

# UKCIP Adaptation Wizard Case study: A housing Association

## About Gentoo

Gentoo Group is a non-profit organisation which aims to make a positive mark on the future by investing in people and property. The company was formed in 2001 when Sunderland’s tenants voted to transfer 36,000 homes to Sunderland Housing Group, which later evolved into Gentoo in June 2007. Since then, Gentoo has shown commitment, with over £400 million invested back into people and property.

Gentoo Group comprises several businesses: Gentoo Ventures, Gentoo Homes, Gentoo Construction, Gentoo Sunderland, Gentoo Living and Gentoo Green.

Gentoo Green is a not-for-profit company limited by guarantee whose role is to promote sustainability across the whole Gentoo group. It works under the following themes: energy, recycling, waste, properties and transport.

Gentoo has won several green awards, they are ISO14001 accredited, have developed KPIs and achieve a high level in the code for sustainable homes. It has done little adaptation work to date though, and is keen to address this. Like others in the sector, Gentoo is sensitive to weather variability. There is concern that climate change could exacerbate those weather-related risks already faced by the business, and present new risks not previously encountered. Gentoo recognise the need to identify the potential impacts of climate change on the business and take steps that may be necessary to protect its strategic and operational objectives in the face of a changing climate.

UKCIP has worked with Gentoo to complete a high level climate risk assessment using the UKCIP Adaptation Wizard. Given the many and varied interests of the Group, a broad rather than deep approach was adopted. Gentoo Group was split up into two work streams for the purposes of the study:

- Gentoo Sunderland (which is the traditional registered social landlord arm) and Gentoo Living, who provide social support to tenants of Gentoo Sunderland. This would have a specific Sunderland focus.
- Gentoo Ventures, Gentoo Homes and Gentoo Construction. These businesses have clients and interests throughout the North East and are likely to have considerations of a more technical nature.

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. The first workshop was held on Monday 8<sup>th</sup> December 2008 and the second on 23<sup>rd</sup> February 2009. Further internal work on the risk assessment was then conducted before a third working session was held in January 2010.

### STEP 1: Getting started

<b>Task 1.5: What does the business want to achieve by using the Wizard?</b>	
a) What does the company want to achieve?	The project group will need to decide what they want to get out of this work. Overarching objectives could include, for example: <ul style="list-style-type: none"><li>• To explore the robustness of Gentoo Group to projected future climates.</li></ul>

	<ul style="list-style-type: none"> <li>• To increase our understanding of the effects of the future climate on insurance policies, customer confidence and other specific business concerns.</li> <li>• To raise awareness of climate change within the organisation.</li> <li>• To establish whether there is an urgent need to adapt to climate change and to gauge the level of risk.</li> <li>• To make the case to senior management for the need to adapt to climate change.</li> <li>• To make recommendations as to how resilience to climate impacts be improved.</li> <li>• To protect Gentoo’s strategic and operational objectives in the face of a changing climate.</li> </ul> <p>It was decided that climate impacts affecting any part of the Gentoo Group will be considered whether they occur in the North East, elsewhere in the UK or internationally.</p>
<p>b) What are the criteria against which a successful outcome is judged?</p>	<p>The work will be judged a success if:</p> <ul style="list-style-type: none"> <li>• Key climate risks are identified</li> <li>• The implications of climate risks have been understood and addressed.</li> <li>• Climate change is incorporated into the company risk register.</li> <li>• A climate adaptation team is established, or an individual is made responsible for, keeping a watching brief on the issue.</li> </ul>
<p>c) Who needs to be involved?</p>	<p>The first meeting (Dec 2008) was attended by 17 participants that collectively represented all Gentoo businesses, or cross-cutting business areas. Job roles present at the meeting were:</p> <ul style="list-style-type: none"> <li>• Gentoo Green’s Strategic Manager and Sustainability Projects Officer;</li> <li>• Gentoo Sunderland’s Customer Services Assistant, Neighbourhood Housing Manager, Environmental Projects Manager and Head of Operations</li> <li>• Gentoo Group’s Risk Manager, Health and Safety representative, Solicitor, Procurement Manager</li> <li>• Gentoo Homes’ Architectural Technologist and Market Researcher</li> <li>• Gentoo Construction’s Project Manager, Preservation &amp; Glazing Manager and Monitoring Officer</li> </ul>

