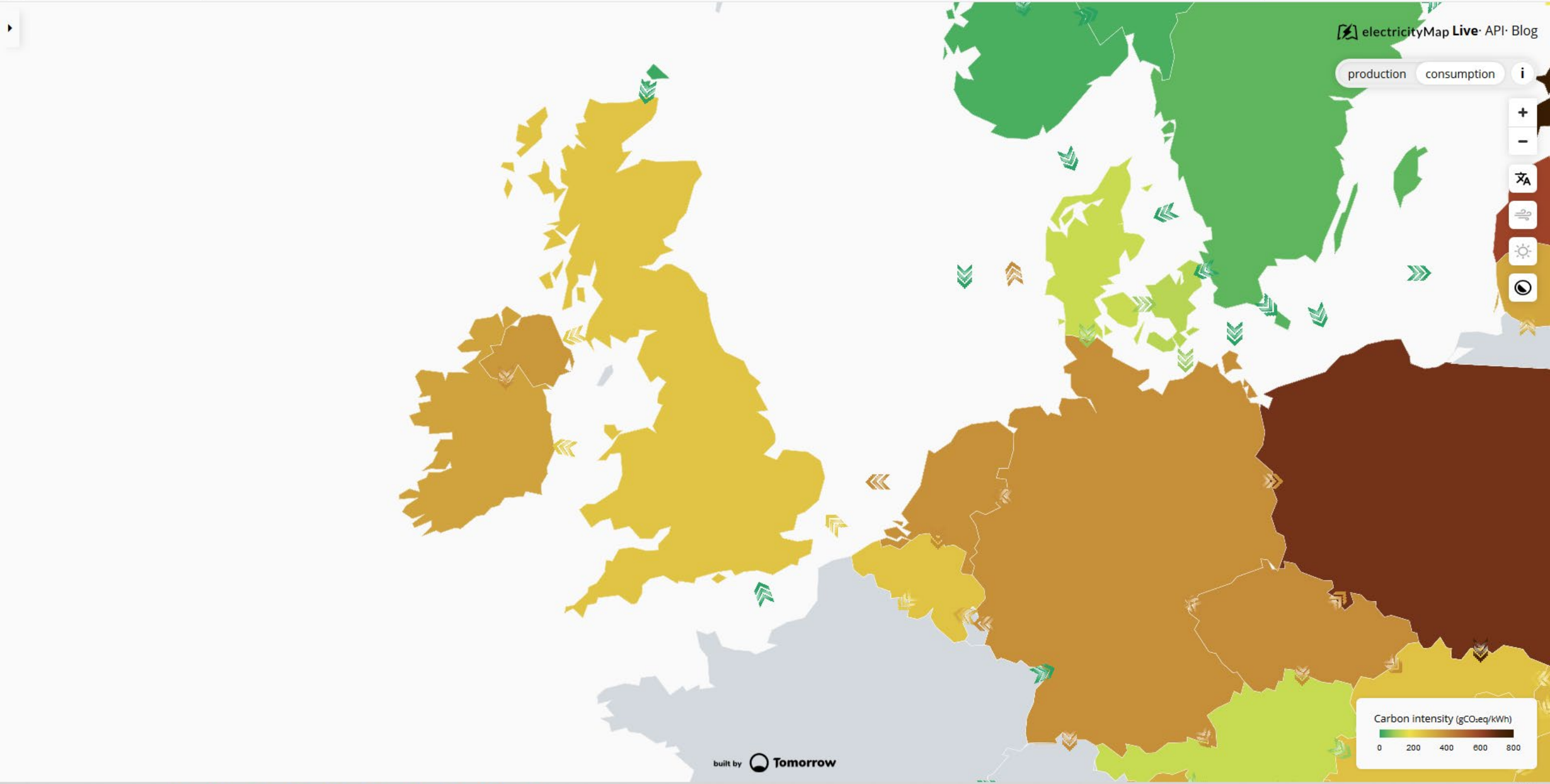
30/09/2020


electricityMap Live· API· Blog
production
consumption
Carbon intensity (gCO₂eq/kWh)
0
200
400
600
800
built by Tomorrow

UK Generation Assets (Coal Fired Power Stations)

Power Station	Location	Closure Date	Capacity
Fiddlers Ferry	Cheshire	31st March 2020	1.51 GW
Drax Units 5 & 6	North Yorkshire	2023	1.29 GW
West Burton A	Nottinghamshire	2023	2.00 GW
Ratcliffe on Soar	Nottinghamshire	2024	2.00 GW

