
Understanding the value of the Adaptation Reporting Power process to the reporting organisations involved

Report prepared for Defra by the Adaptation and Resilience in the Context of
Change network

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ARCC network

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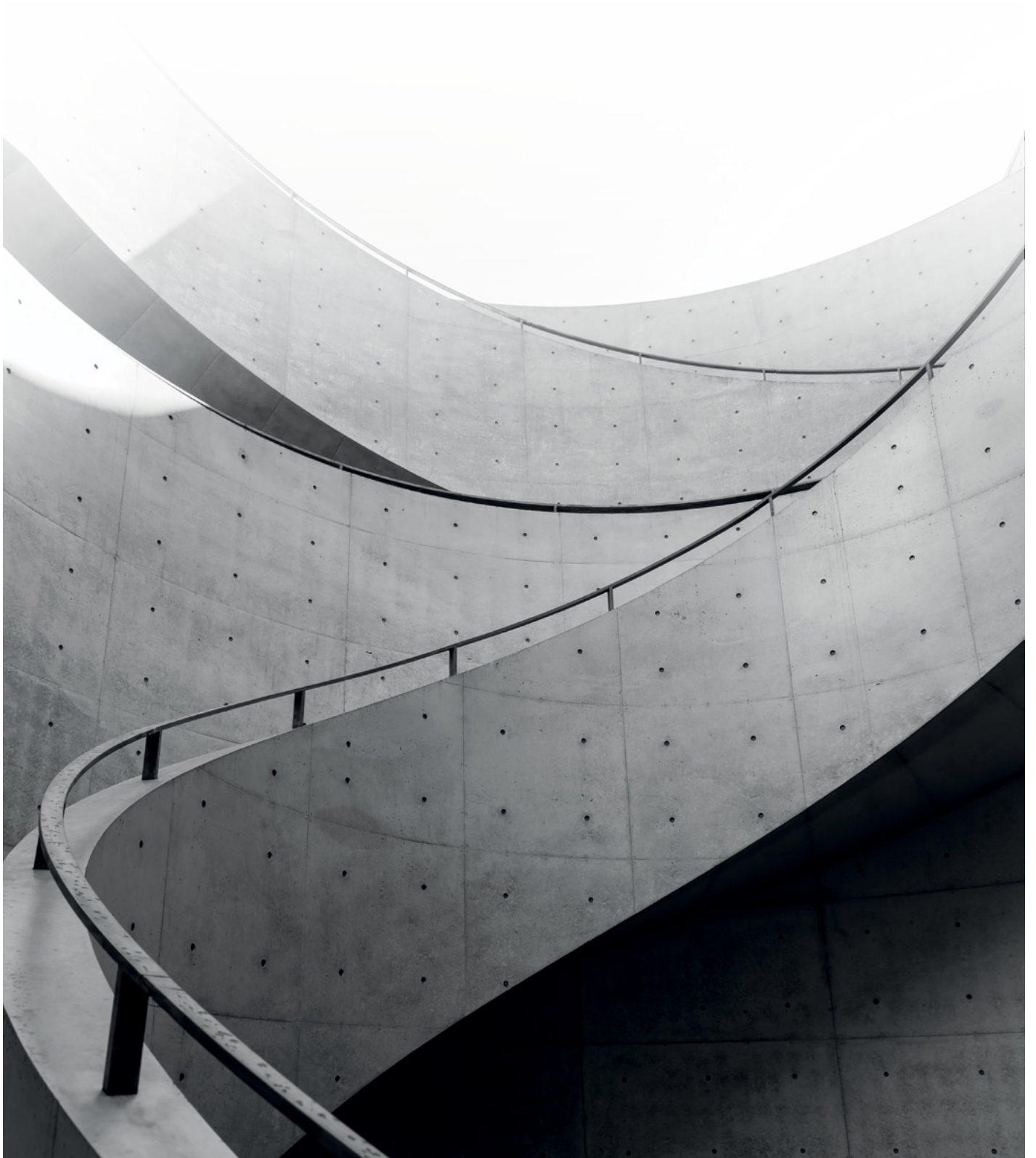
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Contents

Summary	5
Introduction	7
Engagement with reporting organisations	9
Perspectives on value	11
Value added by the report & reporting process	11
Goals & expectations when preparing & publishing the report	12
Fit with existing planning & operational processes	13
Uses of the report within the organisation	14
Summary	15
Considerations from non-reporting organisations	16
Suggestions for enhancing the impact & value of the process	17
Knowledge and evidence gaps limiting the value	20
UK Climate Projections	20
Consideration of interdependencies	21
Sharing of information	21
Perspectives on the overall experience	23
Conclusions & considerations	24
Annex 1: Organisations interviewed	26
Annex 2: Evidence & information gaps	28



Summary

Reports prepared in the context of the Adaptation Reporting Power (ARP, Climate Change Act 2008) have the potential of adding substantially to the national understanding of climate risks and to the scope, effectiveness and efficiency of adaptation responses. There is a hypothesis that this potential can be better realised if reporting organisations value the process beyond just meeting the reporting requirements.