	<ul style="list-style-type: none"> <li>• Gentoo Living’s Customer Involvement Co-ordinator</li> <li>• Gentoo Ventures’ Project Manager</li> </ul> <p>The meeting was facilitated by UKCIP and a representative of Business in the Community.</p> <p>Five individuals took part in the second workshop (Feb 2009) at which an initial assessment of potential climate change threats and opportunities was made. This more focused group was considered practical and appropriate as the workshop was exemplary (its purpose was to demonstrate the methodology) and aimed to complete an initial “first cut” risk assessment only. Further work was conducted internally over the next few months which enabled others to contribute to the process outside of meetings.</p> <p>The third workshop (Jan 2010), at which potential adaptations to key risks were explored, was attended by 3 individuals from Gentoo Green. Because climate change is considered a “green”, or environmental issue, there is a danger that other business areas may not become engaged and expect that Gentoo Green, as the “green arm of the business”, will provide all the answers. It is essential to gain buy-in from all aspects of the business.</p>
<p>d) What timescale of climate risks are to be considered?</p>	<p>The timescale under which these climate impacts were considered was determined by Gentoo’s existing planning horizons. Three relevant timescales were identified:</p> <ul style="list-style-type: none"> <li>• Many buildings have an 80 year lifespan (80% of building stock is expected to still be in use in 2050 and in 2080).</li> <li>• Investment plans have a 30 year timeframe although there are also shorter term plans of 10 years within this, and annual reviews.</li> </ul> <p>Climate risks were thus assessed for two time periods: the next 5 years, and for the next 50 years.</p>
<p><b>Task 1.10: What difficulties might be faced and how could they be overcome?</b></p>	
<p>a) What barriers exist and how might they be overcome?</p>	<p>No barriers were explicitly identified at the outset, although progress was intermittent, possibly owing to lack of continuity and conflicting work pressures and priorities.</p>

## STEP 2: Is Gentoo vulnerable to the current climate?

<p><b>Task 2.1: How have previous weather events affected the organisation?</b></p>	<p>Experience of previous weather impacts on the company was described and captured in a participatory workshop session. Weather events that have affected Gentoo in the past were identified as being high winds, fluvial flooding, high temperatures, snow/ice/frost and drought.</p> <p>Details of how each of these kinds of events had affected Gentoo were captured in a simplified version of Table 2.2 of the Adaptation Wizard (which is in turn based on UKCIP's LCLIP methodology).</p> <p>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.</p>		
	<p><b>Impact</b></p>	<p><b>Consequence</b></p>	<p><b>Response</b></p>
	<p>Tower cranes were stopped in high winds</p>	<p>Delay in construction</p>	
	<p>Wind blew off ridge tiles &amp; led to water ingress</p>	<p>Staffing issues</p>	<p>Contingencies developed</p>
	<p>HQ flooded due to lack of maintenance</p>	<p>ICT affected</p>	
	<p>Internal office temperatures uncomfortably high in hot weather</p>	<p>Staff complaints, staff comfort energy costs from fans</p>	<p>Purchase of fans for short term solution</p>
	<p>Drought caused subsidence in clay rich soils, requiring underpinning</p>	<p>Structural damage, increased costs, impact on reputation</p>	<p>Underpinning and look at future designs</p>
<p><b>Task 2.2: What is the company's attitude to risk?</b></p>			
<p><b>Task 2.3: What are the critical thresholds for the current situation?</b></p>	<p>No specific thresholds were identified but some may be available for extraction from company records. This task has not yet been undertaken. Should key risks be identified that would lend themselves to analysis, the UKCP09 threshold detector could be a valuable tool.</p>		