UK Generation Assets (Gas Fired Power Stations)

- 32 Active CCGT Power Stations
- Total Capacity 30.2GW
- In 2016 gas fired power stations generated a total of 127 TWh of electricity, this has dropped to 119 TWh in 2017, 115 TWh in 2018 and 114 TWh in 2019

UK Generation Assets (Nuclear Power Stations)

Name	Type	Capacity (Mwe)	Closure Date
Dungeness B	AGR	1110	2018
Hartlepool	AGR	1210	2019
Heysham 1	AGR	1150	2019
Heysham 2	AGR	1250	2023
Hinkley Point B	AGR	1220	2023
Hunterston B	AGR	1190	2023
Sizewell B	PWR	1188	2035
Torness	AGR	1250	2023

https://www.edfenergy.com/energy/power-station/daily-statuses

So what?

- National Grid Winter Outlook 2019-2020 Key Messages!

1 The margin on the electricity system is greater than last winter and well within the Reliability Standard set by the Government.

2 The gas supply margin is expected to be sufficient in all of our security of supply scenarios

3 We anticipate no additional adequacy or operability challenges for the coming winter as a result of the UK's planned exit from the EU. We have tested our planning assumptions in a broad range of scenarios and via engagement with industry.

4 We have the tools and services we need to enable us to manage anticipated gas and electricity operability challenges across the winter period.

But…

- 7GW Coal Decommissioned by 2024
- 7GW Nuclear Decommissioned by 2023

- There is a looming “Energy Gap”

UK Energy Gap…

- https://www.greenpeace.org.uk/resources/filling-the-energy-gap/
- https://www.wired.co.uk/article/nuclear-energy-electricity-uk-renewables
- https://www.carbonbrief.org/analysis-uk-low-carbon-electricity-generation-stalls-in-2019

Net Zero!

- “The UK today became the first major economy in the world to pass laws to end its contribution to global warming by 2050.”
- Energy and Clean Growth Minister Chris Skidmore said:
- The UK kick-started the Industrial Revolution, which was responsible for economic growth across the globe but also for increasing emissions.
- Today we’re leading the world yet again in becoming the first major economy to pass new laws to reduce emissions to net zero by 2050 while remaining committed to growing the economy - putting clean growth at the heart of our modern Industrial Strategy.
- We’re pioneering the way for other countries to follow in our footsteps driving prosperity by seizing the economic opportunities of becoming a greener economy.

Net Zero!

- The UK's 2050 net zero target — one of the most ambitious in the world — was recommended by the Committee on Climate Change, the UK's independent climate advisory body. Net zero means any emissions would be balanced by schemes to offset an equivalent amount of greenhouse gases from the atmosphere, such as planting trees or using technology like carbon capture and storage

CCC Progress Report July 2019/June 2020

- July 19 “We find a substantial gap between current plans and future requirements and an even greater shortfall in action.”
-
- June 2020 “Net Zero has been adopted as a key goal of the Government and the Prime Minister is chairing a Cabinet Committee to deliver it. There were important new announcements on transport, buildings, industry, energy supply, agriculture and land use. But these steps do not yet measure up to meet the size of the Net Zero challenge and we are not making adequate progress in preparing for climate change.”

- https://d423d1558e1d71897434.b-cdn.net/wp-content/uploads/2019/07/CCC-2019-Progress-in-reducing-UK-emissions.pdf

- https://d423d1558e1d71897434.b-cdn.net/wp-content/uploads/2020/06/Reducing-UK-emissions-Progress-Report-to-Parliament-Committee-on-Cli.._-002-1.pdf

CCC Progress Report June 2020

- The delay of COP26 to November 2021 provides a window to address this policy deficit and establish a credible internationally-leading position

- The goal to substantially expand supplies of low-carbon power must be accompanied by steps in the Energy White Paper to encourage a resilient and flexible energy system.
- Enduring market mechanisms are needed to drive investment in a much wider set of low-carbon industrial technologies and industrial sectors than the piecemeal schemes announced so far.

- https://d423d1558e1d71897434.b-cdn.net/wp-content/uploads/2020/06/Reducing-UK-emissions-Progress-Report-to-Parliament-Committee-on-Cli.._-002-1.pdf

CCC Progress Report June 2020

- It falls to the UK Government in this Parliament to take the major decisions that will guide further progress towards Net Zero and improved climate change resilience. We began this Parliamentary term with an acute public health crisis, and delay to COP26; the UK now has the opportunity to lead a decisive response to the chronic crisis of climate change itself.

