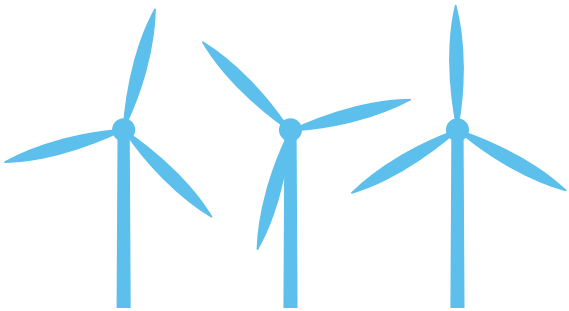
University of East Anglia

CLEAN ENERGY FOR A CLEAN FUTURE



HOW UEA'S EXPERTISE AND TALENT CAN HELP YOUR ENERGY BUSINESS

CONTENTS

BREAKING BOUNDARIES AND PIONEERING INNOVATION FOR OVER 50 YEARS

WELCOME TO UEA

UEA helps businesses throughout the region and further afield find solutions to their challenges, and we have a range of specialist knowledge and facilities to support and help develop the energy sector.

Read on to find out how we can work together and help your business grow.

UEA HAS THE ENERGY EXPERTISE

Our globally renowned research is helping tackle critical challenges facing the energy industry and is leading innovation in the sector.

Energy expertise flourishes throughout UEA from social sciences, policy and behavioural research in Norwich Business School through to science and technology for example in the Schools of Chemistry, Computer Science and Engineering. UEA is also home to one of the longest established and largest interdisciplinary departments of Environmental Sciences in Europe, which is internationally renowned for its pioneering research.

WORLD TOP 200

Times Higher Education
World University Rankings 2022

UEA HAS THE TALENT

The right recruits could transform your business. Connect with the 17,000 students and 4,000 recent graduates at UEA and give your workforce an injection of dynamism, fresh thinking and enthusiasm.

Placements are part of the university curriculum for a range of degree courses, allowing organisations to draw from a breadth of subject knowledge when engaging with UEA students. Depending on your needs, you can recruit undergraduates, postgraduates or PhD students. Placements provide students with invaluable experience in the workplace but are also an excellent opportunity for businesses who need skilled researchers, or extra help on projects.

FIND OUT MORE ABOUT HOW A STUDENT PLACEMENT COULD BENEFIT YOUR BUSINESS:

Email us:
placements@uea.ac.uk

Visit our website:
www.uea.ac.uk

CONNECT WITH

17,000 STUDENTS

4,000 RECENT GRADUATES

Georgiana's success

"It is essential for students to get a taste of the industry... All the knowledge gathered during my placement was key for my later degree success."

Georgiana-Elena Sfeclis, *BEng (Hons) Engineering (Electronic and Electrical) with a Year in Industry, UEA*

"Having an industrial placement within our company has been of enormous benefit to us. The enthusiasm, new ideas and different approaches demonstrated by [Georgiana] have been like a breath of fresh air."

Paul Clark, *Software Manager, bf1systems*

Jack's success

"My appointment at EDF Energy empowered me to have the confidence to pursue everything... to always strive for more..."

Jack Grant, *Finance and Economic Regulation Intern, EDF Energy*

"Jack's appointment to the team has been a huge success... a result of both his high-quality contributions to a variety of the team's activities and his integration within the team on a personal level."

Joe Rippon, *Sizewell C Financing Programme Manager, SZC Financing and Economic Regulation team*

WORK WITH US TO GROW YOUR BUSINESS AND BUILD A CLEAN FUTURE

We can help your business grow, recruit talent, and access new funding, markets and ideas.

We work with organisations throughout the energy sector to help them realise their ambitions. Access our research excellence through consultancy, collaboration and wider partnerships.

TALK TO US ABOUT YOUR BUSINESS NEEDS AND HOW WE CAN HELP

Email us:
business@uea.ac.uk

Visit our website:
www.uea.ac.uk/business

Follow our social media accounts to keep up with our latest business news and opportunities:

showcase/uea-for-business
@UEAforBusiness

READ ON to find out more about our research excellence and our industry partnerships.

WORLD-LEADING RESEARCH

Our research tackles the challenges facing the energy industry head-on – developing novel technologies, identifying solutions for society and the environment and influencing policy and regulation.

6th

UEA RANKING IN THE UK FOR RESEARCH CITATIONS

(Times Higher Education World University Rankings 2022)

PUSHING BOUNDARIES FOR 50 YEARS

CLIMATEUEA

ClimateUEA creates the space to push new boundaries in interdisciplinary climate research. UEA has pioneered climate research for nearly 50 years.

Our Climatic Research Unit and Tyndall Centre for Climate Change Research have broken new ground in understanding the global climate system and its implications for society and continue to do so.

