Climate Change Adaptation Report

2021 Update

December 2021 | Version 1.0

ABP | KEEPING BRITAIN TRADING

Contents

Executive Summary

ABP is the UK's leading ports group, owning and operating 21 ports around the UK and handling approximately a quarter of the country's seaborne trade. We are the market leader in the sector, handling over 88 million tonnes of cargo every year, equivalent to £150 billion of UK trade. We also operate one of the UK's busiest rail terminals at Hams Hall in the Midlands. As a result, we support over 119,000 jobs and contribute over £7.5 billion to the UK economy.

ABP is directed under the Climate Change Act (2008) to provide voluntary climate adaptation reports in relation to its role as Harbour Authority for the Humber, Immingham, Hull and Southampton. This is ABP's Third Round Climate Change Adaptation Report, supporting the government's ongoing commitment to tackle climate change and meet the country's Net Zero target.

Our ports are extremely important for the handling of UK goods and, as such, deemed critical national infrastructure, whose continued existence and contribution to trade underpins a significant amount of economic activity. For example:

- ABP Humber contains four ports: Hull, Goole, Grimsby and Immingham. The Humber ports handle £75 billion worth of trade, support 33,000 jobs, and contributes £2.2 billion to the UK economy every year.
- Southampton is the UK's largest export port; the number one vehicle handling port, Europe's leading turnaround cruise port, and the UK's most productive container port. The Port of Southampton supports 45,600 jobs and contributes £2.5 billion to the nation's economy every year.

We acknowledge climate change is happening and sea levels are rising. We know that the biggest climate change risk to our Harbour Authority operations is sea level rise. Whilst there remains uncertainty how the frequency and intensity of storms may change, we also know we need to proactively manage this risk.

This report outlines how we are continuing to manage climate change risk through our operational procedures and how we are playing our part as the world transitions to a low carbon economy. We continue to invest in flood resilience, renewable energy generation and green technologies. Today 17 out of our 21 ports have renewable energy generation projects providing clean power for the business, our customers and the national grid.

We [ABP] continue to demonstrate our fundamental role in Keeping Britain Trading time through the COVID-19 pandemic. We are hubs for jobs and industry and are critical infrastructure if the UK is to decarbonise the energy and industrial sectors.

We cannot move our operations away from the coast. Sea level rise will mean that our risk from flooding will increase but we can be flood resilient. We are planning and investing in port resilience and we call again for Government support through the planning and flood and coastal erosion risk management process. Without government assistance and flexibility in planning policy, many opportunities for decarbonisation and advancing a green/blue economy could be jeopardised.

About Associated British Ports

ABP Group

1. ABP is the UK's leading ports group, owning and operating 21 ports around the UK and handling approximately a quarter of the country's seaborne trade. We are the market leader in the sector, handling over 88 million tonnes of cargo every year. Our ports include Immingham, the UK's largest port by tonnage, and Southampton, the UK's largest export port. The group's other activities include rail terminal operations (Hams Hall Rail Freight Terminal), dredging (UK Dredging), and marine and hydrographic consultancy (ABPmer). Each port also offers a well-established community of port service providers.

2. ABP's port locations are geographically diverse and well positioned on key global and European trade routes. The ports are located in close proximity to important domestic industrial clusters, logistics hubs and major conurbations. ABP owns a total of 3,743 ha of freehold land, which includes 960 ha of strategic development land in prime locations across the country. Our ports are Ayr, Barrow, Barry, Cardiff, Fleetwood, Garston, Goole, Grimsby, Hull, Immingham, Ipswich, King's Lynn, Lowestoft, Newport, Plymouth, Port Talbot, Silloth, Southampton, Swansea, Teignmouth and Troon.

3. By facilitating trade for businesses and manufacturers, ABP's ports play an essential role at the heart of the UK economy, supporting around 120,000 jobs and contributing £7.5 billion to the economy every year. Together with its customers, ABP handles around £150 billion of UK trade annually, with £40 billion of UK exports passing through the Port of Southampton, making it the UK's number one export port.