This report provides evidence of the added value identified and realised by reporting organisations during the second round of reporting (ARP2) with the aim of testing this hypothesis and informing the development of a reporting strategy and guidance for the third and subsequent ARP rounds. The evidence was gathered through a series of semi-structured, qualitative interviews with 18 reporting organisations and 2 organisations that decided not to report, representing a range of infrastructure services.

The interviews revealed that:

- There is value added from the perspective of the reporting organisations through both the reporting process and the availability and use of the reports. The added value ranged from further raising awareness, consolidating climate change adaptation activities, and promoting discussions on climate risks and adaptation in the organisation and within and across sectors, as well as with external partners.
- The value to reporting organisations could be increased through greater transparency and demonstration of the use of the reports, including provision of feedback on their contributions to informing policy.
- There is considerable interest within reporting organisations in maximising the value of the information contained in the ARP reports (including to track progress), in sharing and learning from good practices and in supporting a better understanding of, for example, dependencies and interdependencies.
- There are a number of key scientific evidence and knowledge gaps currently limiting the value of the reports to the reporting organisations and which could be addressed through future investment in research.

- Looking forward to the third round of reporting, organisations have suggestions relating to the scope and timing of the process, the use of the reports, and on guidance and feedback which could enhance the impact and value of the ARP process to them.
- Reporting organisations believed that the development of requirements and guidance for future rounds of the ARP should reflect the differences in the maturity and capacity of the reporting organisations in terms of consideration of climate risks and adaptation.

This latter point to some degree reflects the changing nature and capacity of many of the reporting organisations as they have learned (and valued that learning) from previous reporting rounds and integrated that learning into their organisational planning and investment processes (i.e. moving towards mainstreaming of risk-based climate adaptation planning).

Introduction

To help ensure key organisations prepare effectively for climate change, the Climate Change Act 2008 gives government the power to direct organisations responsible for essential services and infrastructure, and those with functions of a public nature, to produce reports on:

- the current and future predicted impacts of climate change on their organisation,
- proposals for adapting to climate change,
- the assessment of progress towards implementing the policies and proposals set out in previous reports.

For each round of reporting (now every five years), the government is required to lay before Parliament a report setting out the intended approach to exercising this Adaptation Reporting Power (ARP). The government may extend the period for laying any such report, but must publish a statement setting out the reasons for the delay and specifying when the report will be laid before Parliament.

In the first round of reporting, ARP1 (December 2010 to December 2011), 91 organisations, primarily from the energy, transport and water sectors, provided reports on a mandatory basis, and a further 14 provided reports on a voluntary basis. An independent evaluation of the risk assessments contained in the reports was carried out by Cranfield University to provide advice to the Department of Environment, Food and Rural Affairs¹ (Defra). The same team also provided an analysis of the ARP process from their perspective including some thoughts on how the second round might be undertaken².

1 [Evaluating the Risk Assessments of reporting organisations under the Climate Change Act 2008](#). Cranfield University, August 2010

2 [Evaluating the Risk Assessment of Adaptation Reports under the Adaptation Reporting Power](#). Final Summary, Cranfield University, January 2012

In July 2013, the strategy for the second round of reporting was published. First round reporting organisations were invited to provide progress updates and a small number of additional organisations were invited to report for the first time, all on a voluntary basis. Reports were expected by December 2016. To date, reports have been received from 86 organisations, including several joint reports submitted on behalf of a number of organisations (total of 59 reports).

To assist in evaluating the ARP2 process, the Adaptation and Resilience in the Context of Change (ARCC) network indicated to Defra that it was interested in exploring with reporting organisations in the infrastructure sector the effectiveness and value of the reporting experience to the organisations involved. There was also an interest in identifying research and knowledge exchange requirements to support future reporting rounds.

Defra are interested in such independently-gathered information to help validate and strengthen information provided from previous rounds and to help identify specific ways in which future ARP rounds can be directed to make them of greatest overall benefit.

In terms of the overall ARP review process, Defra is examining the use of the reports by government and interviewing other non-infrastructure reporters and the Adaptation Sub-Committee (ASC) is looking at how the reports support the overall climate change policy cycle, including as the Climate Change Risk Assessment (CCRA) and the ASC reports to Parliament on progress on adaptation.

Engagement with reporting organisations

The ARCC network carried out semi-structured, qualitative interviews with 18 reporting organisations (listed in Annex 1) representing the range of infrastructure services. All reporting organisations in the infrastructure sector were invited to participate by Defra and of those 18, including two representative bodies, responded positively³.

