SuNRISE Coast

Suffolk & Norfolk
Research & Innovation on the
Sustainable Energy Coast

A VISION FOR THE SOUTHERN NORTH SEA

To deliver a £32m programme of sustainable development in Norfolk and Suffolk.

Based on a proposal submitted to the Strength in Places Fund, 2020

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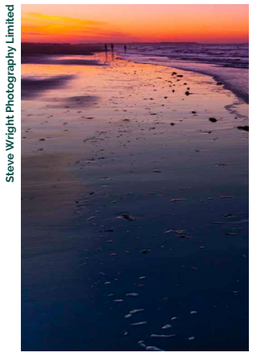
Steve Wright Photography Limited

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Scroby Sands. Image taken from www.alamy.com

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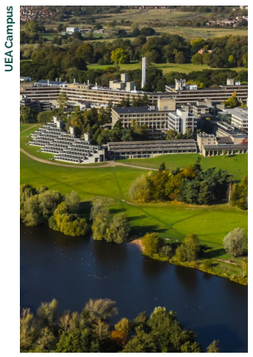
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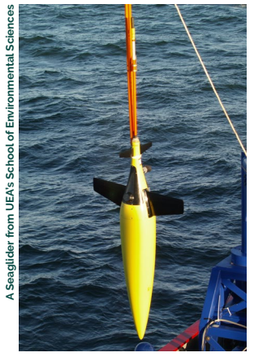
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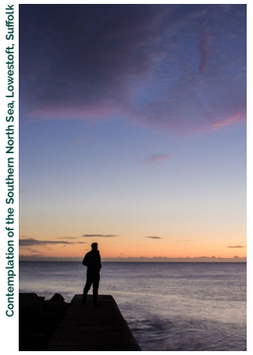
Contemplation of the Southern North Sea, Lowestoft, Suffolk

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FOREWORD

> **...By investing in clean technologies – wind, carbon capture, hydrogen and many others – Britain will lead the world into a new Green Industrial Revolution.**
>
> - The Ten Point Plan for a Green Industrial Revolution, HM Government, November 2020

***SuNRISE Coast* is a collaborative vision for an innovation programme that will drive the sustainable development of the Southern North Sea region. It is an exciting partnership between the University of East Anglia (UEA), the Centre for Environment, Fisheries and Aquaculture Science (Cefas), the Offshore Renewable Energy Catapult and the East of England Energy Group (EEEGR), shaped by an extensive consultation with an engaged and supportive community of stakeholders. This brochure showcases the programme's enormous potential to bring substantial economic, social and environmental benefits to Norfolk and Suffolk.**

East Anglia is the UK's epicentre for energy, powering the 'Northern Powerhouse' and providing fuel to the 'Midlands Engine'. Substantial capital investment is planned in energy and infrastructure projects by 2040, and the Southern North Sea is the primary focus for this investment. Sustainable development requires successful management of significant environmental risks, development of shared infrastructure across energy and other marine activities, plus regulatory reform, all through cross-sector and cross-discipline collaboration and innovation.

The SuNRISE Coast programme presents a unique opportunity to tackle complex multi-partner challenges to drive economic growth, create new local markets (e.g. green hydrogen and aquaculture innovation) and bring wider benefits to the East of England, benefitting some of the most deprived coastal towns in the UK.

This vision has been captured in a bid for support to the UK Research & Innovation (UKRI) Strength in Places Fund: *Suffolk and Norfolk Research and Innovation on the Sustainable Energy Coast, or SuNRISE Coast*. If funded, the programme will deliver the clean energy growth objective, a priority target of the New Anglia Local Industrial Strategy. We are eager to start putting these exciting plans into practice, working closely with industry, local government, marine planning, regulatory and licencing bodies and NGOs. Support from the Strength in Places Fund will catalyse Norfolk and Suffolk and their offshore area to become an international exemplar in delivering integrated clean growth.

There is an urgent need for the SuNRISE Coast programme to get underway. Our government has recognised we are facing a climate emergency and set legally-binding and extremely stretching net-zero carbon emission targets. It has published a 'green industrial revolution' ten-point plan and a new Energy White Paper setting out how the UK will clean up its energy system and reach net zero emissions by 2050. Economic and regulatory changes related to COVID-19 recovery and Brexit call for fresh thinking, new ambition and collaboration. Innovation in practice in the clean energy sector is needed now and there is no better place to lead the way than in the Southern North Sea region.