4. We have statutory functions as Harbour Authority for each of our 21 ports. Our statutory Harbour Authority functions comprise:

    - The provision and maintenance of harbour facilities, i.e. quays, wharves, piers, etc
    - The provision of navigational safety functions, including lighting and buoying the harbour, the removal of wrecks and other obstructions and maintenance dredging of navigational channels
    - The regulation of the activities of other persons at the harbour including the movement and berthing of ships in the harbour by means of directions and byelaws, and licensing dredging and the construction of works in the harbour by other persons
    - The carrying out of harbour operations including cargo-handling activities
    - The provision of a pilotage service
    - Nature conservation and the prevention of pollution duties

5. ABP's statutory powers include a duty to have regard to the conservation of flora and fauna. We work with the statutory nature conservation advisors and voluntary organisations to manage the area in which we operate and have agreements with the RSPB and Environment Agency on the Humber. We continue to engage, and where practical, adapt our management for the benefit of nature conservation.

6. We are directed to report as a harbour authority under the Climate Change Act (2008) in areas where more than ten million tonnes of cargo pass through per annum. These ports are on the priority list as they comprise national infrastructure; vulnerable to the projected impacts of climate change; and because climate change adaptation requirements are not already covered in existing regulatory frameworks related to their functions.

7. For ABP we are reporting for the Humber Estuary Services, Immingham, Hull and Southampton Harbour Authorities.

Humber Estuary Services

8. Humber ports and terminals are the region's engine for economic growth. They play an important role in the exploitation of new business opportunities, enable expansion into new markets and attract significant amounts of inward investment. The ports offer a major geographical advantage with unrivalled access into the UK. With excellent road and rail links, some 40 million consumers and over 60 per cent of the country's manufacturing capacity are within a four-hour drive of the Humber. Crossing times to the Continent are as short as ten hours.

9. Humber Estuary Services is responsible for over 145 square miles of estuary. Humber Estuary Services provides the marine functions across the Humber Estuary. It is the Competent Harbour Authority for the provision of Pilotage services; Vessel Traffic Service Authority and Local Lighthouse Authority for the Humber. Its Vessel Traffic Services operation handles some 32,000 shipping movements annually, of which nearly 15,500 require the services of one of our pilots.

10. Humber Estuary Services is also responsible for the conservancy of the Humber Estuary, which involves the ongoing maintenance of safe and navigable channels for all vessels using the estuary. It has a dedicated hydrographic survey team, which monitors the depth and location of channels in the estuary. The surveys allow regular publication of nautical charts, and notices to mariners to promulgate the changes in depths and channel alignments.

11. As the local Lighthouse Authority, it is responsible for marking channels and navigational hazards with buoys and other marks and lights. We maintain 127 floating marks; with the ever-changing morphology channel marker buoys are moved as often as every 14 days in the upper estuary ensuring safe navigation.

Hull Harbour Authority

12. The Port of Hull handles approximately 10 million tonnes of cargo, amounting to around £12 billion in trade each year. As well as containers, ferry travel and Ro-Ro, Hull specialises in handling forest products and a range of bulk commodities. Hull is also home to the UK's first fully-enclosed cargo-handling facility for weather-sensitive cargoes such as steel and bagged products. The Hull Container Terminal is a multi- million pound investment, which handles over 100,000 containers a year and has cemented Hull’s position as a leading gateway for trade, offering reliable and resilient supply chain solutions. Adjacent to the port, the Humber International Enterprise Park is one of the largest development sites in the UK. Regular short-sea services operate to Europe, Scandinavia and the Baltic States and the port benefits from worldwide deep-sea connections. Our Rotterdam Terminal accommodates the new super-cruise ferries operated by P&O Ferries on the Hull-Rotterdam crossing. We directly employ around 500 people with a further 5,000 people employed in the wider port community.