The interviews focused on eight areas:

1. how those organisations reporting would define the value added by the report and the reporting process,
2. goals and expectations when preparing and publishing their report,
3. fit of the reporting process within the organisation's planning and operational processes,
4. uses of the report within the organisation,
5. suggestions as to how the impacts/value of the process and report could be enhanced,
6. gaps or shortfalls in knowledge, evidence or guidance available that limited impacts/value,
7. lessons learnt from preparing the report, especially in the context of enhancing value to the organisation, and
8. perspectives on the overall experience of the reporting process.

³ The organisations interviewed covered 18 of the 41 reports submitted from the infrastructure sector, and included representation from 9 of the 10 sub-sectors as listed by Defra (see Annex 1). It is recognised that the selection process adopted, the nature of the interviews (qualitative and based on dialogue) and the relatively small sample size (due to the scope of the work) could introduce some bias when drawing conclusions. But the benefits of such an approach that enabled wide-ranging discussions and the opportunity to explore emerging factors in greater depth contributed to overall conclusions that aim to be both valid and useful for informing the broader effort to develop a strategy for the third round of reporting.

The first four areas were intended to explore the value of the ARP2 process and report and included reflections on any changes from the ARP1 process. The remaining areas looked at seeking views and learning that could help inform future ARP rounds from the perspective of enhancing the value to the reporting organisations.

Additional information was taken from the ARP2 reports submitted by those organisations interviewed.

In addition, a number of organisations decided not to report in the second, voluntary, round. To explore the reasons for this, two non-reporting organisations in the infrastructure sector agreed to be interviewed. Discussions focused on the reasons for the decision from the perspective of the value to the organisation, the factors that were considered in making the decision, and how these factors might be addressed in the future to enhance the overall value of the ARP process.

Perspectives on value

The first four questions looked to gather information on the value and use of ARP2 from the perspective of the reporting organisations interviewed.

Value added by the report & reporting process

There was a strong emphasis on the value of the process of reporting in providing reporting organisations with a focus for continued, and sometimes enhanced or renewed, consideration of climate change adaptation internally. The ARP process assisted with raising awareness of the issue across different departments, consolidated activity related to climate change adaptation and, in many cases, promoted on-going discussion of adaptation at a senior level to stimulate action. Given the wide variety of risks that face all organisations and the on-going day-to-day operational requirements, the ARP process helped ensure that climate change adaptation continued to be considered by organisations. It also served to enhance awareness of policy initiatives and provided an additional conduit for strengthening links with government departments.

The various approaches used to respond to ARP2 usually built on well-established corporate mechanisms (in part derived from work on ARP1) and, in several cases, identified the need to further develop action plans and risk registers etc. to help manage adaptation within the business.

Many reporting organisations took the opportunity of using ARP2 to show leadership and to highlight their responsible approach. Others took reassurance from the process to ensure that they are aware of the latest science and up-to-date on sector initiatives. And a number of reporting organisations took the opportunity to build technical and scientific capacity internally with a view to looking to develop skills for the future.

The ARP2 reports themselves have provided reporting organisations with a useful summary and an additional thread for engagement with customers and external stakeholders. They have been used to help build awareness and engagement across sectors as well as to stimulate links with other, often regional, stakeholders. This is particularly true where reporting organisations are interested in interdependencies with local policymakers, communities and business.

Several organisations mentioned the value of the report in providing evidence for action and an opportunity to strengthen discussions with government policy and regulatory bodies. But there was a strong and repeated request for more feedback from government as to how the information is being used to inform action across the UK.

Looking at those reports submitted on behalf of a sector and by reporting organisations representing their membership, added value was identified by taking a collaborative approach e.g. in identifying a common risk register for the sector. This brought discipline to the consideration of climate change adaptation across organisations, stimulated the sharing of information and provided a single summary as a point of reference for use both internally and for stakeholders. Benefits were gained from reduced resource requirements and from shared knowledge exchange activities.

In contrast, a small number of reporting organisations found much less value in the ARP2 process and report. This was mainly due to the timing being too close to the first report; there was no new scientific information available on which to base any updated assessment of risk, and/or little change in corporate risk particularly given the long-term nature of climate change. In these cases, the reports tended to provide a summary of existing initiatives and business-as-usual activities.

Goals & expectations when preparing & publishing the report

Nearly all reporting organisations provided the ARP2 report primarily, and in a couple of cases solely, to comply with the request for information from Defra in a timely and appropriate manner. The reporting organisations recognise the need for public services and infrastructure to be resilient to climate change and understand that reporting organisations have a responsibility to contribute to the overall UK picture. Consequently, even though the second ARP was voluntary, the majority stated that they would expect to report irrespective of the formal status of the request.

Those reporting organisations reporting for the second time were looking to build on outputs from ARP1, to review progress, to update their use of underpinning scientific information and to assess what further information was needed to inform decisions into the future.