The 2020s will be a decade of profound change. The impacts of climate change are increasingly as visible as they are alarming. This will be the decade when transformations need to happen at an unprecedented scale, if we are to confront, mitigate and adapt to climate change. Our research is agile and creative, integrating arts and humanities approaches to address the growing climate and biodiversity emergency. ClimateUEA builds on our interdisciplinary strengths to invent new forms and outcomes in climate research for the 21st century.

Discover more about some of our pioneering climate change researchers and their latest projects, impact and ground-breaking work.

www.uea.ac.uk/climate

ENGINEERING AND TECH HUB FOR THE EAST

PRODUCTIVITY EAST

Productivity East is a £7.4 million regional hub for engineering, technology and management based at UEA, opened in September 2021. Supporting industrial and education partners to work alongside our world-leading researchers and talented students, we can discover practical solutions to current and future challenges.

Working in partnership with New Anglia Local Enterprise Partnership, New Anglia Advanced Manufacturing and Engineering (NAAME) and Tech East, Productivity East provides state-of-the-art equipment – including advanced robotics and CNC, 3D printing, a dedicated computer aided design (CAD) studio and a materials testing laboratory – to educate the next generation of engineers.

Working in partnership, students, academics and businesses explore new ideas, develop prototype designs and create innovative products and services.

www.uea.ac.uk/groups-and-centres/productivity-east

@productivityuea

PRODUCTIVITY EAST

£7.4m INVESTMENT

"SETI WILL HELP NURTURE THE EAST OF ENGLAND'S THRIVING RESEARCH AND INNOVATION ENVIRONMENT."

JOHNATHAN REYNOLDS
MANAGING DIRECTOR, OPERGY LTD

DRIVING THE INNOVATION ECOSYSTEM OF THE FUTURE

EAST OF ENGLAND SMART EMERGING TECHNOLOGIES INSTITUTE (SETI)

SETI is a research and innovation initiative led by UEA, aiming to create the fastest collaborative research testbed in Europe. The virtual Institute will aim to connect UEA with core ICT Research groups at the Universities of Cambridge and Essex, Norwich Research Park, Cambridge Science Park, Adastral Park Ipswich, and Essex Knowledge Gateway.

By linking world-leading researchers with local industrial stakeholders, SETI will improve collaboration and enable research to move to large-scale field trials more quickly and easily. SETI will support experiments in a range of science and engineering areas using data technologies such as artificial intelligence, the Internet of Things and 5G linked to key sectors such as Agritech, Supply Chain, Energy and Intelligent Manufacturing.

SETI will nurture a unique research and innovation ecosystem, providing support for the development of new applications and services from concept to prototype to validation.

SETI will demonstrate smart technology in the field whilst capturing valuable real-world, real-time data. This will help turn research insights into business opportunities that will provide jobs and grow the economy.

Jonathon Reynolds, Manager Director of Opergy Ltd, says:

"The opportunities SETI presents to the clean energy sector are significant and unique, not only for the East of England but for the UK as a whole. SETI will support the sector by improving the sharing of data, tools and expertise, as well as increasing the availability of highly skilled scientists and engineers. SETI will help nurture the East of England's thriving research and innovation environment."

*SETI is led by **Prof Gerard Parr**, Head of School of Computing Sciences, UEA*

www.uea.ac.uk/business/access-entrepreneurship-and-innovation/seti

THE FUTURE IS BLUE

MARINE KNOWLEDGE EXCHANGE NETWORK (M-KEN)

The Marine Knowledge Exchange Network (M-KEN) is a professional research and impact community that connects industry, SME, policy and NGO stakeholders with marine and coastal scientists across East Anglia and beyond. M-KEN works with a vibrant cross-sector network of stakeholders all with a vested interest in the marine environment. The network facilitates and delivers marine and coastal research; ensures research delivers collaborative impacts and helps realise the social, economic and environmental potential of our seas and oceans.

M-KEN's most recent work includes the collaborative Blue Futures project, which worked with a broad range of public, private and third sector organisations to help us visualize features of a resilient, prosperous and healthy future for East Anglia. The findings illustrate that East Anglia has great potential to develop its economy sustainably through innovation and integrated thinking, particularly around five key areas of opportunity. Each one traverses the land-coast-sea interface and integrates the core foundations of sustainable development (environment, society and economy).