<p><b>Task 2.4: How confident am I in this assessment?</b></p> <p>Include in Table 2.2</p>	<p>The assessment of sensitivity to past weather events was based on the personal experience of participants. The information was considered to be reliable. It was noted that additional information would be useful and that company records could be examined for further evidence of past impacts.</p>

### STEP 3: How will Gentoo be affected by climate change?

<p><b>Task 3.1: How is the UK's climate expected to change?</b></p>	<p>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.</p>	
<p><b>Task 3.2: What are the key climate impacts on the respondent's area of responsibility?</b></p>	<p>Key climate impacts to Gentoo 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.</p> <p>Examples of some possible future impacts are listed below.</p>	
	<p><i>PREMISES: Threats</i></p> <ul style="list-style-type: none"> <li>● Customers knowledge of heating systems limited</li> <li>● Material degradation e.g. UV</li> <li>● Construction of houses - knock down some stock?</li> <li>● Thermal properties and mechanical strength</li> <li>● Offices not fit for purpose</li> <li>● Higher temperatures and increased UV can accelerate material degradation</li> <li>● 80% of current housing stock expected to be in use in 2080</li> <li>● Retrofitting is expensive</li> </ul>	<p><i>Opportunities</i></p> <ul style="list-style-type: none"> <li>● Educate customers better</li> <li>● Learn from international examples</li> <li>● Develop partnerships with other housing organisations internationally</li> <li>● Develop in-house knowledge and experience</li> <li>● 20% new housing stock design for life in service</li> </ul>

	<i>LOGISTICS: Threats</i>	<i>Opportunities</i>
	<ul style="list-style-type: none"> <li>● National and international supply chains could be disrupted.</li> <li>● Third party/ utilities/ service providers disruption</li> <li>● Materials cost and availability – seasonal and global</li> <li>● Staff travel – time and operational risks (H&amp;S)</li> <li>● Home visits are essential</li> <li>● Grounds maintenance</li> <li>● Cost/ arrears</li> <li>● Context of increasing traffic, schools.</li> </ul>	<ul style="list-style-type: none"> <li>● Internalise utilities – CHP etc, Rainwater harvesting – to minimise potential disruption</li> <li>● Fewer snow/ ice problems</li> <li>● Procurement opportunities</li> </ul>
	<p>It was noted that Gentoo's organisational structure is conducive to complex, cross-sector issues that require joined up thinking. This is likely to be an asset when adapting to climate change.</p>	
<p><b>Task 3.3: Are there indirect climate impacts that need to be considered?</b></p> <p>Complete in Table 3.2</p>	<p>Yes, a number of factors need to be considered. Gentoo are increasingly seen as providers of 'quality of life' not simply houses. They also have to deal with ageing demographic of tenants. They own a high proportion of listed buildings, for which adaptation options could be limited.</p>	
<p><b>Task 3.4: What risks do these climate impacts present?</b></p> <p>Complete in Table 3.2</p>	<p>The risk of each climate impact was assessed at a second half day workshop in February 2009. This was attended by a smaller subset of those involved in Day 1. It was noted that proportionate adaptation will seek to respond to only the significant climate impacts. A risk assessment was therefore used to identify which of the potential impacts are significant for Gentoo, in the face of uncertainty.</p> <p>For each of the impacts identified during the first meeting, the likelihood of occurrence and magnitude of consequence were assessed. For each impact a decision was also made as to whether to assess the risk within the next 5 years or within the next 50 years to reflect the different planning horizons for managing different areas of the business.</p> <p>During the discussion it was noted that the risk will vary between different parts of the business. In particular, there are key differences between the implications for new build and existing stock and between developments within Sunderland and those in other areas. For some impacts there will be specific vulnerabilities but only for certain tenants (i.e. elderly or ill in particular), localities or properties. Looking at the</p>	

overall business consequences for Gentoo as a whole could mask some of these details.

Out of 33 threats, five came out as being the most significant.