Most organisations also planned (from an early stage) to enhance the value of the ARP process by realising a number of other, complementary, goals when developing the report. The most frequently mentioned goals were internal, with reporting organisations looking to use the process to help align actions to address climate change more closely within corporate structures and to embed actions within broader sustainable development initiatives. The process was used to help identify and review specific vulnerabilities to climate change within organisations and to better enable the appropriate assessment of risk when developing internal projects. By focussing engagement across different departments and by promoting cross-departmental discussion, the ARP2 process aided comparisons across a range of risks leading to a better overall understanding and proportionality when considering the response.

Several reporting organisations aimed to use the ARP process and report to help identify impacts on specific asset groups and as a means of informing discussions with regulators. The reports also provided a useful depository of information on adaptation and have been used to document risks at a specific point in time.

For those reporting across a sector, the discipline that a coordinated approach to reporting brought to the process meant there was an opportunity to think through the wider implications of adaptation to climate change, to share information, to develop a common risk register and to alert others in the sector to possible risks.

The ARP2 reports are being used as briefing material, helping to bring together and synthesise specialist expertise from across the organisation. In support of this, several reporting organisations mentioned their goal of providing a user-friendly and accessible document for a wide audience (internal and external) which showcased their latest activities and helped advance their reputation in this area.

Fit with existing planning & operational processes

As to be expected in key operators of infrastructure, reporting organisations have mature and robust risk management processes and solid risk management cultures across their operations. In general, strategic information for the ARP2 report could be extracted from existing corporate risk registers and related documents. Organisations reported significant progress in this area since ARP1 (which in many cases initiated formal work on adaptation) with ARP2 drawing on information now routinely integrated into existing processes. Gathering the more detailed data and information required to underpin the report was often highlighted as useful within companies as a means of bringing together related work from across different departments and areas of expertise, and also as a means of linking climate change related activities together.

In many cases, adaptation was entirely embedded in the internal reporting process and fully integrated into both short- and long-term business decisions. For other reporting organisations, the ARP process provided a push towards further inclusion of adaptation at the corporate level in risk registers and associated planning cycles. It was also highlighted that the process was of less value to informing current operational processes, which tend to be focused on immediate issues, but was more influential when looking at strategic forward planning.

On timing, the majority of reporting organisations appreciated the flexible approach taken by Defra of allowing reports to be submitted during a wide submission period, but in many cases it was still difficult to align the ARP reporting process with, for example, regulatory cycles. This tended to limit the ultimate value of the report to the organisation both in terms of not reflecting the implications of the latest investment decisions and also in requiring additional resources to provide yet another report.

Nearly a third of reporting organisations used consultants (sometimes in-house) to interpret projections, undertake analysis, and to prepare aspects of the report on behalf of the reporting authority; these were primarily the larger reporting organisations possibly with greater budgets to procure such services. Other reporting organisations chose to use the visibility of the ARP process to both develop internal expertise on climate change adaptation and to enhance available internal resources, both for now and as an investment in capability for the future.

Very few reporting organisations had staff with the sole remit of covering adaptation issues. In many cases, particularly in the smaller reporting organisations, the responsibility for providing the ARP report fell to those with much broader areas of responsibility. With less scientific and technical resource, it was sometimes difficult to know quite where to start in responding to the ARP invitation.

Uses of the report within the organisation

There were many examples given by the reporting organisations of ARP2 being valuable in updating understanding and knowledge of climate change issues and in highlighting the consequences for business both internally and externally (with employees, supply chains, customers, investors etc.). Reports are being used to demonstrate responsibility and leadership in the area of adaptation, within and across sectors and occasionally at a regional level, and to emphasise progress and achievements in preparing for the impacts of climate change. The reports have provided a single source of information and another approach to engagement.

Since ARP1, many reporting organisations have been affected by extreme weather events such as the flooding of 2013/14. Case studies were used very effectively by many reporting organisations to illustrate the effect of climate change (and weather) and to provide evidence of the need for action. In some cases, this evidence has helped overcome the perception that climate change is only a longer-term problem of less priority than short-term, current issues.

As consolidated summaries, the ARP2 reports provide evidence to inform more detailed work activities and a ready-to-go product that can help inform discussions. They provide a documented and common evidence base for discussions with regulators and stakeholders and additional information, often via case studies, of on-going action. Where a single report has been produced for several organisations, there was added value in sharing information, in looking at the risks at a point in time across the sector and in providing a single, sector-based report to inform regulators and policy (which could also help overcome any [perceived] differences that can arise from individual reports).

In contrast, some reporting organisations felt that the ARP2 report was of little use as awareness of climate change issues was already high internally and appropriate links were already established with stakeholders. In some cases, the actual report was too broad to be useful in engaging with stakeholders particularly at the local level, or in negotiations with regulators. And in the short-term, extreme weather events rather than climate change are the drivers for action.