- https://d423d1558e1d71897434.b-cdn.net/wp-content/uploads/2020/06/Reducing-UK-emissions-Progress-Report-to-Parliament-Committee-on-Cli.._-002-1.pdf

Policy Update

Policy Update

The Telegraph

Coronavirus News Politics Sport Business Money Opinion Tech Life Style Travel Culture

UK news World news Royals Health Defence Science Education Investigations Global Health Security

Wind farms couldn't pull the skin off a rice pudding, says Boris Johnson

Wind farms couldn't pull the skin off a rice pudding, Boris Johnson has said, warning the UK is facing a major energy crisis.

By Rowena Mason

02 July 2013 • 10:35 am

Policy Update

Boris Johnson says he remembers how people used to 'sneer' at wind farms

Boris Johnson condemns his past self for 'sneering' at wind power

PM said wind power could not 'pull the skin off a rice pudding'

Jon Stone Policy Correspondent | @joncstone | 19 hours ago | 21 comments

Boris Johnson has accused his past self of "forgetting the history of this country" in his speech to the Conservative party conference in a new defence of wind power.

Pre-released lines from the prime minister's keynote address show will accuse critics of wind power of "sneering" at the technology, now one of the most cost-effective electricity sources.

"I remember how some people used to sneer at wind power, twenty years ago, and say that it wouldn't pull the skin off a rice pudding," he is expected to say.

"They forgot the history of this country. It was offshore wind that puffed the sails of Drake and Raleigh and Nelson, and propelled this country to commercial greatness."

Most popular

Boris Johnson announces 5% mortgage deposits for first-time owners to create 'generation buy'

Emily in Paris faces backlash after Netflix cancel GLOW and Teenage Bounty Hunters: 'This is a real 2020 move'

Trump adds Covid denial to his emerging homestretch re-election message

Coronavirus: UK may need 'stringent' new measures, government adviser warns, as cases soar

Johnny Nash death:

CCC Progress Report - June 2020
Table 13 Recommendations for Dept of Digital, Culture, Media & Sport

- Ensure plans for a digital transition and fibre rollout can complement changing work patterns and travel behaviours, leading to lower-carbon working. Co-ordinate with DfT to invest in digital infrastructure to lock-in positive behaviours that reduce travel demand (e.g. home-working).
- Ensure Ofcom's guidelines take into account best practice in communicating climate change.
- Work with BEIS on ensuring plans for smart, flexible energy systems are resilient to threats from cyber security.
- Ensure sport and culture strategies align to other departments' plans for lower-carbon buildings, more active travel and improved public health.

CCC Progress Report - June 2020
Table 13 Recommendations for Dept of Digital, Culture, Media & Sport

- Priorities for all departments:
- Integrate Net Zero into all policy making, and ensure procurement strategies are consistent with the UK's climate objectives.
- Ahead of the CCC's next adaptation progress report in 2021, demonstrate adaptation planning for a minimum 2°C and consideration of a 4°C global temperature rise (by 2100 from pre-industrial levels).
- Follow best practice shown by leading businesses to monitor and verify their paths to a net-zero and climate resilient future.
- Demonstrate actions that address all of the more urgent risks set out in the second UK climate change risk assessment relevant to the Department.