Prof Fiona Lettice
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How you can support SuNRISE Coast

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WHAT IS *SuNRISE Coast?*

SuNRISE Coast – **Su**ffolk and **N**orfolk **R**esearch and **I**nnovation on the **S**ustainable **E**nergy **Coast** – is an ambitious programme bidding for support from the UK Research and Innovation flagship Strength in Places Fund.

The programme will drive sustainable economic development of the Southern North Sea, its coast, and associated onshore infrastructure in Norfolk and Suffolk while contributing to the national target of achieving a net-zero carbon society. The programme will combine globally recognised research strengths with business opportunity, to stimulate essential regional and national infrastructure projects, and develop new technologies, services, and business models to create growth and employment.

"...the 5-year programme unites world-leading research strengths with applied industry insights"

> **...potential to unlock >£30 billion of proposed regional investment**

It will be an international exemplar for sustainable growth and development, driving Research and Innovation with potential to de-risk and unlock >£30 billion of proposed regional investment. The programme will tackle complex multi-partner challenges to assist future investment and deliver economic benefits.

This 5-year programme unites world-leading research strengths of the University of East Anglia with applied industry and policy insights of the Centre for the Environment, Fisheries and Aquaculture Science and the Offshore Renewable Energy Catapult and key business challenges identified through the East of England Energy Group. This multi-disciplinary collaboration understands the scope of stakeholders' competing demands and common challenges and the complex and evolving regulatory framework. It will address opportunities and challenges associated with:

- **The green industrial revolution, net-zero emissions and biodiversity net-gain targets**
- **COVID-19 recovery**
- **Brexit related economic and regulatory uncertainties**

Extensive stakeholder consultation identified three key challenge themes aligned to the consortium's research capabilities, and Norfolk and Suffolk's Local Industrial Strategy, providing an innovative approach to sustainable multi-user offshore development:

THEME 1:
Data Integration across the Southern North Sea and its coast

THEME 2:
Economically and environmentally sustainable multi-use of the Southern North Sea

THEME 3:
Catalysing Future Sustainable Energy Technology & Infrastructure

SuNRISE Coast will create:

- Dedicated research capacity matched to business need
- Sustainable economic growth enhancing social equity
- Academic-industry 'scenario forecasting' forums to shape priorities, including rethinking regulatory frameworks
- Knowledge Exchange opportunities promoting research-based innovative solutions to business challenges
- Innovative commercial opportunities through translational and collaborative research

SuNRISE Coast will support targeted disruptive research and innovation, translating academic research to commercial solutions and enabling businesses of all sizes to collaborate with the research base. The programme will leverage industry investment, facilitating key infrastructure projects, developing new regional business opportunities and delivering growth, resilience and jobs to some of the most economically disadvantaged and vulnerable coastal places in England.

> **...developing new regional business opportunities and delivering growth**

This ambitious programme adopts a **'whole systems approach'**, aligning and connecting large-scale energy projects, exploring shared infrastructure options, local economic benefits, and creation of new markets including green hydrogen and aquaculture innovation. SuNRISE Coast integrates long-term economic growth with fundamental benefits for local communities and the natural environment.

(Scroby Sands, UK's first offshore windfarm, off Great Yarmouth, Norfolk) Image taken from www.alamy.com

PARTNERS

This programme brings together three world-class research bodies with industry. Working collaboratively on a societal grand challenge - the pressing need for an Energy Transition - consortium partners will unlock synergies of research strengths and industry insights with a focus on the East Anglian coast and Southern North Seas. By harnessing our complementary and trans-disciplinary expertise, we can help our region to trailblaze a path towards achieving Net Zero, delivering sustainability and resilience for our country and our world.

UEA is 10th in the UK for quality of research outputs with over 82% of research rated as 'world-leading' or 'internationally excellent' and ranked 1st for impact in climate and environmental sciences (Times Higher REF). UEA's multidisciplinary Centre for Competition Policy (CCP) is strongly connected with UK (and EU) regulators and provides national advice on regulation, including for the energy sector, while the Marine Knowledge Exchange Network (M-KEN) connects 1000+ cross-sector marine stakeholders and is home to the Blue Futures Project to realise East Anglia's blue growth ambitions. In addition, UEA has significant research strengths in energy technology across the schools of Engineering, Chemistry, Computing Sciences and in sustainable business models and supply chain management through the Norwich Business School. UEA have published over 750 relevant research papers relevant to the SuNRISE Coast vision in the past five years.

