UKCIP Adaptation Wizard Case study: Port of Felixstowe.

UKCIP has worked with the Port of Felixstowe, the UK's largest container port, to complete a high level climate risk assessment using the UKCIP Adaptation Wizard. This document describes the process undertaken to do the assessment. The first three steps of the Wizard were completed in this project. In some cases the information reported here has been filtered, but sufficient detail is provided to illustrate how the process has been applied.

STEP 1: Getting started

Task 1.1: Why should the port worry about climate change?

Like many other ports in the world, Felixstowe is currently sensitive to weather variability. There is concern that climate change could exacerbate those weather-related risks already faced by ports, and present new risks not previously encountered. Port management recognise the need to identify the potential impacts of climate change on the Port and take steps that may be necessary to protect its strategic and operational objectives in the face of a changing climate.

In addition, the Climate Change Act of 2008 may also call for critical infrastructures to report what work has been done to assess their climate risks and develop adaptation plans. Felixstowe is seizing the initiative in a fast–changing policy context and ensuring they will be a position to respond quickly should they be called on to do so.

Task 1.5: What does the Port want to achieve by using the Wizard?	
a) What is the problem that needs to be addressed?	Climate change could exacerbate weather-related risks faced by ports, and present new risks not previously encountered. Examples of climate change impacts that could be experienced include: • power outages caused by damage to the distribution network • changes to sedimentation patterns which could in turn affect navigation routes within the port and require alterations to maintenance and dredging regimes • weather-related disruption to inland distribution networks that could result in knock-on effects within the port • adverse weather negatively impacting on service provision • losses and stoppages as a result of adverse weather. Should climate risks increase in future and adequate steps are not taken to address them, more frequent port closures could result, adversely affecting the port's reputation. On the other hand, if early steps are taken to assess and address climate risks, the port could benefit by getting one step ahead of its competitors.
b) What does the port want to achieve?	The overall aim of this work was thus to protect the port's strategic and operational objectives in the face of a changing climate. Specific objectives are: • To explore the robustness of the port infrastructure to projected future climates. • To increase our understanding of the effects of the future climate on insurance policies, customer confidence and other specific business concerns. • To make recommendations as to how resilience to climate impacts be improved. • To raise awareness of climate change within the organisation. • To objectively assess the need to adapt to climate change

c)	What are the criteria against which a successful outcome is judged?	The work will be judged a success if: • Key climate risks to the port are identified • The implications of climate risks have been understood and addressed. • Climate change is incorporated into the company risk register. • A climate adaptation team is established, or an individual is made responsible for, keeping a watching brief on the issue.
d)	Who needs to be involved?	The following functions were considered critical to the issue and were involved in the initial stages of the assessment: • Health and Safety • Civil Engineering • Procurement • IT • Marine and Ports Services • Commercial • Mechanical and Electrical Engineering • Operations The work was initiated by the Health and Safety Officer and then transferred to the Risk Manager. This was seen to be a positive move as it would facilitate the mainstreaming of climate adaptation in the organisation, and also lend more weight to the issue within the organisation. External stakeholders were not involved at this stage but several players were identified that should be engaged in subsequent stages of the process, namely "Finding out more" and "identifying and implementing adaptation options". Such players might include workers' representatives, Environment Agency, designers and manufacturers of equipment used within the port etc.
e)	What is the lifetime of the decision likely to be?	Assets in the port have a design life of 35 years and a service life of up to 50-60 years. It was agreed that decisions needed to be robust over these time frames.

Task 1.10: What difficulties might be faced and how could they be overcome?		
a)	What barriers exist and how might they be overcome?	Three common barriers to adaptation apply in this case. There is a view that better evidence of, and confidence in, climate change impacts might be needed before adaptation actions could be taken. Without greater certainty, it will be difficult to make a commercial argument for investing in climate change adaptation. It was recognised that investing in climate change adaptation means taking long-term decisions which are incompatible with the investment timeframes of businesses. Normal business risks are often regarded as being more urgent than those posed by climate change, so there is limited pressure to invest many resources in this area of work at this stage. It was also recognised that while some of the issues were well understood, implementing climate adaptation strategies would not be straight forward. As one individual noted: "We have a pretty good idea about what the impacts are and about what we would need to do to stay in business... but implementing some responses isn't trivial".