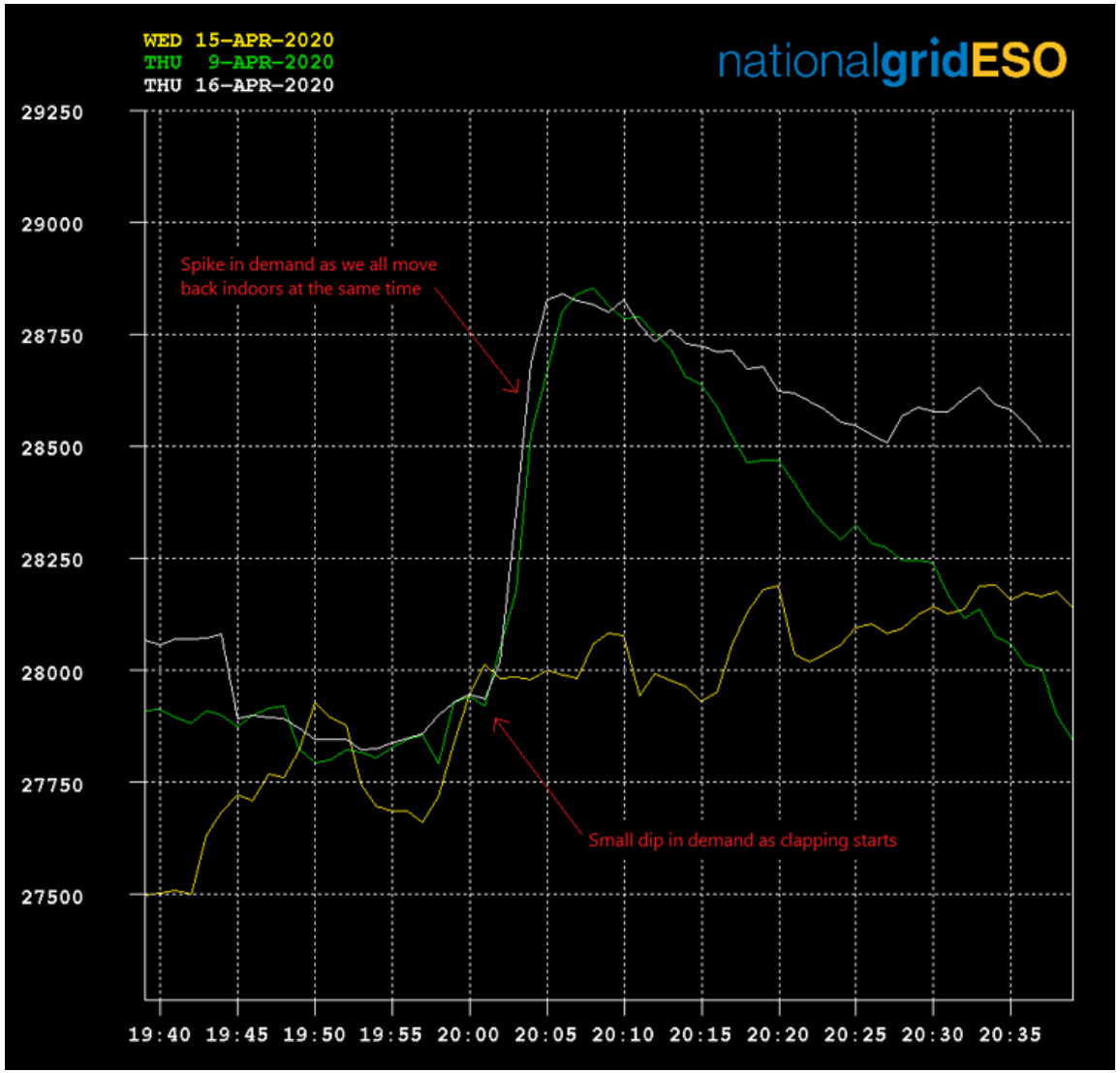
Did lockdown affect Energy Use?

- Traditional TV pickups made a comeback
- “During ‘peak lockdown’ from late March to mid-May, it’s safe to say that more of us were sitting at home than ever in UK history; and many of us watched specific programmes in ‘real time’, when they were actually broadcast. Boris Johnson’s speech to the nation on 10 May drew in a staggering 27.5 million viewers, while on 5 April the Queen’s address attracted 24 million people.

- Our colleagues at National Grid ESO saw how these big viewing figures impacted electricity usage, for example with a 500-600MW pickup at the end of the Queen’s address. This is equivalent to 300,000 people heading into the kitchen afterwards to make a cuppa.