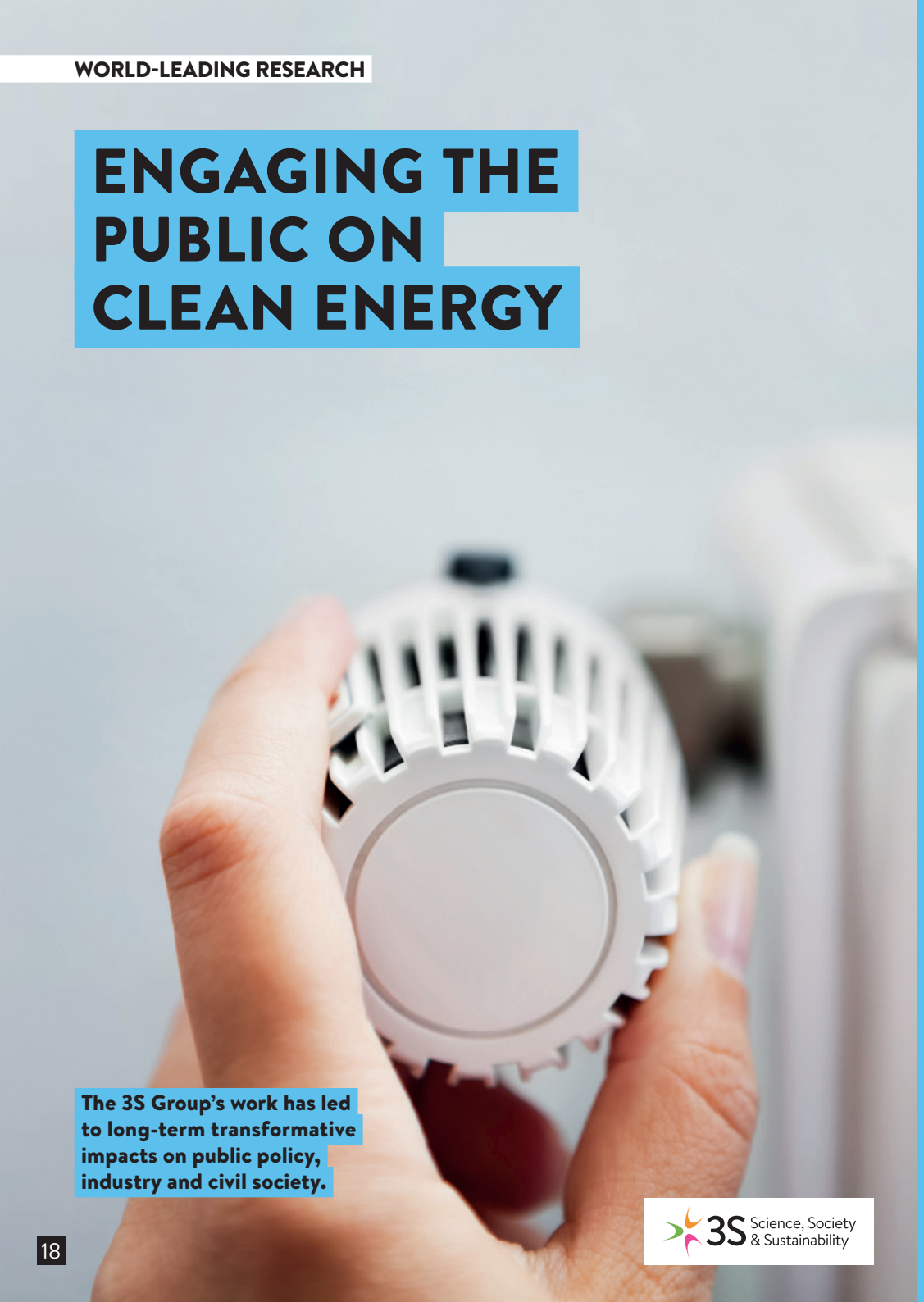
- **Natural Capital is Critical:** Sustaining our natural capital is an essential foundation for all future opportunity
- **Innovations in Renewable Energy:** Unlocking the potential of on and offshore renewable energy technology
- **Food and Drink Futures:** Regional food and drink stories and innovating to nourish the nation
- **Leadership in Low Impact Living:** New forms of living and reducing energy, water and waste footprints
- **Keep Visiting East Anglia:** Enhancing a diverse, year-round visitor economy.

A fundamental premise of the Blue Futures project was that social, economic and natural systems must be better integrated in strategic planning if this is to deliver sustainable development opportunities for the region. The study demonstrates the need to anticipate and proactively adapt to change, and to nurture and capture the value of the natural terrestrial, coastal and marine systems that sustain us.

For more info on M-KEN and the Blue Future's project visit:

www.uea.ac.uk/groups-and-centres/mken

ENGAGING THE PUBLIC ON CLEAN ENERGY



The 3S Group's work has led to long-term transformative impacts on public policy, industry and civil society.

SCIENCE, SOCIETY AND SUSTAINABILITY (3S) RESEARCH GROUP

3S conducts research to better understand and transform the relationship between science, innovation and society in responding to the sustainability challenges we face. The Group's work has led to long-term transformative impacts on public policy, industry and civil society across energy, climate change, and other areas. For over 10 years, 3S has helped to provide a better understanding of sustainability issues, identifying solutions and alternatives.