STEP 2: Is the port vulnerable to the current climate?

Task 2.1: Why should the port worry about the climate?	Climate variability is already an issue for ports. With the future expected to bring wetter winters, higher sea levels and possibly more stormy conditions, there is concern that climate change poses significant business risks to the port, including operational risks, health and safety risks, and reputational risks.
Task 2.2: How have previous weather events affected the organisation?	Experience of previous weather impacts on the port were described and captured in a participatory workshop session. Key weather events that have affected the port were identified as being high winds, fluvial flooding, coastal flooding, high winds and high tides, high temperatures, and snow/ice/frost. Details of how each of these particular events hadaffected the Port were captured in a simplified version of Table 2.2 of the Adaptation Wizard (which is in turn based on UKCIP's LCLIP methodology). The consequences of each type of weather event were recorded, as were any remedial actions taken as a result of the incident. Where possible, a note was made of the effectiveness of these remedial actions, so that they might inform consideration of adaptation options later in the process.
Task 2.3: What is the port's attitude to risk?	To follow.
Task 2.4: What are the critical thresholds for the current situation?	Three key thresholds were identified in this exercise: 1. Wind speeds of more than 45 miles/hour are critical for high level cranes which are not permitted to operate at such wind speeds. 2. A 1 day work stoppage in the Port would be critical for customers with just-in-time deliveries 3. A 3 day closure to the Port would be critical for most customers, and everyone upstream and downstream of the Port would suffer.
Task 2.5: What confident am I in this assessment? Include in Table 2.2	The assessment of sensitivity to past weather events was based on personal experience of participants and company records. They are considered reliable and the information was trusted.

STEP 3: How will the Port be affected by climate change?

Task 3.1: How is the UK's climate expected to change?	Only headline messages from the UKCIP02 climate change scenarios were used in this assessment. These suggest that climate change will mean**:** hotter, drier summers; milder, wetter winters; rising sea levels; more frequent heatwaves; heavy downpours of rain; possibly increased storminess; and less frequent cold snaps.
Task 3.2: What are the key climate impacts on the respondent's area of responsibility?	Key climate impacts to the Port were identified using UKCIP's business areas assessment tool (BACLIAT), again in a participatory workshop style. Results were captured in a simple table that listed potential impacts and opportunities of climate change on the six generic business areas identified in BACLIAT, namely: markets, logistics, premises, people, finance and processes.

<table>
<tr><td></td><td colspan="2">Examples of possible future impacts are listed below.</td></tr>
<tr><td></td><td>Threats</td><td>Opportunities</td></tr>
<tr><td></td><td>All investments in the port are long term; retrofitting is expensive.</td><td>There is an opportunity to ensure all developments build in climate change headroom in a cost effective way.</td></tr>
<tr><td></td><td>Rubber tyred gantries (RTG's) operate at higher heights levels so are more vulnerable to wind</td><td>Establish more/better processes for measuring/monitoring the weather; collaborate with manufacturers to develop more robust designs</td></tr>
<tr><td></td><td>Higher sea levels will increase the risk of quays being overtopped</td><td>Higher sea levels may reduce the need for dredging within the Port.</td></tr>
<tr><td>Task 3.3: Are there indirect climate impacts that need to be considered?
Complete in Table 3.2</td><td colspan="2">Key indirect impacts affecting the port include:
• Changing demands and markets for imported goods
• Changes to the availability of energy for shipping possibly leading to a worldwide reduction in shipping
• Changes to the supply chain logistics

It was noted in discussion that the unit of currency for any Port is the box (i.e. the container). As long as the boxes keep moving it doesn't necessarily matter what is in the box. The nature of the business therefore has some resilience against changing profiles of products imported/ exported as a result of climate. However, if the content of the boxes require different handling processes, or required more refrigeration and therefore power use, the Port could be affected.

Of greater concern was the danger that the mitigation agenda and peak oil issues could reduce shipping worldwide, and that increased demand for locally sourced produce could reduce shipping volumes.