<b>Climate/ weather variable</b>	<b>Threat</b>	<b>Consequence</b>
Increasing frequency of extreme weather events	Impact on wet trades processes (including concrete)	Construction delays and increased process control challenges
All aspects of climate change in the UK	Design implications challenges for new Gentoo properties and for investment and improvement programme	Increased/ new expertise and resource requirements for innovating plus additional costs
All aspects of climate change in UK and internationally	Landuse conflict and shortage of land (for example due to pressures from food production and migration)	Difficulties in securing land for new homes and making space for outdoor living
Rising temperatures	Increased breeding, spread and infestation of pests such as rats, flies and wood-boring beetles.	Increasing volume of callouts and ongoing/ responsive repairs and maintenance work. Challenges relating to new types of repairs and maintenance requirements. Potential knock on effect on surrounding area/ Gentoo reputation.
All aspects of climate change in the UK	Material degradation of Gentoo properties e.g. material expansion, water ingress, subsidence, dislodged elements, wet rot and dry rot etc	As above.

The discussion flagged up a number of areas where more information would have benefitted the rigour of the assessment. These were:

- The changing seasonality of fuel poverty and the vulnerability of

	<p>certain customers/ locations.</p> <ul style="list-style-type: none"> <li>• The potential health impacts and their relationship with housing.</li> <li>• The robustness and resilience of various types of building materials to future climates.</li> <li>• The changing distribution of pests/ infestation and the likely costs associated with this.</li> <li>• The cost to the business of responding to potential new codes and standards or expectations and the potential costs of failing to design for the future climate if there are no institutional drivers.</li> </ul> <p>A similar assessment of key opportunities was then conducted. Fewer opportunities than threats were identified, which in our experience is not atypical. The likelihood of occurrence and magnitude of consequence for each opportunity was assessed over the same two timescales, namely the next 5 years and within the next 50 years.</p>		
	<b>Climate variable</b>	<b>Opportunity</b>	<b>Consequence</b>
	More reliable summer tourism combined with less favourable climate in other destinations	More tourism in the North East	New contracts and business opportunities for Gentoo Group
	Milder winters	Fewer travel problems for home visits related to snow and ice	Avoiding loss of staff time and H&S considerations. Potentially avoiding some rent arrears.
	All aspects of climate change in the NE	Growing market for properties with climate resilient features	Opportunity to lead the way, exploiting new market and potentially new funding opportunities. Will also create opportunity to develop in-house expertise and improve reputation.
	All aspects of climate change in the NE	Damage to Non-Gentoo properties	Opportunity to win more maintenance contracts



<p><b>Task 3.5: Will climate risks be more or less important than non-climate risks?</b></p>	
<p><b>Task 3.6: What are the priority risks that require an adaptation response?</b></p>	<p>Additional work was conducted internally by Gentoo Green after the second workshop to incorporate climate risks into their operational risk register. This identified 5 short term and 5 long term priority risks that required an adaptation response.</p> <p>The consequence of each risk for particular business area was identified and primary controls on each risk were noted. In some cases a responsible officer was named and adaptation actions proposed.</p>
<p><b>Task 3.7: What level of confidence is there in this assessment?</b></p>	<p>This high level qualitative assessment has successfully scoped out key issues for the business to consider. Further (quantitative) consideration of priority risks may, however, be required at a later stage or for particular projects or business areas.</p>

### **What should be done next?**

A number of possible ways forward were proposed at the end of Step 3. These included:

- Commission or carry out an in-house study into priority risk areas.
- Revisit the assessment using both timescales for all impacts.
- Present climate risk assessment to senior management to make the case for greater resource and further work or simply to raise their awareness.
- Identify and evaluate a range of possible adaptation measures for priority risks. This could be devolved into different business areas, for example so that new build and existing stock are dealt with separately. Following this some recommendations could be made for action.