UEA campus

Cefas is one of the world's longest-established marine research organisations and a world leader in marine science, technology and environmental policy, monitoring and assessment. As close advisors to the UK government and international bodies, Cefas are a leading international provider of services for development and implementation of national and regional marine environmental management programmes. Cefas and UEA have a long-established collaboration dating back to 1965, which includes the Collaborative Centre for Sustainable Use of the Seas (CCSUS). Through CCSUS, Cefas collaborates with UEA researchers to provide solutions to some of the biggest challenges facing the world's seas and society, from climate change to energy and food security.

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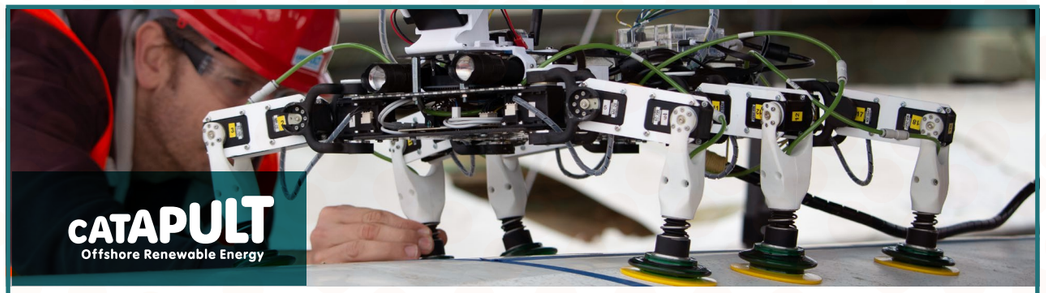

ORE Catapult, the UK's foremost offshore renewable energy technology/innovation centre, has to-date engaged with 960 SMEs, supported delivery of over 400 R&D projects and directed research priorities. Their Research Hubs align the Catapult and UK academic capabilities to support the needs of the offshore renewables industry. ORE Catapult has been instrumental in facilitating knowledge transfer between traditionally closed-door wind farm developers. Enabling trend analysis and anonymised data sharing between developers has allowed benchmarking of wind farms, and leading Joint Industry Projects has facilitated developers to come together to quantify many challenges and provide route maps to solutions.

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The East of England Energy Group (EEEGR) is a membership association with more than 260 members across the region, ranging from large operators and developers through to supply chain companies including numerous SMEs and sole traders. With a primary focus on the Southern North Sea, they are a key voice in the energy sector providing knowledge support and opportunities to help their members' businesses grow, creating new business opportunities and encouraging regional investment.

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"...SuNRISE Coast will directly support a more rapid progression toward our net zero ambitions, through stimulating research and innovation collaborations between our world-class research bodies and our dynamic local industry clusters."

C-J Green, Chair New Anglia Local Enterprise Partnership

A full list of supporters can be found at the back of the brochure.

GEOGRAPHY OF THE REGION

Scroby Sands and offshore wind farm' Credit Mike Page

East Anglia and the Southern North Sea are ideally placed to lead the UK in the transition to a cleaner energy future.

East Anglia is the UK's epicentre for energy, and a major generator of power including:

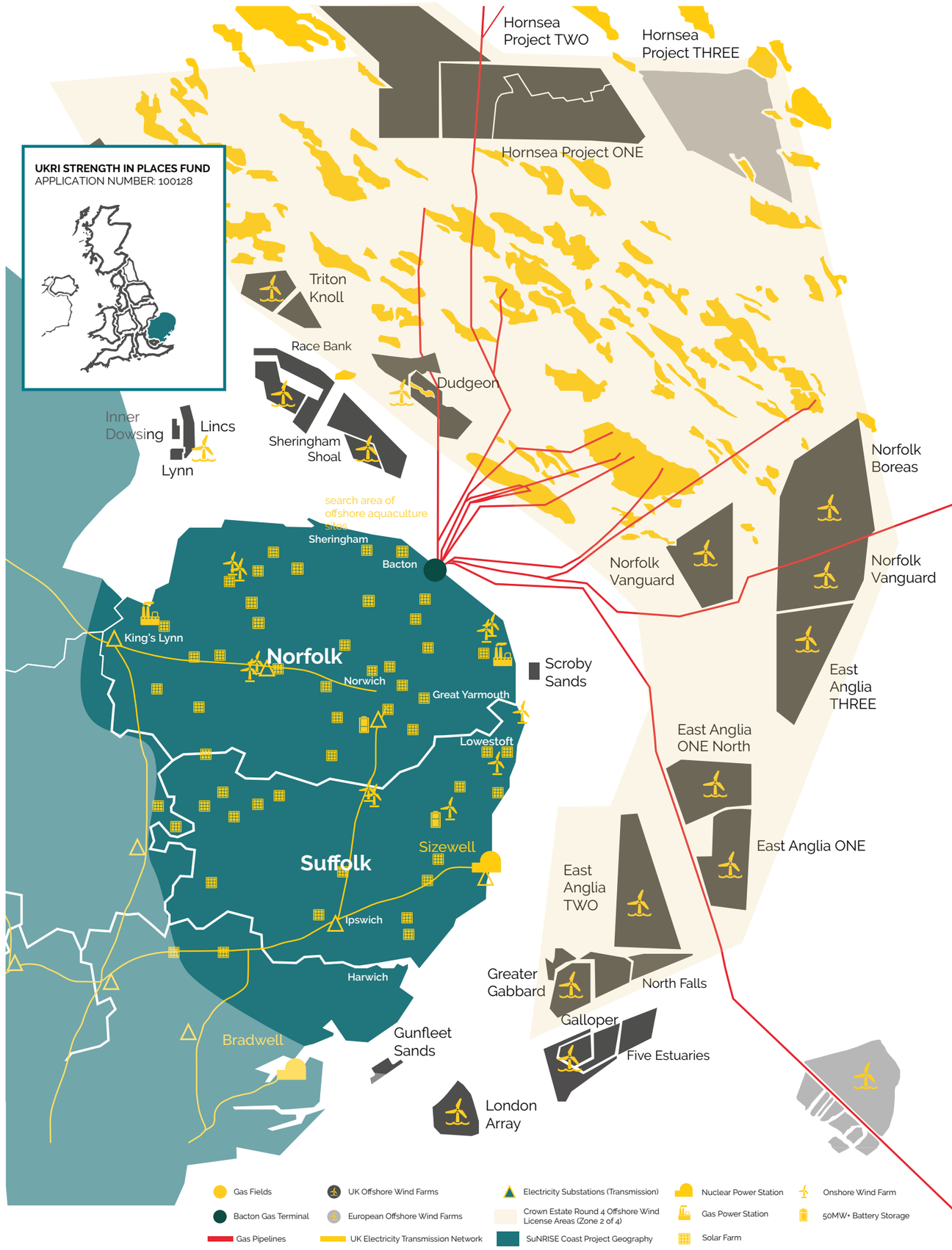
- Over half of the country's offshore wind farms powering >12% of UK homes;

- Bacton Terminal providing 30% of the UK's gas, and enormous potential for the hydrogen economy;

- Nuclear power at Sizewell powering around 8% of UK homes

The natural geographic assets of the Southern North Sea have already enabled the development of Europe's most diverse 'all-energy' cluster and present a great opportunity to stimulate resilient and sustainable growth, with future potential to power the equivalent of 58% of UK homes. Meanwhile, Norfolk and Suffolk - the gateway to the Southern North Sea - are located in the UK's driest and most vulnerable region to climate change impacts. Sea-level rise and coastal erosion put communities, natural assets, and nationally significant energy and port infrastructure at risk.

"...future potential to power the equivalent of 58% of UK homes"



THEME 1:

Data Integration across the Southern North Sea and its coast

This theme will focus on data acquisition and analysis technologies and solutions, supporting digitalisation of energy, infrastructure and marine sectors, and enabling collaboration between the region's energy, marine and growing digital clusters.

