NEW ECONOMICS FOUNDATION

TURNING BACK TO THE SEA

A BLUE NEW DEAL TO REVITALISE COASTAL COMMUNITIES

CONTENTS

EXECUTIVE SUMMARY

ONCE THE SOURCE OF PROSPERITY FOR MANY COASTAL COMMUNITIES, THE UK'S SEAS ARE NOW SOMETIMES PERCEIVED AS A BARRIER TO THEIR ECONOMIC PROGRESS.

OUR COASTAL COMMUNITIES ARE OFTEN THE MOST DISADVANTAGED AND DISTANT FROM PUBLIC DECISION-MAKING, WITH MANY PEOPLE FEELING LEFT BEHIND.

Somewhere, Britain lost something very important: our belief in the sea as a source of prosperity. It is our task to get it back. Turning back to the sea means getting more people excited about what our coast has to offer and growing a new generation of innovative coastal and marine businesses. The Blue New Deal is a plan to put people in control so they can shape local priorities, value their greatest asset, and revitalise the UK coast.

Fishing communities continue to lose jobs and revenue, as fishing rights accumulate in the hands of a few unaccountable companies. Many coastal areas find it hard to retain young people and recruit teachers, as they lack the appropriate physical and digital connectivity. Without the necessary support, communities and businesses are struggling to make the most of the coast's abundant potential for cleaner energy. And without the appropriate resources, local authorities are discouraged from innovating in more sustainable ways to protect homes and businesses from climate change.

"BUT PEOPLE ON THE COAST ARE EAGER TO TAKE CONTROL. THEY WANT TO BE IN THE DRIVING SEAT, LEADING A NEW APPROACH TO REGENERATING THEIR AREAS."

And already the coast is dotted with great ideas and projects – from sustainable shellfish farming projects in Wales and the south west of England, to a world-leading hub for marine renewable energy in Orkney.

Our challenge now is to build on those ideas and help them grow to become opportunities for fundamental, wide-scale change.

A Blue New Deal for coastal communities has to begin by asking how communities can be supported to make the most of their unique assets, now and for future generations.

In practice, that means asking:

- How can we empower coastal communities to become centres for a renewable energy revolution?
- How can we support coastal destinations in attracting visitors year round?
- How can we ensure small fishing boats become and remain economically viable?
- How can coastal communities tackle the impact of second-home ownership on the local housing market, or benefit from inward investment without leaving local people priced out of their communities?

And having asked the questions – speaking with and learning from hundreds of people up and down the country – we can now offer real answers that will help people on the coast take control of what affects their lives, today and in the future.

Some of what needs to happen would broadly apply anywhere, and benefit any community in the country – like developing new sources of finance for local businesses. Others are unique to the specific challenges and assets that coastal communities have – like adapting to coastal erosion or innovative marine leisure businesses.

A healthier coastal and marine environment plays a key role in delivering many of the things that coastal communities need and want.

There are four things that need to happen to revitalise the UK coast, and they must work together to deliver its potential.

1. Local people need to be in control, leading a new approach to regeneration.

2. Coastal communities need to work together to explore how different areas of the coastal economy – including tourism, energy, fisheries, and aquaculture – can help inspire and support each other, to turn again to the sea for jobs and economic prosperity.

3. More needs to be done to support coastal areas to plan for a changing coast. Proactive and innovative approaches are needed to help make the UK coast more resilient to climate change.

4. Government must build the capabilities of places, people, and communities; support projects, small or large; and ensure there is the digital and transport infrastructure that communities need to thrive.

There has never been a more urgent need for communities to come together and lead the change themselves. The Brexit vote was a wake-up call: communities left behind by our economy and ignored by our politics are demanding to be heard. In the face of inequality, political and financial instability, and increasingly urgent threats to the natural environment we depend on, we all want to see a new economy that benefits areas of the country whose potential is not being fulfilled.

"THE ACTION PLAN THAT FOLLOWS IS JUST THE BEGINNING. MAKING IT ALL HAPPEN WILL REQUIRE WORKING AT DIFFERENT LEVELS: COMMUNITIES, NATIONAL AND DEVELOPED GOVERNMENTS, AND BUSINESS AND INVESTORS."

For investors, there is huge potential for supporting the new businesses and innovative projects that are needed.

For governments, the Blue New Deal offers the building blocks for a coastal industrial strategy, which could play a key role in helping to rebalance our economy and begin to close the gaps between the UK's marginalised and well-off regions and communities.

The New Economics Foundation will continue to work with coastal communities from all regions of the UK, to help them reinvent and take control of their local economies, and to speak with a louder voice in government and parliament.

Join us in helping communities shape a better future for the UK coast
www.bluenewdeal.org

TWENTY PRIORITIES TO REVITALISE COASTAL COMMUNITIES

HEALTHIER AND MORE PRODUCTIVE SEAS CAN BE AN ENGINE FOR MORE AND BETTER JOBS INTO THE FUTURE.

Focusing on these 20 priorities, through innovation and greater investment in building expertise and capacity in our coastal communities, has the potential to support around 160,000 additional jobs and add about £7.2 billion to the coastal economy.[1]

PUT LOCAL PEOPLE IN CONTROL

1. **Communities want the power to define what economic success looks like for their areas.** Community-led plans should be taken far more seriously within the wider decision-making system. The economic progress they work towards should be defined by locally felt economic benefits, rather than simply by contribution to the area's gross value added (GVA) or short-term financial returns.

2. **People need the capability and opportunities to play active roles in influencing their local place and economy.** This includes offering local training in technical and financial skills to build local expertise; providing forums and events for people to meet and interact; and rekindling people's connection with their local natural environment.

3. **People and communities want greater control over the public goods and services they rely on, such as housing, energy, land, and transport. Inward investment needs to add value to a place without pricing local people out.** Innovative models of common ownership can help harness assets like land and energy for the good of the community.

PLAN FOR COASTAL CHANGE

4. **Coastal areas have unique planning challenges and they need confidence to plan robustly and innovate for the future.** A regional planning tier should be re-established to integrate land, coastal, and marine planning, and make it easier for different areas, authorities, and economic sectors to work together.

5. **Coastal communities need support to face the difficult decisions imposed by a rapidly changing climate and coastline, including relocation.** Innovative approaches to adapting to coastal change need to be seen as an equally important measure as just defending the coast, and should be reflected as such in planning policies.

6. **Experimentation is crucial to help build the evidence needed to prioritise alternative solutions to managing our coast.** Government should support coastal areas in funding innovative approaches in their locality.

INVEST IN A COASTAL TRANSFORMATION

7. **Government should treat the coast as a unique case in its national approach to both industrial strategy and infrastructure development.** There should be a coastal industrial strategy and targeted public investment to build the capabilities of places, people and communities on the coast.

8. **Local projects need better access to finance than the big banks are able or willing to provide.** Government should encourage a more diverse network of local and regional banks to channel investment into sound local businesses.

TOURISM

9. **Visitors – from home and abroad – need to be inspired by how much the UK coast has to offer and to find it easy and affordable to visit.** A UK coastal tourism push is needed; transport connectivity and affordability must be a high priority.

10. **Accessible, wildlife-rich seafronts, and a healthy marine environment, are assets to tourism and vital for communities to take pride in what their local areas have to offer.** Post-Brexit, the government should retain and strengthen the EU's Bathing Water Directive[2] to have the continent's cleanest coastline and beaches.

11. **Strong local supply chains retain more value locally – it shouldn't just be a few shops that benefit from visitors to a place.** Communities, industry, training centres, and government need to play their part in supporting small and medium enterprises (SMEs) and businesses that create positive local economic, social, and environmental impact.

ENERGY

12. **The UK should lead the world in offshore and marine renewable energy.** Businesses, local authorities, innovators, and communities need a clear commitment from government to long-term innovation funding and to rapidly phase out support and rhetorical backing for fossil fuels.

13. **Communities and towns should be empowered to become centres for community-led renewable energy** – both community owned energy and other projects with genuine local benefit. As part of this, the right conditions and proper access to finance are essential.

14. **The UK needs an ambitious programme to insulate homes and buildings, reduce energy bills, and cut carbon emissions.** Energy efficiency must be a UK national infrastructure priority.

FISHERIES

15. **Fishers need healthy fish stocks – today and for years to come.** National policy must follow scientific advice to set fishing limits sustainably and preserve future fishing opportunities.

16. **Smaller boats are the lifeblood of thriving ports – those that are fishing sustainably need to get a larger share of fishing opportunities.** The UK currently gives only 1.5% of the national fishing quota to the smallest category of boats, even though they make up over 75% of vessels.

17. **Fisheries management and governance need to better support fishing communities.** The UK needs a small-scale producer organisation (PO), which can give smaller boats a voice and greater control to help rebalance power in the fishing industry.

AQUACULTURE

18. **Aquaculture innovators need the government's support and commitment to pioneer new sustainable aquaculture businesses,** including funding to support innovation focused on raising environmental standards.

19. **Businesses should come together and collaborate with local authorities to set up local or regional 'seafood hubs'** that provide support, training and marketing opportunities to aquaculture producers and fishers, and better connect them with the local economy and communities.

20. **Clean water is essential for fish and shellfish health, and therefore crucial to the success of aquaculture businesses.** As part of a wider effort to have the continent's cleanest coastline and beaches, regulators must ensure the UK meets current EU water quality targets, and increase, or at least keep the same, targets post-Brexit.

INTRODUCTION

COASTAL COMMUNITIES CAN TURN TO THE SEA ONCE AGAIN FOR JOBS AND INCREASED WELLBEING, WHILST BUILDING A STRONGER ECONOMY FOR THE FUTURE. TALKING ABOUT THE FUTURE OF THE UK COAST, AND ITS UNIQUE CONTEXT, MAKES SENSE TO PEOPLE AND IS A TIMELY DEBATE.

A UNIQUE ASSET

The UK coast is home to more than 11 million people.[3] Coastal communities are not all the same – they range from small islands and fishing villages, to port towns and major urban centres, and they have different contexts and local priorities.

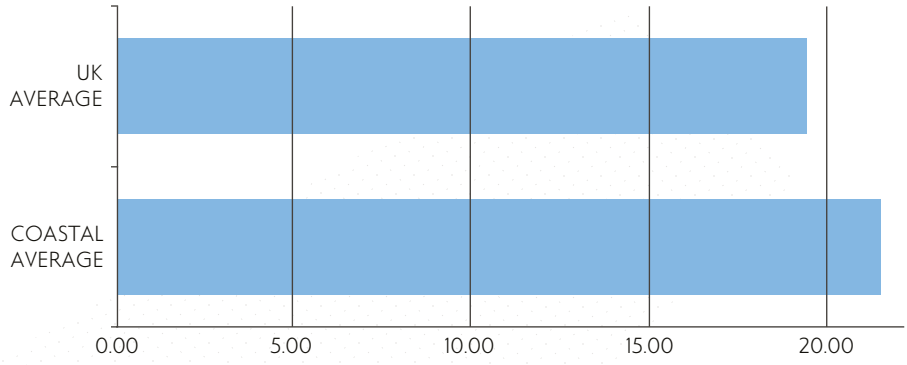
But dotted across the UK's vast coastline, they all have one thing in common: they are at the forefront of the UK's relationship with the oceans. The coastal and marine environment is coastal communities' unique asset, it is what makes them different, and it is an essential part of their history and their identity.

The future of the oceans is relevant to all of us, but coastal communities depend on it for jobs, economic activity, and wellbeing.

THE UK COAST TODAY

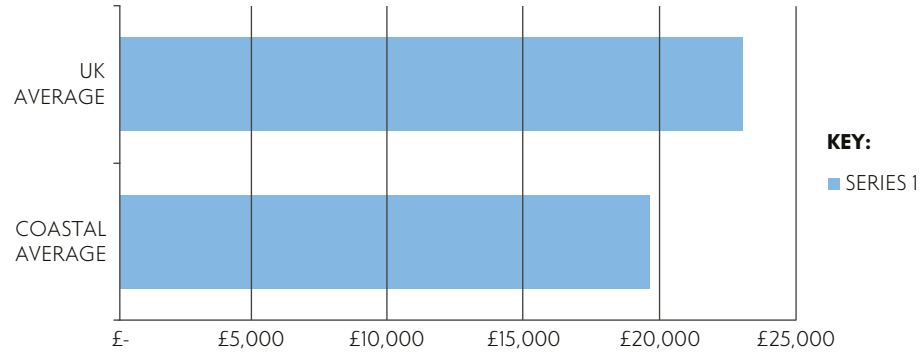
Today, coastal areas top the list of the most deprived areas in the UK.[4] When compared to non-coastal areas, they see higher levels of underemployment, economic inequality, and educational underachievement (Figures 1–3).

FIGURE 1. INDEX OF MULTIPLE DEPRIVATION



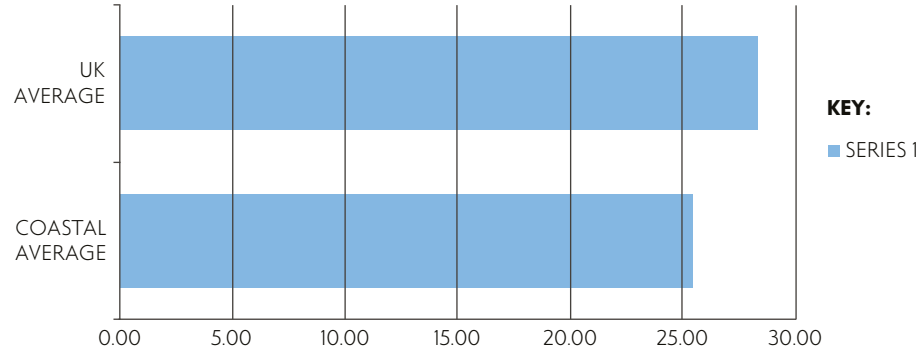
Source: Office for National Statistics (ONS)[28]

FIGURE 2. AVERAGE INCOME PER HEAD



Source: Office for National Statistics (ONS)[28]

FIGURE 3. PERCENTAGE OF POPULATION WITH HIGHER EDUCATION LEVEL+



Source: Office for National Statistics (ONS)[28]

Coastal communities also have an increasing elderly population and experience higher outward migration – young people are often forced to move elsewhere due to a lack of employment and wider social opportunities.[5] For many coastal and island communities, especially but not only those that are remote, there are additional challenges in terms of infrastructure and connectivity (Case study 1).

The *2016 State of Nature* report showed how nature is faring worse in the UK than in most other countries. Yet, over the last eight years, public spending on UK biodiversity has fallen by 32%.[6] For the coastal and marine environment, the key challenges remain the impact of our activities – a combination of pollution, over-exploitation, and climate change.

Climate change is also posing particular challenges for many coastal communities, and this will only get worse without rapid global action to cut carbon emissions.

Increasingly stormy and extreme weather will affect coastal infrastructure, such as local energy supplies, and pose challenges to isolated areas and those with older populations, who are reliant on public services, such as transport and health. More frequent flooding is likely to bring down house prices, affect

CASE STUDY 1

CHALLENGES FOR MORE REMOTE COASTAL COMMUNITIES

The Durness Development Group is a community company in Durness, the most north westerly village in the Highlands, with a population of around 400. The New Economics Foundation heard from the group about its struggle to access finance to build a small community tidal harbour and a pier.

The Durness Development Group has plans to develop the local economy and create local opportunities by making the most of its geographic position, which it says, is a missing link for leisure boats crossing the area. But it currently lacks the necessary infrastructure and the community has no safe access to the sea.


© Lee Carson

The community has no safe access to the sea.

Like other communities in the country, the local population in Durness is shrinking, which poses a challenge to its economic future. Several families have moved away for work and the local school has gone from 27 to 10 pupils.

Find out more about the Durness Development Group at www.developingdurness.org

tourist attractions, discourage further investment, and have a negative impact on people's wellbeing. Rising sea levels are also forcing many communities to make difficult decisions, such as having to leave their homes and communities, as they battle with coastal erosion.

HOW DID WE GET HERE?

The complexity of challenges facing the UK coast has not developed overnight, and many have been recognised for some time.

- In 2007, a select committee report[7] on communities and local government already highlighted many of these challenges as long-term trends. It concluded that "seaside towns are the least understood of Britain's 'problem' areas", and that "the government does not sufficiently appreciate the needs of coastal towns".

- In 2002, a coastal socio-economic scoping study[8] for the Scottish government, highlighted that "there has been minimal interest to date in considering the socio-economic experiences of coastal communities" and that "as part of the development of any future national coastal management framework, it is important that mechanisms are set in place for promoting, managing and monitoring coastal economic development programmes".

In recent years, several national policies and government initiatives have been developed, thanks to the efforts of a range of groups on the coast and government agencies (Case study 2).

More sustainable and innovative approaches are already happening, but they are still far too few to deliver the transformation that is needed. What policies still have not been able to address is that the problem for many coastal communities is that they lack the scale of power and resources needed to address their complex and many unique challenges. Now they face an increasingly uncertain economic future.

CASE STUDY 2
GROWING NATIONAL EFFORTS TO SUPPORT THE UK COAST

The 2009 Marine and Coastal Access Act (MACAA)[1] has improved coastal access; created marine regulators; and is helping to establish a series of Marine Conservation Zones (MCZs), marine plans, and different aspects of marine licensing. Since 2009, devolved administrations have built on MACAA and established their own marine acts (Marine Scotland Act 2010;[2] Marine Act Northern Ireland 2013)[3], and Wales has developed the Environment (Wales) Act 2016.[4]

The 2011 UK Marine Policy Statement[5] set out a vision for the UK to deliver "clean, healthy, safe, productive and biologically diverse oceans and seas".

In 2012, the UK government's Coastal Communities Fund (CCF)[6] was launched to support "coastal communities that are able to use their assets (physical, natural, social, economic and cultural) to promote sustainable economic growth and jobs". The initiative, administered by the Big Lottery Fund, reinvests some of the profits made from coastal and marine assets, managed by the Crown Estate, back into the communities closest to them. Since 2012, it has awarded grants to 218 organisations across the UK to the value of £125 million. This funding is forecast to deliver over 18,000 jobs UK-wide, and help attract over £240 million of additional funds to coastal areas.

In 2015, the government announced that the CCF would be extended to 2021 with at least £90 million of new funding available.[7] Also in 2015, the UK government supported the creation of 118 Coastal Community Teams in England[8] – bringing together local residents, business, and councils. The teams have been tasked with coordinating regeneration projects in their area and helping to shape bids for the Coastal Communities Fund.


© David Iliff

Clean, healthy, safe, productive and biologically diverse oceans and seas.

CO-DEVELOPING AN ACTION PLAN

The UK public, when asked, is consistent and clear about what they want their economy to deliver:[9] secure and well-paid jobs, increased wellbeing, effective public services that guarantee good health and education, low levels of economic inequality, and a healthy environment.

The Blue New Deal initiative, led by the New Economics Foundation and launched in summer 2015, offered a joined-up vision for the UK coast, one that could balance the social and economic needs of communities with those of our coastal and marine environment, ensuring their return to prosperity.

In recent years, coastal towns have grabbed headlines with names like "poverty-on-sea"[10] and even "misery-by-sea".[11] So, coastal communities welcomed a fresh and more positive narrative about the challenges they face.

The Foundation brought together a diverse network of people, from all regions of the UK, to explore the remaining barriers for success, develop ideas, and propose solutions, to turn a shared vision into a reality. This report is a result of this process – what we have heard and learned – a comprehensive package of what needs to happen to revitalise the UK coast.

1. DECIDING WHAT NEEDS TO HAPPEN

PEOPLE ON THE COAST WANT TO BE IN THE DRIVING SEAT, LEADING A NEW APPROACH TO REGENERATING THEIR AREAS. AND THERE ARE NEW POSSIBILITIES ALREADY GETTING STARTED IN COMMUNITIES ALL OVER THE COUNTRY.

The coast is dotted with great ideas and projects – from sustainable shellfish farming projects in Wales and the south west of England, to a world-leading hub for marine renewable energy in Orkney. Our challenge now is to build on those ideas and help them grow to become truly transformative opportunities for change.

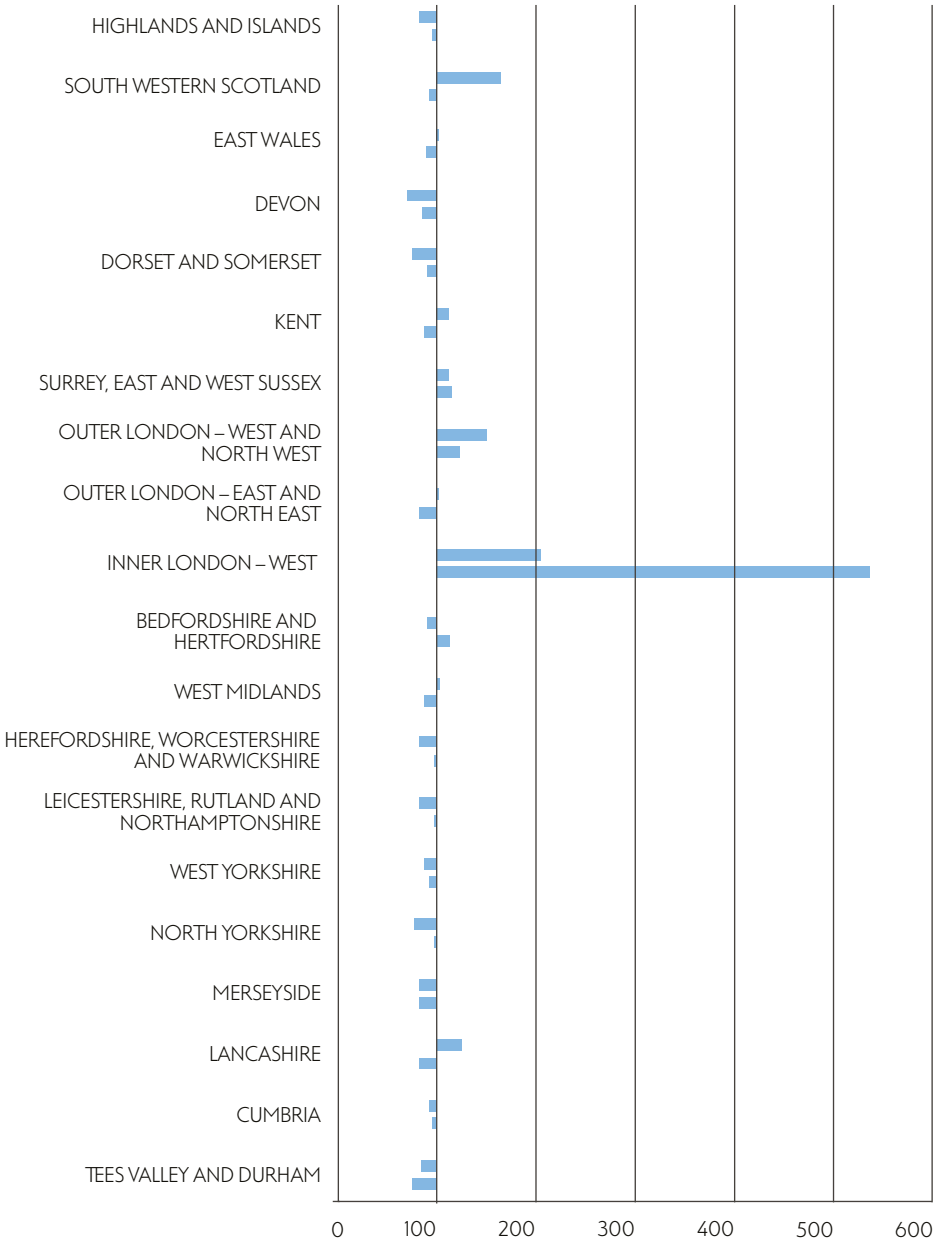
PART OF A BIGGER PROBLEM

When listening to communities on the coast, many feel disconnected from sections of the country where decisions are being made, which affect their lives. They see how our economics and politics seem to be benefiting some areas of the country more than others. And they are right.