The Group's most recent work includes projects with the UK Energy Research Centre – including the establishment of its Public Engagement Observatory – which is developing a new approach to societal engagement with energy and climate change.

The Observatory maps the many different ways that people are engaging with energy, climate change and net zero, ranging from everyday consumption, citizens' assemblies and social media, through to protests and community action.

Through openly sharing and engaging others in this work the Observatory aims to help make low carbon energy transitions more coordinated, responsible and responsive to society

A previous 3S project studied small-scale, community-led sustainable energy projects, such as solar water heating and insulation clubs, evaluating their carbon and energy performance. The research provided independent advice to policymakers, community groups and energy businesses, exploring how successful projects could be replicated and scaled-up.

Other areas of work include fuel poverty among social housing tenants. The research team interviewed tenants about their everyday energy use and management, and spoke to staff about measuring and monitoring use, and interventions to try and improve their tenants' energy vulnerability.

The Group's research also looks at technology and innovation. One project explored how the effectiveness of smart home technologies (such as sensing and monitoring networks and advanced control devices) in reducing domestic energy demand and household bills is fundamentally shaped by their impacts on household dynamics and decision-making.

Another project studied the challenge of reducing energy use when it is 'invisible'. Working in partnership with Green Energy Options (designers and manufacturers of in-home display monitors) the 12-month project trialed a range of monitors with almost 300 households to explore the impacts on their energy use.

www.3sresearch.org

STEERING POLICY TOWARDS A CLEANER FUTURE

THE CENTRE FOR COMPETITION POLICY (CCP)

A successful energy transition must harness the capabilities of individuals, firms, markets, government and regulators.

The Centre for Competition Policy is the UK's leading interdisciplinary centre focused on competition, regulation and consumer policy. It brings together academic experts, officials and practitioners from the fields of business, economics, law and political science to create and communicate high quality independent research.

CCP's research provides insights into how diverse actors may respond to the challenges of addressing climate change. Policies, regulations and markets will need to adapt to changing circumstances and CCP is at the forefront of studying these changes. The multi-sector nature of CCP enables a holistic approach, including insights from settings beyond energy.

CENTRE FOR COMPETITION POLICY

Their research speaks to key themes including:

- Encouraging energy consumption reductions
- Minimising the cost of low carbon technologies
- Distributing the cost of the energy transition equitably across individuals, households and companies
- Incentivising large scale innovations and investments
- The changing nature of energy networks and suppliers.

CCP's members have conducted research on topics including: competitive bidding to award state aid for renewables; how network charges affect the deployment of green technologies and the distribution of costs across households; individuals' behavioural motivations for purchasing carbon offsets; how non-monetary incentives can stimulate consumption reductions; and the complexity of policymaking with multiple objectives.

CCP research is inspired by practitioners and we welcome opportunities to discuss future collaborations.

'FAIR' ENERGY TRANSITION?

As energy is a necessity, questions of affordability and fairness are central. Equally, costly investments are required to address climate. Research by the Centre for Competition Policy on 'Equity and Justice in Energy Markets' provides a foundation for addressing these issues. The evidence suggests that:

- While energy efficiency improvements are often depicted as tackling both climate change and energy affordability, the ability of these improvements to 'solve' fuel poverty needs to be assessed critically.
- Many households do not have access to finance to improve their homes, and even households in energy efficient dwellings may still struggle to afford energy.
- Large increases in costs for low-income households seem likely to result in political pressure for policy change; if costs cannot be contained and equitably distributed, the energy transition could be derailed.
- The statutory duties of the UK energy regulator, Ofgem, have become more complex over time. If greater prominence for climate change is desired, Ofgem's duties should be restructured, not simply an additional duty added.

www.competitionpolicy.ac.uk

Households in energy efficient dwellings may still struggle to afford energy due to their low incomes.

ENVIRONMENTALLY SENSITIVE INFRASTRUCTURE AND LAND MANAGEMENT

An important trend in current UK energy systems is a transition to greater reliance on renewable sources such as solar, onshore and offshore wind, biomass and anaerobic digestion. Linked to this is a shift to a more geographically distributed pattern of supply and demand, with multiple smaller generators instead of a reliance on a few large power stations. Both of these mean that the energy system is becoming a more prominent feature of terrestrial, coastal, and marine environments. This, in turn, has potential consequences for agricultural and fishing activities, landscape character, tourism and recreation, and local biodiversity, as well as possible benefits for employment and new sources of job creation.

Investments in new energy generation also need to take account of the existing infrastructure, such as constraints in the capacity of the electricity transmission and distribution grid and the presence of large numbers of rural households not connected to the gas supply network and consequently reliant on oil for heating. Additions to this supply infrastructure will be needed in coming decades, but they will need to be located to maximise new generation opportunities (including the potential use of hydrogen), serve additional demand (e.g. arising from new housing developments) and limit conflicts with other uses of land, coastal and marine environments.