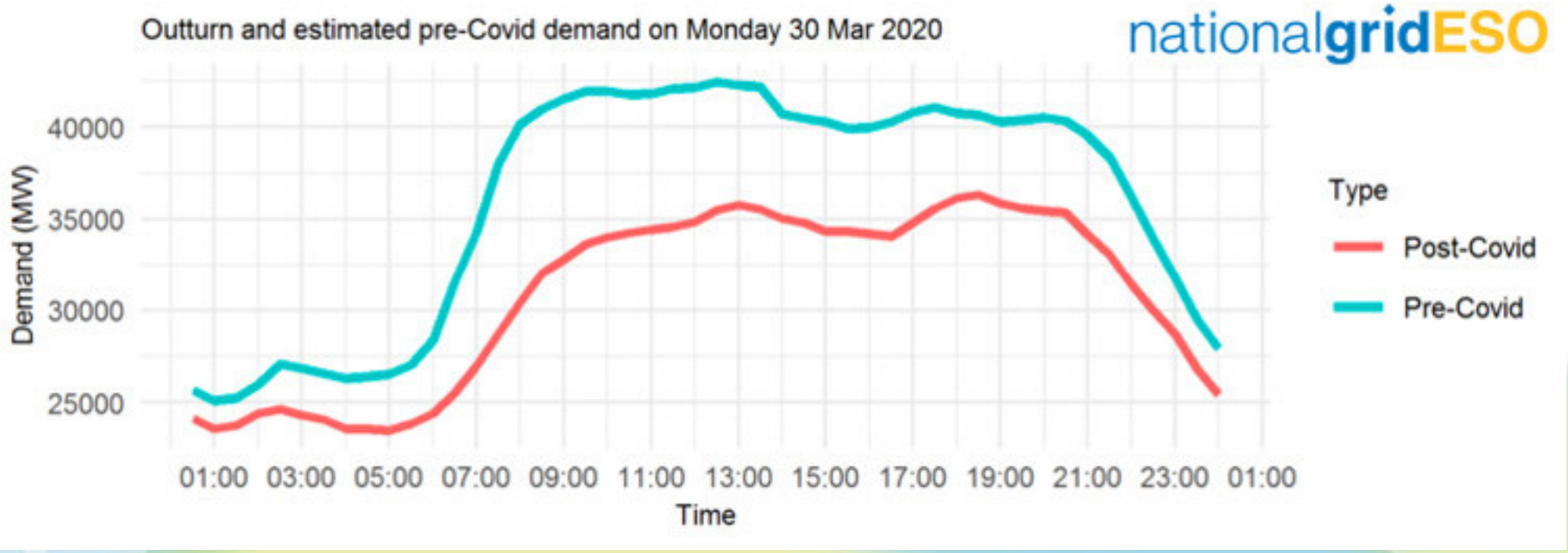
Did lockdown affect Energy Use?

- Clap for Carers caused spike in demand



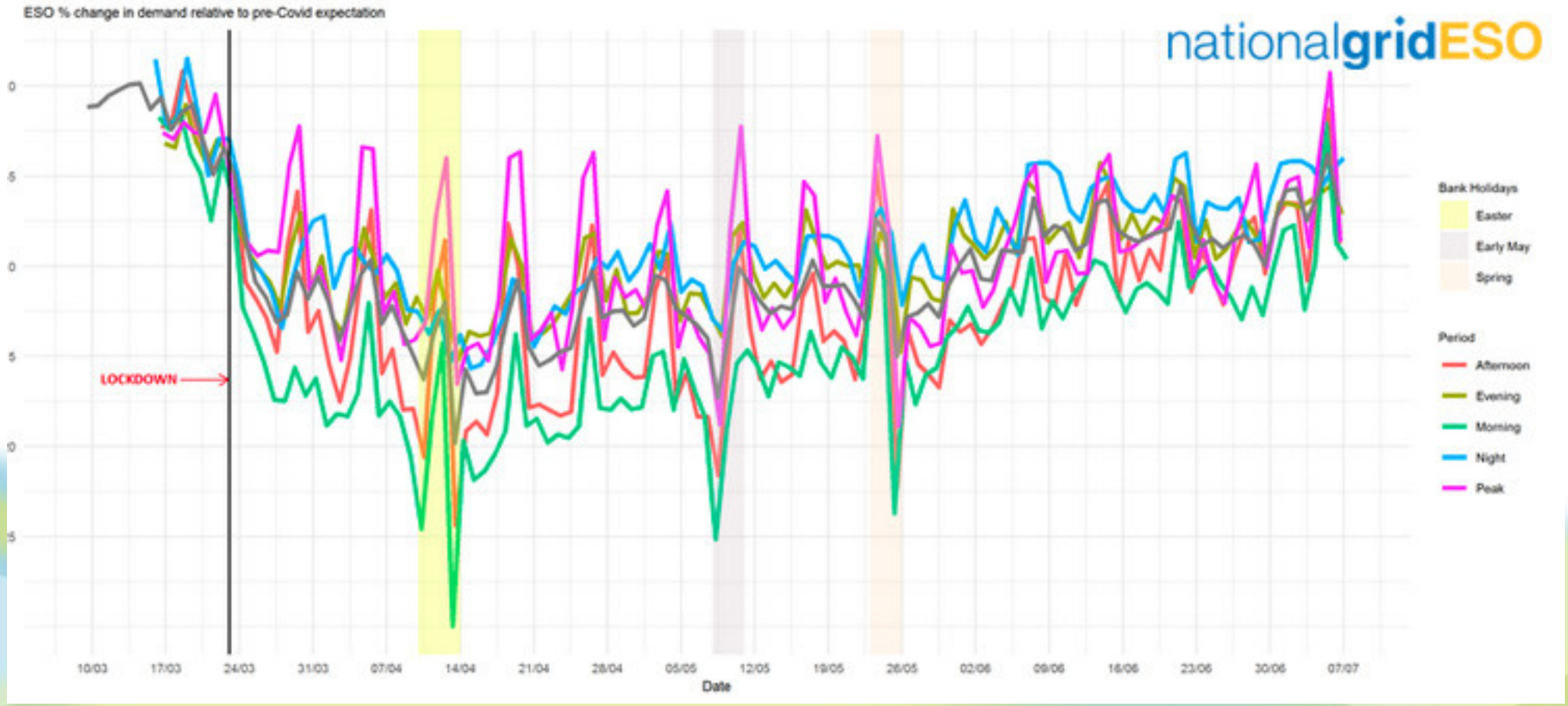
Did lockdown affect Energy Use?