13. In addition to being the owner and operator of the Port of Hull, ABP is the Statutory Harbour Authority for the docks and jetties in the port. The Hull Dock Master holds the statutory powers to control the movement of vessels within the port limits (which includes the riverside berths and jetties). Humber Estuary Services, via the Vessel Traffic Services, controls the movement of all vessels transiting past the port and has control of vessels arriving at, or departing from the port limits. All vessels calling at Hull must report to Humber Estuary Services and the Hull Dock Master work closely together.

Immingham Harbour Authority

14. Immingham is a premier global gateway for international trade and is of national economic and strategic importance to the UK, handling about ten per cent of UK sea-borne trade. It is

situated on the south bank of the River Humber approximately ten miles from Spurn Point. Continental Europe is less than 24 hours' sailing time from Immingham, making the port's potential market of more than 170 million people easily accessible to UK businesses. Beyond that, the rest of the world is accessible through well-established shipping routes. Immingham is a very diverse port operation, handling cargoes that include dry and liquid bulks, ro-ro, lo-lo units and break-bulk general cargo.

15. As with Hull, ABP Immingham is the Statutory Harbour Authority for the docks and jetties comprising the port. The Harbour Master Humber (Humber Estuary Services) and Dock Master Immingham have a very close working relationship. The Dock Master, Immingham, holds the statutory powers to control the movement of vessels within the port limits (which extend 200 yards beyond the berthing face of the riverside jetties) as well as, via Vessel Traffic Services, controlling the movement of all vessels arriving at, transiting past, or departing from, the port limits.

Southampton Harbour Authority

16. The Port of Southampton has a global reach with its container, car and cruise operations and handles over one quarter of the UK's seaborne trade with non-EU countries by value (HM Revenue and Customs, 2014). Less than 100 miles from mainland Europe it has a sheltered, deep-water position on the south coast of England, resulting in minimum weather disruption to operations and minimum deviation from main shipping lanes, along with good inland transport connections. The wider port of Southampton is also home to the Fawley Refinery, one of the largest refineries in Europe as well as BP Hamble, Solent Gateway and several aggregate handling wharves located on the River Itchen. Collectively over 36 million tonnes of freight pass through the Harbour Authority area.

17. ABP Southampton is one of the UK's largest ports in terms of throughput handling around fourteen million tonnes of cargo per annum. Southampton handles over £70 billion of goods every year with £40 billion of exports making it the UK's largest export port. Around 90% of exports are outside the European Union. Around 2.1 million cruise passengers pass through the port every year– a sector worth £1.4 billion annually. We handle over 850,000 vehicles every year the majority of which are UK manufactured vehicles for export, and Southampton is home to the UK's second largest container terminal, operated by DP World, handling 2.0 million TEU per annum. Red Funnel Ferries also run car and passenger ferry services from Southampton to Cowes (Isle of Wight) providing a vital link for the Island's economy.

18. ABP is the Statutory Harbour Authority for the Port of Southampton, encompassing the navigable areas of the River Test, River Itchen, Southampton Water and a section of the central Solent. We are also the Competent Harbour Authority with respect to Pilotage within our Statutory Harbour Area boundary and an extended area covering the East Solent and its Eastern Approaches from Selsey Bill to the Nab Tower. The Harbour Master holds the statutory powers to control the movement of vessels within the harbour area. This area has over 150,000 shipping movements each year, of which more than 9,000 require the services of one of ABP's pilots.

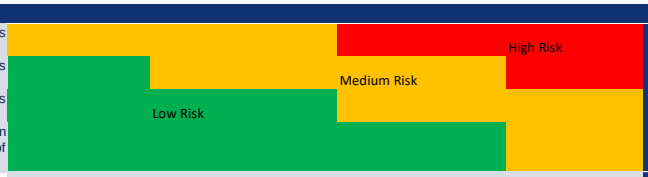
19. We operate the Vessel Traffic Service providing a navigational Information Service, Traffic Organisation Service and Navigational Assistance Service to vessels within the Vessel Traffic Service area. We are also the Local Lighthouse Authority for the Port of Southampton's Statutory Harbour Area by virtue of the Merchant Shipping Act 1995. As Local Lighthouse Authority we are responsible for the provision and maintenance of Aids to Navigation, reporting any defects to Trinity House Lighthouse Service as the General Lighthouse Authority for England and Wales."

