



# **Appendix 9: PACT and Survey Analysis Report**

## *Adaptation Strategies for European Cities: Final Report*

This is part of the Final Report of the project "Adaptation Strategies for European Cities" which has been compiled by Ricardo-AEA for the European Commission Directorate General Climate Action



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# How well prepared are European cities for the adaptation challenge?

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## Summary

This report evaluates the current status of 'adaptive capacity' in cities in Europe, defined here as the capacity to devise and implement appropriate strategies to take account of information about current and potential future climate change. Without sufficient capacity, long-lasting decisions that are important to the economies of cities, to their citizens' welfare, to their ecologies and to other places and communities that are affected by these decisions risk being significantly maladapted, only capable of being changed at significant additional cost.

The PACT Framework, a leading approach for assessing organisational aspects of adaptive capacity, was used with 21 cities that participated in the training workshops to identify their current level of capacity and to identify where efforts to improve might be most effectively directed. This allowed detailed capacity raising programmes appropriate to each of the participating cities and to their coaches to be developed quickly. Data from these reviews allowed broader conclusions to be drawn about the type of intervention appropriate at different stages of the adaptation journey.

The surveys reveal a significant capacity shortfall, which is likely negatively and significantly to affect the future flourishing of cities and which needs focused attention if the gap is to be closed. Alongside this conclusion, we also found that capacity in a few cities is far advanced and that at least some cities will be able to play an important role in leading wider capacity development.

Data tables supporting this analysis are given below and there is further detailed analysis at Appendix 1.

## Why cities need high capacity to adapt

The impacts of climate change arguably already affect many cities and other organisations and may increasingly be expected do so in the future. This means that they need to adapt to those impacts. It is more challenging to adapt, and therefore requires higher capacity, in the following circumstances:

- a) When major impacts are already being experienced, or are possible within the lifetime of major decisions.
  - The challenge is greater for long-lifetime decisions, since uncertainty is greater.
- b) When adaptation actions require a high degree of innovation, i.e. they require new approaches that have not yet been tried and tested.
  - Again, this challenge is greater for long-lasting decisions, since climate impacts are widely expected to be non-linear in character (i.e. current approaches may not be adequate for completely new types of challenge).
- c) When a framework (e.g. regulations, supply chain pressures, guidelines) needs to be created to co-ordinate the activities of other organisations. In such cases, beyond the simple challenge of adaptation there is the additional need to set up or administer a *system of adaptation*.

Many cities clearly meet these criteria and so require a high level of capacity to adapt:

- They have often grown up in river basins or on the coast, which were important to transportation in past centuries. They are typically also vulnerable to heat stress. In addition their populations and industries depend on long supply chains for food and other essential resources, which might themselves be vulnerable to climate impacts.
- They take decisions (e.g. spatial planning decisions, provision of essential services) that are very important for the wider population.
- These decisions are often of very long duration. For instance, the consequences of spatial planning decisions may last for several centuries.
- City administrations typically have an important role in co-ordinating responses, for instance through their use of regulations and through their moral authority.

It is much easier and cheaper to take a decision well in the first place, rather than to re-engineer or retrofit badly adapted facilities after construction in the light of major changes in the climate that had not been considered. Lack of adaptation capacity by cities can therefore potentially have serious consequences for many people, for many organisations and for much-loved places over many generations. Cities therefore typically require relatively high capacity to adapt to climate impacts.

### **PACT: a framework to assess capacity and prioritise improvements**

We used PACT to assess the capacity of institutions to respond to the impacts of climate change. PACT was initially developed during the EU-funded ESPACE programme (European Spatial Planning: Adapting to Climate Events) between 2006 and 2008 and it has developed further since the end of that project.<sup>1</sup>

Adaptive capacity has traditionally been assessed by scoring population-level statistical measures. For instance, there has been shown to be some correlation between economic development, female literacy, social governance structures, etc., and societies' capacity to recover from disasters such as flooding. As a consequence, it has been assumed that societies with higher levels of economic development, etc., would be better able also to take action to adapt to climate impacts that have not yet taken place. However, this is not a safe assumption. There is a very great difference between being able to respond quickly to disasters that have already occurred (which these population-level measures have assessed) and the ability to act in response to possibly weak and contradictory signals about potential future climate so as to reduce or even eliminate the possibility of future harm (which is the very challenging nature of adaptation to climate change). Moreover, it is not clear exactly how these factors might translate into better adaptation actions.

While relatively easy to measure, these statistics that purport to measure adaptive capacity appear to be measuring the wrong thing. They therefore risk misleading policymakers into wrong identification

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<sup>1</sup> Public domain documents and tool-kits consistent with those used in this project are available from [http://www.espace-project.org/part2/part2\\_outputs.htm](http://www.espace-project.org/part2/part2_outputs.htm) (under the heading, 'Adaptive Capacity Benchmarking').

and prioritisation of intervention points and may even lead to complacency on their part as to the likelihood of adaptation taking place without policy support.

The PACT framework addresses such concerns. It was developed through a major EU project, the ESPACE project (European Spatial Planning: Adapting to Climate Events, 2003-9). It has consistently been highly regarded by users and also by expert reviewers.<sup>2</sup> It has increasingly been used in major projects at governmental or sectoral level, including in the UK's first climate change risk assessment, presented to Parliament in 2012, also in reviews carried out in the Indian textiles and agriculture sectors, in Malawian agriculture, and in ASEAN countries by the GIZ (Deutsche Gesellschaft für Zusammenarbeit GmbH), typically on behalf of the German Bundesministerium Zusammenarbeit und Entwicklung (BMZ).<sup>3</sup>

The PACT framework identifies increasing levels of capacity, known as '*response levels*', from lower to higher as follows:

- Response Level 1 (RL1 or *Core business focused*): Organisations working at this response level do not have a climate adaptation programme and do not plan to have one. Research carried out in 2012-13 showed that they are more likely to be private than public sector organisations, tend to be smaller, to take fewer long lifetime decisions and not to have experienced impacts. For these reasons, it is likely that some, perhaps many, of these organisations do not need high capacity.<sup>4</sup>
- RL2 or *Stakeholder responsive*: Organisations working at this response level recognise that they need to act but are still at a very early stage. They include both private and public sector organisations (such as cities). While they do recognise that there may be some risks, they do not recognise many opportunities. They typically have little or no experience and do not understand the adaptation agenda very well. For instance, many confuse mitigation and adaptation. Managers are typically concerned to avoid mistakes and not to wish to draw attention to themselves: 'common sense' is more motivating than 'best practice'. At this early stage, external pressure and support are crucial to getting started and maintaining progress.

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<sup>2</sup> Lonsdale, K.G., Gawith, M.J. et. al. (2010). Attributes of Well-Adapting Organisations: A report prepared by the UK Climate Impacts Programme for the Adaptation Sub-Committee (available online). This group of expert reviewers identified PACT as the most advanced framework for organisational capacity of 17 international frameworks they reviewed. PACT has also been developed to assess mitigation performance. In addition, the peer reviewers for the assessment of adaptive capacity for the UK's first Climate Change Risk Assessment, published in July 2013, for which PACT was a core theoretical framework, stated that PACT represented a major contribution to thinking on adaptive capacity at the organisational level.

<sup>3</sup> It should be pointed out that work in these projects places 'organisational' capacity (as assessed through PACT) as part of a system of adaptive capacity that includes 'structural capacity' (i.e. the ease of changing technological systems as assessed through factors such as replacement cycles and the social complexity that surrounds adaptation decisions) and 'framework capacity' (i.e. the extent to which an appropriate 'enabling framework' is provided by Governments or other actors to support decision makers at different levels of organisational adaptive capacity).

<sup>4</sup> These descriptions summarise detailed research undertaken into different levels of capacity by the UK's Department of the Environment, Food and Rural Affairs between 2012 and 2013, published in July 2013. This may be downloaded from [http://randd.defra.gov.uk/Document.aspx?Document=11256\\_PREPARECA0513Organisationaladaptivecapacity-Finalreport.pdf](http://randd.defra.gov.uk/Document.aspx?Document=11256_PREPARECA0513Organisationaladaptivecapacity-Finalreport.pdf). They are extremely consistent with research undertaken in Europe during the ESPACE project, 2006-08.

