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C40 CITY CAP REVIEW CITY OF STOCKHOLM



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1. EXECUTIVE OVERVIEW

This report provides a review of the City of Stockholm's Climate Action Planning (CAP) activities. Undertaking a Climate Action Plan Review against C40's Climate Action Planning Framework (CAPF) has established the compatibility of a City's CAP with the goals of the COP21 Paris Agreement. In the CAPF, compatibility is measured across three pillars, each of which consists of themes, which can be divided into categories and further sub-categories. These categories and subcategories are described in terms of: 'Essential Practice' and 'Go Further/Best Practice' elements. 'Essential Practice' denotes suitably compatible action in an area that has been deemed as an absolutely necessary component of a fully Paris Agreement Compliant City Climate Action Plan (CAP). Cities which go above and beyond 'Essential Practice' in specific areas are able to demonstrate 'Go further/Best Practice' strategies, which should serve as case studies and exemplary examples for other cities.

- **Pillar 1: Commitment & Collaboration** focuses on the governance and coordination of the Plan, including relationships with national policy and city powers, as well as planning for community and business engagement throughout the Plan's development and delivery.
- **Pillar 2: Challenges & Opportunities** considers the evidence base and existing city conditions, including: emissions baseline, 2050 trajectory, climate risk and socio-economic priorities.
- **Pillar 3: Acceleration & Implementation** defines the transformational action and implementation plan, including monitoring processes and communications.

A review of Stockholm's documentation and actions demonstrates comprehensive and robust actions and processes, which align with the vast majority of the essential requirements of the CAP framework. In addition, many of these actions demonstrate the determination to act beyond the essential requirements and qualify as stand-out examples. These examples highlight an exceptionally strong commitment to act on climate change through a collaborative process with relevant stakeholders. Therefore, several of Stockholm's CAP processes can be regarded to be 'Go Further/Best Practice' examples.

Across Stockholm's C40 CAPF, all actions achieved 'Essential Practice,' with a number of actions going further to achieve 'Best Practice' elements based on information/documentation provided and discussion with the City.

2. INTRODUCTION

2.1 C40 Climate Action Planning Framework

As part of an effort to lead the way on a response to climate change, C40 has conducted extensive research and undertaken a process to develop a roadmap to evaluate member cities' progress in achieving targets in accordance with the COP21 Paris agreement talks. This work, based on *Deadline 2020* (C40, 2016), presents a detailed pathway of what C40 cities need to do to play their part in converting the COP21 Paris Agreement from aspiration into reality. It represents:

The first and significant route map for achieving the Paris Agreement, outlining the pace, scale and prioritization of action needed by C40 member cities over the next 5 years and beyond. Deadline 2020 is committed to keeping the global average temperature below 2 degrees above pre-industrial levels, whilst aiming at limiting the temperature increase to 1.5 degrees above pre-industrial levels. (Deadline 2020)

Building on the *Deadline 2020*, and through an iterative process with member cities, partner organisations and external stakeholders, C40 has developed a *Climate Action Planning Framework (CAPF)* which outlines the essential components of a Climate Action Plan. The CAP is one that will satisfy the goals of the *Paris Climate Agreement (2015)*. The tool provides support and guidance in the development and review of a city's climate action plan. The Framework gives an overview of actions and measures which are essential to achieving a robust and transformative climate change response and effort within a city. High level components of the CAPF are listed below:

C40 Climate Action Planning Framework essential components

- **Pathways Approach** - Developing a pathway to deliver an emissions neutral city by 2050 at the latest, and set an ambitious interim target.
- **Resilience** - Demonstrating how the city will adapt and improve its resilience to climate hazards that may impact the city now, and in future climate scenarios.
- **Wider benefits** - Outlining the wider social, environmental and economic benefits derived from implementing the plan, and improve the accessibility to these benefits by the city's population.
- **Governance** - Outlining the city's governance, powers and the partners who need to be engaged to accelerate the delivery of the city's mitigation targets and resilience goals.
- **Integration** - Considering mitigation and adaptation in an integrated way, identifying interdependencies to maximize efficiencies and minimize investment risk.
- **Evidence-based** - Setting an evidence-based, inclusive and deliverable plan for achieving mitigation and adaptation centred on an understanding of the city's powers, influence and wider context.
- **Monitoring & Evaluation** - Establishing processes to monitor progress, evaluate achievements and refresh climate action planning in line with governance and reporting systems.