Our Approach

Introduction

20. We produced our first voluntary Climate Change Adaptation Report in 2011 with our second round of reporting in 2016. This document is our third assessment report. Much of the background information on ABPs functions as harbour authority is described in our original report (ABP, 2011).

21. For consistency and transparency, we have used the same impact assessment methodology and criteria as previous reports as illustrated below. These identify whether the potential impact to ABP is high, medium, or low.

Likelihood	Expected Frequency					
4	Risk is likely to occur in the next 5 years and/or has occurred in the last 5 years.					
3	Risk may occur within the next 10 years and/or has occurred in the last 10 years.					
2	Risk may occur within the next 40 years and/or has occurred in the last 40 years.					
1	Little evidence to suggest it may occur in the next 40 years. No evidence of occurrence in past 40 years.					
		1	2	3	4	Impact
		Minor	Moderate	Major	Catastrophic	
		< 1%	1% to 5%	5% to 10%	>10%	Financial Impact (EBITDA)
		Others try to exert pressure / receives little coverage	Policy / Strategy undermined / adverse publicity with limited effect on public opinion	Short-term loss of credibility / adverse publicity in local and national press affecting standing within local government professional circles	Total loss credibility / adverse media coverage affecting and public opinion	Reputation
		< 24 hours interruption	24 to 48 hours interruption	48 to 96 hours interruption	> 96 hours interruption	Service Interruption

22. Our approach is illustrated in the PIANC Guidance Document 178-2020 (PIANC, 2020[1]) as a clear illustration of how priorities for action are identified. The update has considered the latest reports by the Climate Change Committee[2] as well as specific guidance documents including PIANC, 2020.

23. This assessment provides a high-level overview of risk across our Harbour Authority areas. There are differences in individual risks and consequences between and within the different Harbour Authority areas and these are assessed further within ABP business processes and procedures.

24. Our risk assessment matrix is provided at the end of the document.

[1] https://www.pianc.org/publications/envicom/wg178
[2] https://www.theccc.org.uk/

What is the evidence our climate assessment is based on?

25. Several climate change risks are identified in the MCCIP 2020 Report Card[3] which could potentially impact the function of a harbour authority, namely: sea level rise and flooding; storm events and extreme weather; temperature, humidity, and precipitation; sedimentation; coastal erosion; water temperature; water quality and habitats and species. In conducting the risk assessments, we have used material from the following sources:

- Climate Change Committee
- UK Climate Projections (UKCP18)[4]. For sea level rise the UKCP18 Representative Concentration Pathway (RCP) 8.5 95%ile has been used
- Coastal Design Sea Levels - Coastal Flood Boundary Extreme Sea Levels Dataset (2018)[5]
- MCCIP Annual Report Cards 2020[6]
- The Environment Agency Flood Risk Maps
- Local tide records
- Horizon Scanning for Climate Change (ABP Internal Document ABPmer, 2019)
- Coastal Flood Risk Reports (ABP Internal Documents ABPmer, 2021)
- Internal ABP business planning and operational documents
- Local knowledge and experience in relation to the areas of jurisdiction

Keeping up to date

26. We continue to invest in our understanding of the risks we face from climate change, both through understanding the direct impact to our port infrastructure and in studying the interdependencies with our customers and the wider infrastructure network.

27. As an example, following the storms of the winter 2013/14, ABP completed a review of the coastal flood risk of its 21 ports in 2015. These reports are currently being updated for use in business decision making from early 2022

28. A further example is our horizon scanning work which has helped identify some of the potential future opportunities and threats to ABP and our customers arising from climate and environmental change. The project summarised the latest understanding on climate change, with a focus on those aspects most relevant to the port industry. It described existing ABP activities and summarised the opportunities and risks associated with climate and environmental change. A workshop was held with port staff from across ABP Group to explore how these changes could affect ABP, in terms of the impacts to port infrastructure and operations; the connectivity to/from our ports; the implications for throughput and customer operations; and the changes to the policy landscape in which we operate. The outcomes of this and other climate change initiatives have been fed into our wider business planning and investment programmes.