- RL3 or *Efficient management*: Organisations working at this response level have begun work to prepare for climate impacts; as they do so, some begin to recognise that there may also be some opportunities. Public sector bodies are currently more likely than private sector organisations to be found at this level of capacity. Their programmes have access to some resources (time and money) and have some support from leaders, but external pressure and support remain important. The process of internal change has begun, often with some resistance becoming apparent. Change agents begin to look outside their organisation for support and guidance and as they do so they begin to identify and take account of ‘good practice’. However, responses remain within a ‘business as usual’ context and focus on current weather impacts only: they have not yet begun to prepare for future climate change.
- RL4 or *Breakthrough projects*: At this level of capacity, which is rare in both public and private sectors (but somewhat less rare in the former), organisations begin not only to look at future climate impacts but actually to find responses to them. Since step changes in impact are often possible when decision lifetimes last for decades rather than years, these organisations need to find responses that step beyond ‘business as usual’: they increasingly need to find ‘breakthroughs’ as well as pursue incremental change.<sup>5</sup> They recognise the strategic dimension of the issue and have typically much more internal support from leaders. Their programmes depend much less on external support. However, reshaping processes requires collaboration with other organisations and so the focus of change increasingly moves outside the organisation itself and towards encouraging and supporting other organisations to engage with the agenda.
- RL5 or *Strategic resilience*: This level of capacity is rare: it can be found in some far advanced climate programmes, typically in the public sector. Whereas RL4 capacity focuses on finding innovative solutions to particular adaptation challenges, the focus of RL5 capacity is to transform socio-technical systems such as an industry, a national economy or a city and its hinterland to prepare for longer-term climate change. This includes the stimulation and support of activity at all the lower response levels, for example taking learning from breakthrough projects to update professional standards and to stimulate new breakthrough projects.<sup>6</sup>

PACT is probably unique among frameworks in that, based on extensive research plus testing across a large number of organisations with very different levels of capacity, it has clearly identified the characteristics of very high capacity as well as offering guidance into what is needed at the early stages of a programme. This means that the PACT framework makes it possible to set measurable benchmarks for the different levels of capacity that may be required by a city:

- A city with no current or anticipated weather impacts and that does not take decisions which might encounter future climate impacts, would only require low ‘adaptive capacity’, typically RL2.
- A city needing to adapt to some current impacts would need to reach RL3 or above.

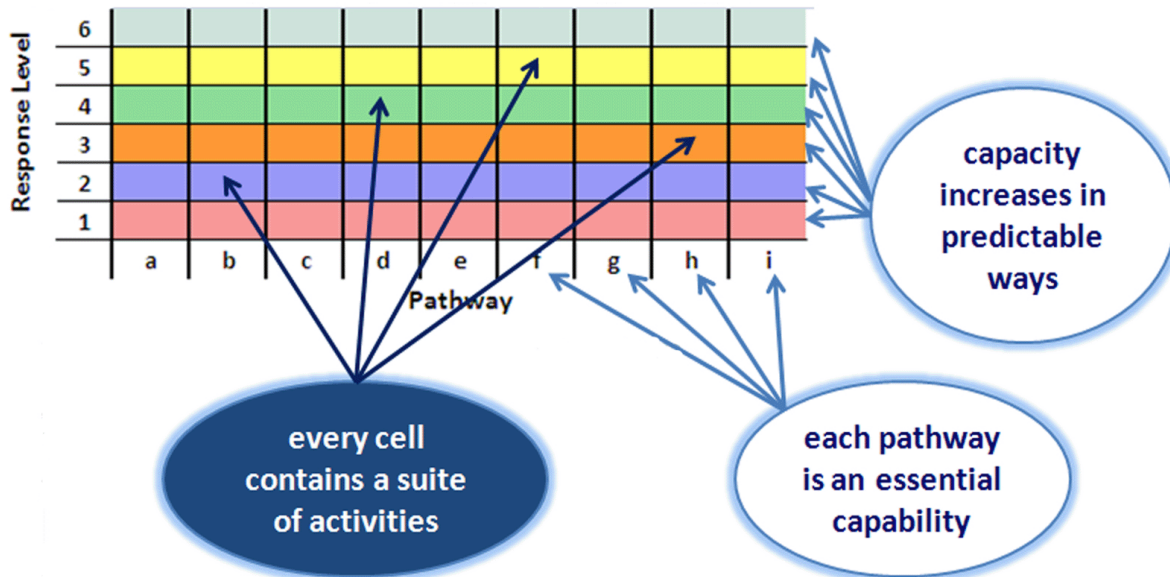
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<sup>5</sup> Stafford-Smith, M., Horrocks, L. et al (2011). Rethinking adaptation for a 4°C world. *Phil. Trans. R. Soc. A*, vol. 369 no. 1934 196-216.

<sup>6</sup> There is also a PACT RL6, but this lies beyond this discussion.



- A city that takes long-lasting decisions the outcomes of which might be influenced by future climate change (as many do) might regularly need to access RL4 in taking these decisions, whether directly or in partnership with other organisations.
- Cities facing complex challenges where co-ordination of a programme of resilience across a number of organisations or sectors is required would need to access RL5 capacity.



**The PACT Framework**

The essential capabilities that need to be developed to develop a strong adaptation programme are represented in PACT by nine '*pathways*' for change, comparable to 'competencies' at an individual level. These were developed through an extensive literature review and were tested and refined in the ESPACE project. They are represented by the letters a) to i) in the graph above. They are as follows:

**a) Awareness.** The ability to realise what climate change means for an organisation's viability, for the viability of its work, for society and for the planet, now and into the future. At low levels of capacity, 'awareness' will be very limited and usually limited to current extreme weather. As capacity rises, 'awareness' extends further in time and in space and becomes more comprehensive across risks.

**b) Agency.** The capacity to spot, prioritise and develop opportunities for meaningful and timely action in response to information about climate change. At low levels of capacity, 'agency' is largely about complying with other agendas, e.g. those of national governments, and thereby avoiding trouble or gaining short term benefits. At higher levels of capacity, 'agency' becomes more strategic, about protecting and enhancing the 'primary purpose' of the organisation.

**c) Leadership.** The extent to which a formal leadership team can identify a vision in relation to climate change and can engage with, support and legitimise its implementation. At low levels of capacity, 'leadership' is about allowing the issue to be discussed at all (e.g. through a policy), and about delegating some authority for action. As capacity rises, 'leadership' becomes more active across systems of organisations.

**d) Agents of Change.** The capacity to identify, develop, empower and support a group or “ecosystem” of champions at different levels so that they can be effective agents of change. At low levels of capacity, some space is allowed for enthusiastic people to offer time and energy to begin changes. As capacity rises, this role is first becomes professionalised and then is used to champion more fundamental changes that may be required.

**e) Working together.** The capacity to involve, respect the needs of, communicate with, learn from, and act in collaborative partnerships with internal and external groups. In the early stages, this may go no further than listening to valued stakeholders such as major funders, national government or opinion leaders. As capacity develops, understanding of who needs to work together develops and more attention is paid to building the capacity of a network of stakeholders to collaborate effectively.

**f) Learning.** The extent to which the city can learn from experience and use what it learns to improve procedures, strategies and mission. (This is a particularly important pathway because it helps identify anything specific that needs attention to unblock change). At low levels of capacity this is typically simple skills and awareness training. As capacity rises, reflective learning from experience is used better to understand the constraints to change and better to redirect a programme of adaptation.

**g) Managing operations.** The embedding of procedures to get to grips with climate change in a systematic way. These develop as the city’s ambitions and competencies grow. At low levels of capacity, this is inevitably somewhat ‘ad hoc’ and then gradually becomes incorporated within an organisation’s management systems. At high levels, advanced management approaches such as real options analysis and network resilience management are used better to cope with inherent uncertainty.

**h) Programme scope and coherence.** How far projects sit within an overall programme for action that is suited to the scope of what the city is trying to achieve and updated in the light of what is learned – where to build on success or to address constraints. At low levels of capacity, the programme is largely defined by others; as capacity rises, the programme extends beyond the organisation itself, co-ordinating the programmes of a system of organisations.

**i) Using Expertise.** The capacity to recognise, access and deploy the necessary skills, understanding and technical and change expertise to make the biggest difference. At lower levels of capacity, typically it is difficult even to recognise where experts are needed; as capacity rises, the value of expertise begins to be recognised and used and eventually the organisation becomes a source of expertise for others.

Since these pathways form a complementary and mutually supporting set of capabilities, all need to develop (or be acquired – e.g. through partnerships) in parallel. This is done by undertaking ‘activities’ that are needed for a strong programme at a given response level. For instance, integrating climate responses into a management system (e.g. into an ISO 14001 programme) is an activity characteristic of



‘managing operations’ at RL3. Carrying out a comprehensive analysis of climate risks several decades into the future is characteristic of ‘awareness’ at RL5.<sup>7</sup>

Moving from one level of capacity to the next clearly involves continuing to do existing activities well, but also doing new activities. This is because of the different character of programmes at each response level: continuous improvement will not necessarily raise a programme from RL3 to the more strategic RL4, for instance: a step change may often be needed.

