

Preparing a Climate Change Action Plan: Paper & Pulp Sector Guidance

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A support service led by the Environment Agency

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The Environment Agency's Climate Ready Support Service has worked with the Confederation of Paper Industries to produce this good practice guidance

Introduction

This guidance will help you assess the risks to your business from extreme weather and climate change. It will also help you identify practical actions to make your business more resilient.

Businesses are vulnerable to extreme weather. In 2012, 54% of businesses faced disruption due to extreme weather. Businesses affected by the 2007 floods took an average of 26 weeks to return to full operating capacity. Could your business survive a similar setback?

Extreme weather incidents are expected to become more common because our climate is changing. Climate projections show that over the coming decades we will face an increased risk of;

- extreme rainfall, leading to more frequent and severe floods
- heatwaves
- drought.

It makes good business sense to prepare for these risks. Their financial impact can be great, but many measures to manage them cost very little. Planning ahead will help you to:

- save your business money in the long term
- give your business the best chance to continue to operate and meet customer orders, in spite of the weather.

Why is resilience to extreme weather and climate change important for you?

Paper mills should prepare for extreme weather and climate change because:

- Access to sufficient quantities of clean water could be affected during drought.
- Reduced river flows mean reduced dilution available for effluent discharge in the river.
- Flooding can interrupt operations and prevent staff access.
- Extreme weather could affect the supply chain and infrastructure on which you rely.
- Extremes in temperature could affect the operation of effluent treatment plants which could cause reduced performance and odours.
- Some types of extreme weather increase the risk of breaching environmental permits.

Climate risk management process

This guidance sets out the following process for assessing and managing climate risk:

1. Getting started
2. Assessing risks of extreme weather and climate change
3. Identifying and implementing measures
4. Monitoring and review.

1. Getting Started

A well-planned approach to adaptation will help you decide what action is needed now and what can be delayed. In adapting your business you should:

- Set out clear objectives e.g. to improve your drought contingency plan
- Ensure management support for the preparation and implementation of this plan
- Find the right people - which colleagues and departments do you need to consult/work with?
- Gather information on how extreme weather has affected you in the past. This will help you to understand weather-related risks.
- Plan to integrate your climate change action plan into existing operational processes such as your business continuity plan and your systems for managing product quality and environmental risk.

2. Assessing risks of extreme weather and climate change

This section sets out a process for identifying and prioritising risks from extreme weather and climate change. You should consider impacts such as flooding, drought, heavy rain, extreme temperature and strong winds.

2.1 Identifying potential impacts

Identify how weather-related hazards could affect your business areas. At this stage you are brain-storming, aiming for a long list and not worrying about whether the impacts are likely to happen or would be significant. You should use any existing records of potential hazards you have compiled as part of your environmental risk management or regular business planning.

The questions below will help you think about impacts across your business. Think about things that have happened in the past, including near misses, as well as impacts that could become more frequent or severe as the climate changes. If possible, involve people with a range of experience and understanding of operational and business processes. You can use Table A in Annex C to record this.

Operations: *Are any of your processes or activities climate dependent or temperature sensitive? You should think about how your activities or the failure of processes could harm the environment.*

Examples of risks to operations:

- Water shortages cause business interruption in times of drought
- Flooding prevents access by staff, customers or vehicles
- Flooding interrupts operations or leads to an uncontrolled release of pollutants (and a potential breach of environmental permit conditions)
- Reduced river flows means the quality of incoming water may deteriorate, reduce dilution of effluent and greater pollution
- Extreme temperatures affect the operation of the effluent treatment plants leading to reduced performance, poor nitrification, reduced oxygen levels and increased potential for odour
- Freezing weather leads to burst pipes
- Due to flooding or snow, land banks are not available for sludge spreading. Stock piles of sludge may lead to odour issues.