### **STEP 4: Identify, assess and implement adaptation options**

Having identified their climate risks in Step 3 above, Gentoo Green incorporated each climate risk into their operational risk register to enable climate risks to be assessed in relation to other risks managed by the organisation, and to assist mainstreaming of adaptation actions in the implementation phase. The risk register identified the consequence of each risk for particular business area and noted the primary controls on each of these risks. Of the 5 short term and 5 long term priority risks identified in Step 3, four were chosen for further consideration:

- Design implications for new homes and existing stock
- Increased risk of pests
- Impacts on wet trades processes
- Threat to procurement of goods and services.

An Adaptation Options workshop was held to identify and evaluate a range of possible adaptation measures for these priority risks, as planned at the end of Step 3. Individuals from the following

business areas took part: Risk and Insurance, Legal affairs, Business Assurance, Service Delivery Management, Facilities Management, Construction, Sustainability and Group Procurement. As few technical experts were present it was not possible to develop detailed technical adaptation options (eg. changes in gutter and downpipe dimensions, shading, thermal mass). The exercise thus focussed on identifying managerial and strategic options with technical adaptations only being suggested where the necessary expertise existed.

**Task 4.1 Identify a range of adaptation options for each priority risk**

The group considered each risk in turn, working collectively to ensure everyone’s expertise was applied to each risk. A long list of potential adaptations was suggested, some of which could be classified as capacity building activities (eg. ongoing monitoring and research) while others were more tangible adaptation actions. Examples of suggested adaptations are illustrated in the tables below.

<b>Risk: Design implications for new homes and existing stock</b>	
	<b>Examples of proposed options</b>
<b>New homes</b>	<ul style="list-style-type: none"> <li>• Conduct further research into future building materials and their likely performance in a future climate. Will timber or steel frames be better suited to future conditions?</li> <li>• Seek opportunities to take advantage of finance initiatives associated with photovoltaic (PV) installation to fund win:win climate adaptations.</li> <li>• Look at the impacts of ground subsidence and materials.</li> <li>• Review ‘sealing’ of new properties. Are sealed buildings more or less adaptive to future climate conditions?</li> <li>• Build in climate adaptation “headroom” so adaptive measures can be installed in future, even though the technology or finance may not be available yet.</li> <li>• Engage and raise awareness of the design team.</li> <li>• Encourage design team to review the design codes and standards to which they comply.</li> <li>• Monitor developments in design developments</li> <li>• Monitor customer complaints to better understand the issues currently experienced in present housing stock.</li> </ul>
<b>Existing stock</b>	<ul style="list-style-type: none"> <li>• Explore opportunities for embedding adaptation measures via Retrofit Reality</li> <li>• Install water conservation measures</li> <li>• Link into and draw from forthcoming research outputs from the current round of Technology Strategy Board (TSB) climate</li> </ul>

	<p>adaptation research projects.</p> <ul style="list-style-type: none"> <li>• Find out more about retrofit options</li> <li>• Review the effectiveness of existing stock (and policies?)</li> <li>• Accept that some properties have a lifespan which they are not expected to exceed (accept the loss)</li> </ul>
<p><b>Learning point</b></p>	<p>The Retrofit Reality project revealed that improved energy efficiency does not necessarily reduce energy consumption. People still spent the same amount of money energy, they were just able to buy more of it and heat their home to a high degree of comfort. This is indicative of a certain degree of fuel poverty and awareness amongst customers.</p>
<p><b>Risk: Increased risk of pests</b></p>	
	<p><b>Examples of proposed options</b></p>
	<ul style="list-style-type: none"> <li>• Consider how to build houses that reduce potential for insect and other pest damage.</li> <li>• Review drain structures to prevent pests entering or leaving drainage systems</li> <li>• Review waste collection procedures: are they adequate for changing conditions?</li> <li>• Work in partnership with Councils to ensure high standards of waste collection are maintained.</li> <li>• Analyse customer complaints database to monitor pest problems.</li> <li>• Revise complaints database to allow more precise information on the nature of complaints to be recorded.</li> <li>• Monitor timbers to ensure current treatment standard continue to provide adequate protection from wood rot or infestation.</li> <li>• Determine the value of insurance claim data for providing information on pest related problems.</li> <li>• Raise the issue with the preservation team.</li> <li>• Raise customer awareness and provide advice on good practise that can discourage pests.</li> </ul>