By identifying which activities are being undertaken, and which are not, it therefore becomes straightforward to plot them onto a version of the matrix above and so to identify the current position of a climate adaptation programme and compare it against the required level. It also becomes easy to identify which ‘pathways’ are less developed and so most need attention. Examples of these graphs are in the case examples below.

## Methodology

### Methodology with individual cities

In this project, PACT was used with cities as follows.

- a. Standard materials (reports, surveys, etc) were customised for cities. This customisation was done in close collaboration with project partners ICLEI. For instance, minor changes were made to the PACT framework and survey questions and to reports to take account of ICLEI’s particular experience in working with cities on adaptation.
- b. Each of the 21 cities participating in the in-depth workshops then completed a detailed online PACT survey. This was completed not only by the 15 training cities but also by the six peer cities. The online survey was in English.
- c. The purpose of the survey was to identify which of the ‘activities’ (see diagram above) was being undertaken by each city. Depending on the activities being undertaken, a pathway might be scored as ‘not active’, ‘early activity’, ‘significant activity’ or ‘fully active’ at any response level on each of the pathways. Certain activities are seen as ‘essential’ if a pathway is to be fully active at any given response level.<sup>8</sup> Results of the survey were scored and moderated, giving a simple graphical presentation of capacity.
- d. Where necessary, follow on questions were sent to each city. These were designed to clarify any questions arising from the original responses and scoring.
- e. Reports were sent to each of the 21 cities. Again in English, these reports comprised:
  - o A summary report for sharing with city leaders.

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<sup>7</sup> A fuller list of activities may be downloaded from the ESPACE website (see [http://www.espace-project.org/part2/part2\\_outputs.htm](http://www.espace-project.org/part2/part2_outputs.htm) (under the heading, ‘Adaptive Capacity Benchmarking’). While that set of activities covers both adaptation and mitigation, they can easily be interpreted for the relevant activity. The set of activities used in this project have been customised for adaptation, but are largely consistent with the ESPACE set, which are fully in the public domain.

<sup>8</sup> For instance, it is not realistic for a city to be ‘active’ at response level 3 or higher on the ‘awareness’ pathway if no work has been undertaken to identify current risks from extreme weather. However, to do this is not sufficient: further activities also need to have been undertaken for a pathway to be fully activated (example: the results of the survey should be available to decision takers).

- A detailed report for managers responsible for the adaptation programme. This identified specific ‘activities’ (e.g. completing risk assessments, conducting training) that were being done, or not, in the programme.
  - i. The focus was on activities that were relevant to the city’s current status: a far advanced city (e.g. a well-performing ‘peer city’ would be given information on a completely different set of activities than a city that was just starting out.
  - ii. This could therefore be used by coaches and by managers to focus their adaptation efforts onto the most effective areas, aiming to highlight stretching and yet achievable next steps that would help the programme accelerate.
- A copy of questions asked and of responses given.
- A summary of the PACT framework, including case examples, etc.
- f. At each of the workshops, the coaching team was presented with overall results and each coach was briefed on the status of his or her city.
- g. The framework was introduced to participating cities and typical results were shared anonymously.
- h. Each city was offered a briefing on their results and virtually all took advantage of this. Usually, two separate briefings were given (coaches were always invited to and usually attended these):
  - About the results and what they meant.
  - About appropriate next steps.
- i. Following the workshops, coaches and cities were able to use reports to support improvements.

### **Methodology for larger-scale assessment of capacity in European cities**

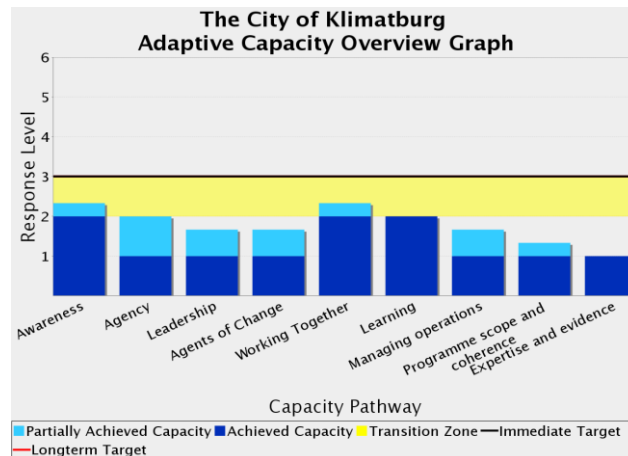
We used the results from the analysis of cities in conjunction with responses from the survey of 196 cities (see Main Report Section 2.3.1) as follows:

- In the survey of 196 cities, respondents were invited to rate their city’s status on climate adaptation. The questions used had previously been demonstrated to correlate well with capacity as identified in in-depth PACT reviews. This sample could therefore offer insights into the overall state of capacity in European cities.
  - It should be noted that this sample, while large, is self-selecting and so might be expected to be somewhat skewed. It would very likely be of somewhat higher capacity than the full population of European cities. This is because cities with lower capacity would be less likely to see it as worth their while to participate in the survey.
  - Cities’ responses were of course ‘unmoderated’ and so further probing was needed for meaningful conclusions to be drawn.
- As noted above, 21 cities (15 ‘training cities’ and six ‘peer cities’) undertook detailed PACT analyses. They had also had an opportunity to review their profile and address any perceived errors in the assessment. Since these cities were drawn from the 196, this in-depth analysis could be used to probe more deeply into the needs of cities at different levels of capacity from the larger sample.

## Comparison of results from three participating cities

The following examples demonstrate the wide range of capacities that were present in the workshops.<sup>9</sup>

### a) Klimatburg: a city that has hardly begun its programme



This graph is typical of an organisation (in this case one of the participating cities from a relatively new EU state that we called 'Klimatburg') that is at the very beginning of its work on climate adaptation. Detailed PACT analysis showed that capacity is exceptionally low (a score of 1 indicates that no capacity is evident at all), but no aspect of this city's programme has been developed very far as yet.

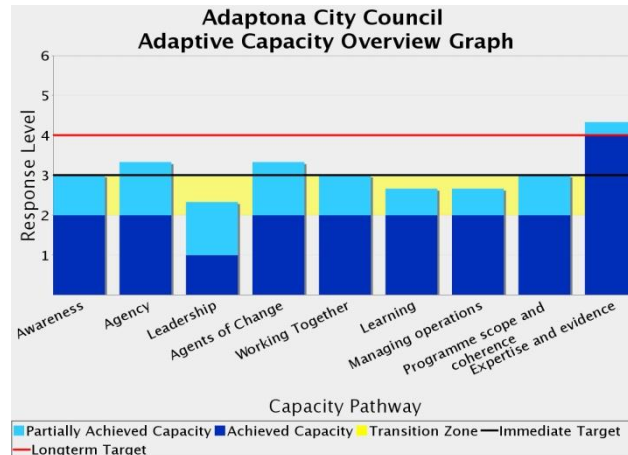
In terms of the PACT pathways, this city has recognised that there are some current risks from extreme weather, but has not assessed them in a formal way. It has little or no understanding of the payback from acting. While its leaders recognise that there may be some need to act, they have not agreed a policy nor yet legitimised any action or allocated any resources. In so far as there are any agents of change, they experience no organisational support whatsoever. The city's engagement with other organisation has picked up that this is an issue (e.g. to the EU itself) but adaptation is not yet incorporated into its stakeholder processes. The city takes advantage of opportunities to learn (e.g. it is participating in the ASEC project) but would not be able to provide training itself to employees or others. Its operational practices in responding to extreme weather have been ad hoc and its programme is at the very earliest stages (again, represented by its participation in the ASEC project). It has absolutely no relevant expertise and would have little or no idea of where to go to find it, or even of what to look for.

This city needs extremely clear guidance and support from coaches (in the ASEC project, but perhaps also from national governments) as it takes its first steps in a discipline that is completely new to it. It would not, for instance, be able to assess even current extreme weather risks for itself, let alone assess longer run vulnerability to complex climate scenarios. Generally speaking, programmes in cities such as these would begin with recognised risks from recent extreme weather and only move on to longer term risks once a basic organisational response has been put in place and some initial successes achieved.

<sup>9</sup> All results were confidential to the particular city and only shared with the coaching team. These names are therefore anonymised but the case examples are based upon specific participating cities. However, the results for 'Resilio' were slightly amended to make the identity of that city less obvious. However, it remains very typical of capacity profiles in advanced organisations such as these cities.

In discussions during the workshops, it became clear that often the most appropriate type of support is a simple checklist (do this first, then do that, then assess this using this tool, ...).