Logistics: The paper industry relies heavily on supply chains, utilities and the transport network. *Could disruption in these areas caused by extreme weather result in business interruption, loss of productivity or rising costs?*

Examples of risks to logistics:

- Extreme weather disrupts transport, affecting in-coming and outbound deliveries
- Extreme weather causes power cuts
- Climate impacts overseas affect the price of materials or reliability of supply chains, or reduce the quality of wood fibres.
- Increased risk provides an opportunity to strengthen supplier relationships and increase oversight of the supply chain.

Assets: *Could there be damage, degradation and maintenance implications for your buildings, grounds, plant or machinery?*

Examples of risks to assets:

- IBCs lifted by floodwater leading to loss of content and possible pollution
- Floodwater overloads the effluent treatment plant
- High winds blow site litter off-site
- Buildings fabric is damaged by to extremes of wind, heat, rain.

People: *Could the comfort, health and safety of your employees be affected by extreme weather?*

Examples of risks to people:

- High temperatures lead to problems for staff's thermal comfort and related building services.
- High winds cause safety issues on site e.g. danger of tanks being blown over

Markets and Finance:

- *Could there be a change in demand for existing products due to climate change or awareness of resilience as an issue? E.g. increase in demand for products which are water and energy efficient.*
- *Could you gain market advantage by being more resilient to extreme weather and climate change?*
- *How could your vulnerability to extreme weather affect your insurance costs, or the availability of capital investment?*

Table D in Annex D is a quick reference guide listing potential effects extreme weather can have on your business with some suggested resolutions. The flow chart in annex D outlines the different areas of a business in more detail.

2.2 Prioritising risks

Now you have a list of potential impacts you should prioritise them according to the risk they present. Before you do this, review the impacts to see if any can be dismissed straightaway because they are trivial.

Prioritising risks is largely a matter of you and colleagues using your knowledge of your business to make a judgement call. This process can be helped by you assigning a simple 'High', 'Medium' or 'Low' for both the **likelihood** and **magnitude** of each impact. Make a note of the thinking behind your ratings so that your assumptions are transparent. (You can use table B in annex C to record this task.)

Assessing likelihood:

The following questions will help you to estimate the likelihood of each impact in turn:

- *Has the impact already been experienced? Or have there been any near misses?* This is a good indication that the hazard is already an issue with the current climate regardless of climate change. On the other hand your knowledge of your systems may tell you that a hazard could have an impact in future, even though it has not done so to date.
- *Is the potential impact related to flooding or drought?* If yes, we can help you to assess the risk and you should use the processes set out in **annex A**.
- *Can you identify any thresholds?* This means trigger points such as temperatures or river levels above or below which an impact occurs or becomes significant. You might identify thresholds using past experience, or from company policies, procedures or operating standards for machinery.
- *Does the business area affected by the risk involve making any decisions with long term consequences (beyond 10 years)?* If not, then only the current climate risk may be relevant. However, be aware that the climate may have already changed so your perception of the risk may be out of date. For any areas where longer timescales are relevant make sure you should consider future climate change. Climate change may mean thresholds are breached in the future, even if this hasn't happened before. You can use the information in annex A to get an idea of the effect that climate change may have on the likelihood of some impacts.

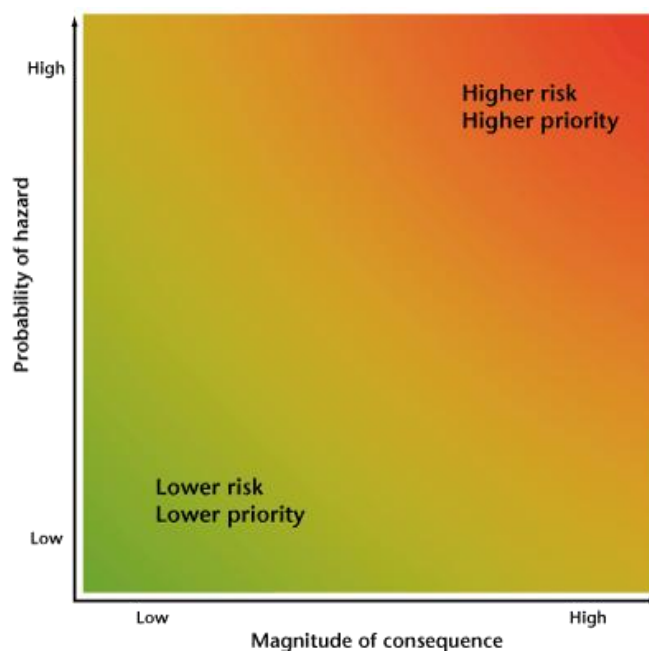
Assessing magnitude:

Magnitude means the size of the business consequence of the impact. The following questions will help you to estimate the magnitude of each impact.