The UK is the fifth wealthiest nation in the world. But it is also the only one of the world's leading economies where inequality has increased[12] this century. Britain is home to some of the richest and poorest regions in Western Europe, and the gap between their economic fortunes is widening.[13]

Figure 4 compares GDP per person (adjusted for purchasing power) between regions in the UK – or how people in different areas are able to afford buying things like food or a house. The 100 line shows the average in the whole of Europe (EU28). More than half of UK regions (NUTS2 regions) are below the European average, whilst London far exceeds anywhere else in Europe. Struggling coastal communities are not alone. They are a part of a bigger problem. They sit alongside other areas in the UK that have never truly recovered from the loss of traditional industries and jobs over the past decades.

FIGURE 4. REGIONAL INEQUALITY IN THE UK COMPARED TO THE EU28 AVERAGE (=100)



Source: Eurostat
Gross domestic product (GDP) per inhabitant in purchasing power standard (PPS) in relation to the EU28 average, by NUTS2 regions, 2014

KEY: 100 = EU28 AVERAGE

Since the 1970s, successive public policies have failed to inject new life into marginalised UK economies:

- They have not been able to generate the appropriate investment in those areas to support good sustainable jobs and attract ongoing investment.
- They have increasingly widened the gaps between people, their local assets, and resources, with ownership of public goods and services – such as energy, land, and fishing rights – going into ever fewer and unaccountable private hands.
- They have made these communities more dependent on government hand-outs, stripping them of a sense of pride in creating their own opportunities for a better future.

Perhaps it's little surprise that the top five areas that voted to leave the EU were all coastal.[14] Communities left behind by our economy and ignored by our politics are demanding to be heard.

For coastal communities, taking action to support, inspire, and regenerate the UK coast was important before Brexit; now, it's essential. Their geography, compounded by their social and economic challenges, make them some of the most vulnerable areas in the country to future economic and environmental shocks.

There has never been a more urgent time for communities to come together, to share skills and resources, and lead the change that is needed, themselves.

FOUR THINGS THAT NEED TO HAPPEN

There are four things that need to happen to revitalise coastal communities, and these must work together to deliver its potential:

1. **Put local people in control:** Section 2 outlines how people and communities can take control and lead a new approach to regenerating their areas.

2. **Deliver good jobs and healthier seas:** Sections 3–7 set out how coastal communities can work together to explore how different areas of the coastal economy – including fisheries, aquaculture, energy, and tourism – can help inspire and support each other, to turn again to the sea for jobs and economic prosperity.

3. **Plan for coastal change:** Section 8 explores the urgent need for proactive and innovative approaches to help make the UK coast more resilient to climate change.

4. **Invest in the coastal future:** Section 9 looks at the role of government, as well as public and private finance, in building the capabilities of places, people, and communities; supporting projects, small or large; and ensuring there is the digital and transport infrastructure that communities need to thrive.

Here's how we can do it.

2. PUTTING LOCAL PEOPLE IN CONTROL

THE SUCCESS OF LONG-LASTING COMMUNITY REGENERATION WILL ULTIMATELY BE ABOUT LOCAL PEOPLE – THOSE WHO LIVE AND WORK IN A LOCAL AREA, INCLUDING BUSINESSES, NON-PROFIT ORGANISATIONS, SCHOOLS, LOCAL GOVERNMENT AND COMMUNITY GROUPS – INCREASINGLY HAVING THE POWER AND THE ABILITY TO DECIDE AND ACT ON WHAT MATTERS TO THEM.

Coastal, and non-coastal communities alike, need to be given the powers and capabilities that they need to shape their own economic future.

WHERE ARE WE NOW?

Every place is different, so we can't define what works for each community. Different people in an area should be able to engage in shaping their local priorities and testing different approaches to regeneration, and have the opportunity to play a genuine role in decisions that will ultimately shape their future.

The coast is an asset for coastal communities, but who owns it? This question became pertinent as we talked to people from around the UK coast about the potential for communities to turn again to the sea for opportunities. It is fair to say the vast majority of the UK coast, just like inland, is in private ownership – including many important seafront assets like ports, and even beaches.

For communities, this is often a barrier to developing local economic plans; for seafront managers, this creates extra challenges when trying to manage the coast or implement measures to improve public amenities.

Private land ownership is not always a bad thing, if areas are still accessible to the public, and managed in the public good (Case study 3). But for people and communities to take control, they need to have a say and power over their shared resources, and the places where they live (Case study 4).

Putting people in control means building their capabilities and supporting them in taking ownership of their places, their local resources, and their working lives; helping them build resilient economies that can withstand external shocks; and enabling them to deliver on shared goals.

These principles would broadly apply anywhere. But here, we talk about what needs to happen, with a focus on what that means for coastal communities.

CASE STUDY 3
COASTAL OWNERSHIP: THE NATIONAL TRUST

The National Trust is a charity set up to restore natural assets in the UK, protect them, and make them accessible to everyone. It is a cherished national institution and by far the largest coastal owner in England, Wales, and Northern Ireland, looking after 775 miles of coastline.

Since 1965, its Neptune Coastline Campaign[10] has received donations from hundreds of thousands of people, enabling the purchase of 574 miles of coastline. Over the years, it has developed several good approaches in public engagement and land management for the public good.

The Neptune Coastline Campaign has puchased 574 miles of coastline since 1965.

CASE STUDY 4
COMMUNITY LAND BUY-OUT

In 1997, the residents of the Hebridean island of Eigg[11] undertook a pioneering community buy-out, which "gave islanders control of their future for the first time" – taking control of their land[12] and empowering the community to make decisions about the future of the island.

The community trust then set up community-owned hydro, wind, and solar capacity to power the island, including an electrification project in 2008 – with the result that over 95% of the island's electricity demand is now supplied by renewables and the population has grown by 40%.

The islanders of Eigg are a great example of energy contributing to place-making, regeneration and a healthier environment. Since then, they have inspired a wave of similar schemes on other Scottish islands.

Over 95% of the island's electricity demand is now supplied by renewables.

WHAT NEEDS TO HAPPEN NEXT?

1. Communities want the power to define what economic success looks like for their areas. Decisions need to be taken as close, and as accountably, as possible to those they will affect, through more inclusive democratic institutions.

- *Community-led plans should be taken far more seriously within the wider decision-making system. The economic progress they work towards should be defined by locally-felt economic benefits, rather than simply by contribution to the area's GVA or short-term financial returns.* This would enable communities to invest in what matters to them, including delivering social and environmental outcomes, such as increasing local wellbeing, a more equal distribution of economic benefits, and environmental sustainability (Case study 5). *Community-led plans, such as Neighbourhood Plans, must be integrated with the wider economic development plans in an area, for example, with those led by local enterprise partnerships.*

- *Governments should give local authorities greater powers over planning, taxation, spending, and borrowing, and require them to work closely with community-led economic and development plans.*

- *Local public services should be increasingly co-produced.* Co-production is an approach that turns people from passive recipients of a service into active participants. It directly engages local people in tailoring their local services, by making use of local skills, knowledge, and experiences.

CASE STUDY 5

RETHINKING THE LOCAL INDICATORS OF ECONOMIC SUCCESS

In 2010, local activists and change-makers in Bristol came together to form the Happy City project.[13] They realised that in order to improve the lives of people in local communities around the UK they needed a new story that redefines what it means to prosper.

Happy City ran an extensive engagement process over a three-year period working both with leading experts around the UK and beyond; with local people through community events; with local policy makers and talking to local community organisations and housing associations.

Happy City and the New Economics Foundation worked together to develop a new measure to reflect the things that are known to most influence wellbeing and that matter most to local people – the Happy City Index.[14] They have since published results for the index for other cities around the UK.

The Happy City project developed a new measure to reflect the things that matter most to local people.

- Local economic plans can ensure a more holistic approach to development, and make sustainable use of environmental resources, including materials, waste, physical spaces, and energy. *Strategies, such as neighbourhood plans, should be built around available assets (like beaches, iconic buildings, and heritage sites), skills, and opportunities to decarbonise the economy.*

2. People need the capability and opportunity to play active roles in influencing their local place and economy.

- Local economies should be able to generate good jobs, wellbeing, and wealth within the local area, and distribute economic benefits fairly and widely. *Government needs to ensure that the UK's economic policy supports the economic resilience of places. Community groups should have access to training in technical and financial skills to help them develop their own robust and well informed local economic vision and strategy.*

  – Methods, such as the community economic development[15] approach, are tools that communities can use to deliver more sustainable development locally. Strong local economic plans would, for example, support a diverse network (in sector and scale) of businesses and organisations, which are well connected by short supply chains, so that money keeps flowing into the local economy as much as possible, rather than leaving the area straight away. This strong 'multiplier effect' can be achieved in different ways, including through channelling public and private sector procurement more effectively, through SMEs. Local multiplier assessments (e.g. LM3)[16] can be used to build evidence of the wider economic benefit of local procurement.

- *Communities can create opportunities (e.g. forums, events, initiatives) for people to come together, which work to engage a wide representation of people locally, without discrimination. Government can provide increased access to information, to enable communities to self-organise and actively engage in the issues affecting their areas.* It can achieve this by:

  – Recognising and strengthening the role of groups and organisations on the UK coast (e.g. coastal partnerships, coastal groups, coastal community teams, community forums), which are creating opportunities for those with a stake in the marine environment to develop and deliver ideas together. *Investment should also go into building local capacity (e.g. training in new skills and acquiring resources) so that local institutions can work more effectively.*

  – *Encouraging a network of businesses and organisations (public and private sector), which enable greater democratic employee representation,* with a view to increasing workers' share of productivity gains, reducing wage inequalities, and giving people more control over their work and time, so they are able to actively participate in community life (e.g. co-operatives, mutual ownership).

- *Government, communities, and businesses can maximise the use of the coast and the marine environment as a health and education asset by supporting initiatives that rekindle people's connection with their local natural environment, built assets, and other members of the community.* Such initiatives enable people to gain increasing knowledge of their place and make the most of it together, and can help public bodies deliver public goods – such as health and education – more cost-effectively (Case study 6).

CASE STUDY 6

BEACH CLASSROOMS, CITIZEN SCIENCE AND SEA SWIMMING

BEACH CLASSROOMS

Learn to Sea[15] is an award-winning marine education facility in South Devon, run by the marine biologist Maya Plass, which uses the coast as an educational resource. Her approach allows children the chance to use the South Hams coastline to learn while also having fun. Through engaging rock pool sessions, beach activities, and play, schoolchildren are taught curriculum-focused subjects and marine conservation at South Milton Sand's 'sea school'.[16] Schools on the coast can make the most of 'outdoor' classrooms, such as local beaches, and develop lessons on the coastal and marine environment, and economy.

© Sussex Partnership NHS Foundation Trust

Open-water swimming has significant benefits for both mental and physical health.

COASTAL AND MARINE 'CITIZEN SCIENCE'

'Citizen Science' initiatives, such as CoCoast[17] and Seasearch[18] (volunteering underwater), are about members of the public contributing to scientific knowledge and discovery by collecting data or by analysing and interpreting findings. It is a fun way to bring local people together and it can help encourage future scientists. CoCoast represents a unique collaboration between a wide range of organisations who believe members of the public should be empowered to contribute in meaningful ways, sharing their skills and enthusiasm, rather than just observing scientists. They have Training Hubs at seven university, research and conservation organisations around the UK. A number of other organisations bring expertise on science, policy and volunteer-experience to the project. Seasearch is a project for volunteer sports divers who have an interest in what they're seeing under water, want to learn more, and want to help protect the marine environment around the coasts of Britain and Ireland. The main aim is to map out the various types of seabed found in the near-shore zone around the whole of Britain and Ireland.

SEA SWIMMING TO TREAT MENTAL HEALTH – AND HAVE FUN

Open-water swimming has significant benefits for both mental and physical health. The Outdoor Swimming Society,[19] established in 2006, is a UK initiative led by individuals who wanted to provide a space within which people could share the joy and adventure of swimming outdoors.

"WHEN SO MANY PEOPLE GET TOGETHER, JUMP IN THE WATER, AND EXPERIENCE THAT EXHILARATION ALL AT ONCE – IT'S ELECTRIC"

MAUREEN, WHO STARTED OPEN WATER SWIMMING WHEN SHE WAS AT AN ALL-TIME LOW IN HER LIFE

Health bodies can also support and help deliver health benefits from the coast and seas, through open water swimming programmes, like the one led by Brighton Recovery College,[20] working with people with mental health problems. "As a group of passionate sea swimmers, this was something we wanted to share with those who might otherwise struggle to find the confidence to give it a go. Brighton has a heritage of visitors coming and 'taking the waters' and so it seemed the ideal place to pilot a modern-day equivalent. Although we got quite a few surprised reactions when we suggested taking people with mental health problems swimming in the sea, there were enough others who shared our passion and could see the value in what we were trying to do. With the support of Saltwater Events, an open water swim coaching company, we able to develop and safely deliver a sea swimming course at the Brighton Recovery College." (Hannah Denton, Sussex Partnership NHS Foundation Trust.)

CASE STUDY 7
COMMUNITY-DRIVEN MARINE MANAGEMENT

The Community of Arran Seabed Trust (COAST) is a community organisation on the Isle of Arran, west Scotland. It is one of the few examples in the UK of community-driven marine management.

"THE CORE CONCEPT UNDERLYING EVERYTHING COAST DOES IS THAT WHEN MARINE LIFE THRIVES SO WILL THE COASTAL COMMUNITIES WHICH DEPEND UPON THE SEA FOR THEIR LIVELIHOODS. IT IS THEREFORE IN EVERYONE'S INTERESTS TO ENSURE WE MANAGE OUR SEAS AND FISHERIES EFFECTIVELY FOR OUR OWN GENERATION AND GENERATIONS TO COME."

ANDREW BINNIE, EXECUTIVE DIRECTOR, COAST

The Lamlash Bay No Take Zone is recovering well with larger lobsters and significantly more scallop spat recorded in the zone. This is expected to have a positive effect on the surrounding waters, benefiting scallop divers and creelers that work within the newly created South Arran Marine Protected Area (MPA). All this positive change also attracts a lot of scientific and media interest, generating many tens of thousands of pounds for the local economy in direct spend and free advertising.


© COAST Arran for NEF

COAST's strength is that it involves different people in the community. It has given local people greater ownership of how their local area is managed and developed. And it works together with other interest groups at a national and international level.

The number of plastic bags found in 2016 was almost half when compared to the previous year. MCS believes this is a direct result of the 5p charge, which was implemented across the whole of the UK. However, the number of drink containers, caps and lids rose up more than 4% on the previous year. MCS supports calls for a Deposit Return System (DRS), which would give a financial incentive to return plastic drinks bottles.

"THE NEED TO RESTORE MARINE HABITATS AND PROPERLY MANAGE THESE ECOSYSTEMS FOR THE BENEFIT OF SOCIETY AND THE ECONOMY IS NOT UNIQUE TO THE CLYDE. WHAT IS REALLY EXCITING IS THAT OTHER GROUPS ACROSS THE COUNTRY ARE WAKING UP TO THE HUGE POTENTIAL OF OUR MARINE ENVIRONMENT.

WE ARE EXCITED TO BE WORKING WITH THE NEW ECONOMICS FOUNDATION TO MAKE THE BLUE NEW DEAL A REALITY. THERE'S MUCH MORE WE CAN DO TO BUILD ON OUR SUCCESS IN ARRAN, AND WE WANT TO SEE MANY OTHER COMMUNITIES AROUND THE UK'S COAST LEADING ON MARINE MANAGEMENT IN THEIR AREAS AND THRIVING ONCE AGAIN."

ANDREW BINNIE, EXECUTIVE DIRECTOR, COAST

COAST involces different people in the community, giving locals greater ownership of their local area.

3. People and communities need greater control over the public goods and services they rely on, such as housing, energy, land, and transport. Inward investment needs to add value to a place without pricing out local people, or leading to excessive gentrification.

- *Government should work with local authorities to encourage and support communities that wish to play a leading role in managing their coastal and marine environment,* for example through community-led marine protected areas (Case study 7).

- *Government should create and play an active role in supporting new ways of opening up and sharing access to common resources* – for example, community-fishing quotas,[17] community land trusts,[18] community energy, and asset transfer or the disposal or acquisition of land. This is broadly already happening in Scotland via the Scottish Land Reform Act 2003[19] and the Scottish Community Empowerment Act 2015.[20] The wealth of information and best practice on these and other models should be held in one place and actively promoted to communities.

- *Local economic development needs to safeguard local access to housing.* This can be done in different ways:

  – Public and community partnerships can build homes with affordability locked in over-time (e.g. community land trust, mutual homes ownership schemes).[21]

  – With the appropriate powers, councils could adopt living rents for the area (basing rents on local incomes rather than local markets).[22]

  – Local authorities should move away from selling off public land for short-term capital gain, and instead consider ways to generate long-term rental income from land assets[23] – for example, through providing high-quality, energy-efficient social housing. Attracting institutional investment and community-led housing partnerships would allow local authorities to invest in housing in this way, despite constraints put on council borrowing.

  – Local authorities can limit the impacts of second-home ownership in the area, by working with communities to ensure the local housing market meets the local housing needs. For example, second-home ownership can be curbed[24] through creating a neighbourhood development plan that prohibits new builds for non-residents, following St Ives' example (Case study 8).

CASE STUDY 8
ST IVES VOTES ON SECOND HOMES

In 2016, St Ives, a coastal community in Cornwall, held a referendum to ask its residents whether they agreed with a ban on building any housing other than 'principal homes'. The 12,000 local parishioners voted overwhelmingly in May in favour of the neighbourhood development plan (NDP) that includes this planning provision.

St Ives is one of many coastal communities around the UK that faces this challenge. Tourism is an essential part of its day to day life and impacts significantly on planning issues as the demand for property is high. St Ives' NDP determined that further development of new open market housing without any restrictions on occupation, which could be used as a second or holiday home, is no longer socially, economically or environmentally viable in the NDP area.

According to St Ives council, 25% of the town's residential properties were second homes in 2011, a 70% increase in a decade. Following the referendum, they were challenged, however, by the local land agent RLT Architects, which argued that the plan infringed the rights of people who live in a capitalist society to buy property where they want. In November, a high court judge ruled that St Ives' proposal did not breach human rights legislation, and the community now wait for a final say on their planning provision.

> "THIS IS A HUGELY IMPORTANT JUDGMENT FOR CORNWALL, ST IVES TOWN COUNCIL AND FOR THE RESIDENTS OF ST IVES WHO WANTED TO ENSURE THAT ANY NEW HOMES IN THE TOWN WOULD BE THE RESIDENT'S SOLE OR MAIN RESIDENCE. WE ALSO KNOW THAT A NUMBER OF OTHER LOCAL COMMUNITIES, BOTH IN CORNWALL AND ACROSS THE REST OF THE COUNTRY, ARE ALSO INTERESTED IN INCLUDING SIMILAR POLICIES IN THEIR OWN NEIGHBOURHOOD PLANS AND HAVE BEEN WATCHING THIS CASE WITH INTEREST."[23]
>
> *EDWINA HANNAFORD, CORNWALL COUNCIL*

According to St Ives council, 25% of the town's residential properties were second homes.


© Robert Pittman

3. DELIVERING GOOD JOBS AND HEALTHIER SEAS

ECONOMIC PROSPERITY AND HEALTHY SEAS CAN AND MUST GO HAND IN HAND FOR COASTAL AREAS. EVERYWHERE IS DIFFERENT, AND THERE ARE MANY ECONOMIC OPPORTUNITIES THAT COMMUNITIES CAN EXPLORE.

We have started by focusing on four main areas: tourism, energy, fisheries and aquaculture. Most importantly, these different areas of the coastal economy can inspire each other, and combine to create new business models.

A STARTING POINT FOR ACTION

A Blue New Deal for coastal communities had to start by asking how communities can support more businesses and economic activity by making the most of their unique asset, now and for future generations. A healthier coastal and marine environment plays a key role in delivering many of the things that coastal communities need and want.

We have focused on four areas of the coastal economy: tourism, energy, fisheries, and aquaculture. By working together, these areas can make each other stronger and support innovative new businesses models.

- Innovative marine energy projects, like tidal lagoons,[25] offer wider opportunities for coastal regeneration, including a range of tourist attractions.

- Fishing communities can reinvent themselves as sustainable 'seafood hubs' – bringing together fishers, aquaculture producers, anglers, and tourism businesses – to create a new brand for the future, whilst protecting their heritage.

- Offshore wind platforms could be designed to include improvements in offshore aquaculture, making the most of natural resources and space.

- Fishers can work alongside environmental groups and energy businesses to turn old or unusable fishing gear into a range of products, creating new opportunities[26] for local manufacturing businesses.

The following sub-sections provide some context for each focal area, highlight their key priorities and assess the potential economic impact of delivering different measures. Economic benefits would mainly arise from growing faster in some areas, including aquaculture, marine renewables, solar power, energy efficiency, and tourism.

4. TOURISM

THE UK'S EXTENSIVE COASTLINE AND MARINE ENVIRONMENT ARE BIG SELLING POINTS FOR TOURISM AROUND THE UK COAST, BUT THIS POTENTIAL IS NOT BEING REALISED.

WHERE ARE WE NOW?

Coastal tourism[27] already supports more than 230,000 jobs in coastal communities around the UK, and contributes £3.8 billion to their income – expressed in GVA terms. There are more than 7,000 tourism businesses on the UK coast, out of which an overwhelming majority are SMEs. In some coastal towns, for example St Davis in Wales, more than 50% of local jobs are in tourism-related activities.[28]

Table 1 presents the jobs and GVA supported by coastal tourism in respective countries and regions of the UK. When considering the indirect economic and employment impacts of tourism through spill-over effects on other sectors, we estimate that coastal tourism supports more than 440,000 jobs. The Technical Appendix presents a breakdown of GVA and jobs supported by each coastal local authority.

The UK coast and seas are unique assets for coastal tourism. Its **diverse habitats and wildlife**, as well as its heritage, support a range of activities cherished by people both at home and abroad, including coastal walks, boat trips, coasteering (exploring a rocky coastline by climbing, jumping, and swimming), surfing, diving, and nature watching (Case study 9).