## b) Adaptona: consolidating a response to current extreme weather

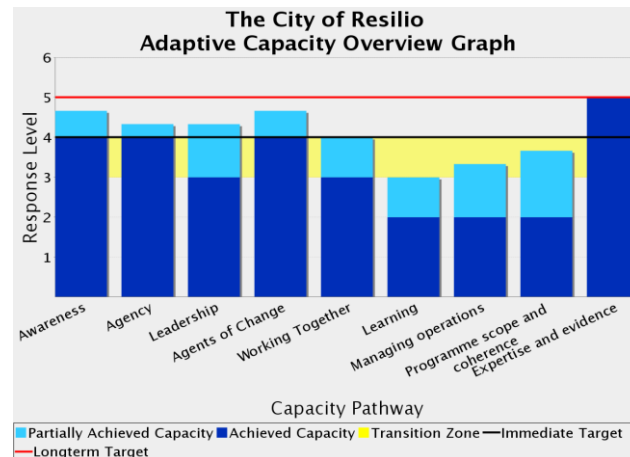


The second example is from one of the training cities (here called 'Adaptona') that also undertook PACT analysis. It is putting a comprehensive programme in place to respond to current impacts of extreme weather (e.g. current flooding risks). However, it has not yet done enough of the necessary work (typically at PACT response level 4 and above) that would be required to take future climate change into account. This makes it very unlikely that longer term decisions can yet be taken in a climate-resilient way.

Adaptona's awareness is strong on the current risks posed by one aspect of current extreme weather, even beginning to look at how this might develop over future years. However, as yet it has not done a wider analysis of risks and future understanding is still at an early stage, not being widespread through the city administration. It is beginning to recognise both paybacks from dealing with this risk, and also some opportunities to advance other priorities for the city as it responds to this risk. There is a lack of support from the organisation's leaders, however: despite there being some support from political leaders, this has not yet translated into clear policies and funded activities within the administration. This is causing increasing concern to the committed agents of change working on the programme, often on the edges of other, properly funded, roles, who are becoming increasingly unhappy about lack of support from above. They have begun professional consultation with the city's stakeholders, have begun to formulate training for staff and to formalise operational processes. A programme of activity across the city's activities has been developed and implementation has begun. However, lack of support is limiting further progress in all these areas. A particular strength, however, is the relationship with a local university, which provides a world-class resource potentially able to assist the city to move forward.

This city is far advanced from Klimatburg and is doing just the right things to embed the programme across the city administration. It could potentially to move on to evaluate and address future climate change impacts reasonably quickly – e.g. within a year. However, the major blockage in this programme is the very weak leadership support. While this lags so far behind the rest of the programme, other efforts are almost certain to be wasted. A coach can use information such as this to discuss longer term ambitions with city leaders and to help focus a detailed programme for the next period.

### c) Resilio: moving ahead as it responds to longer term climate risks



The final example (here called the City of Resilio) is amended slightly from the results of one of the furthest advanced cities. This is among the highest capacity organisations yet identified through PACT analysis. Its programme is very far advanced.

The city administration has a strong understanding of risks of future climate change for decades, in some cases even centuries, into the future. It fully understands the vital importance to the city of dealing with these risks, now and far into the future. Its leaders also appreciate this. However (as is often the case at this point in a programme’s development), they are having some difficulty in reconceiving what it means to be leaders as activity moves beyond the civic administration into the wider systems of which the city forms part and that need also to change to support the city’s programme for resilience. The city’s agents of change are already operating in this wider domain, however, very much seeing themselves as agents of transformation in response to a major threat. Stakeholder engagement is strong and the city is beginning to explore collaborative partnerships for change to address common threats. At the right of the chart, the city has quite outstanding expertise, leading programmes of research and informing and supporting other cities worldwide.

Three lagging areas need particular attention for the programme to realise its full potential. First, learning processes are weak. Even basic skills and awareness training is weak and there are not the reflective learning processes to identify more strategic blocks to change. The lack of these does not empower leaders with the strategic agenda on which they can best be used, therefore holding back the development of strategic leadership. Second, the programme is not yet fully embedded in management systems for operations, even in response to current risks: too much is being learned for the first time, perhaps even over and over again, but not formally embedded in procedures. Finally, the programme itself is not building on experience gained through learning processes, even within the organisation – a standard element of formal management systems – let alone in reaching out to wider changes in the city’s context.

These three areas most need attention, particularly learning processes. To the extent that it does address them, Resilio could realistically aspire very quickly to complete the transition to a very strong and integrated programme for resilience. However, unless it addresses them, the payback from investing in other areas is likely to be very limited.

A fuller analysis of the cities reviewed is presented below.

## Overall levels of capacity: insights from the survey of 196 cities

PACT results from the 21 cities that participated in the training events in greater detail give crucial insights into where improvement efforts can best be focused in particular cities and also more generally at differing levels of capacity. However, the 21 cities that participated in the training events were not selected at random and 21 is in any event small as a sample. These results cannot therefore be expected to give reliable insights into the number of European cities at each level of capacity.

Insights into this can be found by considering the wider population of 196 cities that expressed an interest in participating in the ASEC project<sup>10</sup> by completing a survey on preparing for climate change in their city. A particular self-assessment question within the PACT assessment has previously been shown to correlate with high statistical confidence to the externally-assessed PACT response level. It was therefore possible to use this question<sup>11</sup> in the initial quantitative survey to estimate capacity.

Self-assessments of capacity given by respondents from the 196 cities were as follows:

Self-assessment given by 196 survey respondents (1 = low, 5 = high)	Equivalent PACT RLs	Cities completing survey (n = 196)	% of respondents (cumulative %)
5 (Programme far advanced)	RL4 & RL5	3	1.5% (100%)
4 (Moving ahead of the field)	RL3 & RL4	11	5.6% (98.5%)
3 (Well on the way)	Working towards RL3	32	16.3% (92.9%)
1b and 2 (Not yet begun work – plans and Very early stages)	RL2	134	68.4% (76.6%)
1a (Not yet begun work – no plans)	RL1	16	8.2% (8.2%)

These are striking results:

- 77% of responses are indicative of organisations (e.g. Klimatburg) that are taking little or no action to prepare for current extreme weather (typical of possible early climate impacts), let alone to longer term climate change.

<sup>10</sup> It should, however, be recognised that results from the 196 cities would also be likely somewhat to overstate the state of capacity in European cities (because lower capacity cities would be less likely to participate in the survey).

<sup>11</sup> The wider survey of (196 responses) question compared to the PACT Response Levels:

Please select the one option that in your opinion best describes your city's current status on adaptation to climate change:

a) Not yet begun work on climate adaptation

If your city has not yet begun work on climate adaptation, are you planning to do so in the near future?

- Yes
- No

b) Very early stages

c) Well on the way

d) Moving ahead of the field

e) Our climate adaptation programme is far advanced

- A further 16% of responses are indicative of organisations (e.g. Adaptona) that are preparing for current extreme weather, but that have not begun seriously to engage with future climate change.
- Only 7% of responses are indicative of organisations that are engaging with future climate impacts. Resilio would be one such city (but most would be at far lower levels of capacity).

If we accept that cities will typically require high levels of capacity to avoid 'locking in' poorly adapted solutions in decision taking that impacts upon provision of important services, this therefore suggests that there may be a very great 'capacity gap' for adaptation in European cities.

## Detailed results from the PACT reviews of 21 cities

The 21 cities participating in the project self-assessed at somewhat higher levels of capacity, on average, than cities in the wider sample. This is not surprising, since selection procedures required potential participants to demonstrate willingness to develop their programmes and this would be more attractive to organisations seeking to move beyond PACT RL2. Nonetheless, the sample of 21 cities included all but the lowest level of self-assessment:

Self assessment given by 196 survey respondents (1 = low, 5 = high)	Cities completing survey (n = 196)	21 cities undertaking PACT reviews	'Training' cities / ('Peer' cities) (six of the 21 cities reviewed)
5 (Programme far advanced)	1.5%	0	0 / (0)
4 (Moving ahead of the field)	5.6%	4 (19%)	2 / (2)
3 (Well on the way)	16.3%	8 (38%)	4 / (4)
1b and 2 (Not yet begun work – plans and Very early stages)	68.4%	9 (43%)	9 / (0)
1a (Not yet begun work – no plans)	8.2%	0 (0%)	0 / (0)

The six peer cities clearly self-assessed considerably more critically than training cities – i.e. for the same self-assessment, all of the peer cities were considerably higher in capacity than all but one of the training cities.<sup>12</sup> However, two of these were much further ahead (they were amongst the highest scoring organisations yet reviewed through the PACT methodology). This led to four different groups eventually being selected for comparison through detailed PACT reviews:

- **Training: low:** A group of nine training cities self-assessing at 1 or 2 in the above table.
- **Training: medium:** A group of six training cities self-assessing at 3 or 4 in the above table.
- **Peer: medium-high:** A group of four more mainstream peer cities.
- **Peer: high:** Two considerably further advanced peer cities.