- *How would your business objectives and priorities be affected by the impact?* Answer this by considering how past weather events have affected you and how the things specific to your business (e.g. the types of processes and activities, products, services, market features and available resources) influence the magnitude of the consequences. You should be sure to identify any impacts which are business critical, which will have high magnitude.
- *If you are considering a future time period: are there any business or industry trends that could make you more or less vulnerable in the future?*

You should now prioritise all risks except those you have discarded as trivial. You may wish to visualise risks on a plot such as figure 2.1 below where significant risks will appear in the top right-hand red zone. Significant risks should be managed in your climate action plan. (You probably already have processes to manage risks, and management of climate risks should be incorporated into these processes.)

Figure 2.1: Risk map



3. Identifying and implementing measures

This section will help you decide how to manage your priority climate risks and develop an adaptation plan.

3.1 Identifying resilience options

For your priority risks, brainstorm potential ways that you could minimise the threat or maximise any benefit, if possible involving others from across the business. Draw on experience of dealing with similar risks or from what you know about how others manage similar risks. Check existing processes such as business continuity plans and accident management plans, as these may already contain suitable resilience measures.

Table 3.1 Example resilience options

- Assessment of drainage capacity
- Regime for regularly unblocking drains
- Increased treatment and re-use of water
- Water audits aimed at reducing specific water use per tonne of product
- Investigating alternative sources of water
- Improved storage of paper litter
- Increased storage capacity for sludge during inclement weather
- Securing IBCs and tanks, or raising them if there is a flood risk
- Water storage systems such as rainwater harvesting
- Odour control system
- Insulating and trace heating pipes
- Register for flood alerts and make use of the Floodline – 0845 988 1188
<https://fwd.environment-agency.gov.uk/app/olr/home>
- Put together a business flood plan - see <http://www.environment-agency.gov.uk/business/topics/flooding/32362.aspx>
- Further research to assess risk using external experts

Resilience is secured through a combination of activities or components. It may be useful to refer to the Cabinet Office's guidance on natural hazards and infrastructure - *Keeping the Country Running*¹ which describes the following four components to resilience:

- *Resistance* - preventing damage (e.g. a flood wall)
- *Reliability* – designing processes to operate under a range of conditions
- *Redundancy*- availability of backups or spare capacity
- *Recovery* - enabling a fast response to and recovery from disruptive events.

Resilience measures could be things you intend to implement now, or plans for measures you could introduce in the future. This gives you the flexibility to implement measures or adapt your plan when needed. For example, you might choose to build a flood wall now – but build larger foundations to allow it to be raised at a later date if necessary.

Once you have identified a list of potential options, you should evaluate them by asking questions such as:

- *Will it work?*
- *How much will it cost?*
- *Will there be any unintended consequences for you and others?*
- *Is it flexible enough to allow for adjustments later on?*
- *Is it practical to implement within relevant timescales?*

At the end of this step you should know what measures you will take to manage your priority risks.