On the structure and level of content in the reports, reporting organisations in general welcomed the flexible approach taken by Defra. A wide range of methods were used depending on exactly how individual reporting organisations wished to use the report. Where exchange and communication of information was important, the reports were deliberately written in an accessible style with executive summaries, case studies illustrating action, and images. A more concise approach was often taken when the main justification for the work was informing Defra.

Many other uses were mentioned including:

- driving the collection of data for use both now and in the future,
- providing a baseline for monitoring and evaluation,
- providing a single depository of data and information on climate change adaptation,
- consideration of how to make evidence-informed decision at the right time,
- an initial consideration of interdependencies and shared risks,
- a sense-check on an organisation's activities,
- adding skills to the company.

Summary

Overall, reporting organisations welcomed the light-touch and flexible approach adopted by Defra for the second round of reporting. The reports could be delivered when resources were available, could build on existing, mature risk management processes and could be adapted by organisations to maximise their individual benefit. There was good support from Defra throughout the process and building this relationship with policy was valued.

Considerations from non-reporting organisations

When deciding whether to report or not, the two organisations interviewed considered both the value of ARP1 and the likely benefits to the business. Factors which influenced their decision not to report included:

- no new scientific evidence available since ARP1 that would require a review of existing risks, risk management processes and forward planning decisions,
- adaptation adequately managed within existing corporate structures, and the risks considered to be low,
- considered to be little added-value to individual organisations of reporting separately again.

The lack of available resources and competing priorities were also mentioned, but timing was not cited as an important factor in deciding not to report.

When considering how the ARP process and reports could add value to these organisation in the future, an important factor was the need now to look across sectors and/or regions to enable a more strategic and comprehensive approach to tackling adaptation. This would add value to individual organisations (in terms of shared learning and support), give confidence in an industry-wide view and allow better consideration of cross-sector issues. The timing of future ARP reports should also build on the availability of new scientific evidence.

These findings support the general conclusions drawn from interviews with reporting organisations.

Suggestions for enhancing the impact & value of the process

There is a significant amount of information included in the ARP reports and reporting organisations are keen to realise any additional benefits (both to individual companies and to the policy process) towards ensuring resilient infrastructure across the UK. This could include further exploitation of information in current reports and additional value to be gained over time in monitoring how the UK is adapting to climate change.

Looking towards the third round of reporting (ARP3) and beyond, there were a number of suggestions as to how the process could be developed to enhance the value to reporting organisations.

Scope: Additional value could be gained from minimising the number of non-reporters and encouraging greater inclusion; it only takes one company in a sector not to report to lose much of the potential usefulness with respect to understanding sectoral, regional and national progress. The ARP process is also now well-established, so there is an opportunity to broaden the scope to include additional organisations contributing to the UK economy and having a critical role to play in adaptation.

Timing: Getting the timing right for ARP3 is critical; reporting organisations need to be confident that the process is of use to developing policy and driving action. It was acknowledged that no timing would ever be perfect for all organisations given the various control periods and other reporting cycles they need to meet, but the flexible submission window adopted for ARP2 certainly helped. Several reporting organisations would also prefer a hard deadline (possibly at the end of a window) which would ensure the reports provide a collective snapshot of progress, would aid sharing and collaboration and would allow closer alignment with policy timetables.

In many cases, reporting organisations would prefer a longer period of time before ARP3. Now that climate change risks are more integrated within mature planning cycles, and that the risks tend not to change significantly in the short-term, the period needs to be carefully considered to ensure companies have something useful to contribute and can gain value from the process. ARP2 was a progress report and several reporters mentioned that if there had been no extreme weather events in the period since ARP1, then they would have had little to add to their initial report.

ARP3 also needs to reflect progress in scientific understanding, with the next major update likely to be new climate projections due in 2018. Following the release of the new projections (and taking account of other advances in decision making, evidence and knowledge), organisations will need time to understand the differences between current and new projections and the implications for risks and risk assessments and management strategies before reporting.

Reporting organisations would welcome plenty of notice of any directive for ARP3 so work, including any additional data and information gathering needed, can be factored into forward work plans.

Feedback and use in policy: For ARP2, little feedback was given to reporting organisations beyond brief letters from Defra. Many reporting organisations would value more comprehensive and constructive feedback as a means of learning and improving their approach (and more commensurate with the effort and resources put into reporting). Related to this were comments made by several organisations that the structure suggested in the voluntary guidance from Defra implied that there was further work planned in terms of, for example, comparison and identification of good practice, and this would be welcomed.

On the broader use of the reports, many reporting organisations did not feel they had an adequate understanding of how their report was contributing to national policy; they knew of the CCRA and the National Adaptation Programme (NAP) but were not sure how, if at all, their organisation's report was being reflected in these. It would enhance the value to organisations if they knew how the information was contributing to the national understanding of risks and adaptation, and how government was using this information to help enable organisations, especially critical infrastructure, to respond to these risks. It would also help organisations focus reports to make them more useful to policy, and help strengthen corporate level support for continued involvement in the ARP process.

