

The East of England's vital 'offer' to the UK as it progresses towards net zero and some priority 'asks' regarding mitigation and adapting to climate change risks

Briefing for the East of England All Party Parliamentary Group Meeting
Wednesday 6th December 2023

KEY POINTS:

- The East of England is at the sharp end of climate change. It has the lowest average rainfall and highest average temperatures in England. 20% of the region is below sea-level, in some areas up to 25% of properties are at risk of flooding and the coastline is eroding rapidly.
- The East of England's offshore renewables are central to the UK's clean energy economy and the continued decoupling of growth from emissions is key to energy security, economic prosperity and progress towards net zero.
- The East of England is the UK's most vulnerable region to the impacts of climate change and adaptation is needed because of high risks. The specific risks to the region of climate change require a scientific quantitative assessment.
- Net zero electricity installers and local authorities are all grappling with long energy connection queues. The lack of grid connection is a bottleneck to installing and connecting-up renewable energy solutions whether large or domestic in the region.
- There has been no progress reducing transport emissions. The cheapest and fastest route is potentially a 20mph urban speed limit. Freight contributes to the Region's emissions because of import and agriculture distribution and greener freight is a priority also. Investment in Ely Junction will open-up low-carbon rail to freight.

- Support for Sustainable Aviation Fuel from domestic waste streams and feedstocks will help UK airports deliver jet zero. Sugar Beet pulp reclassification will help support biogas production.
- There is no national framework or secure funding for local authority climate action. Stop-start competitive funding is holding back local progress and does not help markets to develop or secure investment. Devolving funding to local authorities will deliver better outcomes.
- To this end, ongoing collaboration between the APPG and local Climate Commissioners and Partnerships will illuminate and support place-based climate action both regarding renewable energy and adaptation such as flood defences.

This Briefing has been prepared by Asher Minns of the Tyndall Centre for Climate Change Research at the University of East Anglia. Although commented upon by colleagues and APPG members it has not had a full peer-review and is not the view of the Tyndall Centre.



*Scooby Sands offshore wind farm, Great Yarmouth
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Introduction

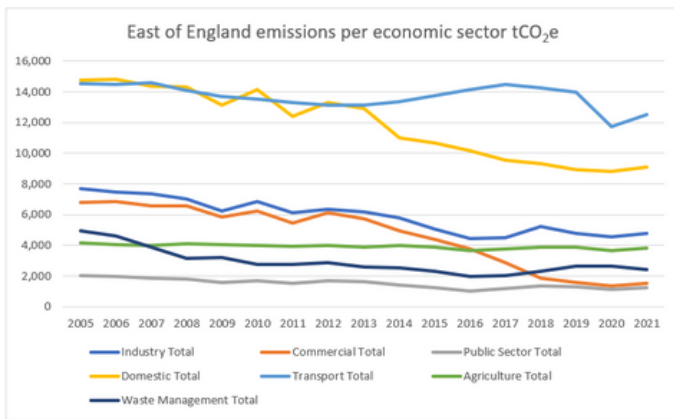


Chart: East of England emissions per economic section GtCO₂e
Source: UK local authority greenhouse gas emissions estimates 2021. BEIS.

2023 is the warmest year recorded so far, 1.43°C above the global average¹. The UK's first 40°C day was in July 2022 in Coningsby, Lincolnshire. While close to the 2015 Paris Agreement target of 1.5°C and 2.0°C of warming, a year is not the same as a long-term breach. In line with the Paris Agreement, the UK's carbon reduction target is 'of at least 100%'.

UK decarbonisation is unachievable without the East's renewable resources connected to the rest of England. It is also the most vulnerable to the impacts of climate change and risk assessments are needed including of those nationally important energy assets, coast and river flood, heat mortality and healthcare, agriculture and biodiversity, and other parts of the economy.

Progress on emissions reduction

The UK and therefore the East of England has made good progress on emissions reduction through decarbonising electricity. East of England per capita emissions are 34% less in 2021 than in 2005, during which the population has increased 12%². This compares to 39% reduction for all Regions since 2005.

The East of England is the third highest emitting English region when including emissions from land use and agriculture, 5th highest without. 2022 data for the UK as a whole may be showing that the post-covid emissions bounce-back has halted. The UK is the fourth highest consumer of electricity in Europe[2] and outside of electricity generation the rate of emissions reductions is slow.