3.2 Making a Plan

Now that you have selected your resilience actions, build these up into an action plan. It probably makes sense for you to incorporate this plan into existing processes such as your business continuity plan or accident management. The plan should specify what you are going to do and when, as well as setting out how you are going to monitor it. The following questions and pointers provide additional guidance;

- *Who will be responsible for implementing actions and for monitoring and reviewing the plan?*
- *Are there any opportunities to integrate your adaptation options into other plans and processes?* For example, business continuity management, risk management or health and safety arrangements
- *When should adaptation measures be implemented (or discussed further if required)?*
There may be key points in time that can be exploited, such as within replacement cycles, maintenance regimes or management system review schedules.
- *Will any communication activities be required to engage staff or external stakeholders?*
- *What are the potential barriers to action and how will you overcome these?*

¹ Cabinet Office 2011, *Keeping the Country Running: Natural Hazards and Infrastructure*
www.gov.uk/government/publications/keeping-the-country-running-natural-hazards-and-infrastructure.

4. Monitoring and Review

You should **monitor** your climate action plan to ensure it is working and does not need amending. Monitoring will tell you whether:

- your plan is achieving the objectives set out at the beginning
- the priority risks identified are being managed.

To help your monitoring you should record extreme weather events and the effect they have on your business. You can use table C in annex C to help you do this.

You will need to decide how often the plan will be **reviewed** and who will be responsible. These reviews could coincide with scheduled reviews of the other business systems. We recommend you review your plan annually or sooner if a factor that has influenced your strategy changes significantly (for example, you are hit by an extreme weather event or important new climate change information becomes available).

Annex A: Sources of Advice and Guidance

Flooding - Assessing risk

Flooding is the most frequently occurring natural disaster in the UK. Regulated businesses are required to prepare for flooding as part of their systems for environmental protection.

As the first step in assessing flood risk consider the following questions:

- Is your site in an area susceptible to flooding from rivers or the sea?
- Is your site susceptible to surface water flooding?
- Has your site been flooded before?
- Will climate change affect the risk of future flooding?

You can answer the first question by consulting the Environment Agency's flood maps. For an indication of the additional risk of climate change, consult:

- the relevant Catchment Flood Management Plan <http://www.environment-agency.gov.uk/research/planning/33586.aspx>
- your local Strategic Flood Risk Assessment – available from your local authority.

Your Environment Agency officer may be able provide further information to help you answer these questions.

If you are at risk of flooding, further assessment options available are:

- flood modelling information from the Environment Agency;
- a bespoke/detailed flood risk assessment.

Further information on flooding - our website has information on flooding including flood maps which can be used to identify the risk of flood in a specific area - see

<http://www.environment-agency.gov.uk/business/topics/32354.aspx>.

- To register for flood alerts - Floodline – 0845 988 1188 or visit <https://fwd.environment-agency.gov.uk/app/olr/home>
- Put together a business flood plan including a link to the guidance document Regulated sites - how to prepare for flooding – <http://www.environment-agency.gov.uk/business/topics/flooding/32362.aspx>

If you are unable to find the information you need on our website, please contact our customer contact centre on 03708 506506.

Drought – Assessing risk

Droughts occur periodically in the UK: in April 2012 drought had been declared in a large proportion of England after two consecutive dry summers and winters. Climate change projections indicate hotter, drier summers as soon as the 2020s. To assess your risk:

- Explore critical thresholds of water usage for your business. How would you cope if the amount of water available reduced by 5, 10, 25 or 50%?
- Check the Catchment Abstraction Management Strategy (CAMS) for your area, these plans show water availability for each river catchment - <http://www.environment-agency.gov.uk/business/topics/water/119927.aspx>
- Consult the latest River Basin Management Plan for your area to find out if catchments in your area are over-abstracted from the point of view of the water environment - <http://www.environment-agency.gov.uk/research/planning/33106.aspx>
- Check historical data on droughts
- Consider whether you have any alternative sources of water such as process water or access to groundwater.