Researchers in the School of Environmental Sciences at UEA are currently leading a national research programme (ADVENT) which is developing new geographical analysis tools to help address these siting and planning issues, with an emphasis on supporting energy system transition whilst protecting natural assets. We are also part of the IRENES Interreg Europe consortium working with Local Enterprise Partnerships and other stakeholders across the region to develop better ways of integrating renewable energy and other ecosystem services in energy and environmental policies.

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ADVENT
Addressing Valuation of Energy and Nature Together

IRENES
Interreg Europe

COLLABORATING WITH COASTAL COMMUNITIES

INFRASTRUCTURE FOR PORT CITIES AND COASTAL TOWNS (IPACT)

Despite the potential benefits of a coastal location, many port and coastal towns and cities around the UK underperform in terms of economic and social wellbeing. Widespread factors include a poor built environment, derelict industrial and other legacy sites, the decline in traditional tourism and poor connectivity to the waterfront. In addition, rising sea levels and coastal erosion pose major challenges and demand innovation in resilience.

The iPACT Network is a multi-institutional collaboration across the UK, which will identify people-focused, infrastructure-based solutions to the complex problem of improving social well-being and prosperity in coastal communities through resilient and sustainable regeneration.

The Network will work in partnership with councils who are all facing the same challenges, across Southampton, Lancaster, Norfolk and Suffolk, to look at themes of connectivity with the coast, inclusive infrastructure, maintaining and enhancing resilience, coastal region transport, and nature-inspired, human scale engineering.

The Network will initially carry out a series of community-based workshops to identify key issues and potential solutions, before conducting select pilot studies. In this way, the iPACT Network will become a thriving collaborative research and user community that will develop and implement sustainable infrastructure solutions to improve the wellbeing, resilience and sustainability of the UK's coastal settlements for decades to come.

Prof Robert Nicholls
School of Environmental Sciences and the Tyndall Centre for Climate Change Research

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COASTAL PARTNERSHIP EAST: NORFOLK & SUFFOLK COAST TRANSITION PROGRAMME

Norfolk and Suffolk have some of the fastest eroding coasts in Europe, with properties, businesses and whole communities directly and indirectly affected by loss of property, infrastructure and utilities.

A consortium led by East Suffolk Council with North Norfolk District Council and Great Yarmouth Borough Council has made a successful bid to Defra's Innovative Resilience Fund to deliver the Norfolk & Suffolk Coast Transition Programme. The Programme, which is due to start in summer 2022, will offer a complete suite of planning, engagement, technical, financial and policy tools to support coastal transition for Norfolk and Suffolk communities, and which could also be applied to the rest of the UK coast. Tangible, measurable and sustainable changes will be delivered in these locations, working in close collaboration with communities who live and work there. This will enable them to physically adapt to climate and coastal change now and for future generations.

It was also recently announced that North Norfolk District Council – alongside East Riding of Yorkshire – will receive funding via a £36 million investment as part of the same flood and coast innovation programme. This Coastal Transition Accelerator Programme is designed to help communities on areas of the coast that cannot sustainably be defended from coastal erosion.

www.coasteast.org.uk/resilience

coastal partnership east

NEW GENERATION FOR SOLAR ENERGY

Led by Dr Kaplani, UEA's Solar Energy Lab researches solar energy and photovoltaics (PV) and develop new generation PV technologies, with the aim of increasing PV performance, system reliability and durability.

To improve system reliability and longevity the Solar Energy Lab focuses on developing advanced solar cell and module characterisation and diagnostic methods based on non-destructive testing techniques, including current-voltage characterisation, infrared thermography, UV fluorescence, electroluminescence imaging, combined with advanced computational methods for accurate characterisation, identification of defects and diagnostics. Through collaboration with national and international partners, the development of smart PV monitoring and diagnostics systems further drives innovation in this space.

Research on the spatiotemporal modelling of solar radiation and dynamic PV performance enables power output prediction in free-standing, sun-tracking systems and building-integrated PV (BIPV). We accurately model transient effects of varying environmental conditions on PV performance for the prediction of PV power output. These models address the need for online PV monitoring and diagnostics, smart grid processes and predictive management of BIPV. The emerging sector of Floating PV (FPV) had experienced rapid developments over the last few years and our research is vital for the reliable and durable operation of FPV systems in both fresh water and offshore environments.

Dr Eleni Kaplani
School of Engineering

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BLUEPRINT FOR A NEW ENERGY SYSTEM

An award-winning EU funded project on the Greek island of Tilos has allowed it to become the first energy independent island in the Mediterranean by solely relying on solar and wind power.

The TILOS (Technology Innovation for the Local Scale energy storage) project was a collaboration between the University of Anglia (UEA) and the University of Applied Sciences in Piraeus. TILOS also engaged 15 participating enterprises and institutes from seven European countries.