The UK requires a quadrupling of emissions reductions outside of the power sector⁴. At COP26 Glasgow, the UK committed its National Determined Contributions (NDCs) to be at least 68% of 1990 levels. Progress is being assessed at COP28 in Dubai. UK expansion of North Sea fossil fuel production is not consistent with its targets for NDCs.

The UK was an electricity exporter in 2022 because of the embargo on Russian gas and low output of French nuclear. The increase in UK renewable electricity kept power emissions stable and is cheaper to produce, 61% cheaper than gas in 2025 compared to 2021 prices⁵.

Domestic emissions

Though emissions from buildings because of clean electricity has reduced, reductions in gas heating have made much slower progress and now account for one fifth of UK emissions. In 2022, emissions from homes fell by 6%, a likely effect of home energy-saving through unaffordability, a balance between bills and colder homes and the milder winter.

Local electricity network capacity is bottlenecked and limits connections for generators and customers, greatly slowing progress and what is possible. Connections are needed for heat networks and pumps, EV charging, Solar PV, onshore wind, biomass etc. Smart use technology and innovation can also make best use of capacity to avoid distribution bottlenecks in the absence of connections.

Local Area Energy Plans map what energy infrastructure is needed and are the responsibility of Local Authorities: they are just beginning to be underway. Norfolk, as an example, requires about eleven joined-up Local Authority Energy Plans in collaboration with UK Power Networks. Lack of grid connectivity might also be an explanation for why the region has so few community renewable energy schemes⁶.

Onshore wind is a further East of England resource that requires exploitation for Regional and therefore National benefit. A Regional summit with UK Power Networks/Eastern Power Networks because of their new responsibility and business incentives would have value. Communities are also asking why they are not benefitting economically or socially from renewables as with Scottish onshore⁷. Ofgem has announced the forming of Regional Energy Strategic Planners⁸.

¹Climate Copernicus Newsflash Accessed 08/11/2023

²June 2023 UK local authority greenhouse gas emissions estimates 2021

³Aug 2023 Statista Research Department accessed 16/11/2023

⁴June 2023 Climate Change Committee Progress in reducing UK emissions.

⁵Aug 2023 Electricity Generation Costs DESNZ

⁶<https://communityenergyengland.org/pages/nationalmap>

⁷May 2019 Community benefits from onshore renewable energy developments. Scottish Government

⁸19 Nov ofgem.gov.uk/publications/ofgem-green-lights-regional-energy-planning-roles-speed-net-zero-transition

The region's biggest urban regeneration site is East Norwich, 50ha of mostly disused former industrial land on the River Yare where it flows into the Norfolk Broads. It is hoped that its more than 2,000 dwellings become a nationally important net zero and adaptation exemplar. This project is one of the focuses of the place-based-Norwich Climate Commission, including promoting a Norwich Standard as science-based guidelines beyond statutory planning legislation.

Transport

There has been no progress in reducing transport emission, they are the highest share of emissions in 40% of all UK local authority areas. Ensuring EV infrastructure and embedding it within planning requirements significantly addresses emissions from transport and normalises EV-owning. Electricity consumption by EVs will double from now to 2030 at between 1.2 and 1.9 million⁹ (2030 for petrol-diesel phase-out is now 2035). The connection charging infrastructure from Eastern Power Networks is critical, as discussed above.

This region, with its network of cities and rural communities requires funding intervention for areas that the market will not prioritise such as EV charging rollout and the systematic challenges of public transport.

The cheapest but not the most popular way to reduce transport emissions could be to introduce 20mph speed limits in cities and towns - as shown in Wales, although just implemented, and 7 other local authorities with better data¹⁰. Speed reduction of 10mph could save 30% of urban car emissions¹¹ and a theoretical calculation for Norfolk yields a saving of £32m over five years based on a 20% casualty reduction on 30mph roads with on a one-off investment of £2.2m¹². An authoritative research briefing on '20 is plenty' by the Parliamentary Office of Science Technology (a POSTnote^[13]) would be extremely helpful on this issue.

Freight, because of imports from ports and food distribution from agriculture, are also significant. HGVs are 20% of UK emissions though regionally likely higher. Freeport East is researching a Green Transport Hub and renewable and nuclear hydrogen Energy Hub. Investment in Ely Rail Junction will open rail freight and passenger travel.