Further information on drought

- Conserving water - www.environment-agency.gov.uk/business/topics/water/32070.aspx
- Drought explained - www.environment-agency.gov.uk/homeandleisure/drought/31783.aspx

Extreme Temperatures – How to assess your vulnerability

The UK experienced extreme heatwaves in the summers of 2003 and 2006. Such summers will become more likely as the climate changes. On average winters are expected to become milder. However, very cold winters with heavy snow, such as we have had in recent years, will still occur. To assess your risks:

- Identify temperature thresholds which could affect your business (staff and processes).
- Check that suppliers have adaptation measures in place for extreme temperatures – would their ability to deliver/collect supplies and goods be affected?
- Check the UKCP09 climate change projections to see how temperatures could change. You can use UKCP09's weather generator to explore how often any temperature threshold will be reached in future (<http://ukclimateprojections.defra.gov.uk/22540>). If you need help using the Weather Generator, contact EA's [Climate Ready](#) service.
- See the Health and Safety Executive's information on work place temperature requirements: <http://www.hse.gov.uk/temperature/index.htm>
- See UKCIP brochure (Climate Change, Heatwaves and Preparing Your Business): <http://www.ukcip.org.uk/wordpress/wp-content/CLARA/Heatwaves-factsheet.pdf>

Storms and High Winds

Storms and high winds can affect businesses and the services on which they rely. At the moment we do not have good evidence for how the frequency and severity of storms and high winds might change in future. You can assess your risk to this hazard by.

- assessing your site to see if any areas could be vulnerable to strong winds
- checking if your business has been affected by storm damage in the past.

General Climate Change Advice & Guidance

- For advice and information on climate change projections the UKCP09 website cover a wide variety of climate change projections which could help you with your assessments - <http://ukclimateprojections.defra.gov.uk/>
- The EA's adaptation wizard is a five step process which will help to with a more in-depth understanding of climate change and can help you conduct a high level assessment of your organisations sensitivity to the current climate and future climate change. For this and other Climate Ready resources see: www.environment-agency.gov.uk/research/137639.aspx

Annex B - CASE STUDIES

Devon Valley Mill – Site Flooding

Devon Valley Mill is in a floodplain and has flooded several times in the last few years. In response the company has implemented a number of measures to improve the site's resilience such as:

- developing a flood action plan
- signing up to Environment Agency's flood warning service
- installing fixed bunding in key areas of the site, such as around the boiler system.

The mill's flood action plan identifies escalating trigger points dependent on the level of flooding, with specific actions noted for each. The actions start with installing flood boards and constructing sandbag barriers wrapped in polythene, with guidance for differing construction types depending on the access point being protected. The plan then progresses to moving items to higher ground, evacuating staff and making electrical supplies safe. Finally the production process is closed down and the system is flushed of chemicals to prevent pollution. Unless there is a severe case of flooding, processes continue as normal without disruption.

In 2012 the site flooded twice in three days which resulted in the site being shutdown. It was operating again after four days, and the operators consider that without their flood resilience measures and procedures, the site would have been closed for a number of weeks. Since the 2012 floods the company has decided to move its offices upstairs so office furniture and equipment will not be damaged by any future flooding.

Paper Mill Affected by Drought

A paper mill in the Midlands relies on water abstracted from an adjacent river. Water is abstracted from the river to a receiving pond, the mill uses an average of 2,200m³ of water a day, and at full capacity needs up to 2,800m³. During the dry conditions of summer 2011 the river's level dropped and the supply of water to the mill reduced to 800m³ per day. This had a significant impact on operations as the mill had no alternative source of supply, nor any contingency plan in case of drought. This was despite the fact that it had recently been upgraded.

To alleviate the problem the mill diverted one arm of the adjacent river to increase the flow to the abstraction point whilst maintaining a minimum flow rate within the main body of the river. This measure was agreed with the Environment Agency but allowed for only 12 months as it caused a short section of river to dry up. Within these measures, the mill considered other local users of the river and through additional works, ensured that drinking water for neighbouring livestock was still available. This required the mill to regularly inspect the watercourse and establish good relationships with their neighbours.

The mill has now committed to implementing measures to increase its resilience to drought including commissioning an experienced consultant to undertake a water audit to identify where the majority of freshwater was used in the system. This led to further improvements in flow metering and targeting reductions within the manufacturing process. It was identified that re-circulating the water used for sealing vacuum pumps would save up to 700m³ per day and utilising process water for flushing pumps would save an additional 40m³ per day. There are several product changes per day and improving the storage infrastructure on site reduced the amount of water and raw material lost to the effluent treatment works during the down time caused by the changes in product.