Guidance: There was a wide range of views here. Many reporting organisations have limited resources and would value more prescriptive guidance on what is needed by Defra to report progress, including where useful information can be accessed (e.g. signposting to the latest science). A common format was welcomed, at least as a starting point, and recognising that it helps comparability. In contrast, others felt the suggested questions were too prescriptive and/or quite generic and were not all relevant to the different types of reporting organisations (companies, regulators, or sector-wide). This probably limited the usefulness of the information provided.

In general, the ARP process has now been integrated into existing management processes, so a completely new approach for ARP3 would not be helpful. This also links to consideration of the added value from tracking progress across ARP rounds which might also be a factor to consider for the future.

Mandatory or voluntary: There was a relatively even split amongst those organisations interviewed between those wanting a mandatory submission requirement versus those looking for a voluntary approach. Most organisations would report whatever the status to provide evidence of managing their risks responsibly; regulators would expect this, as might customers.

Suggestions were made that the value of reporting would be enhanced if the process was compulsory; this would maximise usefulness at the national level by providing consistent information across sectors, ensuring information is not lost and by aiding discussions on interdependencies. In some cases, a legal requirement (for ARP1) had ensured high-level strategic consideration and contributed to a changing corporate perspective on adaptation issues. In contrast, voluntary reporting was seen as a means to encourage sector-wide reporting with value gained in sharing resources, benchmarking and providing information on an additional level of progress.

Sector- and regional-level: Linked to the question of mandatory or voluntary reporting, some sectors are already working together in order to respond to the ARP process and valued the ability to report voluntarily as a sector. For other sectors, the ARP3 process might be the next step to helping provide a wider and more comprehensive view of climate change adaptation. Collaborative reports across a region were also suggested as an approach to add value to the national picture and to promote partnership work.

Interdependencies: This was widely acknowledged to be a difficult area. It was not always clear exactly what Defra wanted to know here. Many reporting organisations would value further guidance and leadership in this area (for both the ARP process and in the broader context).

Sharing of information: There seems to have been little sharing of information within sectors after submission of the ARP2 reports. Reporting organisations were generally in support of greater sharing of information, both at the sector-level and regionally. A variety of sector-level organisations could help with this as could cross-sector, independent fora such as the Environment Agency's Infrastructure Operators Adaptation Forum (EA/IOAF). But it was noticeable that the business structure of sectors influenced the degree of sharing, with the more highly competitive sectors being understandably less able to share details.

Knowledge & evidence gaps limiting the value

It was clear from discussions that reporting organisations have invested considerable time and resources in understanding the latest climate science and the likely impacts of climate change. This evidence is then being incorporated into risk management processes and used as a basis for investment decisions.

There is a general acknowledgement of the need to keep up-to-date on scientific progress and its implications; but in-house expertise and capacity to engage with on-going research varies widely between reporting organisations as do the internal resources available to commission organisation- and/or sector-specific research.

A number of gaps and shortfalls in the knowledge and evidence available from research were identified both during the interviews and from the ARP2 reports (see Annex 2). The areas range from very detailed scientific knowledge such as a better understanding of climate variables, through the need for improved knowledge exchange processes to facilitate the provision of useful information for decision-making, to specific guidance requirements to support future ARP processes.

The ARCC network will use this information to inform future research council, and other funding agency, investments, but it can also be used to help direct sector-led coordinated research and innovation programmes and by boundary organisations looking to focus knowledge exchange and translation of research to inform industry.

The following three key areas were highlighted:

UK Climate Projections

The single most valuable scientific input to the ARP process to date has been the UK Climate Projections, 2009⁴ (UKCP09). These projections are currently being

4 Plus updates and additional information from the Coupled Model Inter-comparison Project Phase 5 (CMIP5), the Intergovernmental Panel on Climate Change Fifth Assessment Report (IPCC AR5) and work on the Adaptation Sub-Committee high-end climate change scenarios (H++ scenarios).

updated (UKCP18) and many of the on-going requirements from research reflect requirements from UKCP18 in terms of specific variables, changes in spatial resolution and for guidance and data formats which allow companies to incorporate information into their own analyses.

The ARP3 process would be of most value if it was timed to allow reporting companies to review new information in UKCP18 and to update their climate change risks assessments accordingly. In support of this, regular updates on progress and continued opportunities to influence the UKCP18 project e.g. through the non-governmental user group, would help reporting organisations integrate emerging results into their own internal processes.

To inform investment decisions, many organisations are looking for improved spatial resolution from the projections and, where possible, increased certainty in specific variables and products. The level of uncertainty in the projections remains a barrier to making investment decisions especially in the medium and long-term (whilst noting that other reporting organisations require only the general direction of change to inform decisions).