- Lockdown Lie-ins: morning peak moved later



Did lockdown affect Energy Use?

- Drastic drop in demand is now returning to new normal



Did lockdown affect Energy Use?

- Traditional TV pickups made a comeback
- Clap for Carers caused spike in demand
- Lockdown Lie-ins: morning peak moved later
- Big drop, now returning to near “normal”

Data Centres

- Climate Issues
- Energy Issues

Climate Change & Energy

Climate Change

- Greenhouse Gases
- Change in Weather patterns
- Sea Level Rise
- Increase in Frequency of catastrophic weather events
  - Cyclones/Typhoons/Hurricanes
  - Flooding
  - Heat Waves

Energy

- Decommissioning of Plant
- Transition to Renewables
- $, €, £, R- Money
- Reliability of Renewables
- Political Inertia
- Carbon Taxes

Data Centre Context – Climate Change

- Greenhouse Gases
  - Access to and Use of Fossil Fuels
  - Energy Mix
  - Renewables?
- Change in Weather patterns
  - Physical Security of Asset(s)
  - Cooling?
- Sea Level Rise
  - Location
- Increase in Frequency of catastrophic weather events
  - Resilience

Data Centre Context - Energy

- Decommissioning of Plant
  - Loss of Resource
  - Blackouts/Rationing?
- Transition to Renewables
  - Time
- $, €, £, R- Money Capex
  - Cost of New Facilities
- R, $, £ € - Money Opex
  - Rising Fuel Costs
- Reliability of Renewables
  - Possible Impact on Uptime/Resilience
- Political Inertia
  - Delay
  - Carbon Taxes
- Resource Depletion
  - Alternatives
  - Cost?
- Energy Security
  - Access to Energy Products
- CSR/Sustainability
  - Public Perception

Data Centre Energy Demands - UK

- We don't really know!

- What we do know is that the commercial data centre sector, i.e. Colocation in the CCA 2nd Period (3rd is due!) Published in September 2017

- 2.579TWh

Data Centre Energy Demands - UK

- Or..
- 0.76% of Total UK Generation
- 339TWh
- Which is
- 0.285% of Primary Energy
- 2339TWh

- Ref: http://www.techuk.org/images/CCA_Second_Target_Report_04.pdf

Data Centre Energy Demands - UK

- Excludes BT (3rd in CRC tables)
- Excludes All Private Data Centres/Server Rooms!

Data Centre Energy Demands – UK
Carbon3IT Research 2017

- Based upon 80,000 DCs, Server Rooms, etc
- Average Energy Cost £57K
- Total 38.54TWh
- Add CCA – 2.579TWh
- = 41.11TWh
- 12.13% of UK Generation

Data Centre Energy Demands – EU

2007 •56TWh

2020

•104TWh

A problem for environmental policy makers
A problem for the energy bill payer
A compelling motive to optimise energy efficiency

Data Centre Energy Demands – Global

- Assessing implications of growing demand for data centers requires robust understanding of the scale and drivers of global data center energy use that has eluded many policy-makers and energy analysts.
- The reason for this blind spot is a historical lack of “bottom-up” information on data center types and locations, their information technology (IT) equipment, and their energy efficiency trends.
- This has led to a sporadic and often contradictory literature on global data center energy use.

- Ref: https://science.sciencemag.org/content/367/6481/984.full

Data Centre Energy Demands – Global

- 1% of Total Global Energy
- 2% of Total Global Energy
- 3% of Total Global Energy

Data Centre Energy Demands – Global Estimates & Forecasts

- 2010
- 153TWh 2005 (Estimated)
- 203-273TWh 2010 1.1-1.5% Global Energy Use (Estimated)

- 2018
- 205TWh 1% Global Energy Use (2010-194TWh)

- Ref: https://science.sciencemag.org/content/367/6481/984.full

Data Centre Energy Demands – Recommendations

- Policy Support – Energy Efficiency Standards IT Equipment
- Investment in New Technologies
- Public Data and Modelling

- Global data center energy use is entering a critical transition phase; to ensure a low-carbon and energy-efficient future, we cannot wait another decade for the next reliable bottom-up estimates.