Conversely, greater use of low carbon modes within the supply chain, notably rail and coastal shipping, had opportunities for the port as it has more rail connections than any other UK port, and a greater critical mass to support viable coastal services.</td></tr>
<tr><td>Task 3.4: What risks do these climate impacts present?
Complete in Table 3.2</td><td colspan="2">The risk of each climate impact was assessed at a second half day workshop. All those present at the Day 1 workshop participated in the risk assessment workshop, with the addition of a representative of Operations. As per 1.5(e), three different time scales were identified for the assessment:
• the current climate e.g. for decisions relating to contracts/ office management.
• the 2030s climate e.g. for decisions relating to new equipment technologies;
• the 2060s climate e.g. for decisions relating to new developments.

A 1-5 risk rating was chosen, as suggested in the Adaptation Wizard, and in accordance with internal practise. For each impact, a score was given for the "likelihood of the impact occurring" and "the magnitude of the impact should it occur", for each of the 3 timescales involved. The two scores multiplied together produced a risk rating for each impact.

A useful discussion was held during the risk assessment as to whether or not the rating for a particular risk should assume that some</td></tr>
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	adaptation to potential impacts will take place. It was argued that if adaptation to each risk was assumed to take place, then there was a danger that all risks will be "adapted away". However, it was also unrealistic to assume that no adaptation to increased risks would take place – and to do so would over-inflate the significance of climate risks. It was agreed that incremental adaptation to climate risks should be assumed, but that all assumptions should be carefully recorded so that the logic behind the risk rating would be transparent. Discussion was also held on how the concept of consequence should be defined. Some risks are predicated in safety, some on reputation, others on costs. The "type of consequence" was likely to vary between impacts, and may also change with time. For example, wind is currently a risk to cost and reputation, but should wind risks increase, reputational risks could become greater in relation to other risks. The relative significance of risks was resolved in discussion. A total of 21 risks and 4 opportunities were rated and ranked.
Task 3.5: Will climate risks be more or less important than non-climate risks?	Non-climate risks were not explicitly incorporated into the risk assessment, but an overall judgement was made at the end of the exercise as to how significant climate risks were in relation to other non-climate risks.
Task 3.6: What are the priority risks that require an adaptation response?	Priority climate risks that require an adaptation response were identified as follows: 1. Power supplies - including high voltage lines – may be disrupted owing to off-site disruption to the network as a result of increased frequency of high winds or other extreme weather 2. Increased frequency of extreme weather events could increase the frequency of crane and pilot stoppages. 3. Increased risk of flooding could put on-site power supplies at risk. 4. A port closure of more than 3 days, caused by high tides, winds, heavy downpours of rain 5. Combined sea level rise and storm surge may increase the risk of quays being overtopped, which would cause high voltage power supplies to cranes to be shut off, resulting work stoppage. 6. Consistently higher sea levels would reduce clearance between ships and booms affecting the (un)loading of ships.
Task 3.7: What level of confidence is there in this assessment?	This exercise has been a high level qualitative assessment that has successfully scoped out key issues that the Port should consider further.

STEP 4: What should be done next?

The process has identified a number of issues which require further examination. Reassuringly though, no high likelihood / high magnitude risks, or shock outcomes, were identified that needed to be urgently addressed.

The two key issues for the Port in future are likely to be riverine flooding and wind. To some extent, these are risks that the Port has least control over, but they are issues that could usefully be addressed in the absence of climate change (ie. significant benefits could be realised by addressing current weather variability). The appropriateness of the current high wind threshold and the wind agreement could also be examined.

A number of internal Capacity Building actions were proposed.

1. Results of the risk assessment exercise should be circulated internally to raise awareness of climate change, and to support further examination of key climate risks.
2. Climate risks should be incorporated into the flood risk management plan and business continuity plan.
3. A watching brief on climate change is needed to ensure the port is armed with the latest information and prepared for any changes that might alter the conclusions reached in this exercise.
4. The appropriateness of the current high wind threshold and the wind agreement could be examined.
5. Options for addressing key risks should be identified, assessed and implemented as appropriate.
6. The port might wish to consider undertaking a quantitative analysis of key climate risks using the new UK Climate Projections (UKCP09).