Konstantinos Chalvatzis, Professor of Sustainable Energy Business, who worked on the business models and commercial proposition of the project, has extensive experience in on- and off-grid smart systems integration that brings together renewable energy, heat and electricity storage, electric vehicles and dynamic demand management.

Key to the success of the new energy system was the development of Greece's first hybrid power station, which produces energy from its own wind and solar power generators combined with battery storage, all coordinated under a sophisticated energy management system. This makes the generation of electricity cost effective, reliable and completely green. The system is a blueprint that can be used across the world including faraway communities or even by providing clean and efficient energy for refugee camps or remote hospitals.

Prof Chalvatzis' current research aims to mainstream net zero delivery for on-grid consumers. Specifically, with focus on energy end users, Prof Chalvatzis has been the European Commissions' DG Energy Inaugural Chair (2015-2019) on Customer Engagement with Smart Grid and Energy Storage where he has coordinated research-led responses to EU level policy making.

Prof Konstantinos Chalvatzis
Norwich Business School

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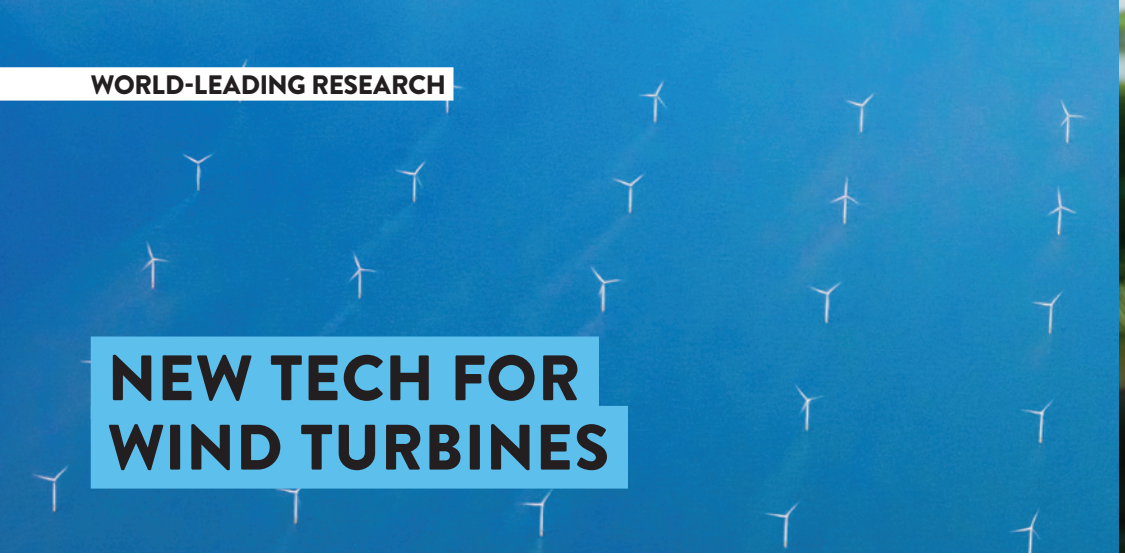

NEW TECH FOR WIND TURBINES

The most widely adopted (>55%) wind turbine drivetrain architecture comprises a doubly-fed slip-ring induction generator (DFIG), a fractionally (typically a third) rated frequency converter and a three-stage gearbox. The reason that this existing drivetrain is so widely employed is that it is cost-effective because it makes use of widely available industrial components and adopts a low cost partially-rated converter.

A new generator technology called Brushless Doubly Fed Machine (BDFM) has been developed by Dr Salman Abdi Jalebi (UEA) in a collaborative project led by Prof Richard McMahon, Warwick WMG.

In BDFM a medium-speed generator leverages the advantages of the existing DFIG drivetrain, but also improves upon the intrinsic reliability by adopting:

- Medium-speed Brushless DFIG, excluding brush-gear and slip-rings, known to be the highest failure rate components in the generator
- Partially-rated converter, identical to the high-speed wind turbine generators
- Two-stage gearbox, excluding the third high-speed stage, known to be the highest failure rate part of the gearbox.

Current research and development on BDFM by the group includes:

- BDFM design optimisation for wind and flywheel energy storage applications
- BDFM Vibration and noise analysis and mitigation
- BDFM fault diagnosis methods for real-time condition monitoring.

Dr Salman Abdi Jalebi
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BATTERY INNOVATION

In recent years, the demand for lithium ion batteries has grown exponentially as they have become the primary power source for portable electronic devices and electric vehicles. Prof Yimin Chao, an expert in nanotechnology, is developing novel materials to be used in these batteries, helping to increase their capacity and lifetime, making them more sustainable.