Away from surface transport, aviation emissions almost doubled in 2022 compared with 2021 and are 25% lower than 2019. Stansted Airport and its parent company MAG are members of this APPG and of the Government's Jet Zero Council. MAG has a target of net zero operational emissions at its airports by 2038 and is committed to net zero for the sector by 2050, supported by their own financial incentives for zero emission aircraft and Sustainable Aviation Fuel (SAF)¹⁴.

Developing a domestic SAF industry requires bringing forward the implementation of a Revenue Certainty Scheme for SAF earlier than 2026, and re-prioritising waste to be used as a feedstock for SAF rather than energy-from-Waste. Recent forecasts show that without a domestic SAF industry, the UK could be left importing millions of tonnes of SAF at an annual cost of £3bn¹⁵. It will introduce a SAF mandate requiring at least 10% SAF in the UK aviation fuel mix by 2030¹⁶. The government announced the winners of its SAF/Advanced Fuels Fund competition on 17 November, none in the East.

Bioenergy

Emissions from lowland peat means that agriculture and land-use emissions account for 34% of all Cambridgeshire & Peterborough emissions. Tackling this is likely to be much more difficult than decarbonising the national energy supply. Farmers that want to adapt to climate change need more tailored support.

Biomass is the second largest source of renewable energy in the UK: it generated 13% of electricity in 2019¹⁷ and can be heat, biogas or transport fuels, and also offers to replace fossil fuels in some other products such as biochemicals and bioplastics.

Biomass Energy Carbon Capture and Storage (BECCS) is termed a negative emissions technology and needs to be proven at scale. Its development requires investment, robust testing and frameworks, as well as CCS infrastructures yet to be developed. Demand for biomass is expected to rise in the UK and globally (see Transport section above) and increased amounts of biomethane are needed to help decarbonise the gas grid.

⁹Winter 2018 Local Energy East Strategy: An energy strategy for the tri-LEP area

¹⁰March 2023 Big Benefits from 20MPH on Faster Roads 20splenty.org

¹¹Future Transport futuretransport.info/urban-traffic-research accessed 18/11/23

¹²Casualty Cost and 20mph calculator 20splenty.org/cost_benefit_calculator accessed 18/11/23

¹³<https://post.parliament.uk/type/postnote/>

¹⁴MAG supports Government's Jet Zero Strategy with new pledges for a more sustainable aviation sector

¹⁵Research from Stonehaven Insights

¹⁶2023 Biomass Strategy DEZNZ

¹⁷Jan 2023 Biomass for UK Energy POSTNote

Bioenergy has particular relevance to East of England rural properties where many are off the gas grid with oil central heating or solid fuel. The bioenergy regional opportunity is in addition to farmers providing crops and crop residues for bioenergy feedstocks, coupled with nearby locations of energy generation power plants.