29. ABP also benefits from its unique position having direct access to the latest scientific knowledge on climate change through its subsidiary company ABPmer. ABPmer is a marine consultancy and survey company which has over 70 years' experience advising marine and coastal industries on its operations and developments.

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[3] http://www.mccip.org.uk/annual-report-card/2013/
[4] http://ukclimateprojections.metoffice.gov.uk/
[5] https://data.gov.uk/dataset/73834283-7dc4-488a-9583-a920072d9a9d/coastal-design-sea-levels-coastal-flood-boundary-extreme-sea-levels-2018
[6] http://www.mccip.org.uk/

Our Climate Change Risk Assessment

30. Our risk assessment is provided at the end of this document. It shows that the most significant issues for our role as Harbour Authority in the Humber and in Southampton are:

- Flood damage of harbour authority assets
- Interruption to port operations during storm events

31. These issues arise from flooding to Harbour Authority infrastructure and the health and safety hazards to our staff when operating during storm events, both shoreside and at sea.

32. The outcomes of the updated risk assessment are summarised in the table below.

33. Sea level rise will increase the likelihood of flood damage of harbour authority assets. This could include damage to infrastructure, including electricity supply and loss of operation with potential knock-on effects to other critical infrastructure. This risk is assessed as medium in the Humber authority areas and low in Southampton.

34. The potential for increased storminess could also result in storm damage to harbour authority assets resulting in increased asset survey and maintenance costs. This is assessed as medium across our Harbour Authority areas.

35. Increased storminess could also result in reduction or temporary interruption of operation during storm events to maintain safety of pilots and port staff. This would result in vessel delay. The risk is assessed as medium across our Harbour Authority areas.

36. All other climate change risks are assessed as low.

37. We are embedding climate change risk into our Business Strategy, planning, decision making and operational procedures through:

- Improving resilience of port infrastructure
- Improving operational resilience and business preparedness
- Tackling transition to a net zero economy

38. The following sections outline how we are managing the key risks arising from the risk assessment.

What Control Measures Do We Have in Place?

Improving resilience of critical infrastructure

39. The most significant climate change risk to our Harbour Authority Areas is flood risk through tidal flooding of our critical infrastructure assets. The risk increases through the combination of sea level rise and the potential for increased storminess. Whilst the confidence that sea levels are increasing is high, there is uncertainty in how climate change will change the frequency of storm events. We manage flood risk through a range of infrastructure improvements and operational processes [note that the boundary for the Humber Estuary Harbour Authority is managed from the Port of Hull and does not have specific port assets].

40. The highly modified nature of ports means that the risk of coastal erosion is not a significant issue within the Harbour Authority boundaries. Whilst erosion of the seabed can expose the toe of the walls and change local wave conditions, this is managed through ABP's asset management processes and is not impacting our statutory functions.

Hull and Immingham Harbour Authorities

41. Our sea defences also protect the urban areas of Hull and we continue to work in partnership with the Environment Agency to implement joint funded improvements to the infrastructure, including improvements to the lock gates at Hull and local resilience measures to key infrastructure. We have also moved our Vessel Traffic Services from Spurn Head to Grimsby which has reduced the risk of flooding and coastal erosion to these services, providing safer operation and vessel access at the berth. These infrastructure improvements have reduced our risk rating from high to medium, but the low-lying topography of Hull and Immingham means that flooding remains a key risk.

42. We are key stakeholders in the Environment Agency's flood risk management of the Humber Estuary, helping to shape the Humber 2100+ strategy which is defining the most sustainable, credible and cost -effective approach to manage tidal flooding over the next 100 years[7]. This, and previous flood risk management strategies, are supported by extensive flood modelling and investigations. We also work closely with Lead Local Flood Authorities and Local Resilience Forum and have historic legislation and memorandums of understanding to manage key infrastructure on our estate, such as pumping stations, for the benefit of those outside the port estates.