At present lithium-ion batteries restrict electric vehicles to a range substantially below that of conventional cars. Current research into the development of novel materials to maximise the energy storage capacity of these batteries includes replacing graphite as the anode material with silicon, due to its exceptionally high specific capacity. However, silicon undergoes volume change when in use which can cause mechanical stress resulting in a very short lifetime. This has restricted its commercial application.

Prof Chao is developing novel materials that will allow free expansion and contraction, reducing the mechanical stress associated with anodes in lithium-ion batteries. This development will improve the battery life and will allow for the deployment of the batteries in commercial applications. Due to the novel architecture of the materials, the anodes made with Prof Chao's novel materials have five times higher energy density and energy storage capacity than existing materials.

Prof Chao's research has established that his novel materials are viable to replace graphite as the commercially used anode material in these batteries. This innovation in battery materials is vital for their future use in electric vehicles, electronic devices and grid-scale energy storage.

Prof Yimin Chao
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THE WEATHER EFFECT

Globally and locally installed capacities of Wind and Solar Power continue to rapidly grow, harnessing the abundant clean energy sources around us, making a vital and significant contribution to the substitution of fossil-fuelled power generation.

The natural variability of the weather presents opportunities and challenges for the renewable energy sector and for grid operators. This is the focus of the research undertaken by Prof Steve Dorling and colleagues.

2020 saw an usually windy February, the sunniest Spring and sunniest month on record (May) in the UK and surrounding waters, contributing to record-breaking renewable energy power production. This variability in the contribution of renewable energy to meeting total electricity demand was the subject of the ECEM project (European Climatic and Energy Mixes). Led by UEA, the project delivered an online demonstrator tool which helps users assess the extent to which weather and climate variability affects the capacity of energy systems to meet demand for electricity, both in the recent past and under future climate change.

The weather can also affect the safe and efficient construction and maintenance of offshore wind farms, as well as their performance. Since 2013, Weatherquest Ltd, headquartered in the UEA Enterprise Centre, have been providing operational support services to leading wind turbine manufacturer Siemens, and to the offshore windfarm power generators RWE-Innogy, Eon, Scottish Power and EDP-Renewables in the North Sea, helping to optimise the construction and O&M phases of windfarm projects.

Weatherquest helps clients find safe weather windows in which to operate, including suitable wave conditions. The team also help clients address critical issues for the industry such as blade vulnerability to erosion caused by different rain droplet sizes and the impact of lightning on turbine reliability – a lightning climatology for the UK and surrounding waters is in preparation.

Prof Steve Dorling
School of Environmental Sciences

s.dorling@uea.ac.uk

www.weatherquest.co.uk

weatherquest

THE ENERGY INDUSTRY AND THE WEATHER INTERACT

Meteorological variables have a significant impact upon many areas of the energy industry.

WORLD ENERGY & METEOROLOGY COUNCIL (WEMC)

Prof Alberto Troccoli established WEMC at UEA to promote and enhance interaction between the energy industry and the weather, climate and environmental sciences research community.

WEMC's current projects include the EU H2020's The Added Value of Seasonal Climate Forecasting for Integrated Risk Assessment (SECLI-FIRM) led by UEA, which aims to demonstrate how improved climate forecasts can add practical and economic value to decision making processes and outcomes in both the energy and water sectors.

Meteorological variables have a significant impact upon many areas of the energy industry, including electricity price, renewable energy generation (solar, wind and hydro) and on energy demand. SECLI-FIRM provides seasonal forecast information to improve energy and water management decision making.

Better management decisions will ultimately lead to an improved supply-demand balance in the energy sector, and therefore to a more efficient energy system, with corresponding benefits for climate change mitigation.

www.wemcouncil.org

www.secli-firm.eu

OUR PARTNERSHIPS

UEA is a pioneer of interdisciplinarity, fostering innovation and collaboration both on and off campus. Our relationships with networks and organisations help drive energy innovation, linking researchers with businesses and facilitating developments to tackle the challenges facing the sector.

NORWICH RESEARCH PARK

Norwich Research Park's vision is to change lives and rethink society through pioneering research and innovation, reframing the future of research and delivering regional growth. It is home to a wealth of world class research in some of the areas of greatest importance to society today. As one of six institutions on Norwich Research Park, UEA researchers collaborate with a community of more than 3,000 world-leading experts, and 170 businesses based on the Park.

www.norwichresearchpark.com

norwich research park

COLLABORATIVE CENTRE FOR SUSTAINABLE USE OF THE SEAS (CCSUS)

UEA and Cefas have a long-established relationship dating back to 1965. In the 50th year we established the Collaborative Centre for Sustainable Use of the Seas (CCSUS) bringing together people and investment and providing an interdisciplinary hub for research, engagement, knowledge transfer and training.