- Ref: https://science.sciencemag.org/content/367/6481/984.full

Whilst…

- The EU has ambitious plans and has begun preparing policy and other instruments to create the….

- EU Green Deal

EU Green Deal – Data Centres

- On the 11th December 2019…

- "At the same time, Europe needs a digital sector that puts sustainability at its heart. The Commission will also consider measures to improve the energy efficiency and circular economy performance of the sector itself, from broadband networks to data centres and ICT devices"

EU Green Deal – Data Centres

- On the 19th February 2020…
- "Data centres and telecommunications will need to become more energy efficient, reuse waste energy, and use more renewable energy sources.
- "They can and should become climate neutral by 2030."

EU Data Centres Energy

- Lack of credible data

- EUCOC Data (2017) INDICATES 289 DC's consumed 3.7 TWh
- UK (CCA) 2.579 TWh

- Hmmmm, that's means that EU data centres = 1.21 TWh ?

Mitigation Actions

Mitigation Actions

Mitigation Actions

- The EUCOC covers…
- Data Centre Utilisation, Management & Planning
- IT Equipment & Services
- Cooling
- Data Centre Power Equipment
- Other Data Centre Equipment
- Data Centre Building
- Monitoring
- Practices to become minimum expected
- Items under consideration

EUCOC
DC Utilisation, Management & Planning

- Involvement of Organisational Groups
- General Policies
- Resilience Level & Provisioning

EUCOC
IT Equipment & Services

- Selection & Deployment of New IT Equipment
- Deployment of New IT Services
- Management of Existing IT Equipment & Services
- Data Management

EUCOC
Cooling

- Air Flow Management & Design
- Cooling Management
- Temperature & Humidity Settings
- Cooling Plant
- Computer Room Air Conditioners/Air Handlers
- Reuse of Data Centre Waste Heat

EUCOC
Data Centre Power Equipment

- Selection & Deployment of New Power Equipment
- Management of Existing Power Equipment

EUCOC
Other Data Centre Equipment

- General Practices

EUCOC
Data Centre Building

- Building Physical Layout
- Building Geographic Location
- Water Sources

EUCOC Monitoring

- Energy Use & Environmental Measurement
- Energy Use & Environmental Collection & Logging
- Energy Use & Environmental Reporting
- IT Reporting

EUCOC
Sections 10 & 11

- Practices to become minimum expected
- Items under consideration

Mitigation Actions

Mitigation Actions
BS EN 50600 Series

- Data Centre, Design, Build & Operate Standards

Design & Build

BS EN 50600 Series (ISO22237) as Technical Specifications

BS EN50600 -1 General concepts
BS EN50600 -2-1 Building Construction
BS EN50600 2-2 Power Distribution
BS EN50600 2-3 Environmental Control
BS EN50600 2-4 Telecommunications Cabling Systems
BS EN50600 2-5 Security Systems

CLC EN 50600 TR-99-1 – EUCOC
CLC EN 50600 TR-99-2 – Sustainability Guidance

Operations

ISO 9001 – Quality Management Systems
ISO 14001 – Environmental Management Systems
ISO 50001 – Energy Management Systems
ISO 27001 – Information Security Management Systems
ISO 22301 – Business Continuity Management Systems

EN50600 Series (ISO22237 Technical Specification)