SuNRISE Coast will create the **"Southern North Sea Data Observatory"** combining and extending currently disparate data sets and enhancing data acquisition and analytics. This requires:

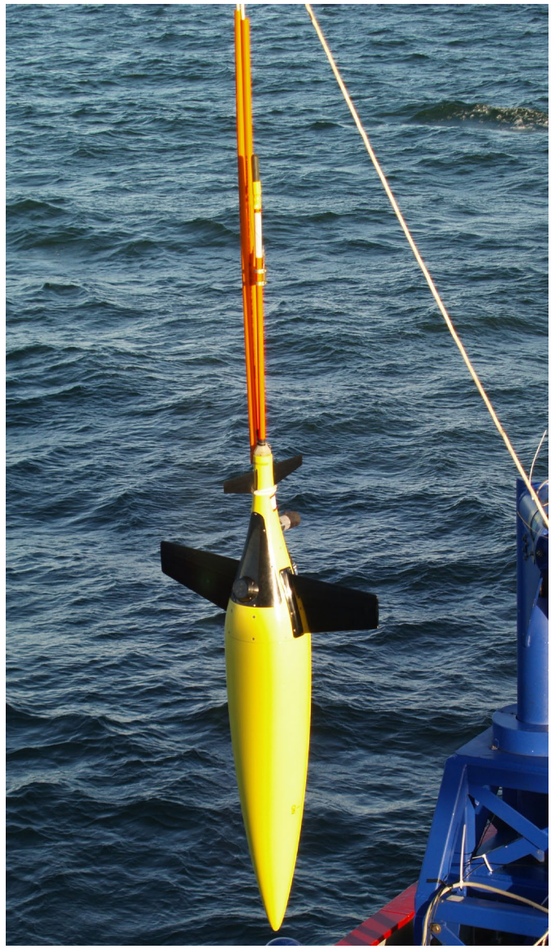
- **Mapping of existing sensor networks, observations and monitoring devices**
- **Dataset aggregation**
- **Additional targeted observations**
- **Research expertise in big data, spatial analysis and environmental modelling**
- **Investment in infrastructure and equipment**

The **Southern North Sea Data Observatory** will provide up-to-date baseline knowledge, underpin systems understanding, and deliver real-time spatial data. Engagement with the stakeholder community will ensure the observatory is fit-for-purpose with a user-accessible interface; consultation identified that disparate and inaccessible data are key challenges.

Theme 1 will also pioneer the concept of **'e-Lighthouses'** to support auto-navigation of autonomous vehicles (terrestrial, aerial, subsea), data collection, processing and transmission.

Access to more representative real-time data and collaboration with the consortium's research base will improve future modelling, forecasting, application development, logistics and supply chain operations, and inform the development of new regulatory frameworks.

This theme will enable more robust and confident strategic planning and large-scale investment, promoting growth and providing the background and baseline information required by Themes 2 and 3.



A Seaglider from UEA's School of Environmental Sciences used to monitor and capture data at sea

THEME 2:

Economically and environmentally sustainable multi-use of the Southern North Sea

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While the energy sector is central to the economic development of the Southern North Sea there is clear potential for other interests and commercial developments, linking the sector to Government's priorities for future fisheries, biodiversity recovery and food production targets.

New business opportunities in 'aqua-tech' – aquaculture technology – and diversification in other marine industries will create new local jobs, reduce environmental risks associated with existing infrastructure, and ensure the sustained health of our natural capital assets.

A whole systems approach will be adopted to **identify and deliver** options for greater **co-existence and co-location** of aqua-tech and energy together with other offshore activities, using data from the **Southern North Sea Data Observatory** to test potential opportunities and determine their viability for the region and as blue investment targets. Selected projects will be supported with integrated environmental and social assessment and risk management to underpin sustainable multi-use of the region's natural capital. SuNRISE Coast provides an exciting opportunity to embed the development of next-generation technologies (Theme 3) within the environmental assessment context from ideation, producing co-use innovation specified to deliver environmental sustainability as well as economic return. **Co-benefit scenarios** already proposed by stakeholders are:

Combining **seaweed and shellfish farming** with energy developments

Artificial structures and de facto marine protection to create **biodiversity havens** and **fish nurseries**

Innovative multi-benefit approaches to delivering coastal **resilience**

Biodiversity recovery and enhancement alongside fisheries diversification

Optimised natural capital associated with shift to co-location/co-existence

THEME 3:

Catalysing Future Sustainable Energy Technology & Infrastructure

This theme will assist the creation of next generation energy-production technologies with long-term economic impact.