Annex C: Templates

Table A – Identifying potential impacts (section 2.1)

Business area	Responsibility	Weather-related hazard that could affect business area or cause environmental harm	Describe past or potential effects on business area or environment	Adaptation action already taken
<i>Operations</i>				
<i>Logistics</i>				
<i>Assets</i>				
<i>People</i>				
<i>Markets</i>				
<i>Finance</i>				

Table B – Risk Assessment (section 2.2)

Potential Impact	Critical Threshold <i>(if relevant)</i>	Likelihood *	Magnitude *	Priority

* Assign a rating of high, medium or low and make a note of your thinking behind the rating.

Table C - Monitoring Weather Event Log (section 4)

Business Area –			
Date	Weather event	Extent of Incident	Damage/effect to the business or environment

Annex D – USEFUL QUICK GUIDES

Table D - Potential Issues & Resolutions

Past Weather Event	Effect on the organisation	Example Resilience Options	Example of Critical Threshold
Flooding & Extreme Rain	<ul style="list-style-type: none"> • Flooding prevents access by staff, customers or vehicles • Flooding interrupts operations or leads to an uncontrolled release of pollutants (and a potential breach of environmental permit conditions) • Flooding disrupts transport, affecting in-coming and outbound deliveries • IBCs lifted by floodwater leading to loss of content and possible pollution • Floodwater overloads the effluent treatment plant • Due to flooding land banks are not available for sludge spreading. Stock piles of sludge may lead to odour issues • Buildings fabric is damaged by to extreme rain. • Extreme rain causes power cuts • Extreme rain bursts could affect outside operations 	<ul style="list-style-type: none"> • Assessment of flood risk • Regime for regularly unblocking drains • Assessment of drainage capacity • Increased storage capacity for sludge during inclement weather • Securing or raising IBCs and tanks • Register for flood alerts and make use of the Floodline – 0845 988 1188 https://fwd.environment-agency.gov.uk/app/olr/home • Put together a business flood plan see http://www.environment-agency.gov.uk/business/topics/flooding/32362.aspx • Further research to assess risk using external experts 	<p>Flood waters reach 0.3 metres</p> <p>surface water flooding up to 0.3m</p> <p>Rainfall over 48 hrs up to x mm</p>
Drought	<ul style="list-style-type: none"> • Water shortages cause business interruption in times of drought (water abstraction restrictions may be implemented) • Reduced river flows means reduced dilution of effluent, and greater pollution • Quality of incoming water may deteriorate 	<ul style="list-style-type: none"> • Increased treatment and re-use of water • Water audits aimed at reducing specific water use • Investigate alternative sources of water • Water storage systems such as rainwater harvesting • Further research to assess risk using external experts 	<p>River drops to a level which prevents required abstraction – for physical or regulatory reasons</p>

Extreme Temperatures	<ul style="list-style-type: none"> • Extreme weather disrupts transport, affecting all deliveries • Extreme temperatures affect the operation of the effluent treatment plants leading to reduced performance, poor nitrification, reduced oxygen levels and increased potential for odour • Freezing weather leads to burst pipes • Buildings fabric is damaged by extreme heat. • High temperatures lead to problems for staff comfort and related building services. • Due to snow, land banks are not available for sludge spreading. Stock piles of sludge may lead to odour issues 	<ul style="list-style-type: none"> • Increase storage capacity for sludge during inclement weather • Insulating and trace heating pipes • Further research to assess risk using external experts 	
High Winds	<ul style="list-style-type: none"> • Extreme weather causes power cuts • High winds blow site litter off-site • Buildings fabric is damaged by wind • High winds cause safety issues on site e.g. danger of tanks being blown over 	<ul style="list-style-type: none"> • Improved storage of paper litter • Securing IBCs and tanks <p>Further research to assess risk using external experts</p>	<p>e.g. when wind speeds reach Xmph</p>

Business Areas to Consider