EN50600 3-1 Operational & Maintenance

Mitigation Actions

Mitigation Actions

- Enterprise
- Colocation
  - Operator
  - Tenant
- Telco

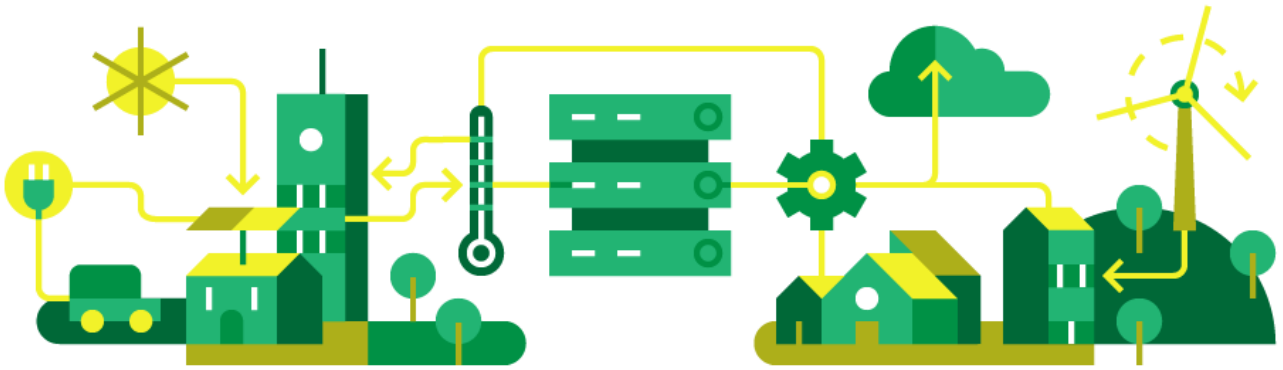
- Design & Build
  - Enterprise
  - Colocation
  - Telco

Mitigation Actions

CEEDA

Mitigation Actions

Mitigation Actions

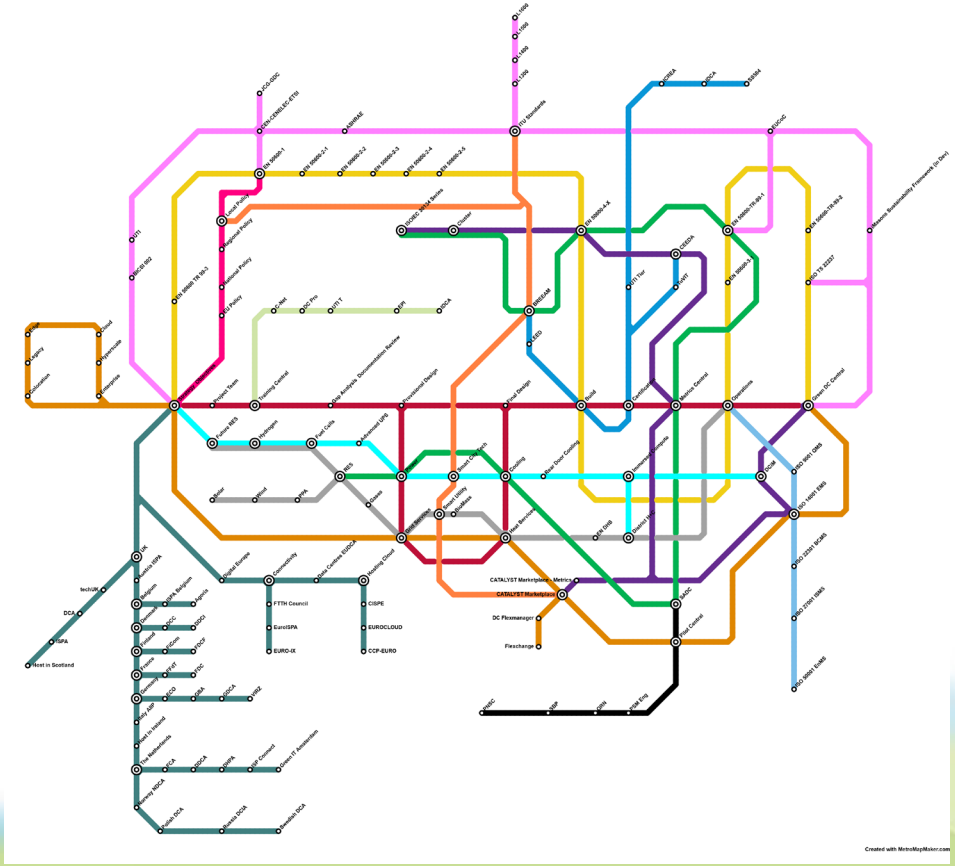


CATALYST aspires to turn data centres into flexible multi-energy hubs, which can sustain investments in renewable energy sources and energy efficiency. Leveraging on results of past projects, CATALYST will adapt, scale up, deploy and validate an innovative technological and business framework that enables data centres to offer a range of mutualized energy flexibility services to both electricity and heat grids, while simultaneously increasing their own resiliency to energy supply.

Mitigation Actions

WWW.PROJECT-CATALYST.EU

Mitigation Actions



HTTPS://ROADMAP.PROJECT-CATALYST.EU

Agenda

- Data Centre Definition
- Background - Climate Change
- Background – Energy
- Data Centres Impact of Climate Change & Energy
- Data Centre – Energy Consumption UK, EU, Global
- EU Green Deal
- Mitigation Actions

- Q&A’s

Questions & Answers

Thank You

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