- There have been several efforts to improve people's access to the coast. In particular, initiatives to build **coastal paths** covering the entire UK coastline, which allows coastal communities to make the most of their unique asset in terms of health and wellbeing, as well as supporting the local economy and attracting visitors. The South West Coast Path in England is recognised as one of the region's principal tourism attractions and leisure facilities. The Wales Coast Path is the first in the world to encompass a country's entire coastline. And work on the England Coast Path – to cover the entire English coastline – is expected to be completed in 2020.

TABLE 1: DIRECT AND INDIRECT COASTAL TOURISM REVENUE AND JOBS SUPPORTED IN THE UK

COASTAL TOURISM LOCATED IN:	GVA (£ MILLION)	AS % OF TOTAL GVA	JOBS
SCOTLAND	£1.53	0.40%	84,238
WALES	£961	0.67%	52,918
EAST MIDLANDS	£118	0.14%	6,511
EAST OF ENGLAND	£533	0.45%	29,340
NORTH EAST	£393	0.30%	21,669
NORTH WEST	£1.09	0.39%	59,822
SOUTH EAST	£1.49	0.38%	82,124
SOUTH WEST	£1.56	0.71%	85,721
YORKSHIRE AND THE HUMBER	£358	0.24%	19,720
Total UK	**£8.033**	**0.30%**	**442,062**

Source: NEF based on Business Register Employment Survey, Beatty et al[29] and Marine Scotland[30].

*Numbers on the table are sometimes rounded, so totals may not exactly reflect the sum of each row

- But as important to visitors are the local people, the **quality of life in a place, and a community's particular culture, heritage, and hospitality**. The current conditions of **deprivation in many coastal communities**, in addition to public perceptions of traditional seaside tourism resorts as "tacky and dated",[31] are negatively impacting the attraction of the UK coast as a visitor destination.

- Furthermore, the amount of **marine litter** washing up on UK beaches since the end of the 1990s has almost doubled, and its impact on quality of life, recreational opportunities, and aesthetic value contributes to the negative image and adds costs to society. Swimming in the sea off the coast of Britain has only become a healthy activity in recent years, after decades of poor water quality. Since 1976, the UK has been subject to the EU's Bathing Water Directive (BWD), which gave member states targets to meet certain water quality standards in bathing areas. Although progress has been slow, by 2015, 97% of England's bathing waters had passed the EU Commission's minimum standards, compared to only 27% in 1990.[32] More still needs to be done to maintain and improve on this success.

We are currently not making the most of the distinctiveness of our coastal communities and the richness of our coastal and marine assets. When listening to tourism businesses, their number one priority is to improve the quality of the tourism experience on the coast.[33]

- The UK coast is considered by many as a national treasure and yet visiting the coast is not a high priority.[34] This is due to a **lack of awareness of what the coast has to offer**, compounded with the **lack of transport infrastructure** to make the coast accessible to visitors from the UK and from abroad.
- Coastal **tourism businesses** face staffing challenges[35] relating to recruitment, engagement, and retention. Labour turnover costs the sector £274 million annually.[36] At the same time, **tourism jobs** are often low-wage, low-skill, seasonal, and part-time employment, which offer limited opportunities for career development.

CASE STUDY 9
ECOTOURISM ON THE MORAY FIRTH

"VIEWING WILDLIFE IS THE MAIN DRIVER BEHIND OVER ONE MILLION TRIPS TO SCOTLAND EVERY YEAR – AND OVER HALF OF THOSE ARE MADE BY UK TOURISTS. THIS HELPS TO SUPPORT OVER 2,700 FULL-TIME JOBS."

JIM MATHER, FORMER SCOTTISH MINISTER FOR ENTERPRISE, ENERGY AND TOURISM (2007–2011)

The economic impact of marine and coastal wildlife tourism in Scotland is significant and growing. Visitors who make their trip primarily to view wildlife at the coast or in the marine environment spend £163 million per year (around 50% of the total wildlife expenditure) and generate economic impacts of nearly £40 million. Many of these trips occur in May and June. Studies have found visitors tend to visit wildlife visitor centres more often than other groups and are more likely to visit northern parts of Scotland, with 43% of nights by coastal wildlife tourists spent in the Highlands and Islands.

Marine wildlife tourism is also prominent in the Highlands as well as in the southwest of Scotland including Glasgow, Ayrshire, Arran, Dumfries and Galloway. Dolphin watching was given as a significant reason to visit the east coast area for 52,200 overnight visitors, and 17,100 of these deem viewing dolphins was the main reason for their trip. The conservation of this species is therefore of particular importance to the local economy of the wider Moray Firth area. Coastal and marine wildlife as a tourism sector has seen continued visitor interest and growth and is likely to continue to do so, possibly due to changes in public attitudes, increased media coverage of coastal wildlife and a lesser interest in long-haul holiday destinations, benefiting a number of coastal communities.

Marine wildlife tourism is also prominent in the Highlands.

- Coastal communities are not only struggling to retain their young people, but young people (under-35s) also make the smallest percentage of visitors to the coast.[37] **Attracting and keeping young people** happy on the UK coast is a key challenge, but also a major opportunity to support coastal communities and reinvent coastal economies. A key issue is the **lack of affordable housing and the impact that second-home ownership** has on the housing market. The purchase of holiday homes skews the focus of the community, making it much more transient. It also makes ownership of property prohibitively expensive for many, particularly those working in low-paid, seasonal jobs.

WHAT NEEDS TO HAPPEN NEXT?

1. Visitors – from home and abroad – need to inspired by how much the UK coast has to offer and to find it easy and affordable to visit. A UK coastal tourism push is needed; and transport connectivity and affordability must be a far higher priority.

- *Government should set a headline goal to increase coastal tourism revenue, at a minimum by 3.8% per year to 2025*, to meet the UK-wide average growth. A more ambitious policy would aim to increase it by more than national average, or 5% per year to 2025. A key part of that should be to encourage domestic tourism.

- *Coastal areas should work together – with support from government – to develop a strong and coherent national coastal tourism brand to champion the UK coast.*[38] This shouldn't be a top-down exercise but an inclusive, jointly owned project that engages a diversity of coastal towns and cities. *Local authorities and seaside towns can also work with a diversity of local sectors to develop a collaborative identity and brand for their place or region* (e.g. Ireland's Wild Atlantic Way,[39] Morecambe Bay's Sense of Place toolkit[40]).

- *Government needs to ensure local transport authorities can invest in public transport infrastructure – buses, light rail, and dedicated routes for walking and cycling – to make the UK coast more accessible, and to better connect local economies.* This investment should also aim to deliver multiple benefits in areas such as better health, reduced congestion, improved air quality, and carbon reductions.

2. The UK coast needs to be accessible, host wildlife-rich seafronts, and support a healthy marine environment. These are assets to tourism and vital for communities to take pride in what their local areas have to offer.

- *Post-Brexit, the government should retain and strengthen the EU's Bathing Water Directive (BWD)* to have the continent's cleanest coastline and beaches.

- There is a wealth of best practice on how local authorities, community groups, and local businesses can work together to keep the coastline, including beaches, clean, healthy, and accessible. *Tourism bodies and the relevant government departments should work closely with environmental groups to share best practice information with local areas.* For example:

  – Plastic waste can be reduced by installing water fountains near beaches and other tourist spots.

  – Government should build on the success of the plastic bag levy by extending the same principle to other major sources of waste that end up in the sea, for example by implementing a plastic bottle deposit scheme.

  - Traditional and more innovative litter reduction schemes – including beach cleans,[41] adequate recycling bin provision, and ideas such as 'fishing for litter' initiatives,[42] can have a big impact (Case study 10).

The land, coastal, and marine planning systems – and their integration – is hugely important in enabling communities and businesses to create healthier and more resilient coastal habitats for both land and seascape (which incorporate the transition between land and sea at the coast, covering the terrestrial and the marine environment). We discuss the planning system further on Section 8.

- *Government should continue to support the creation of a well managed ecologically coherent network of marine protected areas (MPAs)*[43] *in UK seas.* Newly created areas should follow scientific and expert advice on design, implementation, and management principles. *Local areas can lead the creation and management of MPAs close to their coast* by bringing together local tourism businesses, scientists, and marine managers to create strategies in line with the particular needs of protected areas and species (Case study 9).

CASE STUDY 10

GROWING NUMBERS OF VOLUNTEERS CLEAN OUR BEACHES

The Marine Conservation Society (MCS) has run its Beachwatch beach litter survey and clean-up programme since 1994. In September 2016, its flagship event, the Great British Beach Clean, saw just short of 6,000 people clean 364 beaches around the UK and record the litter they found.[26]

Volunteers collected 268,384 litter items over one weekend. Although this number is slightly less than in 2015 (when it was just over 277,000), it is still a staggering amount of litter polluting our beaches. This shows that more needs to be done to reverse this trend.

The number of plastic bags found in 2016 was almost half when compared to the previous year. MCS believes this is a direct result of the 5p charge, which was implemented across the whole of the UK. However, the number of drink containers, caps and lids rose up more than 4% on the previous year. MCS supports calls for a Deposit Return System (DRS), which would give a financial incentive to return plastic drinks bottles.

© Ian Lee

Volunteers collected 268,384 litter items over one weekend.

- *There are significant opportunities for communities and local businesses to develop nature-tourism offers, which both financially support, and help to educate and promote, a healthier environment.* These include wildlife watching; adventure tourism and even underwater travel (Case study 11). Initiatives like the Hebridean Whale and Dolphin Trust's Sea Change project,[44] for example, bring together conservation groups, schools, economic sectors, and community groups. Methods like visitor payback schemes[45] – where visitors choose to give money[46] (or other help) to assist the conservation or management of places they visit – can engage local businesses to support a community fund, which is then used to reinvest in the assets and resources underpinning these activities.

3. It shouldn't just be a few shops that benefit from visitors to a place – strong local supply chains retain more value locally. The more locally sourced goods and services that supply the visitor economy, the better.

- *Communities, industry, training centres, and government need to play their part in supporting SMEs and entrepreneurs on the coast.* SMEs need hands-on and accessible[47] support and training across a range of areas – technology, management, marketing, social media, and resilience to risks, such as climate change. *Government should work with industry and training centres to provide this.*
- Local economic strategies should encourage businesses that are actively trying to improve their area and creating positive local economic, social and environmental impact. For example:
  - Incentivising co-operative and socially driven business models (e.g. social enterprises, community interest companies, cooperatives), and encouraging organisations who specifically focus on employing people in particular need of opportunity, such as young people not in education, employment or training (NEETs), or who offer training and apprenticeships for local young people.
  - Incentivising services designed to support local attractions and activities, which facilitate visitors' experience and engagement, and create more local jobs (e.g. canoe hire, boat-based tourism, surfboard hire, diving equipment hire, etc.).
  - Offering networking opportunities (e.g. events and forums), through the local destination management organisation, for businesses in an area to share best practices and develop new ideas and projects.
- *National and local marketing strategies could strengthen coastal paths' connections with outdoor activities, local wildlife and unique local offers in terms of food, culture, and heritage* (Case study 12). Coastal paths – including the soon-to-be completed English coastal path – are a big tourist draw, but there is a lot more to do to make the most of their potential.

CASE STUDY 11
ACTIVITY TOURISM, UNDERWATER TRAVEL AND NATURE TOURISM

OUTDOOR TOURISM AND ACTIVE HOLIDAYS ON THE COAST

Our coast is full of potential to get more people active outdoors, supporting better health, wellbeing, education and environmental awareness, through activities like climbing, trekking, walking and a range of watersports. Many watersports, such as surfing and kitesurfing, have a particular appeal to people aged under 35 who relish exciting experiences, but others, such as swimming, kayaking and sailing appeal to a broader age range.[27]

In Wales, outdoor activity tourism is worth £481 million to the economy and supports 8,243 Welsh jobs. Total expenditure on outdoor activity tourism in Wales accounts for 10% or 12% of expenditure in the tourist economy as a whole, according to Visit Britain and Welsh government sources, respectively.[28] The strength of this sector lies in the varied nature of the habitats and landscapes of Wales.

But this potential is not only in Wales. The surfing industry plays an important role in the local economy of northern Devon in the southwest of England.[29] There are approximately 42,000 people, who surf in northern Devon each year. Through the money they spend locally, surfing is estimated to be worth £52.1 million to the local economy.

With over half of our young people (aged 35 or under)[30] saying they 'don't know much about' what our coast has to offer, there is a lot more we can be doing to make the most of this potential; and there are plenty of coastal destinations around the country with something to offer.

OPPORTUNITIES THROUGH UNDERWATER TRAVEL

Around the world, there are some exciting new ideas about how we can engage with what lies beneath the oceans. 'Underwater travel'[31] can be about enhancing the marine experience, through diving and below-the-surface offers, which are developed sensitively to ensure ecological balance, or by bringing the underwater world to the surface.

In New Zealand, a new Marine Research and Education Centre[32] to be set up in Lochmara Bay is looking to combine underwater lessons with marine conservation, presenting opportunities for it to become a unique tourist attraction for the area. The development of marine education offers, combining adventure and discovery, could also make use of local marine and maritime cultural heritage.[33]

Recent advancements in 3D technology are also capturing underwater heritage sites and stories to create virtual reality displays, making them accessible to the wider public.

© David Merrett

The Dorset and East Devon coast was designated as a World Heritage Site in 2001.

ECONOMIC BENEFITS OF THE JURASSIC COAST

The Jurassic Coast is estimated to support around £111 million of output and up to 2,000 jobs in the wider Dorset and East Devon area, on an annual basis. The Dorset and East Devon coast was designated as a World Heritage Site based on its outstanding geological and coastal characteristics in 2001. It is the only natural World Heritage Site in England. It covers 95 miles of coastline from Old Harry Rocks in Dorset to Orcombe Point in East Devon.

The quality of the Dorset environment, and the Jurassic Coast in particular, is a key influence for people to visit the area. A business survey, carried out by Ash Futures in association with Vallance Economics on behalf of the Dorset Council and the Jurassic Coast Partnership,[34] showed a demonstrable positive impact of the Jurassic Coast on businesses' performance. The Jurassic Coast team have played an important role in developing a brand, which has helped attract more people to the area, and have assisted organisations in extracting value from the designation through leveraging additional funding.

The surveys indicate that the majority of businesses feel that the Jurassic Coast significantly helps with wider marketing of the area, and a large proportion of those businesses adopt the brand for their own purposes. Significant public investment has flowed into the area and, although difficult to quantify, much of this is associated with the World Heritage Site and the Jurassic Coast brand.

It was also clear that residents highly value the contribution the Dorset environment makes to their own wellbeing, and that they continue to value the largely free and open access currently afforded.

THE IMPACTS OF INCREASING COASTAL TOURISM REVENUE

Estimating the economic impacts of increasing tourism revenue and jobs is complex. (The Technical Appendix has a lengthier explanation). This is because there are risks of substantial displacement effects. For example, one coastal area may start attracting visitors who would have visited another coastal area instead, meaning some areas will develop their tourism sectors at the expense of other areas.

That is why it is so important that coastal areas collaborate and work to strengthen each other. Based on the recommendations we have proposed, we have looked at different ways through which net coastal tourism revenue and job opportunities can be enhanced without displacing other UK-based tourism.

It is worth noting that increasing benefits from tourism may take the form of avoided losses. For example, reversing ecological degradation of certain coastal areas may not increase tourism visitors or spend, but may avoid a potential reduction of both. Estimations we provide in this section should only be considered indicative.

Table 2 shows the impacts of respective scenarios. The moderate-growth scenario assumes that coastal tourism revenue growth keeps up with national average (3.8% per year) to 2025. The high-growth scenario measures the impacts of growing coastal tourism revenue by more than UK average tourism growth (5% per year) to 2025.

Depending on the scenario, between 92,802 and 128,274 additional jobs could be supported by increasing tourism revenue across the UK coast.[51]

CASE STUDY 12

MARITIME AND COASTAL HERITAGE TOURISM TRAIL

During the Blue New Deal workshops to develop the action plan, a cross-sector idea to support inshore fishing, sustainable seafood and tourism was discussed. The group involved academics, businesses and practitioners.

What they want to see is an integrated strategy (either at the national or regional level) to develop place-based tourism packages, in particular for fishing communities. A maritime and coastal heritage tourism trail could be developed to support the launch of the English Coastal Path, which will cover the entire English coast by 2020.

The 'trail' would make the most of the coastal path as a marketing tool for the communities, which are linked through it. The ideas discussed involved: developing local and shortened supply chains to increase the value of local seafood and support the viability of small-scale fisheries; consumer education and awareness on sustainable fish (including wild caught and farmed fish), as well as cooking lessons to support consumption of more sustainable species; creative and innovative approaches to develop place identity, based on seafood and fishing heritage, aquaculture and angling, to attract visitors; improving the health of fish stocks and the marine environment; and some research to better understand the local context and the relationships between fisheries, the local community and the environment.

A project like this requires multiple partners and can be best delivered if it is led by communities with the support of businesses, environmental groups, tourism boards, local authorities and funding partners, for example, enterprise partnerships and retail sponsors. Government however must play a role too.

TABLE 2: THE BENEFITS OF INCREASING COASTAL TOURISM REVENUE AND JOBS

	MODERATE-GROWTH SCENARIO		HIGH-GROWTH SCENARIO	
COASTAL TOURISM IN:	ADDITIONAL GVA (£ M)	ADDITIONAL JOBS	ADDITIONAL GVA (£ M)	ADDITIONAL JOBS
SCOTLAND	£290,773,473	17,684	£401,918,272	24,444
WALES	£182,662,133	11,109	£252,482,622	15,355
EAST MIDLANDS	£22,474,556	1,367	£31,065,195	1,889
EAST OF ENGLAND	£101,275,077	6,159	£139,986,304	8,514
NORTH EAST	£74,796,759	4,549	£103,386,955	6,288
NORTH WEST	£206,493,400	12,558	£285,423,116	17,359
SOUTH EAST	£283,478,466	17,240	£391,834,833	23,830
SOUTH WEST	£295,893,838	17,995	£408,995,837	24,874
YORKSHIRE AND THE HUMBER	£68,069,814	4,140	£94,088,713	5,722
Total UK	**£1,525,917,515**	**92,802**	**£2,109,181,846**	**128,274**

Source: NEF based on Business Register Employment Survey, Beatty et al[48] and Marine Scotland[49] and Deloitte.[50]

* Numbers on the table are sometimes rounded, so totals may not exactly reflect the sum of each row.

5. ENERGY

COASTAL COMMUNITIES ARE UNIQUELY PLACED TO BENEFIT FROM AND CHAMPION SUSTAINABLE ENERGY.

Decentralised energy, like solar power, could help ensure local economic resilience. Energy from our seas, like offshore wind and tidal power, could generate significant coastal employment; and greater energy efficiency could help reduce energy bills and fuel poverty.

WHERE ARE WE NOW?

The UK coast and seas host some of the world's best cleaner energy resources, including onshore, offshore, and marine renewables, as well as innovative technologies, like seawater heating. The UK has an incredible advantage for wind energy; both onshore and offshore wind are already success stories, but unless government renews its commitment to support renewable technologies for the long term, this potential will not fully materialised.

Taken in combination, offshore wind, tidal, and wave energy currently support approximately 22,000 jobs,[52] and add approximately £2.2 billion to the UK's national income, on an annual basis. Of these jobs, around 3,500 are likely to be in coastal areas, through operations, maintenance and installation.[53] The figures in **Table 3** account for indirect supply chain impacts, as well as indirect jobs throughout the economy.

TABLE 3: MW CAPACITY, JOBS AND GVA CURRENTLY SUPPORTED BY OFFSHORE WIND, TIDAL AND WAVE EVERGY

	MW CAPACITY INSTALLED	GROSS VALUE ADDED (£ MILLION)	JOBS
ENGLAND	4204	£1,854	18,353
SCOTLAND	199	£139	1,306
WALES	726	£291	2,918
NORTHERN IRELAND	1.2	£9	81
UK	**5130.2**	**£2,293**	**22,658**

Source: NEF based on BEIS (a)[54], BEIS (b)[55] and UK Energy Research Centre[56].

*Numbers on the table are sometimes rounded, so totals may not exactly reflect the sum of each row

The UK has strong climate laws. The 2008 Climate Change Act requires the UK to cut carbon emissions by 80% by 2050. But the government is failing to meet this target,[57] and the Paris Agreement, to which the UK is a signatory, raised the bar still further, committing the world to keeping temperature rises to well below 2 degrees Celsius.

Cutting global carbon emissions requires an unprecedented effort.[58] The UK needs to do much more if it is to play its part, meet its targets, and secure a cleaner, more democratic, diverse, and resilient energy system for the future.

- In practice, the government is still determined to maximise recovery of the UK's remaining oil and gas resources, with ongoing tax cuts for the North Sea firm and similar pledges to the presumed fracking industry. At the same time, policy and funding support for **renewable energy** have recently been slashed, with huge impacts[59] on investor confidence and employment in the sector.
- In the past decade, the UK has seen an incredible surge of **community renewable energy projects** across the country (Case study 13), proof that there is great appetite in communities to own and manage their energy, and to invest in renewable and cleaner sources. But in October 2015, a survey of 80 community energy groups with membership totalling 11,000 people, revealed that 90%[60] of groups feel that their developing projects are completely or partially at risk. This is a direct result of the government's cuts to Feed-in Tariff (FIT) subsidies,[61] which, since the scheme began in 2010, had attracted £50 million in capital investment and generated £45 million for local economies. In addition to FIT subsidies, community energy projects will no longer be able to benefit from tax incentives such as enterprise investment schemes, the Seed Enterprise Investment Scheme, or the Social Investment Tax Relief, making their investments much less attractive.[62]

CASE STUDY 13

COMMUNITY RENEWABLE ENERGY PROJECT IN FISHGUARD

In the past decade, the UK has seen an incredible surge of community renewable energy projects across the country, proof that there is great appetite in communities to own and manage their energy, and to invest in renewable and cleaner sources.

In Fishguard, Wales, the community set up the Transition Bro Gwaun's (TBG) renewables group in 2008 to look at local renewable generation. Being by the coast, they wanted to look at opportunities to generate energy from the tides, but found it too difficult to make it work.

In the summer of 2011, with support from the Welsh government's community renewables programme, Ynni'r Fro, they started to look for sites for a local community wind turbine. In 2015, they finally got the turbine up and running.

Throughout the process, they benefited from a range of support mechanisms that were in place at the time, in order to make it happen, but also faced many challenges. Their first planning application was refused in January 2014, largely on the basis of visual impact on the conservation area of Fishguard and Lower Town. The local authority also considered that community involvement carried no weight, but in the appeal decision, in August 2014, the application was allowed, with opinion reversed on both of those issues.

Having gained planning permission, they had to confirm grid access and Ofgem registration – the latter enabling the current Feed-in-Tariff rate to apply provided that connection was made within 12 months. The next task was to raise the £285,000 needed for TBG's 50% share, which proved easier than expected, the whole amount being lent by 29 individuals and three local community groups within six months.

Local investment and support from the Welsh government's programme were key factors in making this project happen, and the community in Fishguard is now happy to share its experience with other communities.

Find out more about Transition Bro Gwaun at www.transitionbrogwaun.org.uk/abergwaun-community-turbine

The turbines for the Ynni'f Fro project were up and running in 2015.