Developing integrated energy innovations in the Southern North Sea will drive the **energy transition** and provide an international exemplar for the use of new technology and regulatory frameworks. Both largescale energy challenges and complementary local energy applications, such as electric vessels and autonomous inspection of offshore assets, will be included in theme 3 through:

- Feasibility studies to develop coastal grid network solutions for improved connectivity and energy storage (batteries/hydrogen)

- Enabling testing and demonstration of new technologies

- Next generation offshore wind components and operations

- Embedding circular economy principles through recommissioning of redundant assets (e.g. pipelines).

- This will require not only technological but also regulatory innovation

Seawater desalination, hydrogen production and other **chemical extraction** offer significant potential for large scale wind, existing natural gas subsea infrastructure, and new nuclear to combine for sustainable energy production. Delivering power, heat, clean water and potentially other high-value chemicals through brine electrolysis. This is a time limited opportunity as existing offshore infrastructure currently associated with gas extraction could be re-purposed rather than decommissioned.

Cutting across all three themes, SuNRISE Coast will examine all relevant policy and regulatory frameworks, identifying barriers to investment, growth and deployment of new innovations, investigating how multi-layer governance models could improve effectiveness and efficiency.

> **'...integrated energy innovations in the Southern North Sea will drive the energy transition'**

(Moored at Great Yarmouth, the Seajacks Scylla) Image taken from www.alamy.com

ENDORSEMENT FOR *SuNRISE Coast*

This vision has been supported by a number of organisations, listed here. Find out below how you can support the SuNRISE Coast vision to become a reality.

Anglian Water
The Anglian Centre for Water Studies
Cefas
EDF Energy
EEEGR Special Interest Groups:
Marine Science and Technology SIG
- 4C Offshore Ltd.
- Associated British Ports
- DNV-GL
- East Coast College
- East Point GEO Ltd.
- Fugro
- Gardline
- IMarEST
- Inspection Verification Bureau
- James Fisher Marine Services
- MarineSpace
- Next GeoSolutions
- N-SEA
- RovCO

Offshore Wind SIG
- 4C Offshore Ltd.
- Associated British Ports
- East Coast College
- Hutchison Ports (UK)
- James Fisher Marine Services
- NessPoint
- ODE
- Opergy Group
- Petersons
- Proeon Systems
- ProServ
- Seajacks
- Stowen Group
- Survitec
- Tecosim
- Worley

Reuse and Decommissioning SIG
- Centrica Storage
- Dana Energy
- ENI
- INEOS
- IOG plc
- National Grid
- Neptune Energy
- Oil & Gas Authority
- Oil & Gas Technology Centre
- OneDyas
- Paradigm
- Premier
- Shell UK
- Spirit Energy
- Wintershall

Environment Agency
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Marine Management Organisation
Natural England

New Anglia Innovation Board
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- Hethel Engineering Centre
- Hethel Innovation
- New Anglia LEP
- Norfolk County Council
- Norwich Research Park
- Norwich University of the Arts
- OrbisEnergy
- Suffolk County Council
- TechEast
- University of Suffolk

New Anglia Local Enterprise Partnership

Norfolk and Suffolk All-Energy Industry Council
- Associated British Ports
- East Coast College
- East Suffolk Council
- EDF Energy
- Great Yarmouth Borough Council
- Greater South East Energy Hub
- Hydrogen East
- New Anglia LEP
- Norfolk County Council
- Oil & Gas Authority
- Opergy
- OrbisEnergy
- Peel Ports Great Yarmouth
- Scottish-Power Renewables
- Shell U.K
- Sizewell C
- Suffolk County Council
- Vattenfall
- West Suffolk College
- Worley Group

Norfolk and Suffolk Unlimited
Norfolk County Council
ORE Catapult
Scottish-Power Renewables
Sizewell C
Suffolk County Council
The Crown Estate
University of East Anglia
Vattenfall
Water Resources East

DISCUSS

Talk to us and others to find out more about the programme, understand how to get involved and prepare ideas and challenges for SuNRISE Coast to work on.

SHARE

Please spread the word, expand the network and show your support for this vision by sharing this brochure, web links and follow and support our twitter campaigns at @SuNRISECoastSNS

INFLUENCE

Help us to influence the success of this bid and the outcomes of the programme by engaging with SuNRISE Coast, sharing information and showing your support.

Sunrise.coast@uea.ac.uk **@SuNRISECoastSNS** **www.uea.ac.uk**

Contemplation of the Southern North Sea, at Ness Point, Lowestoft, Suffolk

How you can support SuNRISE Coast

DISCUSS SHARE INFLUENCE

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