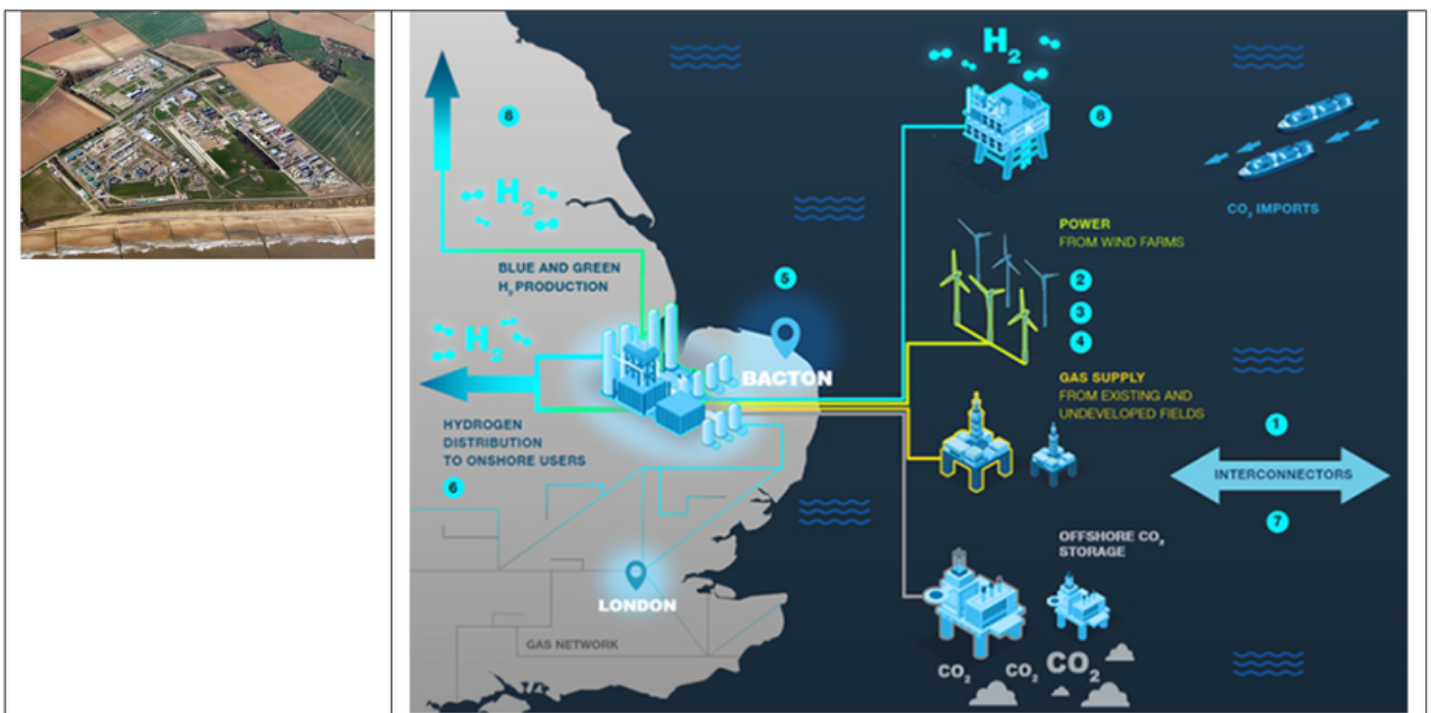
British Sugar identifies a need to reclassify types of beet pulp from animal feed to a bio energy crop so that it can be used in Anaerobic Digestion for Biogas. BECCS (Biomass Energy Carbon Capture and Storage) in the East potentially offers further solutions to the region's high and unchanged agricultural emissions (see chart). The Government's Biomass Strategy 2023 and BECCS GGR report¹⁸ 2023 (Greenhouse Gas Removal) are the latest detailed updates.

Industry

The Bacton Terminal on the north coast of Norfolk is an opportunity for re-purposing existing infrastructure as part of a potential CCS-enabled hydrogen production project (Carbon Capture and Storage) into depleted gas fields. The Government has a Special Interest Group assessing Bacton for hydrogen production, storage and transport, which processes a third of the UK's offshore gas.

The Government is due to publish a hydrogen networks pathway¹⁹ in 2023. Freeport East is investigating hydrogen energy for freight.

British Sugar processing factories have annual emissions of 700,000-800,000 tons, its four factories producing up to 1.2 million tonnes of sugar annually. This APPG member has invested in anaerobic digestion, Combined Heat and Power, and operate what was the UK's first bioethanol plant to reduce their emissions by 13% since 2018. They are next seeking to explore hydrogen, electrification, and small modular reactors. British Sugar applies circular economy thinking, creating 27 different sugars and products with less than 200g waste for every ton of sugar.



¹⁸Aug 2023 Biomass Strategy 2023, Ability of bioenergy with BECCS to generate negative emissions. DESNZ.

¹⁹Aug 2023 Hydrogen Strategy UpDate to the Market, DESNZ

Place-based emissions action

More than half of emission cuts rely on people and business taking up low carbon solutions that are decisions that are made at a local and individual level.

Place-based Climate Commissions and Partnerships mostly comprise local experts motivated to help steer local authorities as their independent friends. They help to address gaps between centralised and local powers, policy and funding barriers and the lack of capacity and skills with broad political support.

Support and recognition are needed for Climate Commissions and Partnerships that are helping to implement UK-wide net zero ambitions locally, are agile, and engage with businesses, communities, schools. Top-down knowledge can only go some way to delivering change but has a far greater impact when deployed within trusted and independent local knowledge works.