Through CCSUS, our researchers work together to provide solutions to some of the biggest challenges facing the world's seas and oceans, from climate change, plastic pollution, biodiversity loss and overfishing, to ensuring energy and food security. The centre plays host to over 100 scientists from both UEA and Cefas combining leading-edge multidisciplinary marine science with practical expertise and the latest technological know-how to ensure that the seas and oceans are used sustainably for the benefit of people in the UK and worldwide.

The Centre is based in the School of Environmental Sciences at UEA but collaborative projects also involve expertise from the Schools of Economics, Biological Sciences, Chemistry, Maths, International Development, Computing Science and Pharmacy as well as other institutes on the Norwich Research Park.

Through its six themes, the Centre is delivering a step change in scientific understanding of the aquatic environment:

- Climate Change Impacts and Adaptation
- Marine Technology, Monitoring and Risk
- Ecosystem and Coastal Processes
- Life in the Seas
- Energy and Food Security
- Marine Systems and Society.

CCSUS Collaborative Centre for Sustainable Use of the Seas

Cefas

www.uea.ac.uk/ccsus

INNOVATION OFFSHORE

ORE HAS WORKED WITH

OVER 600 SMEs

OVER 250 R&D PROJECTS

OFFSHORE RENEWABLE ENERGY CATAPULT (OREC)

The OREC is the UK's leading technology innovation and research centre for offshore renewable energy. It has a significant track record supporting research and innovation, having engaged with over 600 SMEs to date, and supported the delivery of over 250 R&D projects. Their research is industry-led; the research strategy is influenced by consultations with key stakeholders including owner/operators, equipment manufacturers, the top-tier supply chain, SMEs, and innovators, as well as national and regional governments and enterprise agencies. Outputs from these consultations are then combined with research and community engagement, particularly academic engagement.

OREC research covers three primary areas, fulfilling many fundamental elements of the offshore renewable energy industry and relevant technology developments:

- Testing and validation of new technologies
- Operational Performance
- Disruptive innovation.

Through Research Hubs in partnership with leading UK Universities, which combine academic and industry skills and resources to better respond to industry's needs, the Catapult aims to build a stronger, complementary offering of academic research, innovation, demonstration and representative testing to the offshore renewables sector.

In January 2020, with support from the New Anglia Local Enterprise Partnership, OREC opened a new regional office at OrbisEnergy in Lowestoft.

UEA and OREC are working together to identify opportunities to collaborate and combine UEA's academic strengths with the Catapult's research and innovation capabilities and extensive industry knowledge. Projects are already in the pipeline that aim to deliver sustainable development of the South North Seas region, off the East Anglian coast, and to achieve better governance and integration of offshore renewables.

ore.catapult.org.uk

CATAPULT Offshore Renewable Energy

SKILLING UP FOR A SUSTAINABLE FUTURE

VATTENFALL

Vattenfall is one of Europe's largest producers and retailers of electricity and heat, whose goal is to enable fossil-fuel free living within a generation. In September 2021, Vattenfall and UEA entered into a partnership, to formalize some of the work ongoing involving staff and students spanning several areas of the University's research and teaching programme. The partnership will focus on building the workforce of the future and creating career opportunities linked to the offshore wind industry within the East of England region, as well as furthering public and business engagement to achieve net zero.

The partnership will see an expansion of UEA's role in delivering Vattenfall's Norfolk Offshore Wind Zone Skills and Employment Strategy, as well as specific skills programmes and collaboration on doctoral research programmes. This will support several different routes into the renewable energy industry, and contribute to bringing highly paid, highly skilled employment opportunities to the region.

The collaboration follows a successful pilot with students from UEA securing paid placements within Vattenfall's workforce to accelerate their learning and knowledge of working in the burgeoning offshore wind industry.

group.vattenfall.com

VATTENFALL

EAST OF ENGLAND ENERGY GROUP (EEEGR)

EEEGR is a key voice for the energy sector, putting the region and its expertise on the radar of major international players and influential politicians at regional and national levels. EEEGR has close links with UEA both through the Skills for Energy programme and through their Special Interest Groups (SIGs).

The Skills for Energy programme focuses on delivering skilled people to the industry for long-term careers and ensuring the existing workforce continues to meet the industry's needs, now and into the future. A long standing relationship with the School of Engineering sees UEA students participating annually in EEEGR's flagship South North Seas conference, providing students an opportunity to engage with industry and companies the chance to identify talented students who can work with the company through a placement and may become future employees.

EEEGR also operates several Special Interest Groups (SIGs) which aim to address current cross-cutting issues for the energy industry and produce tangible outputs. UEA are active members of the Marine Science and Technology SIG, which is focused on the development of technology, scientific methodologies and programmes to ensure sustainable use of the marine environment and support the development and maintenance of a diverse and healthy offshore energy economy. UEAs active involvement in the SIG enables bridges to be built between our researchers and the energy industry, contributing to knowledge exchange and enabling access to skills and resource.

www.eeegr.com

EEEGR Skills for Energy EAST OF ENGLAND

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