- The UK has one of the poorest quality, energy-inefficient, housing stocks in western Europe, resulting in high rates of winter deaths and an estimated cost of over £1 billion to the NHS, a year.[63] Around 46,700 winter deaths since 2010 have been attributed[64] to people living in cold homes. Although the devolved administrations in Scotland and Wales have recently implemented measures to improve **energy efficiency**, UK government investment has declined considerably since 2013.[65] A 2016 report by the National Audit Office (NAO)[66] showed that, since 2013 there has been a dramatic 60% decline in the delivery of home energy efficiency. Coastal buildings are more likely to be exposed to severe winddriven rain, and as a result material and fabric damage to buildings in coastal areas can often be higher and more costly.

WHAT NEEDS TO HAPPEN NEXT?

1. The UK should lead the world in offshore and marine renewable energy. Businesses, local authorities, innovators, and communities need a clear commitment from the UK government to long-term innovation funding and to rapidly phase out support and rhetorical backing for fossil fuels.

- *Businesses, local authorities, innovators, and communities need a clear commitment from the UK government that it will support an ambitious target for energy generation, from offshore and marine renewables, by the year 2020, and champion all renewable energy for the long term – well past 2020.* An ambitious target to have 15GW of offshore and marine renewables installed by 2020, could add £3.4 billion to the economy and support an additional 34,000 jobs across the UK. This would not only give confidence to investors – large and small – but also to educational institutions, to invest in skills and training.
- *Government policy needs to be backed up by long-term innovation funding commitments* (e.g. for research and development, and for test and demonstration sites, such as Wave Hub in the south west of England; (Case study 14). Ongoing subsidy will also still be needed: the costs of renewable technologies are falling as deployment has increased, thanks in part to the investor confidence provided by subsidies,[67] but the job is not yet done. Some sectors in particular, for example tidal energy, will continue to need support to encourage cost reductions and innovation. *Government should ensure that, post-Brexit, the UK matches or exceeds EU funding streams that would have paid for research and innovation, including Horizon 2020 funding towards Low Carbon Technologies.*
- In line with its pledge to the G20 group,[68] *the UK government should work to rapidly phase out the high levels of fossil fuel subsidies,*[69] which the International Energy Agency has argued[70] undermine the development of renewable energy.
- *A new government industrial strategy should specifically include a plan for manufacturing supply chains for renewable systems.*

2. Communities and towns should be empowered to become hubs for community-led renewable energy – both community-owned energy and other projects with genuine local benefit. As part of this, the right conditions and proper access to finance are essential.

- *UK government should set targets, and provide financial support (which could include development finance), for community or locally owned energy, including minimum regional targets to encourage a proactive approach by the public sector and communities as investors.* Scotland has already set a target of 500MW of renewables to be in community

and local ownership by 2020. Community Energy Wales has proposed a target[72] of 100MW for Wales to be installed over the period of 2016–2020. The planning process should be amended accordingly to give a greater emphasis to community-owned energy projects with genuine local benefit (Cornwall Council's planning policy for community energy provides a good model).[73] *Government should support pilot innovation projects in decentralised energy systems,* such as the 'low carbon energy systems'[74] model being developed in Scotland.

- *Local authorities should explore options to set up their own energy suppliers,* or partner with one of various new not-for-profit municipal energy suppliers. This can give local areas the levers to reduce energy bills for residents, engage people in the energy system, and steer local infrastructure towards local priorities (e.g. by giving power purchase agreements – PPAs – to local renewable projects).

- *Government must step up its support for local energy supply markets, including by clarifying the requirement by local generators to supply to the national grid.* In the UK, the market structure has resulted in[75] a significant 'leakage' of energy value out of cities, regions and ultimately the entire country. Enabling new, local business models to be tested that reverse this loss of value is an important next step, to ensure that the value created by locally[76] generated power is realised and shared locally in the form of lower energy prices, new jobs and skills in a local economy, improved energy security and stronger support for local renewable energy. More investment in back-up power supplies is especially important for coastal communities impacted by flooding events (Case study 15).

3. The UK needs an ambitious programme to insulate homes and buildings, to reduce energy bills, and to cut carbon emissions. Energy efficiency must be a UK national infrastructure priority.

- *Government should commit to ensuring that one million homes a year are insulated to a good standard*[77] *until the year 2025,* with a bias towards those where residents are at greater risk of fuel poverty.[78]

CASE STUDY 14

BRISTOL ENERGY AND THE SOUTH WEST MARINE ENERGY PARK

BRISTOL ENERGY – A MUNICIPAL ENERGY COMPANY

Bristol Energy[35] is one of the UK's first municipal energy companies. It is wholly-owned by the council and it has pledged to provide local people with low carbon electricity and support energy efficiency. Opened in 2015, the company aims to supply energy at competitive prices, with its tariffs expected to save customers an average of £250 a year, and to invest in community-based renewable generation. Bristol Energy forecasts a 12% return on the council's investment after five years, rising to 35% after 10, with money reinvested for social good.[36] Being the first city in the UK with its own currency, the company has partnered with Bristol Pound to encourage more people in the city to keep their money local.

THE SOUTH WEST MARINE ENERGY PARK

The South West Marine Energy Park (MEP)[37] is a truly collaborative effort to make the most of the significant tidal, wave and offshore wind resources off the South West coast and in the Bristol Channel. It was established by a core

partnership, led by Cornwall Council and Plymouth City Council; the Cornwall and Isles of Scilly and Heart of the South West Local Enterprise Partnerships; Regen SW, Plymouth University and the University of Exeter; working with (the former) Department of Energy and Climate Change and representatives from the marine energy industry. The wider South West MEP partnership now consists of over 50 public and private sector organisations, including representatives from supply chain companies, technology developers and industrial partners.

The variety of energy resources within the park means that there is a broad portfolio of investment opportunities for projects in offshore wind, wave and tidal stream technologies, with future projects using floating wind and tidal range technologies. The close proximity of resources and infrastructure, together with a strong industry base and research facilities, creates a unique environment to support the development of new technology while also providing the scale and range of market opportunities needed to attract investment and sustain industrial growth.

Regen SW[38] has identified that there are at least 350 companies active, or with a high degree of potential, in the marine energy sector. It is difficult to calculate the value of the sector within the overall economy, but a rough estimate suggests that the Marine Energy sector currently provides employment for between 300 and 500 people in the South West mainly working for technology developers, marine operations companies, consultancies, marine sciences and environmental, legal and financial, research and some manufacturing.

The economic analysis produced by the Offshore Renewables Resource and Development (ORRAD) report has identified that the sector could eventually support over 5,000 people in the South West in the period from 2017 – if the South West can realise its natural resource and economic potential.

A leading initiative by South West MEP is Wave Hub – the largest consented demonstration area for marine energy technologies in the world, including the FaB Test nursery site in Falmouth Bay and a world class hydrodynamic test facility in the new Marine Sciences building, which will open later this year in Plymouth. These facilities, added to the research capability and extensive facilities available through the region's universities and in the private sector, ensure that the South West is able to provide a 'technology pathway' to support the development of new technology from concept design, prototype and component testing through to full-scale demonstration.

Wave Hub is the largest consented demonstration area for marine energy technologies in the world.

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CASE STUDY 15
THE GIGHA BATTERY PROJECT

The Isle of Gigha is situated off the west coast of Scotland and is host to the first community-owned grid-connected wind farm in Scotland;[39] three turbines with a combined capacity of 675 kW.

The island has around 150 residents and the main industries are tourism, farming and aquaculture. Profits from energy generation support the Isle of Gigha Heritage Trust, which helps develop the local economy, for example[40] through a housing refurbishment programme that provides high quality accommodation for local people. A source of local and independent energy was needed for the island, as the overhead power line coming from the mainland is subject to faults and power outages that can last for days at a time.

© Martyn Jenkins

The Isle of Gigha is home to Scotland's first community-owned grid-connected wind farm.

This affects many activities at Gigha. The island's fish-farm, for example, must continuously draw fresh seawater and pump it through the ponds, so if there is a problem with the electricity supply the operators of the farm have to use diesel generators.

The Gigha Battery Project is developing a prototype Energy Storage System to realise the full potential of the island's new Enercon E33 wind turbine (currently, full output cannot be realised because of grid constraints). The battery can store power and release it at times when there is capacity on the grid. This enables the community of Gigha to access the additional power, and thereby income.

It also provides a real world environment through which the technology can be prototyped – paving the way for future innovations in sustainable energy technology, as well as showing the way for other rural communities to harness the full potential of their own renewable power.

- *New-build standards for homes must be clear, and set to rise over time.* Tougher regulation is needed to ensure landlords of private rented accommodation – typically the least well insulated in the UK – bring their properties up to scratch. These rules must be tailored to ensure high-quality retrofit and meaningful action on fuel poverty, given the unique characteristics of coastal properties. Seaside properties have particular characteristics and the environment places unique demands on the fabric of the buildings.

- *Insulating homes to this standard should be treated as one coherent priority national infrastructure project, with a focus on providing the funding (public and private) that is needed to deliver.* The Scottish government has already established[79]

energy efficiency as a national infrastructure priority. This would empower coastal local authorities and communities to develop programmes of home insulation that work for the particular needs of their housing stock: homes in coastal areas are typically costlier to insulate,[80] due to an excess amount of wind and rain.

THE IMPACTS OF ADDITIONAL RENEWABLE ENERGY DEPLOYMENT

At a national level, there is scope for considerably expanding the offshore and marine renewable sector.[81] Table 4 shows how, under an ambitious scenario, additional offshore and marine renewable deployment could add £3.4 billion to the economy and support an additional 34,000 jobs across the UK. If only a fraction of these jobs – namely part of construction and operations and maintenance jobs – were located in coastal communities, an additional 3,500 coastal jobs could be supported.

We also looked at the local benefits of additional renewable energy deployment for coastal Local Authorities in the UK. In addition to their marine renewable potential, coastal communities also benefit from onshore renewables, which currently play a greater role in generating income and supporting employment in coastal areas. Whereas offshore renewables are still highly concentrated in some areas of the country, onshore ones are more decentralised, and can benefit coastal communities around the country right now.

Table 5 shows how doubling the onshore renewable capacity on the coast could lead to the creation of more than 26,000 additional jobs.[86] This assumes the creation of strong local supply chains, which ensure that the majority of employment throughout the construction and operation phases is locally sourced – as proposed by this action plan.[87] Detailed estimations per coastal local authority are available in the Technical Appendix.

TABLE 4: BENEFITS OF DEPLOYING ADDITIONAL MARINE RENEWABLES

	MODERATE SCENARIO: 12GW		AMBITIOUS SCENARIO: 15GW	
	GROSS VALUE ADDED (£ MILLION)	JOBS	GROSS VALUE ADDED (£ MILLION)	JOBS
UK	£2,079	20,544	£3,474	34,332
ENGLAND	£1,681	16,641	£2,809	27,809
SCOTLAND	£126	1,185	£210	1980
WALES	£264	2,646	£441	4,421
NORTHERN IRELAND	£8	73	£14	122

Source: Source: NEF based on BEIS (a)[82], BEIS (b)[83], UK Energy Research Centre[84] and Fraser of Allander Institute[85]

TABLE 5: BENEFITS OF DEPLOYING ADDITIONAL ONSHORE RENEWABLES IN COASTAL LOCAL AUTHORITIES

	10% INCREASE IN RENEWABLES CAPACITY		50% INCREASE IN RENEWABLE CAPACITY		100% INCREASE IN RENEWABLE CAPACITY	
COASTAL LOCAL AUTHORITIES LOCATED IN:	GVA (£ MILLION)	JOBS	GVA (£ MILLION)	JOBS	GVA (£ MILLION)	JOBS
SCOTLAND	£56	887	£284	4,437	£568	8,874
WALES	£19	309	£99	1,547	£198	3,093
EAST MIDLANDS	£43	678	£217	3,392	£434	6,784
EAST OF ENGLAND	£3	51	£1,898	253	£32	507
NORTH EAST	£379	6	£11,633	30	£3	59
NORTH WEST	£2,326	36	£52	182	£23	363
SOUTH EAST	£10	164	£869	821	£105	1,642
SOUTH WEST	£173	2,715	£296	13,574	£1,739	27,147
YORKSHIRE AND THE HUMBER	£59	925	£847	4,625	£592	9,250
TOTAL	**£169**	**2,644**	**£847**	**13,219**	**£1,694**	**26,438**

Source: Source: NEF based on BEIS (a)[88], BEIS (b)[89], UK Energy Research Centre[90]

Note: Numbers on the table are sometimes rounded, so totals may not exactly reflect the sum of each row.[91]

ECONOMIC IMPACTS OF RAISING ENERGY EFFICIENCY

In England and Wales, more than 16 million households or 71% of total households have poor energy efficiency, defined as an Energy Performance Certificate (EPC) rating of D or below. At the same time, fuel poverty hits approximately 10% of all households. Increasing residential energy efficiency could substantially reduce household energy bills, reduce fuel poverty, and significantly contribute to climate change mitigation – as the residential sector is responsible for 15% of the UK's carbon emissions.

Although poor energy efficiency of the residential sector is not a coastal-specific problem, it needs to be part of a strategy aimed at rejuvenating coastal communities. Investing in energy efficiency yields multiple benefits to households and to the economy more widely. A 2015 study estimated that incrementally lifting all UK households to an EPC C rating could create up to 91,000 additional jobs by 2020, notably boosting manufacturing and construction employment. Table 6 presents a breakdown of employment impacts across the UK's different regions and countries.

TABLE 6: EMPLOYEMENT IMPACTS OF BRINGING RESIDENTIAL ENERGY EFFICIENCY TO EPC RATINGS IN THE UK BY 2020

REGION/ COUNTRY	ADDITIONAL NUMBER OF JOBS	PERCENTAGE INCREASE IN EMPLOYMENT
LONDON	10,300	0.19%
SOUTH EAST	12,900	0.26%
EAST OF ENGLAND	9,600	0.31%
SOUTH WEST	8,400	0.28%
WEST MIDLANDS	8,000	0.28%
EAST MIDLANDS	7,300	0.31%
YORKSHIRE AND THE HUMBER	7,300	0.27%
NORTH WEST	9,800	0.27%
NORTH EAST	3,300	0.27%
WALES	3,900	0.27%
SCOTLAND	7,500	0.26%
NORTHERN IRELAND	2,600	0.31%
TOTAL	**91,000**	**0.26%**

Source: Washan et al.[92]
Note: Numbers on the table are sometimes rounded, so totals may not exactly reflect the sum of each row.

Although such a policy would require significant, upfront, publicly supported investment, it has been estimated that the UK economy would actually benefit from £2.47 of additional GDP (national income) for each £1 invested into energy efficiency; and the state would raise £1.27 of tax revenue for each £1 spent.

THE BENEFITS FOR COASTAL COMMUNITIES

We replicated this analysis for coastal local authorities only, in order to assess the coastal-specific benefits of increasing residential energy efficiency. A breakdown of EPC ratings by local authority was only available for England and Wales. As such, this analysis excludes Scotland and Northern Ireland.

At the moment, 8.4 million homes located in English and Welsh coastal local authorities have an EPC rating of D or below. Following the methodology adopted by previous estimations, an ambitious policy would at minimum consist of raising these homes to an EPC rating of C. Such a policy would entail addressing coastal-specific challenges: indeed, dwellings located in coastal areas have distinct weather conditions and this may render efficiency measures, such as insulation or draught proofing, more expensive.

The policy would entail two dimensions:

- The installation costs of improving EPC ratings for low-income households would be covered by the state of local and regional public authorities.

- For able-to-pay households, the government would provide a loan subsidy: households would be granted a loan on a 0% interest rate for installation measures and the costs of energy assessments.

On average, the net bill savings of raising homes with an EPC rating of D or below to an EPC rating of C have been estimated to be £245 per household for low-income homes and £216 per household for able-to-pay homes (in £ 2015). These benefits are net of costs, in the following sense: for low-income homes, they account for rebound effects, i.e. the fact that low-income homes may increase their consumption following a reduction of energy bills; for able-to-pay homes, they account for loan repayments.

We find that improving the energy efficiency of residential dwellings in coastal local authorities of England and Wales would result in net annual household savings of 1.75 billion in total (Table 7).

The wider economic and employment benefits would arise from (a) the additional household consumption arising from energy bills savings and (b) the stimulus impact of investment in energy-efficiency measures – for example, impacts of the construction sector.

In the context of this study, only the former could be measured. In total, we find that the additional consumption arising from energy bills savings – in other words, **the value of switching consumption from energy bills to other items – would increase coastal communities GVA by £350.5 million and support more than 10,000 additional jobs in English and Welsh coastal local authorities (Table 8).** Results broken down by coastal local authority are available in the Technical Appendix.

TABLE 7: TOTAL HOUSEHOLD ENERGY BILL SAVINGS IN COASTAL LOCAL AUTHORITIES, BROKEN DOWN BY RESOURCES

COASTAL LOCAL AUTHORITIES LOCATED IN:	TOTAL ANNUAL HOUSEHOLD SAVINGS (£ MILLION)
EAST MIDLANDS	£19,461,261
EAST OF ENGLAND	£168,431,304
NORTH EAST	£133,462,399
NORTH WEST	£207,387,637
SOUTH EAST	£405,519,259
SOUTH WEST	£389,148,961
WALES	£369,568,260
YORKSHIRE AND THE HUMBER	£59,122,668
GRAND TOTAL	**£1,752,101,748**

Source: NEF based on NEED[93] and Washan et al.[94]

Note: Numbers on the table are sometimes rounded, so totals may not exactly reflect the sum of each row.

These figures include the direct GVA impacts only, as they exclude potential multiplier effects throughout the UK economy. They also exclude the stimulus effects of investing in energy efficiency. As such, they are on the conservative side.

More importantly, improving energy efficiency in fuel-poor homes has multiple knock-on impacts, for example on health. It has been estimated that fuel poverty costs the NHS between £600m and £1 billion per year.

TABLE 8: TOTAL GVA AND EMPLOYMENT BENEFITS OF IMPROVING RESIDENTIAL ENERGY EFFICIENCY

COASTAL LOCAL AUTHORITIES LOCATED IN:	GROSS VALUE ADDED (£ MILLION)	JOBS
EAST MIDLANDS	£3.98	114
WALES	£75.63	2,169
NORTH EAST	£27.31	738
EAST OF ENGLAND	£34.47	988
NORTH WEST	£42.44	1,217
YORKSHIRE AND THE HUMBER	£12.09	347
SOUTH WEST	£79.68	2,284
SOUTH EAST	£82.99	2,380
GRAND TOTAL	**£358.58**	**10,283**

Source: NEF based on NEED[95] and Washan et al.[96]

Note: Numbers on the table are sometimes rounded, so totals may not exactly reflect the sum of each row.

BENEFITS TO SCOTLAND AND NORTHERN IRELAND

This exercise could not be replicated in Scotland and Northern Ireland as we found no publicly available estimates broken down by local authority. However, previous studies can be useful in gauging the potential impacts in both countries.

A report commissioned by Consumer Futures Scotland estimates that an aggressive policy to improve the energy efficiency of 835,000 fuel-poor households would create 8,900 jobs and increase Scotland's GVA by 0.27%.

Another report commissioned by Consumer Futures Scotland considers that the impacts could be higher. It estimates that investing in energy efficiency of fuel-poor homes would increase Scotland's and Northern Ireland's output by 0.8%, while increasing employment by 0.8% and 0.9%, respectively. This is equivalent to an additional 20,800 jobs in Scotland and 7,600 jobs in Northern Ireland. However, it was not possible to determine localised impacts, at a coastal local authority level.

6. FISHERIES

OVERFISHING, AND A LACK OF ACCESS TO FISHING OPPORTUNITIES, HAVE CAUSED THE DEVASTATION OF MANY FISHING COMMUNITIES.

But by respecting the ecological limits of fish stocks and marine ecosystems, and rebalancing the fishing industry, small-scale sustainable fishing can have a bright future – securing employment and the distinctiveness of fishing communities.

WHERE ARE WE NOW?

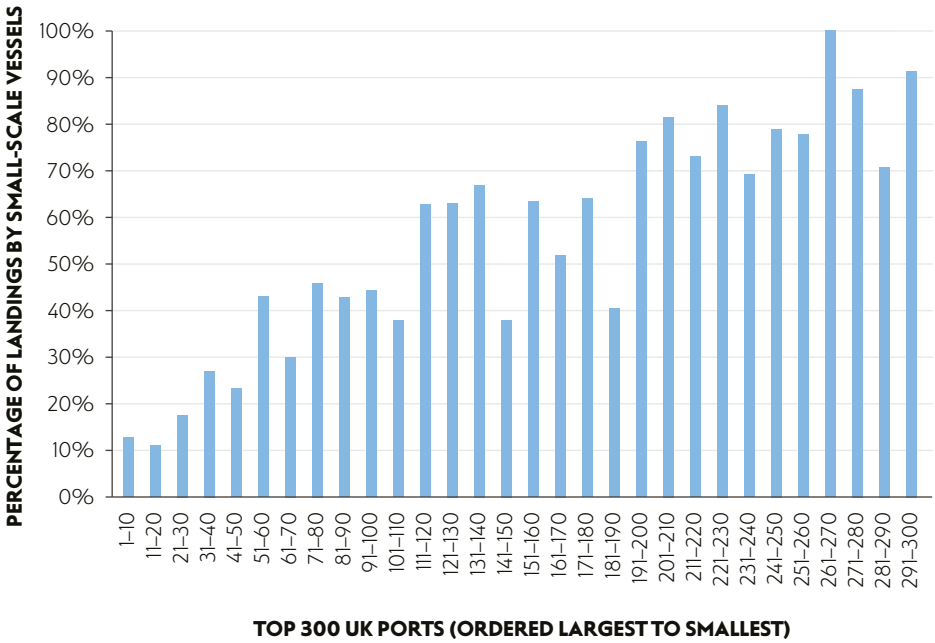
In the past, overfishing – or our failure to properly manage this renewable resource – led to unhealthy levels of some fish stocks and the severe depletion of others. Improved fisheries management in recent years has allowed some commercially fished species to increase from very low baselines, but more work is needed.

The impact of the UK's commercial fishing practices has not only affected fish populations. Beam trawling and scallop dredging, for example, remain widespread fishing activities, which have an impact on the seafloor,[97] damaging sensitive species and habitats.

Inshore fishing is done in coastal waters, mostly by smaller boats, under ten metres (<10 m) in length. The fishing industry is a relatively small sector of the UK economy (0.03% of GDP[98]), but the significance of the inshore fleet to several coastal communities is much greater.

- Over 99% of fish landed by <10 m vessels go to UK ports,[99] which are distributed in communities around the country. A heathy inshore fishing fleet therefore contributes to the economic sustainability of ports all around the country **(Figure 5)**.

FIGURE 5. SIZE OF UK PORTS AND % OF LANDINGS BY SMALL-SCALE VESSELS



Source: Marine Management Organisation – Annual Catch Statistics

- From ports to entire coastal economies, inshore fisheries support a diverse supply chain, including services to vessels' maintenance, fish processing, fish-and-chip shops, food markets and restaurants.