Without implementing place-based climate action, the UK is pursuing a fragmented strategy toward net zero without a framework²⁰, this even includes at the basic level, a standard for local authority climate targets, despite BEIS emissions data being disaggregated. Available funding is competitive, pitching neighbouring authorities against each other as wasted officer effort. The stop-start nature of funded programmes, when won, yields skills shortages, is holding back local progress and does not help the market to develop or secure investment. *Devolved funding should be multi-year and support skills development.*

Place-based adaptation

The East of England has the lowest average rainfall and highest average temperatures in England. Much of the high-quality agriculture land in the Fens and across the region is under flood risk, reliant on an extensive network of ageing drainage infrastructure and sea defences. The funding methodology for flood resilience underplays the importance of protecting the UK and the Region's most valuable agricultural land, greatly impacting national food security.

January 2023 was the 70th anniversary of the disastrous 1953 floods, which gave rise to the extensive defences that protect the East's coastline and communities. The most significant risks of flooding are from overtopping or breaching of coastal defences, and surface run-off from extreme rainfall, with 20% of the region being below sea-level. In addition, the soft sedimentary coastline is eroding rapidly.

The previous (3rd) National Flood Risk Assessment 2008 cites 25% of Norfolk properties at risk of flooding, which is 63,284 homes. Regionally up to 11,000 houses on the open coast are threatened by flooding and erosion over this century if current policies continue²¹. In addition to climate risks, the Region has increasing population and housebuilding, further increasing all risks unless adapted to impacts as well as net zero.

Interim measures are needed for security of water supply. The Environment Agency has to object to major housing developments because of lack of public water supply, its impact on the environment, and rare chalk streams. Anglian Water's proposed new reservoirs are not deployable until the mid-2030's. Its recently published Thriving East²² includes regional indices of climate, economy and society, sustainable growth, economy and society.

For further information on place-based action see a meeting of all of the East of England Climate Commissions and Partnerships²³ convened by Norwich Climate Commission. The Tyndall Centre for Climate Change Research has a pilot method for quantitative climate change risk assessment²⁴ that includes water, flood, heat mortality, biodiversity, crops, natural flood management. *This needs funding for rolling-out to the region to inform place-based adaptation and acceptable risk thresholds for decision-makers and communities.*



The A149 coast road and Cley NWT under water following the surge tide (© Brian Egan)

²⁰December 2020 Local Authorities and the Sixth Carbon Budget

²¹Sayers et al (2022) Responding to climate change around England's coast

²²<https://www.anglianwater.co.uk/siteassets/household/about-us/our-strategies-and-plans/thriving-east/thriving-east-report-final.pdf>

²³July 2023 Climate change in the East of England: Enabling Institutions

²⁴ www.openclim.science Tyndall Centre

Climate Commissions and Partnerships in the East of England²⁵

The Essex Climate Action Commission²⁶ issued its first comprehensive report in 2021 recommending the county adopt more than 100 recommendations that were endorsed unanimously by all political parties.

The Suffolk Climate Change Partnership launched in 2007²⁷ and since 2021, has been working collaboratively with all public sector organisations to deliver the Suffolk Climate Emergency Plan, which focuses on collaboration, sustainable homes, low carbon transport, industrial & commercial energy, and cleaner power.

The Norwich Climate Commission²⁸ brings actors from the public, private and third sectors together to support, guide and track the impact of climate ambitious change and sustainability actions across Norwich.

The Norfolk Climate Change Partnership²⁹ is Officers from the Local Authorities working together to ensure future prosperity.

Cambridgeshire and Peterborough Climate Change Partnership³⁰ provides authoritative recommendations to help the region mitigate and adapt to the impacts of climate change.

The Regional Climate Change Forum is hosted by the East of England Local Government Forum and comprised 50 local authorities to provide regional-level support to achieving their net zero and climate change targets.

The Lincoln Climate Commission is a collaboration with the Council, Transition Lincoln and the University of Lincoln and has published the Lincoln 2030 Climate Action Plan roadmap. (It is outside of official East of England but shares characteristics).

²⁵known to the author

²⁶essexclimate.org

²⁷greensuffolk.org

²⁸norwichclimate.org

²⁹norfolkclimatechange.co.uk

³⁰cambridgeshirepeterborough-ca.gov.uk-6985942.hs-sites.com/cpicc