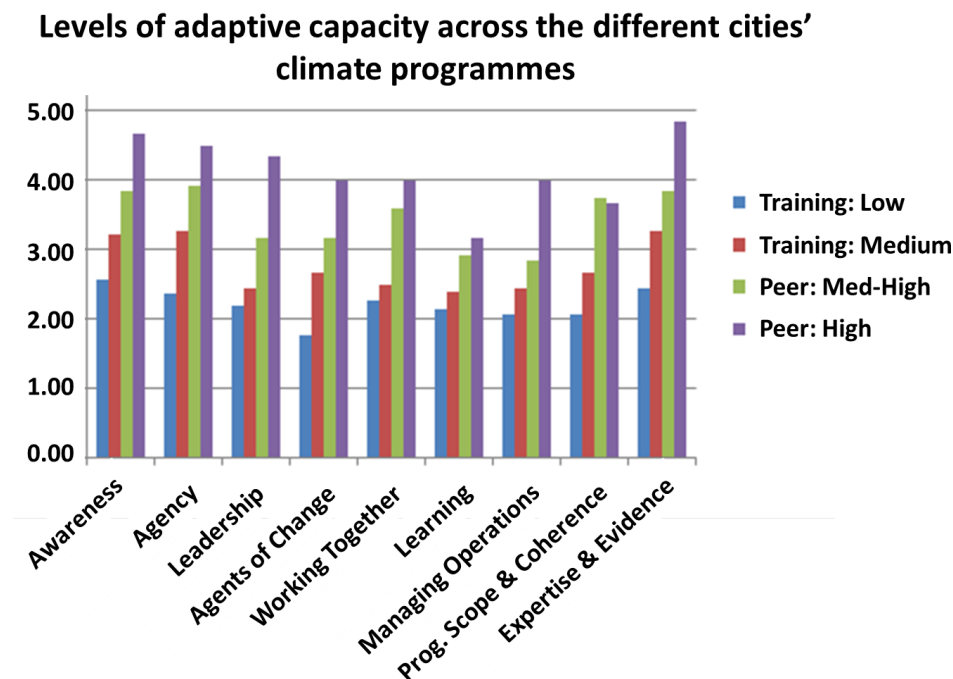
<sup>12</sup> The peer cities were selected for the workshops, and encouraged to participate in the survey, because their programmes were known to be further advanced than the average. They therefore cannot easily be incorporated into the above statistics. Were they to be included, we think it likely that the capacity of the 'training: medium' group would be slightly – but not significantly – higher than reported above.



The average PACT scores of these groups was as follows:

Group	Average PACT score <sup>13</sup> (min – max)	What does this imply?
<b>Training: low</b> (77% of main sample)	2.21 (1.78 – 2.67)	The majority of these cities are indeed at the very earliest stages of their programmes. None has yet established a solid programme to handle current climate impacts.
<b>Training: medium</b> (22% of main sample)	2.77 (2.07 – 3.22)	Only one of these cities has a solid programme to handle current climate impacts, others are close to doing so. One city is very significantly over-estimating its own capacity.
<b>Peer: medium-high</b>	3.44 (3.18 – 3.70)	All of these cities are taking action to prepare for future climate impacts, though generally for one or two impacts only. There are often significant gaps in their programmes.
<b>Peer: high</b>	4.13 (4.07 – 4.19)	While some gaps remain in their programmes, these cities are acting resolutely to prepare for likely future impacts. They could quickly develop capacity to lead wider programmes.

Here is a graph that shows the relative scores of each of these groups on the nine PACT pathways:



Lessons from this analysis are as follows:

- As cities' capacity improves, it does so consistently across all the nine PACT pathways (26 of 27 movements in the chart above are as predicted):
  - Improvement is clearly a question of doing things better across all of the capabilities represented by the PACT pathways: there is no one 'magic bullet' for raising capacity.

<sup>13</sup> These scores are an average of scores in each PACT pathway and do not take account of gaps in a programme. For instance, a city with performance that was either very strong or very weak on different pathways might score the same as another city that is more consistent – but the overall capacity would be greater in the second city.

- Some patterns are easily apparent:
  - At the lowest levels of capacity (Training: low), there is little to build on: these cities need considerable help and guidance. In general each of the pathways is little developed. However, many cities (5 of 9) scored at or below 2.0 on 'Agents of change', which is still less developed, implying that there is a serious shortage of motivated people who are prepared to act to promote and support change in the organisation. Finding, developing and supporting these people, those prepared to be the 'active few' in initiating and driving change, is likely to pay big dividends.
  - Awareness, expertise and 'agency' (understanding of the business case for adaptation) have developed more significantly at the next level (Training: medium), which means that less support is required in these areas to advance capacity. In other areas, the work is primarily that of developing a basic management programme. However, leadership support typically lags substantially. This is where support to improve capacity might usefully be targeted.
    - At this level of activity, leadership development involves policy development, delegation of responsibilities and some resources and periodic reviews of progress.
    - Even these further advanced cities do not yet engage systematically with future climate impacts and so lack the capacity to take long-lasting climate-impacted decisions with confidence.
  - Among the next group (Peer: medium-high), and despite there having been improvements, the human side of change remains underdeveloped (leadership, learning, agents of change), as does managing operations. 'Learning' and 'managing operations' are furthest below the level appropriate to managing a strong response to current impacts and are a considerable way behind the advanced levels needed to support more strategic activity.
    - Learning at these levels requires a systematic search for world-leading practice in whatever field and in whichever country it might be situated. It also requires systematic review of learning from experiments, since both success and 'failure' will offer significant insights into the task of transformation and into what holds it back.
    - Managing operations at this level involves structuring processes for innovation. This involves balancing ambitious experimentation with careful risk management, managing projects to allow innovation to occur.
  - At the highest level (Peer: high), numbers are very low and conclusions must be tentative. However, these cities show outstanding levels of awareness, agency and expertise; moreover, their formal leadership supports the adaptation programme, which suggests that it is indeed seen as crucial to the future of the city. In order to move forward, their programmes' focus needs to change towards leading activity across many organisations and on using insights from cross-organisational learning processes to direct and inform that programme. However, these aspects lag considerably: focusing on these would most accelerate progress.

## Insights from detailed statistical analysis

The 196 detailed responses from the wider survey and the detailed PACT reviews of 21 cities were analysed in depth to identify further insights relevant to capacity building. Data tables are presented at Appendix 1. These are the main findings, cross-referenced where appropriate to the relevant table or graph in Appendix 1:

1. Many cities that self-assess as having low capacity are undertaking major capital works that are likely to be impacted by climate change, or expect to undertake them within the next five years. Since capacity-raising to a sufficient level to recognise and adapt to possible impacts is likely to take more than five years when capacity is low, this means that significant social and financial damage may be expected unless capacity is raised significantly and quickly (Appendix Section A7).
2. Extrinsic drivers (in particular, pressure from national adaptation frameworks) are most commonly given as the reason for beginning an adaptation strategy by respondents from low capacity (self-assessed) cities. Intrinsic drivers (e.g. a vision of a sustainable city, even cost-benefits of adapting) become increasingly important as self-assessed capacity rises, while the extrinsic pressures become relatively less important (Appendix Section A6, Table A1.7).
  - a. This is consistent with other recent surveys<sup>14</sup>, which suggest that the adaptation journey more often begins when decision makers are told to begin it rather than autonomously; the benefits of acting are 'learned' through the process of acting.
3. There appears to be a positive correlation between the strength of the national framework for adaptation and respondents' self-assessment of the status of their programme. That is, the stronger the national framework, the higher, on average, the self-assessed programme status. The scoring of the framework in the analysis was necessarily relatively crude and the correlation is not definitive<sup>15</sup> but it is supported by experience from other studies. It therefore appears likely that interventions into the national adaptation framework, whether at national level or through European Framework type legislation, might be effective in supporting further developments in capacity. However, this appears to be an area where further work might be beneficial (Appendix Section A2, Table A1.2 and Figure A1.3).
4. Detailed analysis of the 21 PACT responses showed (a) that there was no discernable difference in the attention paid to the framework at different levels of (self-assessed) capacity and (b) that the national framework, rather than (say) the European or the regional or the organisational framework, appears to be the most likely to have an influence on city decision makers. The commercial framework (e.g. lenders' due diligence processes) is far and away the least likely to be monitored by city decision makers, but this may be because it has not yet been activated (Appendix Section A9.2).