- Finally, the inshore fishing fleet has a social and cultural value, playing a role in attracting tourists to the coast and providing a sense of identity to local people (Case study 16).[100]

"In over 25 years in the fishing industry I've seen a lot of changes and learnt a lot of lessons – and one thing still sticks out in my mind, big and small boats need each other for the UK to have a balanced fishing industry." (David Warwick, National Federation of Fishermen's Organisations, NFFO)[101].

But fishing communities in the UK have low expectations for the future. When asked, **inshore fishers say their number one priority is maintaining existing jobs.** That's because fishing jobs have been in decline for years – there are now around 12,000 fishers,[102] just one-third the level of the 1940s – and it is very hard to recruit people into the industry.

- The current system for distributing fishing quotas – or fishing rights – in the UK has left inshore fishers struggling to maintain their businesses and remain economically viable. Despite supporting the majority of jobs in the fishing industry and representing 77% of the vessels, the inshore fishing fleet only receives 1.5%[103] of the share of fishing rights for quota species (Fixed Quota Allocations by tonnage), when compared to boats over ten metres (>10 m) in length.[104] While the gross profit margin of the large-scale fleet reached a historic high in the past years, the small-scale fleet is plagued by low profit margins.[105]

- In addition, most of the vessels comprising the inshore fishing fleet[106] are not represented by fish producer organisations (POs). They have been mostly excluded from

CASE STUDY 16

INSHORE FISHERIES AND COASTAL TOURISM WORKING TOGETHER IN SOUTH ENGLAND

TourFish (Tourism for Inshore Fishing, Food and Sustainability) is a project led by the University of Greenwich, in collaboration with different partners, and funded by the EU INTERREG IVA 2 Seas programme.

It is working with communities in the South East and South West of England. The project is promoting responsible tourism[41], by getting inshore fishers to work more closely with their respective communities and local economies, through the production, preparation and consumption of sustainable seafood.

In Hastings, the project works with one of the largest beach launched fishing fleets in Europe. In order to address economic deprivation – Hastings is amongst the twenty most deprived districts in England – they set up an ongoing fishing quarter cultural regeneration programme.

The programme includes the creation of a gallery, café and a series of community facilities, as well as a number of educational and marketing campaigns promoting sustainable fishing in the area. What's exciting about TourFish is that it connected people in Hastings with people in Sidmouth, who were excited to do something similar in their area.

Sidmouth is a small coastal town in Devon. Historically a fishing town, its last remaining commercial fishing boat retired in 2004, although it had long since become a popular tourist destination – you can see the Jurassic Coast from Sidmouth beach. A local campaign group, the Drill Hall Hub Community Interest Company[42] has been working with TourFish to positively engage policymakers and the people of Sidmouth in the principles of responsible tourism as part of the regeneration process in the area.

In both Hastings and Sidmouth, collaboration between the different areas of the local economy improved as a result of the programme. It has helped build new local skills and increase local awareness of sustainable seafood. Restaurants, hotels and retailers are now more likely to source locally and employ local people.

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TourFish is connecting people in Hastings with people in Sidmouth who are doing something similar in their area.

membership, which has effectively distanced them from much of the decision-making around fisheries management. POs are regional trading bodies, mandated by the Common Organisation of the Market (CMO) – a key pillar of the EU Common Fisheries Policy (CFP) – to play a key public role in strengthening the role of producers in providing healthy, sustainable, affordable, fishery products. European legislation requires that "measures should be taken to encourage the appropriate and representative participation of small-scale producers" in POs.[107]

This context of exclusion and an unequal distribution of fishing opportunities has also led to two negative environmental outcomes.

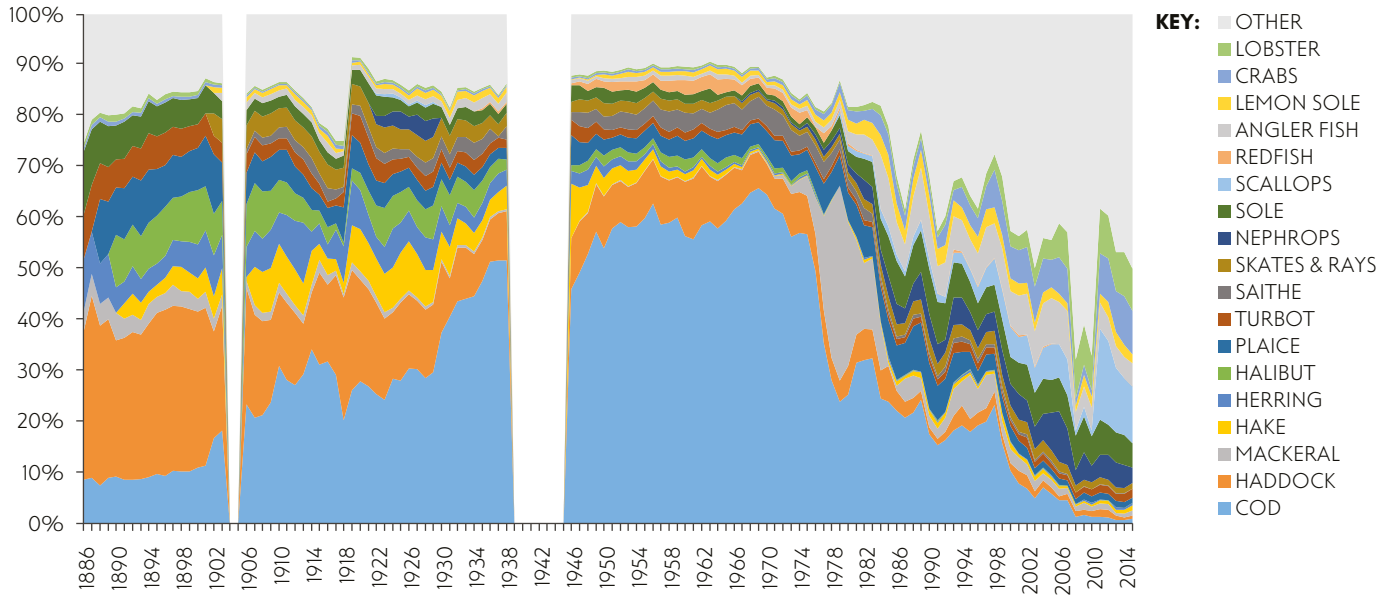
- With less access to fishing quota, inshore fishers exert higher pressure on non-quota fish species, such as shellfish or sea bass, which can lead to overfishing.
- It has led to the wasteful practice of discarding fish,[108] as fishers end up returning over-quota catches to the sea, either dead or alive.

WHAT NEEDS TO HAPPEN NEXT?

1. Fishers need healthy fish stocks – today and for years to come. Biodiverse, resilient and responsibly fished marine ecosystems are essential to preserve future fishing opportunities.

- *Government must follow scientific advice to set fishing limits,*[109] which should be designed to restore and maintain fish stocks at healthy levels.[110] All fish caught must be landed.[111]

FIGURE 6. COMPOSITION OF LANDED VALUE BY SPECIES



Source: Thurstan – The effects of 118 years of industrial fishing on UK bottom trawl fisheries; Marine Management Organisation – Annual Catch Statistics. Current (2015) prices applied to historical landings.
By New Economics Foundation

- *The government should limit or ban fishing practices that are putting pressure on sensitive habitats, such as beam trawling or dredging,* where it has been shown to negatively affect the marine ecosystem.

The benefits of marine biodiversity for fisheries are well studied, particularly in the growing literature on MPAs. Outside of these more direct effects, there is also the simple fact that the species targeted by inshore fisheries are not static and will be constantly changing. Marine biodiversity is therefore important to allow for targeted harvesting of different species in the future (the 'option value'). An analysis of landings over the past century shows that not only have the top species changed over time, but these are changing at an increasing rate, and the composition of landings is becoming much more diverse (a larger proportion of landings from outside of the top species).

With the right priority placed on sustainable fishing by governments, new business models can thrive.

CASE STUDY 17

BOTTOM-UP FISHERIES PARTNERSHIPS IN WALES, SCOTLAND AND ENGLAND

Fishers are already testing new ways to work with their communities, scientists and local authorities and regulators to set up bottom-up initiatives, which are aimed at improving their fishing practices and the health of their fishery. Fisheries Improvement Projects (FIPs), which are run for public benefit, are time-bound projects that can help small-scale fishers achieve environmental standards of certification bodies, such as the Marine Stewardship Council.

The Orkney Shellfish Research Project[43] is another example – a four-year project designed to support positive interactions between the inshore fishing industry and the up and coming marine renewable industry. In the southeast of England, the Kent & Essex Inshore Fisheries and Conservation Authority (IFCA) has been working in close partnership with local fishers to create the UK's largest no-take zone in the River Medway. This will prohibit any fishing activity in a 12.1km^2 area, helping to protect the saltmarsh and mudflat environments, which are important nursery area for bass, mullet, herring and sole.[44]

By protecting juvenile fish in these distinct nursery areas,[45] the no-take zone enhances the offshore harvestable stocks of fish, which can then reproduce and contribute to the future stock. Shane Hales, Chamberlain of the Rochester Oyster and Floating Fishery (ROFF), says "This innovative project could potentially help many Thames Estuary fishermen, as adult fish spread out from these vital nursery areas."[46]

The Pembrokeshire Sustainable Shellfish Pilot Initiative (PSSPI)[47] in Wales is testing voluntary measures to try to improve fishing sustainability within the local potting fleet. The pilot allows trialling of gear modifications at no cost to fishers and incorporation of feedback into final outputs that will be shared widely. The pilot aims to raise awareness and understanding of the environmental and economic issues associated with ghost fishing of static gear, and of voluntary measures to improve fishing sustainability.

By protecting juvenile fish in these distinct nursery areas, the no-take zone enhances the offshore stocks of fish.

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Fishers, communities, scientists, entrepreneurs and local authorities can work together to develop new ways of improving fishing practices, and the health of their fishery (Case study 17).

2. Smaller boats are the life-blood of thriving ports. Those that are fishing sustainably need to get a larger share of fishing opportunities. The UK currently gives only 1.5% of the national fishing quota[112] to the smallest category of boats, even though they make up over 75% of the vessels.

- *The government must increase the allocation of fishing quota to the smallest (<10 m) vessels by at least 30%, giving them a 1.94% share of the national quota.*[113] This would improve the economic viability of these fishers significantly and help redress the current imbalance in how fishing opportunities are allocated.

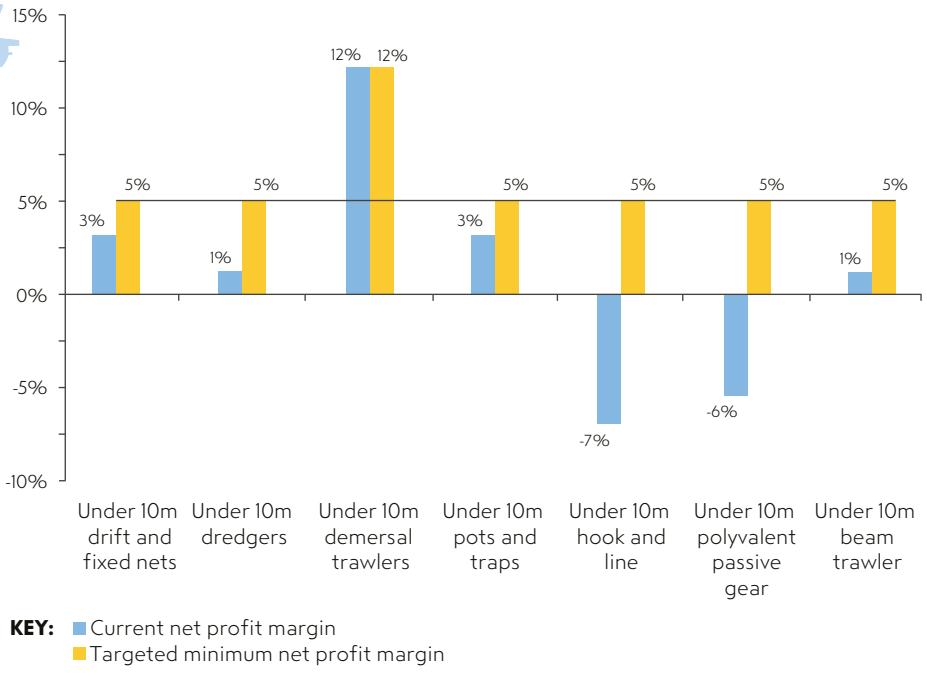
- *A share of the national quota should be set aside for performance-based allocation and facilitating entry for new fishers.* This quota would be at the disposal of the government to distribute according to social and environmental criteria and give new fishers the opportunity to get started. France and Denmark

CASE STUDY 18
RE-ALLOCATING QUOTA TO THE UNDER-10M FLEET

The small-scale, under-10m fleet, provides thousands of jobs and land their catch to hundreds of coastal ports around the UK. They make up 77% of the UK's vessels, yet they only receive a very small share of the national fishing quota: 1.5% in 2014. Although these vessels also fish a large amount of non-quota species, their lack of quota significantly limits their activities. Whilst the large-scale fleet in the UK are experiencing record profits, the small-scale fleet is struggling to stay economically viable.

There are a number of reasons behind this trend including changing markets and aging vessels. Restrictive quota allocations are a frequent complaint that could be addressed at a policy level. To help balance out the sector and ensure a diverse fleet, we are proposing a reallocation of quota to the under-10m fleet which, according to our modelling, will help them reach a 5% net profit margin. As Figure 1 shows, most under-10m fleets are currently unprofitable or barely profitable. We suggest that a minimum profit margin of 5% be pursued.

FIGURE 1. NET PROFIT MARGINS BY UNDER 10M FLEETS: CURRENT AND TARGETED SCENARIO

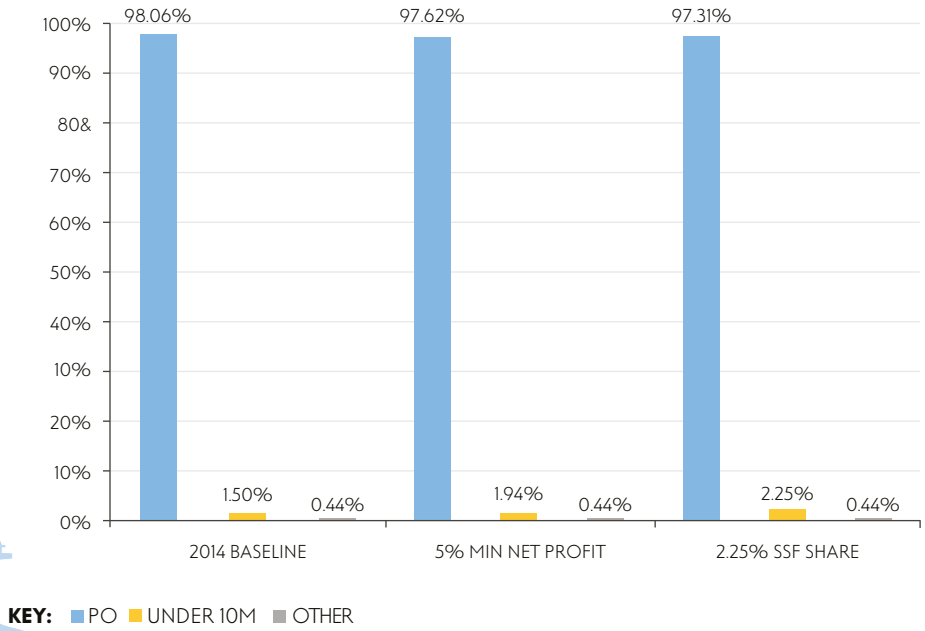


Note: Blue bars show actual net profit margins and orange bars indicate the targeted minimum.

In order to achieve a minimum 5% profit margin, these fleets need to generate additional revenues. This can come from higher landings, made possible through larger quota allocations. We have calculated that, in total, approximately £5 million or £1,500 per vessel of extra revenue is needed. This is based on a 60% revenue to net profit conversion, accounting for higher variable costs that come with higher landings. Our modelling shows that this can be attained through increasing the under-10m quota share by approximately 3,000 tonnes, bringing their total share to just under 2%. This is equivalent to a 30% increase in their annual quota allocation. This reallocation is very small in relation to the total quota allocated to fishers by the government each year. It would have a negligible effect on the fishers who would forego a small share of their quota. This proposal also aligns with a 2009 report for the Department for Environment, Food and Rural Affairs (Defra) by Vivid Economics and Poseidon based on similar modelling of minimum crew wages.

A second option is to give the under-10m fleet a 50% quota boost and bring their total share to 2.25%. This would ensure their economic success to a greater degree and create the conditions for the fleet to expand and thrive. This higher reallocation would still have a minimal effect on the overall distribution, although there may be high allocations for some key quotas. Figure 2 shows the current quota distribution next to our two proposed options for distribution.

FIGURE 2. CURRENT AND PROPOSED QUOTA DISTRIBUTION



This chart shows the UK's quota distribution under the current regime and with our proposed quota reallocations applied. POs (producer organisations) manage quota on behalf of the large-scale fleet. Given the value small-scale fishers bring to coastal communities and their generally lower environmental impact, granting them additional quota will bring significant benefits not just to the fishers themselves, but also to coastal communities and the marine environment. This is one of the most significant actions that can be taken to support small-scale vessels and ports.

A second option is to give the under-10m fleet a 50% quota boost and bring their total share to 2.25%.

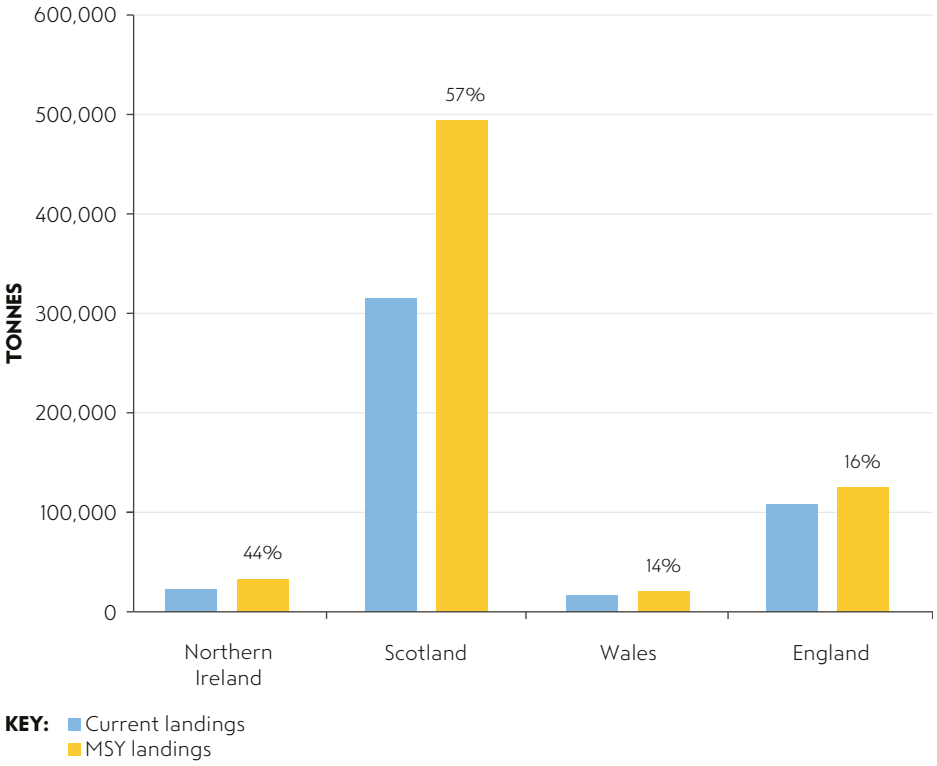
have such reserves in place and it would make the UK compliant with Article 17 of the Common Fisheries Policy (CFP).

A rebalancing of quota would benefit many coastal communities, as the small-scale sector is spread across many ports around the UK. While there are 300 ports in the UK with over £44,000 in landings, the ten largest ports land over half the value and the 30 largest ports land over three-quarters. As small-scale vessels tend to fish out of small ports, a rebalancing of quota from large to small vessels would result in a similar shift in port activity and increased landings in the majority of UK ports (Case study 18).

3. Fisheries management and governance need to better support fishing communities. The UK needs a small-scale producer organisation (PO), which can give smaller boats a voice and greater control to help rebalance power in the fishing industry.

- *Government should help establish national or regional small-scale fisheries producer organisations.* This would give all the benefits of PO membership – marketing support and the sharing of fishing opportunities – to smaller boats that are currently excluded from the system. Government must also enforce rules that require all POs to have a transparent and more democratic governance structure.

FIGURE 7. LANDINGS AT MSY PER UK COUNTRY



By New Economics Foundation

- Not all sustainable fisheries are certified. This often happens when smaller, or less profitable, fishing businesses can't afford the cost of certification by a third party,[114] or because their fishery lacks the data needed for certification. *Government should work with industry and others to ensure that smaller businesses, which are fishing sustainably, are able to benefit from seafood labelling schemes.*[115]
- *Stakeholder groups and decision-making bodies (e.g. Inshore Fishery Groups in Scotland, Inshore Fisheries and Conservation Associations in England) should ensure they are democratic and inclusive, and not replicating current inequalities of power.* They can reach out to groups with a stake in fisheries management, which might not have the same level of resources (e.g. to cover travel expenses to attend meetings) as others might do.

TABLE 9: ECONOMIC AND EMPLOYMENT IMPACTS OF FISHING AT MSY

COASTAL DISTRICT AUTHORITIES LOCATED IN:	ADDITIONAL LANDINGS (£ MILLION)	ADDITIONAL GROSS VALUE ADDED (MILLION £)	ADDITIONAL FTE JOBS
SCOTLAND	£240.8	£115.6	1852.4
WALES	£6.9	£3.3	53.8
NORTHERN ISLAND	£15.2	£7.3	117.5
EAST MIDLANDS	*Negligible*	*Negligible*	*Negligible*
EAST ANGLIA	*Negligible*	*Negligible*	*Negligible*
NORTH EAST	£7.6	£3	58.5
NORTH WEST	£1.05	£0.5	8.1
SOUTH EAST	£2	£0.9	15.3
South West	£36.8	£17.7	283.3
YORKSHIRE AND THE HUMBER	£2.4	£1.15	18.5
OTHER*	£2.8	£1.3	22

Source: BEMEF[116], ONS and STECF
*Including Jersey, Guernsey, the Isle of Man, and unclassified ports

ECONOMIC BENEFITS

Setting limits to fish at maximum sustainable yield (MSY) by following scientific advice, can ensure: (a) that catches of quota species do not decline in the future; and (b) that catches increase for quota species, which are currently overfished.

Using the Bio-Economic Model of European Fleets (BEMEF),[116] we estimate the economic and employment impacts of fishing at scientific advice, per UK region and country broken down by district authority. Calculation details are available in the **Technical Appendix**.

Overall, we find that capping fish catch to comply with scientific advice would increase landings by 45%.

This would translate into an additional GVA of approximately £150 million across the UK coast, and would support an additional 2,400 full-time equivalent (FTE) jobs. It is worth nothing that these are not necessarily new jobs, but may simply mean part-time workers and under-employed fishers move into full employment.