Many reporting organisations have expanded on the UKCP09 projections through their own analysis and experience-based work to reflect key organisation-specific adaptation risks. In terms of understanding the national picture of climate change risk and management within the infrastructure sector, this differentiation can limit comparability of information between ARP reports. Some reporting organisations welcomed the flexibility of being able to use their own approaches e.g. sensitivity analysis, to inform their decisions, others suggested the use of a standard set of UK climate projection to provide a consistent baseline.

When considering the implications of UKCP18 for reporting organisations, a key aspect will be the understanding of the impact of changes between the UKCP09 projections and the new UKCP18 projections. Clear information on differences between the two sets of projections will be needed as will guidance on whether past decisions based on UKCP09 remain valid (i.e. is the business case still based on the best available scientific information).

Consideration of interdependencies

Dependencies and interdependencies were highlighted as a major issue both within and across sectors, and with respect to supply chains. Many reporting organisations noted this as an area of concern but acknowledged that there is no easy way forward given the complexity of the issue, difficulties in defining high risk interdependencies and considering who is responsible for the response.

Sharing of information is being facilitated through sector working groups and through cross-sector fora such as the EA/IOAF. There may be an opportunity through the ARP3 process, to further develop mechanisms to allow this work to go forward towards better understanding and action.

Sharing of information

As listed in Annex 2, there are a number of areas where evidence and knowledge from research can be used to better inform policy and practice. However, the disparity between academic outputs and industry requirements continues, despite on-going efforts by both sides, with research outputs often too generic and/or based at the national-level to enable use by industry. Activities which help with the access, understanding, synthesis and translation of research to provide salient outputs for users continue to be needed, as does signposting to new scientific information.

Sharing of information is also important. The ARP2 reports contain a wealth of information on how various reporting organisations have tackled the challenge of adapting to climate change. There is an opportunity now to move the debate forward across sectors by, for example, work to compare and contrast how operators are assessing, monitoring and reviewing risks and by sharing case studies and best practice etc.

Perspectives on the overall experience

Overall, the greatest value to reporting organisations was seen in the process of reporting, with organisations able to use the flexible approach to strengthen the consideration of climate change adaptation issues at different levels within their organisations and sectors. The reports themselves provide comprehensive summaries of action and progress for both internal and external use.

Reporting organisations are looking towards understanding the outcomes and consequences of the ARP mechanism in terms of helping to ensure UK infrastructure systems are resilient to climate change. Considerable resources have been invested in providing the reports, and many reporting organisations would welcome a better understanding of how Defra and other government departments are using the information to inform policy decisions and how this can support translation into action to reduce risks.

For the future, ARP3 is seen as an opportunity to keep the dialogue moving forward, but the timing and scope are critical for enhancing the value to reporting organisations, including in the support of policy. Careful consideration needs to be given to the most appropriate reporting period. In reality, climate change issues do not tend to change rapidly so any update needs to be timed to take account of new information, including scientific knowledge and evidence, and aligned to meet clearly-articulated needs of policy. On scope, ensuring relevant sectors are fully represented within the ARP process would provide a more complete understanding of current climate risks to the UK and hence better inform the NAP.

Conclusions & considerations

The evidence gathered during the interviews and by reviewing the ARP reports demonstrated the interest and commitment of the reporting organisations to the ARP process. This is particularly reflected in the statements related to learning and to enhancing the value of the reports for the individual organisations, but also towards supporting adaptation and resilience of the infrastructure sector and of the UK more broadly.

The previous sections of this report point to a number of considerations from the reporting organisations that could be used to inform the future of the ARP process, and to progress the natural evolution towards ARP3. By looking across this evidence there are additional considerations that are worth emphasising.

The calls for feedback commensurate with both the effort involved and to facilitate sharing are seen by most of the reporting organisations as critical components towards achieving the required enhanced value. Evidence was provided where feedback and sharing efforts in the past have been appreciated and have impacted positively on subsequent activities, including the ARP2 process. Consideration should be given as to how best to provide effective and constructive sharing and feedback that can also contribute to learning. Particular reference was made here to the value, existing and potential, of sector-based organisations, and also to cross-sector fora such as the EA/IOAF and regional components thereof.

Many of the organisations interviewed have a mature consideration of climate change and adaptation that has been mainstreamed as part of their risk management and decision-making culture. The ARP process is useful as a driver for addressing adaptation within their organisation, in conjunction with other complementary drivers looking to enhance overall resilience. This status of many of the reporting organisations should be considered in the development of ARP3 guidance and requirements.

There was particular mention of the potential to expand the ARP mechanism to include a wider cross-section of industries – a more inclusive reporting process. There was reference within the interviews that limitations in the scope of reporting organisations was for some limiting the value and utility of the reports to the individual organisation, but also of the reports as a whole in providing a comprehensive national view.

Concerns related to dependencies and interdependencies were raised both in terms of areas where more information and support is required, but also where the requirements and guidance could have been clearer. For particular concerns such as this, there is a suggestion that the ARP process (and ARP3 in particular) could be used to drive progress and focus reporting such that the value of the reports in addressing such concerns is enhanced.