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<sup>14</sup> Such as the PREPARE survey carried out on behalf of the UK's Department for Environment, Food and Rural Affairs  
[http://randd.defra.gov.uk/Document.aspx?Document=11256\\_PREPARECA0513Organisationaladaptivecapacity-Finalreport.pdf](http://randd.defra.gov.uk/Document.aspx?Document=11256_PREPARECA0513Organisationaladaptivecapacity-Finalreport.pdf)

<sup>15</sup> Spearman's rank coefficient = 0.637

5. Cities without an adaptation strategy, and with no plans to develop one (Group 1a) overwhelmingly report lack of budget as the main barrier to action (Appendix Table A1.8).
6. Results from the 21 cities that underwent PACT reviews show major differences between assessments of risk by service areas. Sewerage was the most assessed, but water supply, transportation and care of the elderly had received much less coverage (Appendix Section A9.2).
7. There is a high dependency on scientists from universities and from specialist consultancies to carry out risk assessments. It is only at the highest levels of (self-assessed) capacity that internal expertise begins to be developed. This shows the importance of funding of specialists to the development of an adaptation framework at whatever level it might operate (Appendix Section A8).
8. Most respondents reported some recent experience of extreme events in cities. There appears to be no significant correlation between respondents' reporting of extreme events affecting their cities and their self-assessments of cities' levels of capacity. This slightly differs from other recent surveys, which suggest that there might be such a correlation (Appendix Section A3).
9. However, there may be some positive correlation between self-assessed levels of capacity and expectations that impacts will increase over the next 30 years (Appendix Section A4 and Figure A1.6). This may not be a causal link, of course: cities with higher capacity will tend to have looked further into the future and with more rigorous methodologies.
  - a. This is an area that may benefit from further research.
10. Where cities had examined weather or climate risks at all, the level of information sharing on likely climate impacts was exactly the same among top managers as among political leaders.
11. Of the 21 cities that undertook PACT reviews, there was very little outright opposition from top managers (1 city) or from politicians (1 city – a different one). However, it appears that the level of support for an adaptation programme was perceived to be somewhat higher among political leaders (average 2.05 of 4.0) than among senior city managers (1.48 of 4.0).

## Experiences from working with 21 cities with their PACT analyses

1. Cities at different levels related to the PACT reviews differently:
  - Higher capacity cities (e.g. 'Resilio', but also 'medium-high' peer cities) began by probing and critically testing the framework but most of them quickly understood it and valued the insights that it offered.
    - The discussion of their needs was at a very advanced level and far beyond the level of discussion appropriate to or possible with lower capacity cities.
    - For several of them, this was one of the few times that they had received feedback and dialogue relevant to their advanced capacity.
    - One manager from one of the furthest advanced cities had incorporated PACT into his work within days of first receiving the report.
  - Medium capacity cities (e.g. 'Adaptona') typically took considerable care to understand the content of the reports and asked very detailed questions about what they needed to do next.
  - Low capacity cities (e.g. 'Klimatburg') found the reports harder to understand. Our conclusion was that the style of reporting might have been over-engineered for cities at

the very beginning of their progress on adaptation and that simple checklists might have been easier for them to understand.

- A minority of cities (about 20%) did not engage with the reports in any detail. These were spread across different levels of capacity – high, medium and low.
2. We found that lower and medium capacity cities did not realise the extent of the adaptation challenge that they faced in addressing the longer term impacts that might occur within the lifetime of longer term decisions – e.g. infrastructure decisions. The need for high capacity needed to be spelled out more clearly in the reports.
    - The appreciative style of the PACT reports may be partly responsible: these aim to identify what a city is doing well and to build on it. While the reports also emphasise the overall challenge of change, some rebalancing of emphasis may be appropriate.
  3. Cities were specifically encouraged to challenge any inaccuracies in the reports. Some minor changes were reported but these were agreed not to change overall conclusions.
  4. Only one of 21 cities challenged the results of its review more significantly (on the basis that its programme seemed to them to be further advanced than had been indicated by the PACT review). However, the report was consistent with the self-assessment given by the city's managers and they were not able to identify any activity that had been incorrectly assessed.
    - We therefore concluded that the report on the status of the city might possibly have been seen (incorrectly) as criticising the work done by the committed change agents who had undertaken work in the city.
  5. The reports enabled the attention of coaches to be directed to problem areas.

## Conclusions from the wider 196 cities

This survey of capacity in 196 cities to adapt to current extreme weather and to future climate change is, we believe, the largest carried out of any group of relatively similar organisations. Our conclusions are as follows:

1. The great majority of European cities (significantly in excess of 90%) have insufficient capacity to take long-lasting and potentially climate-impacted decisions with confidence that important economic, social and ecological objectives will be achieved. Most cities take many such decisions, which therefore present a significant risk until the capacity gap is closed.
2. In these cities, support is most needed where major decisions with long lifetimes are being taken:
  - a. Particularly amongst the 77% with 'low' or 'very low' capacity, but also more generally, the capacity gap is sufficiently wide that autonomous improvements are extremely unlikely to close it sufficiently quickly to impact upon the decisions.
  - b. The ability of low and very low capacity cities even to identify the particular decisions they are taking that need to take account of a changing climate is low.
  - c. Even where lower capacity cities recognise which decisions might be impacted, their capacity to deal with them is insufficient.
3. Capacity-raising is therefore an appropriate and important goal for policy makers at all administrative levels involved in responses to climate change. The nature of the support that is required will vary by country (depending for instance on the status of national adaptation programmes), as well as by the internal capacity of the cities themselves.

4. Effective use of public resources for capacity raising requires both the identification of upcoming decisions (typically within a three years horizon) that are particularly vulnerable to present or future climate impacts, plus identification of the capacity of people involved in those decisions to take them with due regard to climate.
5. Moving cities from inaction to initial action requires very clear direction and pressure to act (e.g. incentives or penalties) followed by continued pressure but also support to sustain action (e.g. through guidance and regulation).
  - a. Having a strong external framework for adaptation, most likely (but not necessarily) at national level, is crucial in stimulating initial adaptation in cities.
  - b. Support in identifying and developing internal change agents or 'champions' is likely to be particularly helpful in low capacity cities.
  - c. Cities with low capacity very rarely have the expertise in house to assess future and often even current extreme weather risks. Complex future scenarios are unlikely to be helpful to them. These cities either need external support to be commissioned on their behalf (e.g. from expert consultancies or research centres) or need step by step and easy to follow guidance as to risks and how to assess them. Alternatively, and where feasible, decisions should be delayed until appropriate capacity is available.
6. As cities move beyond initial action and begin to establish a solid programme of action to address current extreme weather impacts, their programmes require less external direction; however, continuing external pressure remains important. Internal managers and change agents require support with professionalising – e.g. with peer-to-peer learning processes, with benchmarking, with management systems support and standards, etc.
7. As cities begin to reach the capacity to take potential longer term climate impacts into account, their programmes become increasingly autonomous. However, they appear also to need support to run programmes across multiple organisations, with processes of innovation, and especially with advanced learning processes.
8. A few rare cities have high capacity, approaching the levels required to handle significant resilience programmes. There is also a small but important nucleus of others that could reach similarly high capacity quite quickly (i.e. within two years) if given appropriate focused support. These cities could provide a potentially vital resource to support capacity building both within and between cities.





## Appendix 1

### A1. Introduction to the survey results

Grouping of the survey results by the self-assessment levels 1 through 5 (as set out in Table A1.1) has allowed detailed interrogation of the data.

Self assessment given by 196 survey respondents (1 = low, 5 = high)	Equivalent PACT RLs	Cities completing survey (n = 196)	% of respondents (cumulative %)
5 (Programme far advanced)	RL4 & RL5	3	1.5% (100%)
4 (Moving ahead of the field)	RL3 & RL4	11	5.6% (98.5%)
3 (Well on the way)	Working towards RL3	32	16.3% (92.9%)
1b and 2 (Not yet begun work – plans and Very early stages)	RL2	134	68.4% (76.6%)
1a (Not yet begun work – no plans)	RL1	16	8.2% (8.2%)

**Table A1.1 Comparison of survey self-assessment groups and PACT Response Level (RLs)**

This appendix sets out the results and accompanying analysis as referred to in the main body of the report, split by 6 themes that provide evidence to test a range of hypotheses about the self-assessment groups and corresponding PACT Response Levels (RLs). The conclusions of which, are in the main report and bring the key findings together from this wider assessment of adaptive capacity across European cities.