Table 9 presents results broken down by UK countries and regions, while the **Technical Appendix** provides detailed estimations by district authority.

These figures account for direct GVA and employment impacts only. When taking into account economic and employment multipliers (knock-on effects on other sectors of the economy through supply chain expenditures) ensuring fishing does not exceed scientific advice could translate into an additional income of £440.5 million and support approximately 5,390 additional FTE jobs across the UK.

7. AQUACULTURE

AQUACULTURE – THE FARMING OR CULTIVATION OF FINFISH (LIKE SALMON), SHELLFISH (LIKE MUSSELS AND OYSTERS), AND SEAWEED – IS A GROWING GLOBAL INDUSTRY WITH GREAT POTENTIAL IN THE UK.

This is a sector ripe for innovation, focused on raising environmental standards and encouraging a variety of new business models.

WHERE ARE WE NOW?

Fish farming is not new. Some forms of aquaculture – such as the cultivation of mussels and oysters, and seaweed farming – are already part of many UK communities' history and cultural traditions, with practices dating back to Roman times. Over the centuries, societies have used aquaculture[117] to adapt to growing populations and a changing climate.

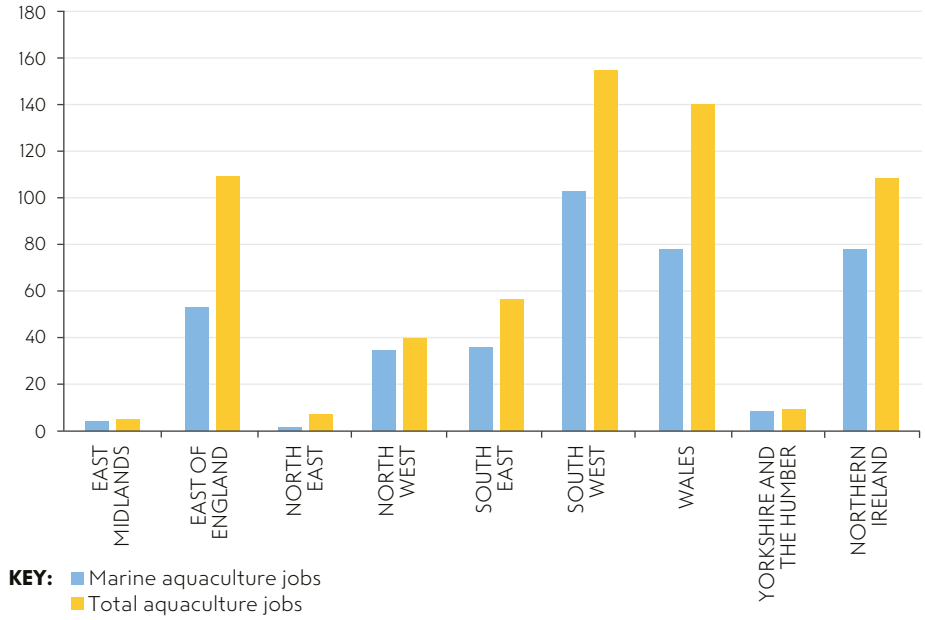
Aquaculture is one of the world's fastest growing[118] food sectors, in part because of overfishing and the growing demand globally for a source of protein. The majority of the fish[119] we consume today is farmed rather than caught by fishers in the wild. In terms of value, the UK is now the largest aquaculture producer in the EU,[120] with Scottish Atlantic salmon by far the most valuable product.

Most of the jobs[121] in aquaculture in England, Wales, and Northern Ireland are associated with small businesses, meeting a relatively local demand.

Although aquaculture practices will not be suitable for every place on our coast, many coastal communities are well placed to make the most of different types of aquaculture, and in several different systems, including freshwater and coastal or offshore waters.

- The UK has great natural conditions to support **shellfish aquaculture** (including the farming of oysters, mussels, scallops, and clams), which can be farmed using various techniques both offshore and in the intertidal zone. The shellfish sector already contributes around £35.6 million annually to the UK economy.[122] Contrary to many types of finfish aquaculture, shellfish and **seaweed farming** (Case study 19) do not require feed or fertiliser inputs, nor insecticides or antibiotics. That means that these

FIGURE 8. DIRECT MARINE AQUACULTURE AND TOTAL AQUACULTURE EMPLOYMENT IN COASTAL LOCAL AUTHORITIES BY RESPECTIVE UK COUNTRIES AND REGIONS



Source: NEF based on Business Register Employment Survey and Seafish

practices can deliver environmental benefits, such as water filtration or food for wading birds.

- There is a very diverse **finfish aquaculture** industry in England and Wales, which produces over 30 different species[123] or varieties of fish in both marine and freshwater. In Scotland, the most significant form of finfish aquaculture is the production of Atlantic salmon – Scotland's largest and main food export[124] (Case study 20). The farming of trout in offshore cages in Scotland is increasing, and could still help grow[125] UK trout production further.

- There is significant potential for large-scale **aquaculture production in offshore waters**, where there is less competition for space, as long as it is well planned and regulated. Offshore mussel farming (grown on ropes), for example, is currently being developed in Lyme Bay, south west of England, and aims to be at full production by 2020.[126] Given that the set-up costs, time, and business risks of this type of project are currently uncertain, the success of this farm, and other similar projects, is likely to act as a catalyst for future opportunities, which could include different species of shellfish and possibly combined with seaweed. But these kinds of innovative projects need support.

Fish are an efficient protein source, requiring lower feed inputs than terrestrial animals. Aquaculture is therefore a more sustainable source of protein than other types of meat, and finfish farming has the potential to help reduce pressure on some wild fish stocks, which are currently overfished.

Although the fishing industry remains a supplier to finfish aquaculture – with fish still being caught to feed farmed carnivorous species, such as salmon aquaculture practices, the aquaculture industry has already dramatically improved[127] the ratio of wild fish needed to produce farmed fish.

CASE STUDY 19
SEAWEED FARMING IN SCOTLAND

Seaweed is an aquatic plant, which can be used in a variety of ways: as a food product, as a healthier alternative to salt, as a natural fertiliser or biofuel. Seaweed farming production has more than doubled globally between 2000 and 2014 – from 10.5 to 28.4 million tonnes – and in 2012, 95% of production was based in Asia.[48]

Mara Seaweed[49] is an innovative and successful Edinburgh-based business that has recently signed deals to supply luxury seaweed food products to Morrisons, Marks & Spencer and Harrods, and is now exporting to the USA. They employ around 10 people full time and around 20 part time and seasonally, and have more than doubled their sales in 2016. The business sources its raw ingredients by harvesting seaweed from the wild in Scotland and Ireland, and has collaborated with several aquaculture producers and research bodies, including Scottish Association for Marine Science (SAMS) for five years. They are looking at enhancing sustainable wild harvest with farmed supply, and they are testing its commercial feasibility.

The most recent project,[50] called S3EED (Seaweed as a Solution for Sustainable Economic and Environmental Development), aims to create reliable and commercially viable, year-round production of four native seaweed species. Fiona Houston, co-founder of Mara, welcomed the prospect of large-scale production of cultivation:

> "FOR US, DEVELOPING THE INFRASTRUCTURE FOR FARMING SEAWEED IN SCOTLAND IS REALLY GOOD NEWS. THIS IS GREAT BECAUSE WE NEED SUPPLIES. OUR CHALLENGE HAS BEEN DEVELOPING THE SUPPLY CHAIN. THE MORE PEOPLE WHO LEARN HOW TO GROW SEAWEED, THE BETTER."
>
> *FIONA HOUSTON, CO-FOUNDER OF MARA*

The seaweed industry in the UK has the potential to tap into a huge international market and contribute towards strengthening coastal economies and communities. There are also the added health benefits of using seaweed: a 2011 review of 100 studies[51] on the benefits of seaweeds, published in the American Journal of Agricultural and Food Chemistry, reported seaweed may be used to help lower blood pressure[52] and promote heart health. [53]

Mara Seaweed is an innovative and successful Edinburgh business employing around 10 full time staff.

© Mara Seaweed for NEF

CASE STUDY 20
SALMON FARMING IN SCOTLAND

The Scottish salmon farming industry has a world-renowned export product sold in over 65 countries. Salmon is the country's top food export with a total value in excess of £400m and a world-wide retail value of over £1bn. Domestically, Scotland's salmon farmers have injected over £1.4bn[54] into suppliers and services and £161.5m into direct salaries over a period of four years.

Salmon aquaculture is a significant employer – employing over 6,000 people in long-term skilled jobs – especially in rural areas of Scotland, and as a result the industry has a high social value in those communities. To ensure the long-term environmental sustainability of salmon farming, the industry can focus on higher quality and value, by continuing its efforts to lower dependence on wild fish. Progress has already been made in recent years. The need to use wild fish in salmon farms has declined significantly – 1.1kg of feed now produces 1kg of salmon, which is an efficient conversion rate (specially when compared to meat production inland).

Salmon farmers can also continue to improve farming practices and reduce the impact on the environment by dealing more effectively with the significant amount of waste produced. Currently salmon faeces and uneaten feed pellets are routinely discharged from Scottish fish farms. The amount of nitrogen and phosphorous released into the sea has an ecological result greater than the sewage produced by Scotland's 5.3 million humans.[55] Furthermore, sea lice breed copiously in salmon farms and can attach to wild salmon and sea trout, causing widespread mortalities and the collapse of many Scottish West coast salmon populations. This has resulted in the loss of fisheries and hotel jobs.[56]

In order to protect fragile marine environments and fish populations, and the livelihoods of the coastal communities who depend on them, the salmon industry can ensure that any spatial expansion of salmon aquaculture meets environmental criteria, is done in line with locally driven economic strategies, and prevents the monopoly of monoculture.


© Reading Tom

The salmon industry can focus on higher quality and value, by continuing its efforts to lower dependence on wild fish.

The industry needs to be supported to continue to improve its environmental standards. And there are still further opportunities, through innovation, to continue to reduce wider impacts on marine fisheries and ecosystems (Case study 21). Aquaculture innovation could also be integrated with other activities on the coast and offshore. For example, offshore wind energy platforms could be designed to include improvements in offshore aquaculture, limiting competition for space, and Scotland has been looking at the potential for aquaculture to co-exist with marine protected areas (Case study 22).

CASE STUDY 21

AQUACULTURE INNOVATION TO IMPROVE ENVIRONMENTAL SUSTAINABILITY

Integrated Multi-Trophic Aquaculture (IMTA) is a method of fish farming whereby finfish are farmed alongside either algae or shellfish, or both. This polyculture approach mimics the nutrient flows in natural systems, where different species co-exist. As a result, it produces multiple outputs[57] from a more integrated food production system. In other words, the significant amount of waste produced by fish farms no longer pollutes the natural ecosystem, as it is used as a source of food for other organisms.

This is important because in conventional salmon farming, for example, around 60% of the nitrogen in the salmon feed is lost to the wider ecosystem and can have negative ecological impacts when it is present in high concentrations. An IMTA approach can also deliver economic benefits. Simulations in the Bay of Fundy[58] have demonstrated a 24% increase in profitability in co-culture systems compared to monoculture. Furthermore, the additional outputs can provide a buffer from financial loss for fish farmers when the primary product runs into loss. There is also a market advantage, with some restaurants stating that they would be willing to pay up to 10% more for environmentally friendly seafood.

IMTA is still in the early stages of development, although a trial in Loch Fyne is being conducted by Scottish Salmon Company and the Loch Fyne Oyster Company, in conjunction with the Scottish Association for Marine Sciences. It has shown promising results so far[59] with increased seaweed and mussel harvests thriving as a result of feeding off the waste produced by the fish farms. The potential for IMTA methods is substantial – helping to mitigate the environmental impact of fish farming, as well as creating new harvests of shellfish and algae, which can help strengthen local economies.

CASE STUDY 22

SCOTTISH WAVES SET TO POWER A WORKING FISH FARM

There is potential to combine clean sources of energy from the sea with aquaculture. WaveNET is a project by Albatern Ltd,[60] a company based in Scotland hoping to make wave energy harvesting economically viable. Unlike other approaches currently being developed, WaveNET is designed to exploit the interactions between absorbers within a coupled, modular and scalable three-dimensional structure that offers a step change technology with more efficient operation at lower cost. The system has been under active development since 2007 and Albatern have now built a multi-disciplinary engineering team comprising 15 engineers from hydrodynamic analysis through design and production to marine operations.

Albatern Ltd is now planning to install a wave energy array[61] that will produce power for a working fish farm in Mingary Bay, UK. The clean power generated from waves will replace the expensive and polluting diesel generators traditionally used to power the fish farms. The wave powered fish farm is part of the £720,000 partnership, announced by Wave Energy Scotland in October 2015, between Albatern and seafood company Marine Harvest to demonstrate wave energy converters as a means of powering offshore aquaculture installations.

© WaveNet array (Albatern)

In addition to innovation to raise environmental standards, seed supply for shellfish aquaculture (usually juvenile spat, which act much like a plant seed for agriculture), suitable site availability for cultivation, a demand for UK-grown species, and water quality are still key barriers[128] to the development of the aquaculture sector.

- One thing all aquaculture practices have in common is that they are all dependent on a healthy environment, and in particular **good water quality**, to succeed. Water management in many parts of the UK suffers from a lack of co-ordination and clarity over governance and financial responsibility. For example, in some areas, local authorities might lack resources to cover the cost of water treatment, and water companies and businesses might not be legally responsible for covering the costs from agricultural pollution or sewage (with combined sewer overflows, or CSOs,[129] being a significant issue for shellfish farming). As a result, waste generated inland ends up polluting estuaries and the marine environment, affecting water quality negatively, and constraining the development of shellfish aquaculture.[130]

- It is important to note that much of the volume and value of the fish caught or farmed in the UK is exported – not processed or consumed in the UK. Foreign seafood markets greatly value UK species such as langoustine, crab, and mackerel, while domestic consumers continue to focus[131] mainly on a small range of species such as cod, salmon and haddock. Seafood producers (in particular smaller fishing boats and aquaculture producers) would benefit from **increased collaboration** with other areas of the coastal economy, including by reconnecting people with the local produce and the need for sustainable healthy food.

WHAT NEEDS TO HAPPEN NEXT?

1. Aquaculture innovators need government support and commitment to pioneer new sustainable aquaculture businesses, including funding to support innovation focused on raising environmental standards.

- *Government must set out national policy and guidance for aquaculture,* devised together with ecological experts, industry, and the devolved administrations (which have been making progress at different paces).

- *Government should improve the design and management of 'several orders' and 'regulating orders',* which grant exclusive fishing or management rights within a designated area, for the development of shellfish aquaculture. The security of tenure of Several Orders – which grant legal rights for shellfish farming – could be extended over a period of time, which is appropriate to support small to medium businesses access finance and enable the economic viability of slow growing species of shellfish[132] (Case study 23).

- *Regulators can work with different sectors to implement socio-economic and environmental criteria when leasing aquaculture sites; and make better use of Regulating Orders* – which allow management rights to designated natural shellfisheries, usually to a public authority – to enable inshore shellfish management and encourage collaboration and community involvement.

CASE STUDY 23
MUSSEL FARMING IN THE MENAI STRAIT

Mussel farming is a traditional activity in Conwy Bay going back some 400 years. Mussel production in the Menai Strait East area produces 7–10,000 tonnes of mussels annually, which represents 30–50% of the total UK production of farmed mussels. Bangor Mussel Producers Limited is the association of four companies – Extramussel Limited, Deepdock Limited, Myti Mussels Limited and Ogwen Mussel Limited – that cultivate mussels in this area.

The Menai Strait East area produces 7–10,000 tonnes of mussels each year.

They employ over 20 staff and operate four boats from Bangor to farm mussel beds within the boundaries of the 1962 Menai Strait (east) Fishery Order. The Menai Strait is protected under the Menai Strait East Several and Regulating Order (SRO), which is granted to the Menai Strait Fishery Order Management Association (MSFOMA), and is managed through collaborative effort. SROs are special legislation to encourage the establishment and management of private and natural shellfisheries in UK coastal waters, granting exclusive rights over shellfish for a specified period in a designated area. The time period of the order and level of protection that it has bestowed has allowed successful business planning, and has supported significant capital investment in vessels and equipment. The use of SROs has therefore helped create an environmentally, and economically sustainable industry, benefitting the communities who depend upon it.

The Association is committed to farming mussels in harmony with the environment; ensuring that operations support a sustainable and vibrant coastal environment; enriching the biodiversity of the mud flats and encouraging wildlife to flourish.

It has a strong commitment to research and has been involved in funding or part-funding more than ten PhDs and a number of other research projects over the last 15 to 20 years – a commitment that will continue into the future. The fishery was the world's first enhanced fishery to be awarded Marine Stewardship Certification in 2010.

- *Government can support different groups in disseminating information regarding the feasibility, the legal requirements, and the process of developing aquaculture in different locations,* to inform communities of what is and what is not possible in their local area.[134] Inshore fisheries and conservation authorities (IFCAs) in England are already leading on this and developing their own aquaculture strategy to help address competition for space. They need government to provide the appropriate funding and resources to continue to develop this work. Information should also be available for communities on what kind of business or co-operative models would best serve their local needs (e.g. community interest companies, co-ops).
- *Government and industry can make best use of available funding, and direct future funding opportunities, to support innovative demonstration sites, which aim to raise environmental standards and production in line with the relevant regulations.* Investment should be directed towards activities the UK has a natural advantage in, and which can support a healthier marine environment (e.g. shellfish aquaculture). For example, trialling restocking and restoring native oyster beds, developing offshore aquaculture, increasing carrying capacity for existing shellfish sites, further exploring seaweed production, and raising the environmental standards of finfish aquaculture (with special attention to salmon farming).

- *Communities and businesses can invest in their own hatchery capacity to produce seed for shellfish farm development.* But to meet the current needs for wild seed to a range of species, and help develop technology, *government should develop a national seed strategy.* For example, Wales has great opportunities to generate mussel seed, but this potential is not currently being realised.[135]

2. Businesses should come together and collaborate with local authorities to set up local or regional 'seafood hubs' that provide support, training, and marketing opportunities to aquaculture producers and fishers, and better connect them with the local economy and communities.

CASE STUDY 24
SOLE DISCRETION – A SOCIAL ENTERPRISE

Sole of Discretion is a social enterprise formed by a collective of small-scale fishers based in Plymouth harbour on the South Coast of Devon. It is one of a number of examples that could be used to inspire 'seafood hubs' around the UK, bringing together aquaculture producers and small-scale fishers to improve the economic and environmental sustainability of their businesses.

The project aims to protect the marine environment through the creation of a dedicated supply chain for ethically caught fish. It is owned by the fishers themselves as a Community Interest Company, ensuring that the benefits are retained in local fishing communities. Fishers get fair prices, rewarding them for their environmental sensitivity (currently UK fishermen only get £1.20–£2.40/kg for the cod, haddock and plaice in the supermarket at £15/kg or more). Sole of Discretion aims to create a mechanism to financially reward the fishermen who are most sustainable.

The distribution network created in the enterprise means that fresh fish can be despatched or frozen within hours of the catch being landed – resulting in better quality fish for consumers, as well as fairer prices for fishermen and a protected marine environment.

They are also working in collaboration with Exeter University's Marine Biology Department to help identify the best fishing practices.

The project helps coastal communities by protecting the declining small-scale fishing industry. This approach benefits the environment as well, as small-scale fishers use nets that do little damage to the sea bed, whilst their nets also tend to have larger holes so they can be more selective about what species and size of fish they catch. This static net fishing is far more carbon efficient too, helping to mitigate the effects of climate change.

Sole Discretion works alongside Exeter University to help identify better fishing practises.

Sutton Harbour © Mercator Media 2016

- *Communities and businesses can work with local authorities to set up local or regional seafood hubs, bringing together aquaculture producers, fishers, and the wider local economies.* Seafood hubs can build on, and learn lessons from, existing fisheries local action groups (FLAGs) and other locally led initiatives (Case study 24).[136] Seafood hubs would need strong local leadership and could support and help raise awareness for a range of issues:
  - Sharing best practices and making the best use of transferable skills locally.
  - Marketing local seafood produce to support stronger local and regional supply chains and help grow demand for certified sustainable UK seafood, including by leading initiatives that connect local producers and the local people and businesses (e.g. working with schools, local chefs, tourism businesses and restaurants).
  - Developing processing capacity locally, which can help strengthen supply chains and support more jobs.
  - Training on new skills and adaptation towards more sustainable fishing and aquaculture practices, as well as training on marketing and digital literacy to support producers to capture more value, or add value to their products. Government should encourage best use of local skills, and support skills training schemes to allow people wishing to enter the aquaculture sector.[137]
- *Government should promote improved and more democratic governance of the aquaculture sector,* by supporting the development of local and regional governing structures, which help producers and the marketing of more sustainable aquaculture products. For example, POs for small-scale fishers could also support small-scale aquaculture producers.

3. Clean water is essential for fish and shellfish health, and therefore crucial to the success of aquaculture businesses. As part of a wider effort to have the continent's cleanest coastline and beaches, regulators must ensure the UK meets current EU water-quality targets, and increase, or at least keep the same, targets post-Brexit.

- *Regulators must enforce water-quality targets – such those currently imposed under the EU Water Framework Directive*[138] – and ensure that post-Brexit the UK's water quality standards are increased.
- *Government should increase regulation requiring water companies to introduce more effective, and faster, investment to avoid CSOs.* This would lead to[139] more suitable sites[140] for high-quality shellfish aquaculture and protect existing shellfish production from closures. It would also benefit bathing waters and recreational activities.

MEASURING THE IMPACTS OF THE BLUE NEW DEAL FOR AQUACULTURE

The Blue New Deal measures for aquaculture could support the growth of the sector in respective countries and regions of the UK.

Based on existing potential growth estimations for different types of aquaculture and for respective countries and regions of the UK (see the Technical Appendix) we estimate that aquaculture production could, on average, support 1,618 additional jobs throughout the UK coast over the next five years. Table 10 shows how, when accounting the indirect jobs supported by the sector through supply chains expenditures (spill overs on regional economies), aquaculture on the coast could support an additional 3,560.

TABLE 10: DIRECT MARINE AQUACULTURE AND TOTAL AQUACULTURE EMPLOYMENT IN COASTAL LOCAL AUTHORITIES BY RESPECTIVE UK COUNTRIES AND REGIONS

COASTAL LOCAL AUTHORITIES LOCATED IN:	ADDITIONAL GVA (£ MILLION)	ADDITIONAL GVA INC. MULTIPLIERS (MILLION £)	ADDITIONAL JOBS	ADDITIONAL JOBS INC MULTIPLIERS
EAST MIDLANDS	£0.8	£1.8	20	44
EAST OF ENGLAND	£9.7	£21.5	233	512
NORTH EAST	£0.4	£0.9	10	22
NORTH WEST	£6.4	£14.1	153	338
SCOTLAND	£7.2	£15.8	172	378
SOUTH EAST	£6.6	£14.6	158	349
SOUTH WEST	£18.7	£41.2	446	980
WALES	£16.2	£35.7	387	851
YORKSHIRE AND THE HUMBER	£1.6	£3.6	40	87
TOTAL	**£68**	**£149.6**	**1,618**	**3,560**

Source: NEF based on Business Register Employment Survey, Marine Scotland and Seafish

Note: Numbers on the table are sometimes rounded, so totals may not exactly reflect the sum of each row.