43. We are also continuing to build flood resilience into our port infrastructure. We have a programme of asset improvements which take account of climate change ensuring that our flood sensitive critical infrastructure (for example, electricity sub-stations) is elevated out of the flood plain, thereby improving port resilience.

Southampton Harbour Authority

44. The ABP port fronts much of the city of Southampton and ABP continues to work closely with Southampton City Council and Local Resilience Forum to better understand the predicted frequency and nature of both surface water and coastal flooding events. We are aware of the risk of interdependent flood events and cascading failures from pluvial events, and we work with the council in managing the risk of highway flooding outside of our port area, including upgrading pumping facilities within our estate.

[7] https://consult.environment-agency.gov.uk/humber/strategyreview/user_uploads/humber-2100--storymap-content-for-website.pdf

45. The coastal flood risk at the port of Southampton is currently low, but it is recognised this will increase with sea level rise. Extensive flood modelling has been undertaken to predict the impacts of future events on the city of Southampton and the results are being used by the port to plan for the future. We are key stakeholders in the council's Local Flood Risk Management Board and Coastal Strategies[8] and are a member of the Local Flood Resilience Forum.

Operational resilience and business preparedness

46. The potential impact of delays to shipping movements through pilotage restrictions from increased storminess remains a medium risk across all our Harbour Authority areas. Although the movement of Vessel Traffic Services in the Humber from Spurn Head to Grimsby has improved operating conditions for pilots at the launch and landing station, conditions at sea remain a significant risk. These risks are managed across all our Harbour Authority areas through monitoring of weather conditions, Dynamic Risk Assessments and Safe Systems of Work. This risk remains medium for all our Harbour Authorities.

47. Where sea level rise and storms have the potential to influence sediment deposition patterns (thereby affecting navigation and dredging), risk is managed through our routine survey programmes which are reviewed regularly.

48. Adaption and climate change resilience is an ongoing process, and we have business processes and procedures which to support this. At Group level all ABP's ports and Vessel Traffic Services are covered by Emergency and Business Continuity planning which are subject to ongoing review and integrated with Local Resilience Forum plans. Our critical services are supported by backup generators and we use common IT platforms which can be accessed remotely if any of our facilities become inaccessible. Our servers are also backed up regularly minimising the risk of data loss in the event of system failures. Resilience actions are being implemented across the Group and at port levels, such as a national agreement with Generator Suppliers to provide mobile generators for all critical activities.

49. The results of group wide and port specific initiatives feed into Emergency and Business Continuity planning and associated support software. We consider climate change risks as part of our normal group risk assessment processes. These plan for the full range of emergency situations, including flood events. Pollution of the marine environment is also considered within the Oil Pollution Preparedness and Response Convention (OPRC) Plan implemented by the Harbour Masters' departments.

50. At an operational level, the outputs have fed into ABP's Compliance System and associated Marine Safety Management Systems, dynamic risk assessments and safe systems of work. All these are subject to regular review. In the longer term they are likely to require consideration of increased temperature on our operations and the personal protective equipment required to protect our employees.

51. As Category 2 responders under the Civil Contingencies Act we work closely with local authorities and emergency services to ensure safety and security of our estates during emergencies.

52. In the Humber, ABP also Chairs the Local Resilience Forum Port Security & Resilience subgroup, which brings all port and terminal operators around the region together to discuss and plan for security-related emergencies and business continuity matters, reporting to the Local Resilience Forum General Working Group and Chair.

[8] https://www.southampton.gov.uk/environmental-issues/flood-risk-management/strategies-plans-studies/

Tackling transition to a Net Zero economy

53. As a central pillar to our climate change adaptation, we are implementing a suite of plans and initiatives to both reduce our own carbon emissions and play a role in the necessary decarbonisation of UK industry.