#### A1.1 Data limitations

There are limitations of the data, showing over-representation by Greece which could be skewing the results. This limitation is because of how the survey data was collected. This was carried out by email invite via the different ICLEI and consortium networks. This meant each European city was not invited separately, potentially resulting in more than one response from a single city. However this is not likely to be a significant factor likely to distort the analysis.

On further investigation, the overall impact of the high numbers responding from Greece is low (compared to population) because there is under-representation of other southern and eastern European countries.

Two Greek cities were part of the wider 48 applications for the 21 places in the EU Cities Adapt project. However, they did not get offered a place due to not being able to fully commit to the time required by the project. It should also be noted that previous work by ICLEI on local adaptation training in Greece will likely have influenced the response rate from Greece as an obvious follow on project for them to try and get involved.

In terms of drawing conclusions from the survey self-assessment groups 1-5, groups 1a (n.16) and 5 (n.3) are less robust due to the numbers in those groups, especially the group with the highest adaptive capacity, group 5. However, one would expect the number of people responding to the survey in these groups to be of a lower number than groups 1b and 2, 3, 4 for two very different reasons. For Group 1a,

the lowest capacity group that have not started nor are planning on doing any work on adaptation to climate change, have little to gain from completing the survey itself. Conversely, there are currently very few organisations with the highest level of adaptive capacity globally.

## **A2. Influence of a national adaptation framework**

Cities from twenty EU member states completed the survey (see Table A1.2). Of the 196 responses the highest number of responses was from Greece (52 out of 196) (see section A1.1 for the limitations of over-representation), followed by Italy and the UK (with 25 and 24 responses each)). Responses from cities were not received from seven EU Member States including Austria, Cyprus, Czech Republic, Latvia, Luxembourg, Malta and Slovenia.

The data points in the plot (Figure A1.3) show there may be some correlation between a city's adaptive capacity and the quality and existence of a national adaptation framework. However, the relatively small number of data points in the study makes it difficult to say definitively whether the correlation is significant or not. The data was used to calculate a Spearman's rank correlation coefficient of 0.637, showing there is some certainly some potential correlation and that a national framework appears to be a positive influence on cities making progress on adaptation. Further work into this relationship would be useful.

**Table A1.2 Country coverage of survey respondents, their National adaptation framework score, ranked by their weighted average capacity level.**

Countries	Total city count by country	National Adaptation Framework score*	Weighted average capacity level	Country rank on capacity level
Ireland	1	2.5	4.00	1
Denmark	6	3	3.83	2
Netherlands	5	3	3.20	3
Portugal	2	1.5	3.00	4
Spain	8	3	3.00	5
Hungary	3	3	2.67	6
United Kingdom	23	3	2.43	7
Germany	5	3	2.40	8
France	10	3	2.30	9
Belgium	11	3	2.27	10
Finland	6	3	2.17	11
Italy	24	2	2.17	12
Bulgaria	7	1.5	2.00	13
Estonia	2	1	2.00	14
Lithuania	2	2.5	2.00	15
Romania	8	1.5	2.00	16
Slovakia	3	0.5	2.00	17
Greece	52	2	1.85	18
Poland	2	1	1.50	19
Austria	0	-	-	-
Cyprus	0	-	-	-
Czech Republic	0	-	-	-
Latvia	0	-	-	-
Luxembourg	0	-	-	-
Malta	0	-	-	-
Slovenia	0	-	-	-
Sweden	10	-	-	-

**Key to table**

\* Score given from

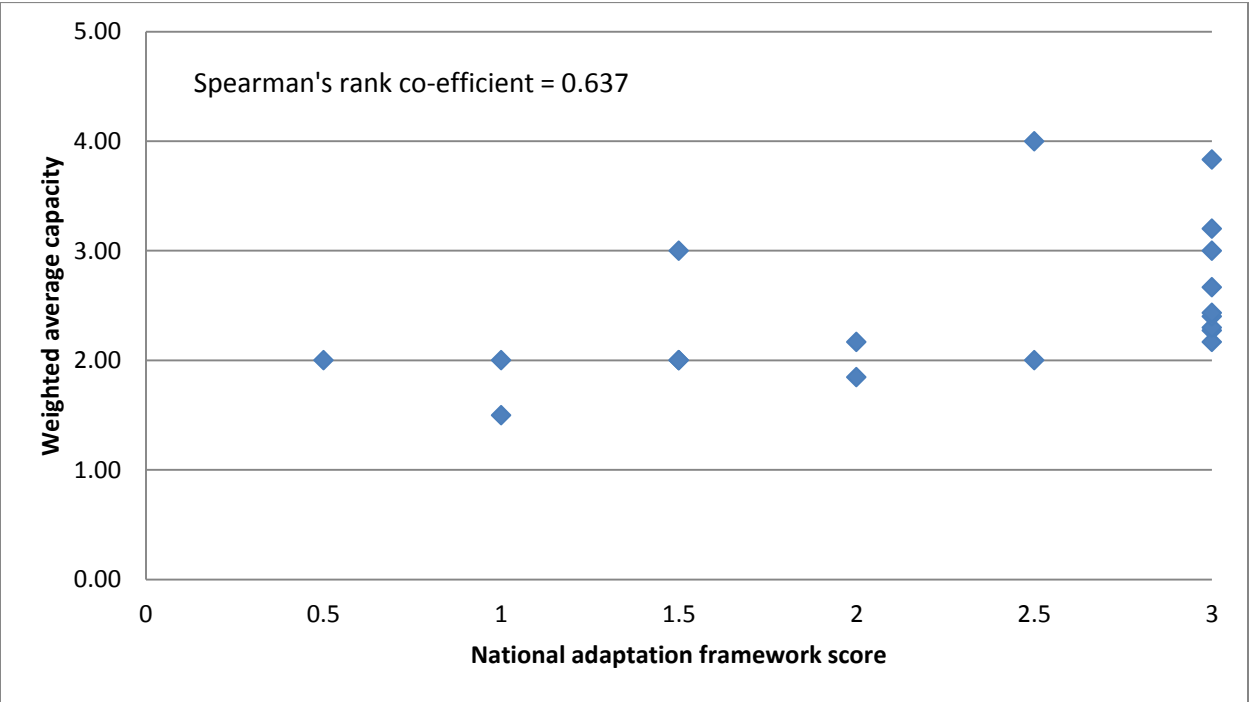
- 0=no/planned
- 0.5=being developed
- 1=adopted

For 3 categories that show evidence of a national adaptation framework:

- National adaptation strategy
- National adaptation action plan
- National adaptation research programme

Evidence taken from [Climate-ADAPT](#)

Figure A1.3 Link between weighted average city adaptive capacity score by country and the strength of national frameworks



### **A3 Experience of past extreme events**

The majority of all respondents across all the adaptive capacity groups have experienced periods of very hot weather or heatwaves and periods of extreme cold. Over 70% of each group have also experienced flooding from very heavy rainfall. Both the disaggregated results for a range of hazards and the average (Table A1.5) show that experience of past events does not lead to an increase in adaptation preparedness.

**Table A1.5 Evidence relating to weather and climate-related hazards and/or extreme events that occurred in the respondent’s city over the past 30 years**

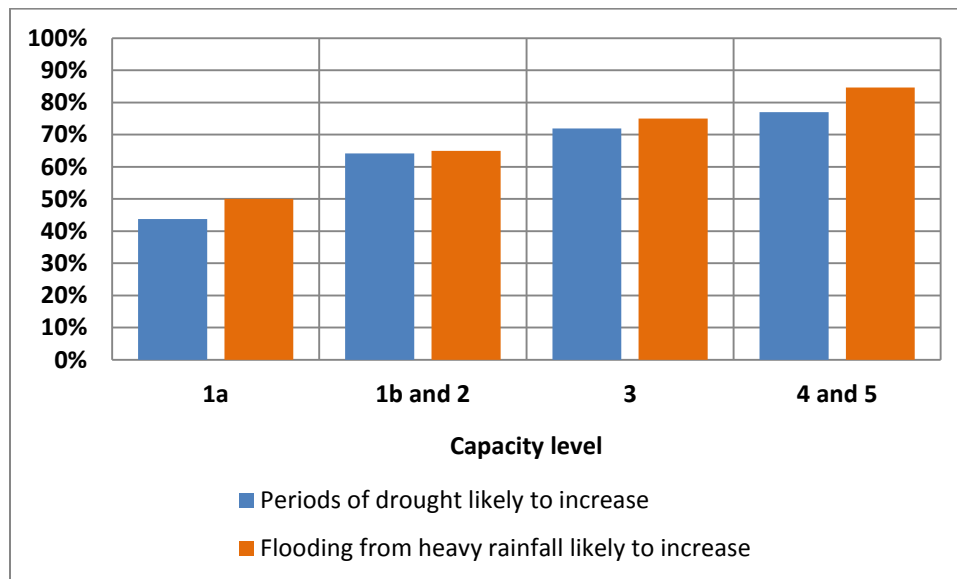
Requested records for each group	Survey self-assessment (1 = low, 5 = high)									
	1a		1b and 2		3		4		5	
<u>Past extreme events</u>	Count	%	Count	%	Count	%	Count	%	Count	%
<b>Average across all past extreme events</b>										
Yes	7	42%	59	42%	13	41%	5	45%	1	39%
No	7	44%	54	40%	15	46%	5	45%	1	19%
Don't know	1	4%	7	5%	2	5%	0	3%	0	8%

N.B. Please note each does not add up to group totals - as the question was “select all that apply”.