8. PLANNING FOR COASTAL CHANGE

COMMUNITIES ARE ALL TOO AWARE OF THE CONSTANTLY CHANGING NATURE OF THE SEA AND THE COAST. BUT CLIMATE CHANGE RAISES THE STAKES. AS IT INCREASES IN SEVERITY AND IMPACT, SO WILL THE RISKS TO COMMUNITIES FROM FLOODING, COASTAL EROSION, AND STORM EVENTS.

National support is needed to give communities the confidence and the support they need to work together, plan, and innovate around the smartest ways to build resilience to climate change – recognising that it is no longer sufficient, or indeed affordable, to always build 'wall defences'.

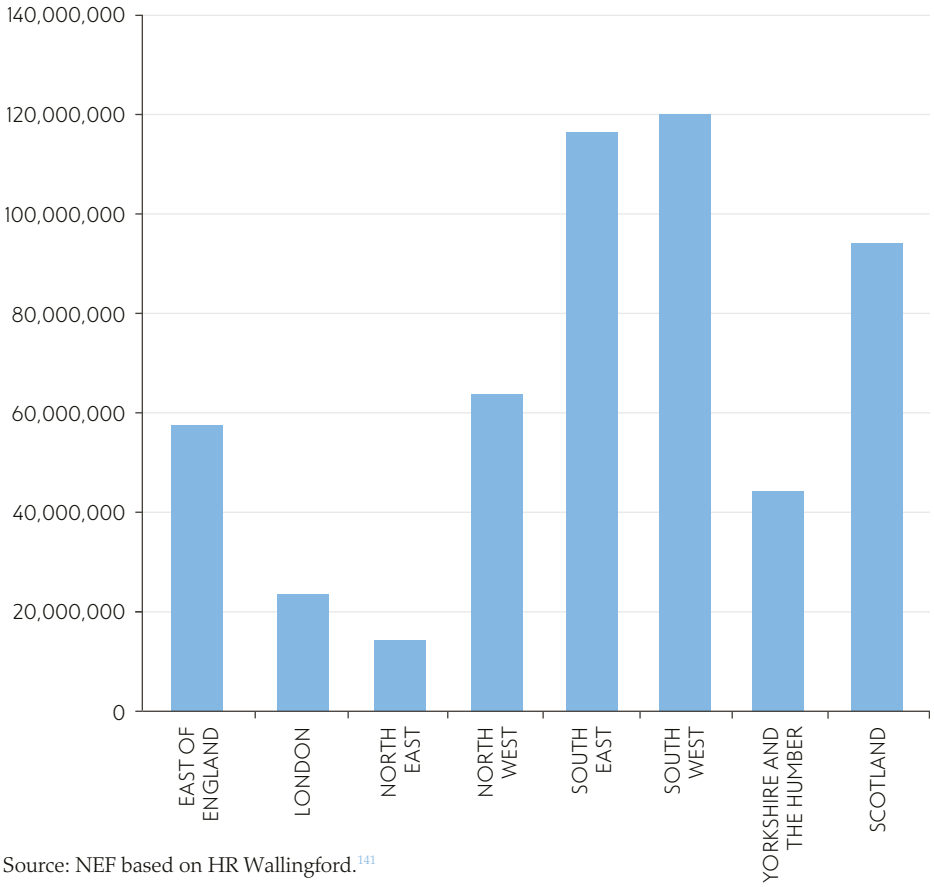
WHERE ARE WE NOW?

Coastal communities have a unique challenge with regard to planning. They need to manage three distinct spatial areas simultaneously – land, coast, and seas. Climate change adds new difficulties to managing our coast, and failure to innovate today is certain to lead to greater economic, social, and environmental costs in the future.

- In Scotland, there are over 93,000 **residential and commercial coastal properties at risk of flooding and erosion**; in England (excluding London), there are over 400,000. These figures, shown in Figure 9, may underestimate the total number of properties located in flood risk areas, and do not account for agricultural land. They are also expected to substantially rise because of climate change, with some assessments considering that the number of properties at risk is likely to triple over the coming decades.

- In November 2007, when a tidal surge and high tides resulted in partial flooding of Great Yarmouth on the Norfolk coast, it raised concerns among the town's business leaders that tourism in the area is vulnerable to climate change.[142] Between December 2015 and January 2016, **severe flooding** affected the north of England and Wales, and parts of Scotland and Northern Ireland. As a result, the government's National Flood Resilience Review was launched. The subsequent Environmental Audit Committee (EAC) report[143] found that the government is failing to protect communities at risk.

FIGURE 9. NUMBER OF RESIDENTIAL AND COMMERCIAL PROPERTIES AT RISK OF FLOODING AND COASTAL EROSION IN COASTAL LOCAL AUTHORITIES, AGGREGATED BY SELECTED REGIONS



Source: NEF based on HR Wallingford.[141]

- Hundreds of properties in England alone could be lost to **coastal erosion** by around 2030. But building in at-risk areas has continued. In 2005, the number of buildings at medium to high risk from coastal change in England was 117,000; by 2014 this had grown to 129,000. Local authorities are struggling to deal with the challenges brought by an eroding coast.[144] They have no clear options to support people whose properties are at risk. They lack funding, and coastal adaptation is still not recognised as an option in government policy.

How we manage our coastline plays a crucial role in the resilience of coastal communities, their local economy, and the way that people experience and connect to the coastal and marine environment.

- The mainstream approach to managing flood and erosion risks on the coast over the years has been to build hard defences (e.g. building a wall). But **'hard' defences** – compounded with changes in agricultural practices, dredging for raw materials, and the building of new structures on the coastal zone – have caused a decline of natural coastal habitats, both in extent and in quality, since the 1950s.[145]

- This approach is no longer sufficient. **Natural flood management** or 'soft' defences (as opposed to 'hard' defences) – aimed at supporting diverse and resilient coastal ecosystems – have been proven to provide a long-term, cost-effective defence against coastal erosion and flooding, while also maximising the potential for tourism, leisure, and recreation activities (Case study 25).[146] After funding three innovative natural flood management trial schemes, the Department for Environment, Food and Rural Affairs (Defra) found that the total value of the flood risk reduction, and other benefits arising from these projects, substantially outweigh the total costs involved in implementation.[147] Coastal wetlands, for example, are valued at £1.5 billion annually in terms of the role they play in buffering the effects of storms and in controlling flooding.[148]

DELIVERING FLOOD PROTECTION AND A MORE RESILIENT COAST

Table 11 shows how a **bold strategy and investment to reduce flood risk in coastal areas**, by protecting residential and commercial properties, would translate into benefits (in terms of avoided losses) worth approximately £185 million a year. These figures assume that avoided costs are spread evenly across time. In the real world, floods are usually sudden episodes, occurring with sparse frequency, and high losses consequently occur during these episodes. For example, the floods of the winter of 2015 in the North of England translated into a £5 billion hit to the economy. The **Technical Appendix** includes detailed results by coastal local authority, and it describes this analysis in greater length.

CASE STUDY 25

RESTORING HABITATS TO INCREASE RESILIENCE

The Medmerry Realignment Scheme is an innovative flood defence project in West Sussex and the largest managed realignment scheme on the open coast in Europe. Opened in November 2013, the Medmerry flood defence held firm during the 2013/2014 floods and is seen as a gold standard of flood defence in the UK. It directly protects 350 houses, as well as the sewage plant and the main road to Selsey.[68]

Between 2011 and 2013, the Environment Agency (EA) constructed 4.25 miles (7 km) of new flood bank inland from the sea between Selsey and Bracklesham, in West Sussex, currently one of the stretches of coastline most at risk of flooding in southern England. It then breached the existing shingle beach to create amazing new wetland habitats for local wildlife.

The previous shingle bank at Medmerry required expensive maintenance each winter, and was not able to prevent coastal flooding during major storms. Much of the site is now managed by the RSPB as a nature reserve. The important new wildlife wetlands are expected to offset the anticipated loss of protected intertidal habitats in the Solent over the next 100 years. In addition, new public access points will be created for residents and visitors to enjoy the wildlife.

This new form of defence has helped to save £300,000 in taxpayers' money each year, the cost of repairing the shingle bank. It also supports local economic growth by allowing businesses to operate year round. Medmerry's new wetlands have enabled the holiday village to revamp itself as an ecotourism destination.

TABLE 11: ANNUALISED BENEFITS OF INVESTING IN FLOOD REDUCTION MEASURES IN THE UK'S COASTAL LOCAL AUTHORITIES (£ MILLION)

COASTAL LOCAL AUTHORITIES LOCATED IN:	AVOIDED COSTS OF FLOODING: RESIDENTIAL PROPERTIES (£ MILLION)	AVOIDED COSTS OF COASTAL EROSION: RESIDENTIAL PROPERTIES (£ MILLION)	TOTAL (£ MILLION)
SCOTLAND	£28.8	£7.7	£36.5
WALES	n/a	n/a	n/a
EAST MIDLANDS	£9.7	£3.2	£13.0
NORTHERN IRELAND	n/a	n/a	n/a
EAST OF ENGLAND	£12.3	£4.2	£16.5
NORTH EAST	£3.9	£2.1	£6.0
NORTH WEST	£11.5	£3.7	£15.2
SOUTH EAST	£33.3	£13.3	£46.6
SOUTH WEST	£28.4	£15.1	£43.5
YORKSHIRE AND THE HUMBER	£5.3	£1.6	£7.0
TOTAL UK	**£133.3**	**£50.9**	**£184.2**

Source: NEF based on HR Wallingford[149] and Environment Agency.[150]

There are also **wider costs to floods**. Avoided losses to households and businesses only represent a small fraction of the benefits of investing in flood protection and prevention of coastal erosion. Flood events entail health costs, negatively affect wellbeing and economic livelihoods, and imply substantial infrastructure losses. Disruptions to businesses and households also entail negative knock-on effects on local and regional economies.

Table 12 outlines the importance of these additional impacts using the example of the 2013/2014 winter floods. What this example illustrates is that the benefits of reducing flood risk through preventative approaches could be considerably higher than the estimate we provide.

- These benefits could be attained through different approaches in the short term, including traditional methods, such as building hard coastal defences. But a range of organisations and local authorities have been working with[153] the Environment Agency to explore innovative ways to do coastal management, including more natural solutions, looking at opportunities to deliver longer-term, more cost-effective solutions to flood protection.

TABLE 12: THE WIDER COSTS OF FLOODS: THE EXAMPLE OF THE 2013/2014 WINTER FLOODS [151]

CATEGORY	DAMAGE (£ MILLION)	PERCENTAGE OF TOTAL DAMAGE
RESIDENTIAL PROPERTIES	£320	25%
BUSINESSES	£270	21%
TEMPORARY ACCOMMODATION	£50	3.80%
MOTOR VEHICLES, BOATS, CARAVANS	£37	2.80%
LOCAL AUTHORITY AND LOCAL GOVERNMENT INFRASTRUCTURE	£58	4.50%
EMERGENCY SERVICES	£3.30	0.25%
FLOOD RISK MANAGEMENT INFRASTRUCTURE AND SEVICE	£147	11.30%
UTILITIES: ENERGY	£0.82	0.06%
ULTILITIES: WATER	£29	2.20%
TRANSPORT: ROAD	£180	14%
TRANSPORT: RAILS	£110	8.50%
TRANSPORT: PORTS	£1.80	0.14%
TRANSPORT: AIR	£3.20	0.25%
PUBLIC HEALTH AND WELFARE	£25	1.90%
EDUCATION	£1.60	0.13%
AGRICULTURE	£19	1.50%
WILDLIFE SITES	£2.40	0.18%
HERITAGE SITES	£7.40	0.27%
TOURISM AND RECREATION	£3.50	0.27%
TOTAL	**£1,300**	

Source: Chatterton et al[152]

- Policy measures and investment in flood prevention have been highly effective in reducing flood risk, where and when they have been systematically implemented. For example, coastal properties located in Shoreline Management Plans sites are 92% less likely to be at risk of flooding, all else being equal. Yet, in publicising the results of the EAC report, its chair Mary Creagh MP said: "Local authorities are not receiving the support they need to prepare for, and mitigate, the impacts of flooding […] it just isn't good enough for Government to react to flooding events as they occur. Communities at risk deserve certainty from government." The report concludes[154] that a proactive approach to flood management is needed.

- Litter and pollution are aggregating factors, when managing flood prevention. Coastal communities ultimately pay the price for **marine and coastal litter and pollution**, which are often a result of a range of activities on land and further upstream: revenue lost through spoilt fish catches; damage to properties and infrastructure; and sewage-related debris on beaches, which can also have adverse effects on tourism.

- Crucially, government needs to support increase collaboration between different areas and planning spheres (land, coastal, and marine), and allow and support coastal communities and authorities to experiment in more innovative approaches so that they can build the evidence needed to prioritise different types of solutions to protect homes and businesses, keep the coastline clean and healthy, and deliver a range of[155] additional social, economic, and environmental benefits.

WHAT NEEDS TO HAPPEN NEXT?

1. **Give confidence: coastal areas have unique planning challenges and they need confidence to plan robustly and innovate for the future. A regional planning tier should be re-established to integrate land, coastal, and marine planning, and make it easier for different areas, authorities, and economic sectors to work together.**

- The demographic, ecological, and economic implications of managing the coast, and its hinterland, requires joined-up working. *Government should re-establish a regional planning tier that integrates land, coastal, and marine planning, as well as the energy system.* A more integrated planning system could better support marine litter and downstream pollution prevention by reducing it at source; pooling investment and encouraging innovation by getting public, private and third sectors working closer together in a region; and be more accommodating to new innovative energy projects and decentralised energy systems. (In Section 5, under 'energy', we explored how the planning process should be amended to give a greater emphasis to community or locally owned energy projects.)

- While there is national policy in place to plan for flood prevention, the number of local flood plans and strategies is worryingly low and the government does not seem[156] to be supporting local authorities to develop them. *Investment should be directed to equip local areas with the expertise and capacity they need, including skills training, and resources to coastal managers and engineers on innovative solutions to coastal management.* Allocation of funding should prioritise those areas most at risk (e.g. from flooding and erosion), and those that lack the appropriate resources (e.g. most deprived areas).

2. Build resilience: Coastal communities need support to face the difficult decisions imposed by a rapidly changing climate and coastline, including relocation. Innovative approaches to adapt to coastal change need to be seen as an equally important measure as just defending the coast, and should be reflected as such in planning policies.

- *Adaptation to climate change needs to be seen as an equal partner with defending the coast, and should be reflected as such in planning policies. This would support local and r*egional authorities, in charge of coastal management, in implementing the best available solutions for their areas. For that to happen, *policy and available funding must be amenable to supporting a range of innovative investments* – far more than either building a wall or not doing anything.

- *Government and local authorities should also work with experts to make sure information and help is provided to communities on coastal change and its risks* – as well as the options available to address them.

- *A mature discussion is needed that includes the possibility of relocation.* Locally, there is a role for influential figures in the community to help tell a new, positive story of adaptation on the community's own terms, and debate the difficult decisions it may involve.

3. Fund innovation: Experimentation is crucial to help build the evidence needed to prioritise alternative solutions to managing our coast. Government should support coastal areas in funding innovative approaches in their locality.

- *Government must set out a clear, long-term strategy and funding commitment to support more innovative and sustainable approaches to coastal management.* Experimentation is crucial to help build the evidence needed to prioritise alternative solutions. Coastal areas need to have greater powers over the decision-making process (including supporting longer time-frames for the delivery of more innovative projects); and to be able to choose and implement the most appropriate solution in their locality.

- *Government should also support and help finance pilot models for help 'harder to fund', more innovative approaches.* There are already a number of examples of innovative approaches to address flooding and erosion risks (Case study 26). Local areas could set up 'coastal innovation hubs' to engage the community, generate ideas, provide leadership, and connect people, expertise and funding to test new approaches.

CASE STUDY 26

BUILDING COASTAL RESILIENCE: THREE DIFFERENT APPROACHES

Different areas of our coastline will require different solutions to deal with a changing coast and the increasing threats from climate change, including flooding and coastal erosion. There are already a number of innovative approaches in the UK and many people working to build the evidence needed to ensure that coastal communities can face these challenges in a way that is cost-effective and sustainable for the long term.

INCREASING BIODIVERSITY AND RESTORING HABITATS TO REDUCE FLOOD RISK

Wallasea Island Wild Coast project[69] is a conservation and engineering scheme to combat the threats from climate change and coastal flooding by recreating the ancient wetland landscape of mudflats and saltmarsh, lagoons and pasture. It will also help to compensate for the loss of such tidal habitats elsewhere in England. Once completed, this will provide a haven for an array of nationally and internationally important wildlife and an amazing place for the local community, and those from further afield, to come and enjoy. Although the reserve is planned to be in development until around 2025, the RSPB who is managing the project, welcomes people to come along and view the progress as each phase comes to life and the marshland naturally regenerates. The current sea wall access along the Allfleets Marsh Trail sea wall is a wonderful place to come to relax and enjoy, whether for walking, cycling, birdwatching, painting, photography or simply taking in the sea air. Over the coming years, the scheme will create a varied wetland landscape with more than nine miles (15 km) of new and improved access routes, and eventually a range of visitor facilities.

SANDSCAPING: LONGER-TERM BEACH NOURISHMENT THAT 'BUILDS WITH NATURE'

Sandscaping is an innovative coastal management scheme that could support long-term adaptation to climate change and increase the resilience of our coastal land, infrastructure and communities.

A partnership between the Crown Estate, Arup, Royal HaskoningDHV, HR Wallingford and Van Oord, is working closely with local authorities, the Environment Agency, coastal infrastructure managers, the academic community and industry experts to develop evidence and reach informed conclusions.[70]

Sandscaping, informed by the European 'Building with Nature' approach, explores the innovative use of marine sand and gravel in large-scale coastal protection schemes which would utilise natural energy from the sea to distribute the beach, creating a new resilient coast. A new large beach could then provide a focus for placemaking – providing a catalyst for a community-led coastal regeneration and development.

The partnership is applying the principles established in a pilot project, Sand Engine, developed in 2011 in the Netherlands. Sand Engine involved the placement of 21.5 million cubic metres of sand to create a hook shaped peninsula off the coast near Ter Hejide, using natural processes to distribute and produce 35 hectares of new beaches and dunes along the coastline.

ADAPTING TO COASTAL CHANGE

New building techniques enable properties to be moveable to a new location when threatened by erosion. The Birling Gap beach,[71] within the parish of East Dean and Friston, East Sussex, is owned by the National Trust (NT). Coastal erosion is a key issue in this area. The National Trust runs an all-in-one café, shop, and information point, which is perched on the cliff above the beach. The attraction receives an estimated 350,000 visitors a year, who can enjoy views towards Beachy Head in the east and the iconic Seven Sisters in the west.

To tackle the challenge of coastal erosion, working as much as possible with nature and not against it, the property team at Birling Gap have implemented a 'roll-back' approach. The building has been renovated with a long-term vision in mind; the café will have a life span of around 25 years, and the shop and proposed visitor centre over 30 years. "We're working with coastal change, closing the original rooms as we need to and creating similar-sized rooms at the back of the building.

> "IN THE FUTURE, WE ALSO PLAN TO DESIGN SIMPLE NEW STRUCTURES THAT CAN EASILY BE TAKEN DOWN AND RE-BUILT. THAT WAY WE CAN STAY AHEAD OF THE ERODING CLIFF LINE."
>
> *JANE CECIL, GENERAL MANAGER FOR THE SOUTH DOWNS*

9. INVESTING IN THE COASTAL FUTURE

THE UK COAST'S POTENTIAL IS NOT BEING FULFILLED AND A TRANSFORMATION IS NEEDED. BUT COASTAL COMMUNITIES SHOULD NOT BE EXPECTED TO DO IT ALL ALONE.

Government needs to take the coast seriously and invest in building the capabilities of people and communities; in their physical and digital infrastructure; in protecting and enhancing the health of their environment, including the sea; and in education, skills and training.

WHERE ARE WE NOW?

Communities alone can't build cross-country railways or raise the level of money needed to restore coastal habitats. Public investment must be available and directed to support a number of the things we have covered in this action plan, to build the capability of places, people and communities on the coast.

- If communities want to develop an app to support tourists to find local businesses and attractions, they need to count on their areas having mobile coverage and broadband connectivity. Wide internet access and digital education are non-negotiable if we are to enable communities to take their economies into the future. Fishers, for example, could engage directly with consumers through online auctions, such as Twitter auctions used by Dreckly Fish[157] in the south west of England.

- Public bodies are currently lacking the resources they need to enforce regulation and provide essential goods and services, such as public health and education, and a healthy environment. Since many of our environmental and socio-economic, challenges require preventive actions, clear and strong regulations and investment in such public areas actually mean fewer costs in the future.

Communities and businesses are often unable to implement projects and innovative ideas because they find it hard to access finance. The 2016 Seafish report on aquaculture,[158] described how, "due to long, extended lead times typical of aquaculture development and

the relatively short-term view taken by "high street" lenders, financial backing for aquaculture is often hard to secure from the private sector, especially when starting a venture". That's only one example of many from small businesses and community projects, which don't feel supported by our private investment system.

- The UK is unique among developed economies in being extremely dependent on a small number of large, global commercial banks (the Big 5). These banks are increasingly focused on lending against existing assets, like London housing, and on lending to other financial institutions – not investing in small businesses, affordable housing, or renewable energy. Since the mid-1980s, the share of lending going to non-financial businesses has been falling rapidly, and now represents less than 10% of total lending.[159] Of the business lending that does occur in the UK, most is heavily concentrated in London and surrounding areas. According to the most recent available data,[160] 33% of SME lending goes to London and the South East compared to just 8% to Scotland, 5% to Wales, and 3% to the North East. This has left whole regions starved of investment, as well as worsening the gap between those who control financial assets and those who do not.

- In countries like Germany, the banking sector plays a more positive role by providing long-term 'patient capital' to areas of the economy in most need. In these countries, the banking sector is characterised by an ecosystem of local and national institutions, democratically owned, controlled, and accountable, investing sustainably in local communities. At the local level, networks of local 'stakeholder banks' (including public savings banks and co-operative banks) are key providers of patient capital to small businesses and play an important role in regional rebalancing of investment. Since the demutualisation of the 1980s and the wave of mergers and acquisitions that followed, the UK simply does not have these institutions. At national level, investment banks leverage relatively small amounts[161] of public capital into a significant source of strategic and long-term finance. We need to reform our banking system and rebuild a more diverse network of national, local and regional banks (at different scales and levels), which can support communities[162] to invest in what matters to them.

WHAT NEEDS TO HAPPEN NEXT?

1. **Government should treat the coast as a unique case in its national approach to both industrial strategy and infrastructure development. There should be a coastal industrial strategy and targeted public investment to build the capabilities of places, people, and communities on the coast.**

- The government is increasingly talking about an industrial strategy, which is as yet very unclear. The Blue New Deal offers the building blocks for a *comprehensive coastal industrial strategy and an investment plan that cover skills, access to finance, research and innovation, energy, and infrastructure.*

  – A coastal industrial strategy should be aimed at developing economic sectors in which coastal areas have a comparative advantage, by investing in building the capabilities of people and communities, strengthening local supply chains, and restoring the natural resources on which their livelihoods ultimately depend.