54. We have we've reduced our own CO2 emissions by over 35% since 2014. We have invested over £55 million in green technologies, including electric vehicles, fuel efficient pilot vessels, high efficiency transformers, new LED high-mast lighting and energy generation.

55. We are generating circa 19% of our total port estate electricity consumption through our own on-site wind and solar renewable energy generation. Most of the remainder is grid imported renewable energy backed by Renewable Energy Guarantees of Origin (REGO).

56. Today 17 of our 21 ports have solar and/or wind energy generation assets providing renewable power for our business, customers and the national grid. Group wide we have 29 MW of on-site wind and solar generation assets and are planning to increase this to over 60 MW over the next five years. The Port of Hull has one of the UK's largest rooftop solar arrays at 6.5 MW. At the Port of Immingham, there is 4.3 MW of operational rooftop solar with plans to double this over the next two to three years. Our new cruise terminal at Southampton also has rooftop solar and its shore power charging for cruise ships will be coming online in 2022, reducing air pollution as well as reducing carbon emissions.

57. We have an ongoing programme of port master-planning with strategic long-term plans now in place for many of our Ports. These masterplans typically have 20-30 year time horizons and consider multiple drivers of change, including climate and environment-related factors. Our Group Strategy and Masterplans have given focus to ways in which the ports can maximise the generation of renewable energy (especially wind and solar) and help decarbonise the UK economy.

58. We are looking at how we can support the country in the transition to a low carbon economy and are working with local authorities, partner organisations and our customers to support the ongoing development of the offshore wind sector. A notable recent example of this is Siemens Gamesa's announcement to double the size of its blade manufacturing plant at the existing Green Port Hull facility. This work is planned for completion by 2023.

59. Similar partnering and investment strategies are being developed across our estates including a vision for hydrogen and carbon capture and storage. Examples include the Port of Grimsby which hosts the world's largest offshore wind operations and maintenance centre; our investment in Lowestoft Eastern Energy Facility (LEEF) will be supporting the Southern North Sea (renewable) energy sector as well as offshore wind farms (OWF) in the wider East Anglia region; and our South Wales Vision is centred on maximising the opportunities for Floating Offshore Wind (FLOW) in South Wales. Decarbonisation is central to the vision, as is adapting to a digitized economy; it includes plans to support decarbonized energy generation, manufacturing, logistics and sustainable growth.

What Further Actions Do We Need To Take?

60. We recognise that adapting to climate change, both in terms of the resilience of our Harbour Authority operations and as a port operator is an iterative, long-term process.

61. We will be continuing to integrate the management of climate change risk into our business planning and operating procedures. Our vision is for our ports to be centres for renewable energy and decarbonised manufacturing.

62. Areas for further consideration in the future are likely to include ongoing improvements in our understanding of the potential effects of climate change on our business. This will include improved understanding of the combined threats of surface water and coastal flood events at our port estates (both now and the future); further integrating flood risk into our asset management processes; and the investigation of more intense storm events on our operations and emergency procedures. We will also be looking at how to raise awareness of climate change risks and adaptation with our stakeholders.

63. We aim to continue to improve our resilience and develop the adaptive capacity of our organisation to ensure we can continue to deliver for ABP`s stakeholders.