The flow of information from the ARP reports into policy such as the CCRA and the NAP could benefit from clarification and a transparent critical path. Statements by most of the reporting organisations reflected both uncertainty regarding the use of their reports within these processes, and that demonstration of this impact would enhance the value of their reports as seen internally and within the sector. It would also give confidence in the utility and value of the process towards action to support resilient infrastructure across the UK.

Annex 1: Organisations interviewed

Communications

Tech UK

Water companies

Portsmouth Water

Severn Trent Water

Thames Water

United Utilities

Yorkshire Water

Regulators

Office of Gas and Electricity Markets

Electricity generators

Energy UK and industry members of their Working Group on Resilience and Adaptation (the report was submitted on behalf of Centrica Energy, Drax Power, E.ON UK, EDF Energy, GDF SUEZ, InterGen, RWE npower, Scottish Power Generation and SSE)

Electricity transmitters

Energy Networks Association (the report was prepared by a task group of electricity distribution and transmission network operator members)

Gas transporters

Wales and West Utilities Limited

Road and rail

Network Rail

Transport for London

Highways England

Strategic airport operators

Heathrow Airport

Manchester Airports Group

Ports

Associated British Ports (Hull, Humber, Immingham, Southampton)

Port of Dover

Port of London Authority

Non-reporting organisations (ARP2)

Luton Airport

Office of Rail and Road

Annex 2: Evidence & information gaps

Climate projections (variables and derived products)

Key variables mentioned (from UKCP18 or elsewhere):

- wind speed and direction
- frequency and intensity of fog events
- frequency and intensity of storms
- frequency of high intensity rainfall events
- ice storms
- peak low temperature
- snowfall
- summer rainfall
- coastal and estuarine sea temperature
- tidal surges – probability and severity
- maximum wave heights
- sedimentation patterns and levels
- rates of coastal erosion
- river flows
- downscaling to sub-regional levels including local scale, catchment scale, estuary level
- combinations and dependencies between variables
- uncertainty in climate projections (particularly fog, wind, lightning)

Communication

- regular updates for progress on developing UKCP18
- continued dialogue with users

Translation

- UKCP09 is very complex – key messages
 - information on changes from UKCP09 to UKCP18 (including where there are no changes to evidence)
 - information on projections from other countries could be useful
-

Extreme weather events (EWEs)

- EWE number, duration and frequency, and combinations or sequences of events. EWEs in the context of on-going weathering.
- quantifying the economic costs of past EWEs
- understanding behavioural changes during EWEs
- sharing of EWE case studies on impact and response

Flood risk & forecasts

- coastal flooding forecasts
- projections of changing river levels
- guidance as to how flood risk maps are changing

Drought

- frequency of extreme drought conditions
- impact of short, sharp drought versus longer term events

Changing river flows

- understanding the impact of low river flows
- understanding ecological response of aquatic environments to changing flow conditions and the impact on waste water treatment and water abstraction
- bridge scour

Interdependencies

- route dependencies – where are the high risks and who is responsible
- need a cross-sector forum to take this forward
- short to medium-term working regionally
- sub-sector interdependencies – where are the vulnerabilities?
- need to consider supply chain resilience

Other

- groundwater flooding – projections and risks
- understanding and exploring the water/food/energy nexus
- considering socio-economic aspects and expectations in terms of infrastructure performance and services

Geohazards

- understanding and mapping subsidence
- ground movement
- scale and frequency of landslips
- changes in peat bogs and the implications for water colour

Data and models

- sharing of data (both monitoring data and related operational data) and models
- sharing of information on downscaling climate projections and impacts
- nationally available data sets, regularly updated e.g. on landslips

Decision-making and risk assessments

- visualising multi-dimensional decision-making processes in risk assessment
- new approaches to understanding risks
- understanding when to take a decision.
- methods to achieve robust decision-making for new investment
- discussion on precision and uncertainty and the level of detail required for decision-making
- how to prioritise the impacts of climate change among other corporate risks
- guidance on metrics for success in adaptation risk management
- guidance on monitoring and review of climate change adaptation actions – is review as part of corporate risk management sufficient

Synthesis and translation

- working with researchers and practitioners to provide salient information
- translation of UKCP09 projections into real terms at the operational level
- stronger links between UKCP09 projections and actual impact at the local and regional environmental level.

Climate impact mapping

- research outputs are often generic and/or based at the national level
- compilation of case studies demonstrating action
- compare and contrast how operators are assessing risk
- compare and contrast how operators are monitoring and reviewing risks
- sharing best practice within and across sectors
- signposting to new scientific information

Understanding the value of the Adaptation Reporting Power process to the reporting organisations involved

Report prepared for Defra by the Adaptation and Resilience in the Context of Change network

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