**Risk: Impacts on wet trades processes**

	<b>Options</b>
	<ul style="list-style-type: none"><li>• Increase use of pre-fab products in new build to reduce exposure to wet or cold weather</li><li>• Programme work as far as possible to match weather conditions</li><li>• Build flexibility into work programme to make it easier to react to weather conditions</li><li>• Explore innovations that provide alternatives to wet trades, which are poorly suited to cold wet conditions.</li><li>• Increase use of timber, steel and glass which don't involve wet trades.</li><li>• Cover houses during the construction phase with giant tents / plastic shelters so works are unaffected by the weather.</li><li>• Establish what the real cost of unproductive weeks are. Knowing the cost of lost labour could justify investment in innovative solutions.</li><li>• Reduce dependency on mortar through innovative materials</li></ul>

**Risk: Threat to procurement of goods and services**

	<b>Options</b>
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	<ul style="list-style-type: none"> <li>• Ensure procurement of critical materials does not rely in a single source</li> <li>• Feed climate adaptation considerations into the review of the sustainable procurement strategy (which takes place next in 2011)</li> <li>• Establish and maintain dialogue between the design and procurement teams so purchasers are kept abreast of up and coming trends in building materials</li> <li>• Develop new supplier requirements to ensure more robust supplies (already under consideration)</li> <li>• Review the risks associated with “just in time” delivery policies.</li> <li>• Increase capacity to store vital supplies (eg. grit, timber, bricks) on site. This would reduce reliance on “just in time” deliveries, increase resilience of supply lines and create potential to sell surplus stocks to others in time of need.</li> <li>• Reduce exposure to volatile resource/commodity costs by creating partnerships.</li> <li>• Conduct research into the use of recycled or processed non-natural building materials to reduce dependency on natural resources which may decline in future (eg. Timber, copper)</li> <li>• Ensure coherence with other strategic objectives</li> <li>• Raise customer awareness of new materials and how to use them</li> <li>• Review climate risks on a regular basis to keep the risk register live and relevant</li> </ul>
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### **Options for remaining non-priority climate risks**

It was agreed that there was no need to explore options to lower order climate risks as these are not sufficiently important to the business as a whole to warrant doing so. The relative importance of these lower order risks should be monitored in an ongoing basis though to ensure that nothing has changed.

### **Task 4.2      Establish the criteria against which you will evaluate your ‘long list’ of adaptation options**

The UKCIP Adaptation Wizard calls for organisations to establish the criteria against which they can **evaluate the ability of each option to achieve their strategic objectives.**

While a commonly accepted set of evaluation criteria has been developed from the literature and UKCIP’s practical experience, Gentoo has an established set of criteria to appraise new business opportunities. It was felt that it would be more appropriate to use these and that doing so would also make it easier to integrate outputs from the assessment of adaptation options into Gentoo’s decision-making process.

Gentoo's new business opportunities appraisal criteria were thus adapted for the purposes of evaluating proposed adaptation options. These were shared in confidence and cannot therefore be included in this case study. The transferable lesson though is that their existing framework could readily be adapted to evaluate adaptation options when each of the criteria was posed in the context of how the adaptation component of the project would affect each rating. Similarly, opportunity screening questions could all be applied in their present form, with "the adaptation component of the project" being the object of the questions.

### **Next Steps**

The following activities are planned to keep this work moving forward:

1. A series of "panel meetings" of 2-3 relevant experts to be held to formally evaluate options according to the revised criteria.
2. The panel meeting looking at the design of new and existing properties will also need to bring together appropriate colleagues to explore technical options for adaptation
3. Gentoo colleagues to be encouraged to put their ideas for climate adaptation options into a live on-line ideas book.
4. It was agreed that the risk register would be kept live through quarterly reviews.