64. Investment in new plant machinery which is much more energy efficient and preferably ‘electric’ or ‘hybrid’.

Climate Variable (e.g. increase in temperature)	Primary Impact of climate variable (e.g. health)	Threshold(s) above which business function will be affected	Potential impacts on organisation and stakeholders	Likelihood	Impact	Risk Rating	Proposed action to mitigate impact	Residual risks for the Harbour Authority	Residual risks outside Harbour Authority control (interdependency)
Sea Level Rise	Flood damage of harbour authority assets.	Nominal quay height or standard of sea defences.	Damage to infrastructure including electricity supply, loss of operation. Potential knock-on effects to other critical infrastructure.	4	3	Medium (Hull, Immingham)	Ongoing programme of assest management and improving resilience of critical infrastructure (electricity sub-stations etc) along with updates to flood risk assessments, Business Continuity Plans, Flood Resilience Planning and Safety Management System.	Hull, Immingham: Failure of defences.	Hull, Immingham: Failure of electricity, communication and rail infrastructure outside the port. Failure of third party flood defences.
				1	3	Low (Southampton)		None identified outside the residual risk profile.	Failure of third party flood defences limiting access to port.
	Interruption to port operations.	Threshold levels of critical infrastructure.	Loss of operation of Vessel Traffic Services and other Harbour Authority operations.	3	1	Low (Humber, Hull, Immingham)	Operation of back-up generators and IT systems. Under constant review as part of Safety Management System and Business Contingency Plan – offsite access and emergency backups.	None identified outside the residual risk profile.	Highways access and electrical supply from outside port.
				1	1	Low (Southampton)			
	Improved safety.	Any increase in sea level will be beneficial for vessel underkeel clearance.	Reduction in maintenance dredging requirements, improved vessel access.	1	1	Low	Ongoing monitoring; each vessel passage is subject to passage planning.	None identified outside the residual risk profile.	Vessel size is increasing with deeper draughts.
	Changes in maintenance dredging requirements.	Reduction in berth and channel depths.	Increased maintenance dredging commitment and associated cost.	1	1	Low	Regular survey programmes, programmed to reflect bathymetric variability.	None identified outside the residual risk profile.	Availability of dredging vessels.
Storminess	Storm damage to harbour authority assets.	Nominal quay height or standard of protection of sea defences.	Increase in asset survey and maintenance costs.	4	3	Medium	Ongoing programme of assest management and improving resilience of critical infrastructure (electricity sub-stations etc) along with revisions to flood risk assessments, Business Continuity Plans, Flood Resilience Planning and Safety Management System.	Hull, Immingham: Failure of defences.	Failure of third party flood defences
	Reduction or interruption of operation during storm events to maintain safety of pilots and port staff.	Thresholds specific to location and type of operation (wave, wind, surge). Force 5 initiates extra procedures.	Vessel delay.	3	2	Medium	Monitoring of weather information and emergency flood/storm warnings. Use of Dynamic Risk Assessments and Safe Systems of Work. Mitigation includes vessel boarding points being brought inshore and stopping operations when necessary.	None identified outside the residual risk profile.	Reliability of weather forecasts and warning services.
	Changes in maintenance dredging requirements due to sedimentation following storm events.	Reduction in berth and channel depths	Increased maintenance dredging costs.	2	1	Low	Post storm surveys where necessary as part of ongoing survey programme.	None identified outside the residual risk profile.	Dredger availability.
Temperature	Health impacts associated with increase in temperature of working areas (shoreside and vessels).	Dependent on location and PPE requirements.	Increased downtime; increased energy bills (and CO2); requirements for new PPE for use in hotter conditions.	2	1	Low	Considered in Dynamic Risk Assessments and Safe Systems of Work	None identified outside the residual risk profile.	Changes in Legislation related to working conditions / hours.
	Increased degradation of assets.	Failure of multiple assets.	Increased downtime; higher maintenance costs.	2	1	Low	Consideration within annual asset reviews.	None identified outside the residual risk profile.	None identified.
	Increase in leisure activity.	Would need to be significant increase in recreational numbers and facilities to impact on our operations.	Increased risk of collision with small craft.	3	1	Low	Increases in the number of moorings / races / events are all risk assessed.	None identified outside the residual risk profile.	Marina development and race programmes organised by marinas / developers / yacht clubs and sailing clubs.
All Climate Variables	Changing customer base within Harbour Authority areas.	Changes in vessel numbers requiring additional or reduced investment in Harbour Authority staff and infrastructure.	Changes in service requirement.	3	1	Low	Considered as part of ABP Strategy and port masterplanning process which take account of both the impacts of climate change but also how the industrial landscape may change in the future with Government and global Net Zero commitments.	None identified outside the residual risk profile.	Changing government legislation and guidance with respect to climate change and restriction on port development (in flood plains).