– It should be supported by a much needed long-term national skills strategy to support the different sectors of the coastal economy, encompassing all educational levels. A skills strategy could look at supporting a programme of training and apprenticeships with an aim to build skills in coastal areas linked to their economic opportunities, and make employers aware of supply chain and local employment early on, highlighting the need to invest in people, and to build partnerships between industry and local educational institutions.

– And it should develop a flexible innovation fund to support innovation in different areas, including fisheries management, technology deployment for marine energy, and coastal adaptation projects. Different communities can make the most of a region's potential and share knowledge, skills, and benefits – a strategy could support the creation of aquaculture zones, marine energy hubs, and regional tourism packages to make the most of one area's strength in supporting the wider region (e.g. how one popular beach can distribute benefits to an entire region).

- As part of a wider national infrastructure plan, the National Infrastructure Commission (or the relevant body) should pay particular attention to coastal challenges.

  – Coastal communities have particular infrastructure needs, with remoteness or distance from major cities often putting them at the bottom of the queue for transport improvements or broadband access. Coastal infrastructure needs are not necessarily the same as other places. For example, 'soft' defences, which are created through restoring natural coastal habitats, should be considered alongside more typical 'hard' defences (Section 8).

  – *The National Infrastructure Commission should be instructed to make recommendations to assess and set out a plan to deliver a rapid improvement in the infrastructure of coastal areas,* including the retrofitting of buildings on the coast; improvements in mobile phone coverage and broadband connection; improving grid infrastructure to support decentralised energy generation; physical infrastructure; coastal defences; and public transport, including making the most of maritime routes to connect different areas of the coast (e.g. ports, harbours and ferry networks).

2. Local projects need better access to finance than the big banks are able or willing to provide. Government should encourage a more diverse network of local and regional banks – which could be supported by other financial mechanisms – to channel investment into sound local businesses.

- *To support SMEs and wider local economic activity, we need a more diverse network of local and regional banks (at different scales and levels), owned and run for the public benefit, with a mandate to lend and provide banking services locally and accountable to local communities (e.g. public savings banks, mutuals, credit unions, co-ops and Community Development Finance Institutions or CDFIs).* This could be achieved through a combination of:

  – Restructuring existing state-owned banks: for example, RBS could be transformed into a network of 130 local banks modelled on the German Sparkassen.

  – Bottom-up initiatives led by communities and/or local authorities to set up new local and regional banks (such as Hampshire Community Bank and the Co-operative Savings Bank Association).

– Changes to the regulatory framework (e.g. capital requirements, access to the payments system) to make it less difficult for these alternatives to compete with incumbent commercial banks.

– Changes in practice and regulation are needed to re-orient our investment system towards socially useful lending.[163] Meanwhile, local authorities can explore the potential to invest a proportion of their pension funds in activities that both benefit the local economy and deliver strong long-term returns to their members. UK savers have over £2 trillion invested in pension funds[164] – including local authority pension funds. But well documented problems, including short-termism and perverse incentives for asset managers, mean that most of this money is channelled into speculative trading[165] of existing assets (such as FTSE 100 shares), rather than providing new finance to productive enterprise. We can learn from initiatives like the Strathclyde New Opportunities Fund, set up to invest in local small businesses. A coastal transformation fund and/or national investment bank could also provide vehicles through which these institutional investors could invest in coastal infrastructure.

10. MAKING IT ALL HAPPEN

THERE HAS NEVER BEEN A MORE URGENT NEED FOR COMMUNITIES TO COME TOGETHER. THE BREXIT VOTE WAS A WAKE-UP CALL: COMMUNITIES LEFT BEHIND BY OUR ECONOMY AND IGNORED BY OUR POLITICS ARE DEMANDING TO BE HEARD.

In the face of growing inequality, political and financial instability, and increasingly urgent threats to the natural environment we depend on, we all want to see a new economy that benefits areas of the country whose potential is not being fulfilled. This action plan is just the beginning, but it offers great potential to support an exciting transformation on the UK coast. Making it all happen will require working at different levels: communities, businesses and investors, and national and devolved governments.

The coast is dotted with great ideas and projects – from sustainable shellfish farming projects in Wales and Somerset, to a world-leading hub for marine renewable energy in Orkney. Our challenge now is to build on those ideas and help them grow to become opportunities for fundamental, wide-scale change.

To communities: We are inviting coastal communities and coastal regions to continue to build on this work, to lead the development of their own 'deals', bringing together community groups, coastal and marine economic sectors, local authorities, environmental groups, and coastal partnerships. The New Economics Foundation will continue to work with coastal communities from all regions of the UK, to help them reinvent and take control of their local economies, and to speak with a louder voice in government and parliament.

To investors: There is huge potential for supporting the new businesses and innovative projects on our coast. These projects need the right opportunities and support to develop into new businesses and innovative ventures.

A starting point could be to support **coastal and marine innovation hubs**, which would provide the facilities that entrepreneurs, creatives, campaigners, and small organisations need to generate ideas, inspire local dynamism, and create jobs, while protecting and reimagining the coast and the sea. A **coastal transformation fund** can provide vehicles through which institutional investors could support coastal economies.

To governments: The Blue New Deal offers the building blocks for a **coastal industrial strategy**, which could play a key role in helping to rebalance our economy and begin to close the gaps between the UK's marginalised and well-off regions and communities.

CONCLUSION

WHATEVER THE FUTURE OF THE UK COAST IS, IT NEEDS TO BE DETERMINED BY COASTAL COMMUNITIES THEMSELVES. AND THEY ARE ALREADY DOING INCREDIBLE THINGS.

But if we want more communities, which have been locked into a story of negativity and decline, to have the energy and the optimism to rebuild their local areas, then we need to build a political and economic structure that inspires people to reimagine their future, and provides them with the tools they need to act on it.

We also need a more positive and inclusive narrative of change to help communities face the challenges ahead.

Coastal communities can't be expected to do it all alone. The complex challenges afflicting many communities and their environment have not developed overnight. Nor are they all particular to the coast.

Yet, everywhere we look on the UK coast, people are working hard to build a better future. From residents in St Ives coming together to exercise real democracy and tackle their common issues with second-house ownership, to hundreds of community energy schemes up and down the country, demonstrating the appetite for people to own their energy and make it cleaner for a more resilient future; from small scale fishers working together with their local authorities, environmental NGOs and tourism businesses to protect fishery nursery grounds; to communities coming together to drive management of their seas to the benefit of future generations.

There are also universities and businesses working to develop the technology to harness renewable energy from our seas; and coastal partnerships led by people who are passionate about their areas, bringing those who share a stake in the coastal and marine environment closer together to develop ideas and solutions. Government agencies are also working alongside environmental NGOs and communities, to deliver innovation in coastal management and community regeneration; and coastal businesses, like the Venus Company in Devon, are leading on environmental protection whilst making the most of the UK's beautiful beaches.

There are a lot of people already working on all the issues we have covered. The many stories of success are proof that the vision is possible: to balance the social and economic needs of communities with those of our coastal and marine environment; to support more and better jobs, increased wellbeing, and economic sustainability, as well as more thriving wildlife and natural ecosystems.

"THESE ARE JUST SOME OF THE MANY GOOD EXAMPLES OF HOW THAT IS BEING ACHIEVED, BUT THEY ARE STILL FAR TOO FEW, NOT ENOUGH TO DELIVER THE REAL TRANSFORMATION NEEDED."

The mission of this action plan is to strengthen coastal areas' existing calls and support the incredible work happening in the UK towards these goals. The unique contribution from the Blue New Deal is that it recognises that one sector can help another thrive, unleashing multiple economic benefits.

Change is a natural constant. The planet, our lives, and we as individuals, are constantly changing. For change to deliver positive outcomes, we need to take control and identify opportunities.

Over the past decades, marginalised areas of the UK have experienced change in a negative way. Changes in the political and economic system have brought unemployment, poorer quality of life, and increased environmental threats.

In addition to rebalancing wealth and power, we need a more positive and inclusive narrative of change to help communities take control over their own future. We need, for example, a more honest debate about climate change and the difficult decisions that are taking place on our coast, as our coastline changes faster and in more extreme ways.

People need increased support to positively embrace and adapt to those changes. They should be able to see change as an opportunity to reinvent their local economies and communities towards increased resilience, inclusion and happiness.

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TECHNICAL APPENDIX
MEASUREMENT APPROACH

1. TOURISM

CALCULATION STEPS	SOURCES OF ASSUMPTIONS	DESCRIPTION
1. Determining the amount of economic activity and the number of jobs currently supported by coastal (and marine) tourism in respective local authorities of the UK.	ONS Business Register Employment Survey[1] (BRES) Beatty et al[2] Marine Scotland[3]	BRES data provides an estimation of tourism jobs and businesses broken down by local authority. However, these represent total tourism jobs, independently of whether these are coastal or not. We consequently use data from Beatty et al and Marine Scotland to estimate the fraction of total tourism-related jobs in coastal local authorities, which can be considered as coastal-related. We also use these studies to calculate the ratio of gross value added (GVA) per job, in order to infer the total gross value added supported by coastal tourism in respective UK coastal local authorities. The sectors we classified as tourism-related are: a) accommodation; b) food and drinks; c) recreation and d) heritage.
2. Determining the potential growth rate of coastal tourism income.	Deloitte and Oxford Economics[4]	According to Deloitte and Oxford Economics' estimation, UK tourism income could grow by 3.8% per year to 2025. According to BRES data, tourism has grown by 2.2% in coastal local authorities since 2009 – this is lower than UK average. A strategy to increase coastal tourism should at a minimum ensure that coastal tourism growth keeps up with UK average (i.e. a 3.8% yearly growth rate compared to the current 2.2%). We also model the potential impacts of a more aggressive strategy, aiming to achieve a higher than UK average growth rate – by increasing coastal tourism revenue by 5% per year to 2025.
3. Measuring the additional income and employment impacts of stronger coastal tourism revenue growth in UK coastal local authorities.	Based on above sources and calculations	The impacts in terms of jobs and GVA are based on growth rates of respectively 3.8% per year (moderate scenario) and 5% per year (high growth scenario) to 2025. The final figures represents the additional amount of jobs and GVA which could be supported by 2025. Our calculations also allow an estimation of additional employment and GVA impacts for each year to 2025. A key assumption is linearity: all coastal experience the same growth rate to 2025, regardless of their starting point. Although this assumption is debatable, it was not possible to gauge site-specific potential growth rates at a disaggregated, Local Authority level. Figures are adjusted to £GBP 2015 to ensure comparability with other estimations of the economic analysis.

2. RENEWABLE ENERGY
2.1 OFFSHORE RENEWABLE ENERGY

CALCULATION STEPS	SOURCES OF ASSUMPTIONS	DESCRIPTION
1. Estimating existing capacity of offshore (marine) renewable energy and baseline jobs and GVA supported by offshore (marine) renewable energy.	Department for Business, Energy and Industrial Strategy (BEIS) (a)[5] BEIS (b)[6] UK Energy Research Centre[7]	The Renewable Energy Planning Database provides detailed information on marine renewable energy capacity installed by site and type of renewable. However, it is challenging to link offshore sites to specific coastal local authorities. The baseline figures have consequently been aggregated by main regions and countries of the UK. BEIS data, and a UK Energy Research Centre report, were then used to estimate the amount of economic activity and jobs supported. To do that we estimate the GVA and employment intensity per MW, based on a range of existing estimations. Sensitivity analysis has been used to test the variation of results relative to jobs and GVA intensity assumptions.
2. Determining the potential growth rate of offshore (marine) renewable energy.	Fraser of Allander Institute[8] Centre for Economics and Business Research[9]	Both the Fraser of Allander Institute and the Centre for Economics and Business Research provide a range of estimates on potential additional offshore and marine renewable energy deployment by 2020. We used those estimates as benchmarks in the context of this study: we consider one scenario whereby offshore capacity reaches 12GW by 2020 and another where capacity reaches 15GW.
3. Measuring the additional jobs and gross value added supported by further deployment of respective offshore (marine) renewable technologies.	Based on above sources and calculations	Based on two core scenarios, we used the calculations carried through in steps 1 and 2 to measure the additional impact in terms of GVA and jobs, in a moderate growth scenario (to 12GW) and a high growth scenario (to 15GW). Figures are adjusted to £GBP 2015 to ensure comparability with other estimations of the economic analysis.

2.2 ONSHORE RENEWABLE ENERGY

CALCULATION STEPS	SOURCES OF ASSUMPTIONS	DESCRIPTION
1. Estimating existing capacity of onshore renewable energy and baseline jobs and GVA supported by onshore renewable energy in coastal Local authorities.	BEIS (a)[10] BEIS (b)[11] UK Energy Research Centre[12]	The Renewable Energy Planning Database provides detailed information of onshore renewable energy capacity installed per site, broken down by type of generation (e.g. wind, solar, etc.). This data has been used as a basis to derive onshore renewable energy capacity at a coastal local authority level. BEIS data, and a UK Energy Research Centre report, are then used to estimate the amount of economic activity and jobs supported, at current MW capacity. To do that we estimate the GVA and employment intensity per MW, based on a range of existing estimations. Sensitivity analysis is used to test the variation of results relative to jobs and GVA intensity assumptions.
2. Determining the potential growth rate of onshore renewable energy in coastal local authorities.	No estimations available at local authority level. NEF three scenarios: respectively a cumulative 10% (minimum), 50% and 100% (maximum) increase of onshore renewable capacity in coastal local authorities by 2020.	These three core scenarios were used to illustrate the potential for further renewable energy deployment in UK coastal local authorities. The maximum estimate (a doubling of renewable capacity by 2020) is equivalent to the growth of total UK onshore renewable capacity from 2012 to 2015.
3. Measuring the additional jobs and gross value added supported by further deployment of onshore renewable energy in coastal local authorities.	Based on above sources and calculations	Based on the three core scenarios, we use the calculations of steps 1 and 2 to calculate the additional impact in terms of GVA and jobs. In the absence of alternative plausible assumptions, we assume linearity: the increase of onshore capacity in each respective local authority is symmetrical to its original capacity. This assumption can be debatable, as some large projects may increase the capacity of an area exponentially, while other areas may already be too spatially saturated to support further renewables deployment to the same extent. Figures are adjusted to £GBP 2015 to ensure comparability with other estimations of the economic analysis.

3. ENERGY EFFICIENCY

CALCULATION STEPS	SOURCES OF ASSUMPTIONS	DESCRIPTION
1. Baseline assessment: determining the number of private properties with an EPC rating below C in coastal local authorities.	National Energy Efficiency Data-framework (NEED), DECC[13]	The NEED dataset provides the number of all residential properties by local authority, broken down by EPC rating.
2. Measuring the household savings (avoided expenditures), involved with lifting all properties below an EPC rating of C to an EPC rating of C in coastal local authorities.	Washan *et al*, 2014[14]	For non-fuel-poor households, the household savings are net of the cost of energy efficiency measures required to lift properties to an EPC C rating. For fuel poor households, the cost is assumed to be directly covered by the state (or other public authorities). This assumption is in line with previous quantitative work on energy efficiency.
3. Measuring the impact of additional consumption expenditures (enabled by fuel savings) on the value added of various sectors in coastal local authorities.	Office of National Statistics (ONS) (a)[15] ONS (b)[16]	We assume that a fraction (5.9%) of household benefits (avoided fuel payments) are saved rather than consumed. 5.9% is average UK saving rate. The rest is used to cover additional household expenditures, which we assume to be in line the breakdown of average household consumption expenditures as per the ONS household consumption survey. Additional spend in one sector (e.g. retail) translates into a symmetrical additional turnover for that sector. We then use the GVA to turnover ratio, as per the ONS Business Survey, for deriving the additional GVA supported. Figures are adjusted to £GBP 2015 to ensure comparability with other estimations of the economic analysis.
4. Measuring the employment impact of additional value added supported in coastal local authorities.	ONS (b)[17]	We use the employment intensity per unit of GVA ratio of each respective sector to derive the additional employment supported.

4. FISHERIES

CALCULATION STEPS	SOURCES OF ASSUMPTIONS	DESCRIPTION
1. Using BEMEF model output to estimate: a) current landings (tonnes) and current value (£) of quota species' landings per UK port and b) project landings (tonnes) and projected value of landings (£) per UK port if quota species' stocks are restored by fishing at scientific advice (Maximum Sustainable Yield).	Bio-Economic Model of European Fleets (BEMEF)[18]	The BEMEF model incorporates the most recent data from the EU's Data Collection Framework (the 2016 data call) while integrating information on key economic relationships and incorporating data from other sources such as fuel prices, interest rates, and technological change. To model fleet performance at a state of maximum sustainable yield (MSY), estimates of MSY biomass and yield are taken from scientific literature and converted into a level of total allowable catch. As the MMO publishes data on landings by port broken down by gear and length, the economic performance of fleets of a particular gear and length can be linked to particular ports. This linkage allows the potential fishing gains at MSY to be distributed across UK ports.
2. Linking each port of landing to respective coastal district authorities to estimate landings (tonnes) and value of landings (£) by coastal district authority and by UK countries and regions.	Townslist website[19]	Unlike for other sectors, we here use district authorities rather than local authorities, due to challenges in linking UK ports to local authorities. The database developed by Townslist links all towns and villages of the UK (including ports) by district authority and main country/region.
3. Translating the value of landings (£) into gross value added and employment currently supported (baseline), and potentially supported in a scenario where fish stocks are restored. Subtracting the latter by the former to estimate the net additional impact on gross value added and jobs supported by the sector.	EU Scientific, Technical and Economic Committee for Fisheries (STECF)[20] ONS Annual Business Survey[21]	The STECF report provides estimations of landings, GVA and employment – job count and full-time equivalent (FTE) jobs. We used this data to estimate the ratio of GVA per unit of landing (£) and the ratio of employment and FTE per unit of gross value added (£). These ratios are then used to translate the value of landings under the two scenario (baseline and sustainable fishing) in GVA and jobs terms. Figures are adjusted to £GBP 2015 to ensure comparability with other estimations of the economic analysis.

5. AQUACULTURE

CALCULATION STEPS	SOURCES OF ASSUMPTIONS	DESCRIPTION
1. Estimating the economic activity (expressed in GVA) and number of jobs currently supported by marine aquaculture per coastal local authority.	ONS Business Register Employment Survey[22] Seafish[23]	The BRES provides the number of jobs in marine aquaculture broken down UK local authorities. We combine this information with data provided in a recent Seafish report, dealing with the jobs and economic activity supported by different types of aquaculture in England, Wales and Northern Ireland. Our focus is not marine aquaculture, including both finfish and shellfish. We also use Seafish and ONS data to estimate the baseline GVA supported by aquaculture in coastal local authorities. This was done by calculating the ratio of GVA per job for respective aquaculture activities (e.g. mussel farming, oyster farming, etc.).
2. Determining the potential growth rate of marine aquaculture – broken down by type of aquaculture – per coastal local authority.	Seafish[24] Marine Scotland[25] Welsh government[26]	We use information provided by Seafish and official government targets in Scotland and Wales to estimate the growth potential of different forms of aquaculture. These growth potentials were then matched to respective coastal authorities, accounting for the fact that some forms of aquaculture can only be undertaken in some areas. For example, Scotland's official targets are to grow finfish production by 3% per year to 2020 and shellfish production by 10% per year to 2020. Similarly, the Welsh government has set an objective of a 20% annual growth in the overall value added of the sector by 2020, effectively doubling aquaculture income. The figures were used as a benchmark to forecast possible future impacts of expanding the sector.
3. Calculating the additional economic activity (expressed in gross value added terms) and number of jobs which could be supported in respective coastal local authorities if potential growth rates materialise.	Based on above sources and calculations	We combine potential growth rates with baseline economic activity (gross value added) and jobs data to obtain the additional economic activity and jobs supported. The figures can be expressed both in annual terms (additional economic activity and jobs per year) as well as in cumulative terms to 2020 (2020 being the time frame set out by existing targets). Figures are adjusted to £GBP 2015 to ensure comparability with other estimations of the economic analysis.

6. COASTAL MANAGEMENT
6.1. COASTAL EROSION

CALCULATION STEPS	SOURCES OF ASSUMPTIONS	DESCRIPTION
1. Estimating the number of dwellings, including households and business, threatened by coastal erosion.	HR Wallingford[27]	HR Wallingford data encompasses the number of residential and non-residential properties at risk of coastal erosion across English and Welsh local authorities.
2. Determining the potential risk reduction of mitigation measures for households and business threatened by coastal erosion.	HR Wallingford[28]	HR Wallingford data distinguishes between properties in and out of Shoreline Management Plans in respective local authorities. This data can be used to estimate the reduction in number of properties at risk when coastal areas are object of shoreline management plans. The probability of being at risk of coastal erosion is significantly reduced through such plans, and this probability reduction was used to subsequently estimate the avoided losses with implementing shoreline management plans across the UK coast.
3. Measuring the economic value (avoided losses) implied by mitigation measures which reduce the number of household and businesses at risk of coastal erosion.	ONS[29]	In order to translate the reduction of number of properties at risk in economic terms, we use house prices statistics provided by the ONS, and combine them with the probability of being at risk of coastal erosion a) in a business-as-usual scenario (no further action to mitigate risks) and b) in a scenario where more plans are implemented, resulting in a reduced probability of being at risk. The difference between the two represent the benefits (avoided losses) of tackling the economic consequences of coastal erosion across English and Welsh coastal local authorities. All figures are adjusted to £GBP 2015 to ensure comparability with other estimations of the economic analysis.

6.2. FLOODING AND FLOOD PREVENTION

CALCULATION STEPS	SOURCES OF ASSUMPTIONS	DESCRIPTION
1. Estimating the number of dwellings, including households and business, threatened by flooding in coastal areas.	HR Wallingford[30]	HR Wallingford data encompasses the number of residential and non-residential properties at risk of flooding across English and Welsh local authorities – including coastal ones, which are object of our analysis. Properties are broken down by risk magnitude, i.e. high (3.3% per year), medium (1% per year) and low probability (0.1% per year).
2. Determining the potential risk reduction of mitigation measures for households and business threatened by flooding in coastal areas.	NEF assumption: moving from medium and high probability of flooding to low probability as per Environment Agency classification[31].	Because of inconclusive aggregate quantitative evidence dealing with the potential impact of concrete risk reduction measures, we model the impacts of a hypothetical reduction of flood risk to a low probability for all properties currently being at a medium and high probability risk. We also use sensitivity analysis on this assumption in order to obtain a range of possible estimates.
3. Measuring the economic value (avoided losses) implied by mitigation measures which reduce the number of household and businesses at risk of flooding.	Chatterton et al (a)[32] Environment Agency (b)[33] HR Wallingford[34]	To express reduced probability in economic terms, we use the average cost of flooding for residential and non-residential properties, as estimated by Chatterton et al. Figures are adjusted to £GBP 2015 to ensure comparability with other estimations of the economic analysis.

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ENDNOTES

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