#### A4. Expectations of future climatic events

For two of the climate hazards (droughts and riverine floods) expected to increase in the future and applicable to the whole of Europe, the survey results show there may be some positive correlation between increasing capacity level and cities expecting periods of drought and flooding to increase in the next 30 years, but more work needs to be done on causality.

**Figure A1.6 Evidence relating to weather and climate-related hazards and/or extreme events that are expected by the respondent's to occur in their city over the next 30 years**



#### A5. Risk of regeneration plans that do not account for climate change

A very high proportion of respondents from the lower levels of capacity anticipated major regeneration plans within the next 5 years. This is very risky as these plans are not likely to take climate change into consideration in time as they are happening now and the cities in this group of 150 are either have no plans to begin work on adaptation or are in the very early stages. For example:

- 99 out of 150 respondents across both Groups 1 and 2 are aware of major urban regeneration plans – but these won't include consideration of climate change.
- 91 out of 150 respondents know about major water infrastructure investment taking place now, but again a consideration of climate change is highly unlikely given the stage the cities are at in their adaptation planning.

44% of the lowest capacity Group 1a foresees sewage investment plans in the next 5 years. This compares with lower levels of between 6% and 25% across urban, water and industrial investment. Here a new EU directive on waste water treatment may be responsible; if this is influencing the results



then any major EU investment will require an EIA which covers climate change with supplementary guidance. This provides a potential opportunity for a 'framework' type intervention.

#### **A6. Reasons for / for no city adaptation strategies**

Survey respondents were asked to select the main reasons for developing an adaptation strategy. There is a downward trend across the capacity self-assessment groups 1-5 for 'National/regional government requirement or recommendation' – here it is likely that those at the higher end of the capacity scale no longer see this as the main driver, but it may have been at the start of their adaptation journey. There is an upward trend as capacity increases for 'vision of a sustainable city', which shows that as capacity rises, adaptation to climate change becomes increasingly integrated with other policy objectives (Table A1.7).

49% of survey respondents who are just getting started on adaptation (Group 1b and 2), state that there is a lack of national and or regional government requirement or recommendation for developing an city-level adaptation strategy. This has identified a large policy gap across many EU countries. This also links back to the influence of a national adaptation framework in section A2 (Table A1.7).

Those respondents with no adaptation strategy planned (Group 1a) were asked to outline the main reasons for this (Table A1.8). The main reason was linked to budget, 88% stated that a lack of budget or resources was the main reason for not having or planning a city adaptation strategy. Conversely, lack of agreement on the responsibility at city department level for an adaptation strategy was considered not as important (13%).

**Table A1.7 Main reasons for Groups 1b-5 for developing an adaptation strategy**

Requested records for each group	Total count	Rank order of importance across all self-assessment groups	Survey self-assessment (1 = low, 5 = high)									
			1a		1b and 2		3		4		5	
Main reasons			Count	%	Count	%	Count	%	Count	%	Count	%
Vision of a sustainable city	146	1st	N/A	N/A	102	76%	30	94%	11	100%	3	100%
Objective to improve the quality of life for citizens	121	2nd	N/A	N/A	88	66%	23	72%	8	73%	2	67%
National / Regional government requirement or recommendation	80	3rd	N/A	N/A	65	49%	12	38%	3	27%	0	0%
Exposure to extreme weather	76	4th	N/A	N/A	53	40%	17	53%	5	45%	1	33%
Cost of business as usual versus action now	59	5th	N/A	N/A	40	30%	12	38%	5	45%	2	67%
Other	10	6th	N/A	N/A	9	7%	1	3%	0	0%	0	0%

**Table A1.8 Main reasons for Group 1a not having a city adaptation strategy**

Requested records	Survey self-assessment (1 = low, 5 = high)
	1a
Main reasons	% (n=16)
Lack of budget or resources	88%
Lack of regional tools	69%
Lack of political commitment	56%
Lack of regional guidance	56%
Lack of national tools	56%
Lack of national guidance	50%
Lack of urban guidance	50%
Lack of urban tools	50%
Lack of regional climate data/projections	50%
Lack of local climate data/projections	50%
Lack of skills and expertise in the area	44%
Other policy priorities	38%
Uncertainty on where to start	38%
Lack of national climate data/projections	31%
Lack of legal obligation	25%
Lack of agreement on the responsibility at city department level	13%
Other	0%

## A7. Assessing risks over longer timescales

On average, those cities getting started on adaptation but still at the lower end of the capacity scale are predominantly looking at risk assessments over the next 10 years, or have no risk assessment planned (both 19% of Group 1b and 2) and are not looking 50 years into the future (Table A1.10). For example across the different risk assessment categories for those getting started on adaptation:

- Buildings – 24% no risk assessment foreseen and the highest proportion don't know if there are building risk assessments planned (34%).
- Health – 16% are looking at up to 10 years, with no 50+ year assessment.
- Infrastructure and energy - the majority (22%) are undertaking risk assessment between 0 and 10 years.
- Water and sewage - the majority (44%) are undertaking risk assessment between 0 and 10 years.
- Biodiversity – 25% of respondents are planning risk assessment in the future.
- Industry – 43% don't know if there are risk assessments planned for industrial development.

Risk assessments that look 30 or 50+ years into the future are more common in the highest capacity group (Group 5) as you would expect.

## A8. Resources for such risk assessments

The sources and expertise used to help undertake these risk assessments in section A7 across the different capacity groups show that for a high proportion across all groups, specially commissioned scientists/universities followed by specialist consultancies are used, and this increases in trend towards the cities in the higher capacity groups. At the higher capacity levels more in-house experts are available to undertake the risk assessments and higher the cities are in capacity the more approaches they use.

## A9. Further analysis from the PACT assessment from the 21 cities

### A9.1 How does attention to the framework differ by different capacity levels?

The PACT reviews of 21 cities showed that there does not appear to be a systematic correlation between (self-assessed) capacity and the level of attention paid to the overall adaptation framework:

<b>Self-scored capacity:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
No of cities	2	7	8	4
Average framework score (max = 1.0)	0.4375	0.327	0.453	0.333

(Scores reflect the likelihood of account being fully taken of current and of potential future developments in the framework).

However, the data also demonstrate clearly that the national framework appears to be most influential, and the commercial framework (e.g. project due diligence procedures) the least influential, to city decision takers. However, this might of course be a consequence of the latter being relatively much less developed at present.

<b>Self-scored capacity:</b>	
European framework (e.g. legislation)	0.429
National-level framework (e.g. legislation)	0.512
Regional framework (e.g. spatial plans)	0.345
Local framework (e.g. local plans or policies)	0.429
Organisational framework (e.g. policies at city level)	0.417
Commercial framework (e.g. financial due diligence rules)	0.190
Overall average	0.387

## A9.2. Analysis of risks by service area

The PACT analysis of 21 cities looked at the extent to which risks had been analysed by service area. Not all cities carry out the same services, so the data were adjusted to take account of this. Responsibility for services is also discharged in different ways. For example it may be carried out directly, or subcontracted, or the city may have a consultative role. Alternatively, it may have no role at all. The latter were therefore excluded from the analysis, even though cities might, in their role as civic leaders, be expected to take a role on behalf of citizens.

Risk assessments also vary in rigour and scope. For instance, they might cover all types of risk in depth (e.g. flooding, heat, etc) or might be very preliminary and cover only a single risk. For this analysis, we weighted the results accordingly but took no account of the duration of the risk analysis (e.g. whether it covered only current weather risks or looked at future climate risks).

The results show major differences between service areas. Sewerage was the most assessed, but water supply, transportation and care of the elderly had received much less coverage:

<b>Service areas</b>	<b>Number of cities with responsibility (delegated or delivery) or with consultative role</b>	<b>% having undertaken some form of risk analysis</b>
Buildings	20	39%
Water supply	19	24%
Sewerage	20	60%
Energy	10	38%
Transportation	17	25%
Care of the elderly	18	25%
Urban green areas and biodiversity	21	36%