(Extracted from C40 documentation on CAPF by Ramboll)

The findings within this Report are intended to highlight the progress that Stockholm has achieved thus far in its efforts to align with stated goals of carbon neutrality by 2050, as well as measures taken to address adaptation in light of new environmental conditions related to a changing climate. Each of the elements within the CAPF have been identified by C40 as necessary components of a robust and effective city climate action plan. It is therefore the goal of this evaluation to ensure that cities are able to achieve this essential practice outcome in order to implement effective CAPs which align with the Paris Agreement and *Deadline 2020* measures.

The pillars and categories below serve as guidance on how to strengthen climate action plans in current or future iterations.

Table 1: The C40 CAPF

Pillars	Themes	Categories	Compatibility Areas/Questions
Commitment & Collaboration (8)	1.1 Governance & Coordination (8)	1.1.1 Political commitment 1.1.2 Resources 1.1.3 Policy Coordination 1.1.4 Inclusive Targets	<ul style="list-style-type: none"> • 1.1.1(a) Political commitment • 1.1.1 (b) Stakeholder engagement • 1.1.2 Budget & resources • 1.1.3(a) Local regulation and laws integration • 1.1.13(b) Regional regulation and laws integration • 1.1.4(a) Emissions Targets & Milestone • 1.1.4(b) Resilient City Goals & Milestones • 1.1.4(c) Inclusive action and benefits
Challenges & opportunities (10)	2.1 City baseline (5)	2.1.1 City Context 2.1.2 City Management & Powers 2.1.3 Actions Baseline	<ul style="list-style-type: none"> • 2.1.1(a) CAP activity assessment • 2.1.1(b) City contextual data and the CAP • 2.1.2(a) City structure, roles & responsibilities • 2.1.2(b) Evaluation of city powers • 2.1.3 Inventory of City actions
	2.2 Emission Baseline (3)	2.2.1 GHG Inventory 2.2.2 GHG Trajectories	<ul style="list-style-type: none"> • 2.2.1 Published GHG Inventory • 2.2.2(a) GHG BAU Trajectory • 2.2.2(b) Future Trajectory
	2.3 Hazards Risks & Impacts baseline (2)	2.3.1 Climate Risk Assessment	<ul style="list-style-type: none"> • 2.3.1(a) Climate Hazard risk assessment • 2.3.1 (b) Climate Impact assessment
Acceleration & Implementation (13)	3.1 Action (6)	3.1.1 Climate Actions (mitigation & adaptation) 3.1.2 Residual Emissions 3.1.3 Action benefits	<ul style="list-style-type: none"> • 3.1.1(a) CAP actions & costs • 3.1.1(b) Transformative CAP actions • 3.1.1(c) Transparent prioritisation method • 3.1.2 Transparent method for residual emissions & offsetting • 3.1.3(a) Mapped other benefits • 3.1.3(b) Assessment of equity distribution
	3.2 Implementation (3)	3.2.1 Action ownership 3.2.2 Delivery timescales 3.2.3 Overcoming Challenges	<ul style="list-style-type: none"> • 3.2.1 Identification action ownership • 3.2.2 Project delivery timelines • 3.3.3 Risk mapping
	3.3 Monitoring, Communication & Evaluation (4)	3.3.1 Monitoring, reporting, evaluation & revision	<ul style="list-style-type: none"> • 3.3.1(a) Monitoring & reporting plan • 3.3.1(b) Evaluation plan • 3.3.1(c) Revision of CAP • 3.3.2 Communication & media plan

2.2 The CAPF Compatibility Review

Ramboll have undertaken a five-step city CAP review process with the City for compatibility with the C40 CAPF and the 2015 Paris Agreement as set out in Table 2 below. A *Compatibility Spreadsheet* has been developed to collate information on the categories and subcategories in the C40 CAPF. The completed Compatibility Spreadsheet for the City (as at March 2018) is attached at Appendix 2.

This Review was undertaken for the City of Stockholm (The City) between February and April 2018, and is representative of documentation and processes available at that time of completion of the review process in April 2018. Björn Hugosson, Head of the Stockholm City Climate Unit, Strategic Urban Development Department and Linda Holmström, Policy Advisor within the Stockholm Climate Unit, Strategic Urban Development Department were the City contacts for the Review, and attended the initial City review meeting. Michael Doust (C40), Indra Levite (C40), Stella Whittaker (Ramboll), David Hoffmann (Ramboll) and Ylva Frithiofson (Ramboll) undertook the Review.

Table 2: City CAP Review Steps

Documentation Review	<ul style="list-style-type: none"> • City documentation received from C40 • Initial Scan of documents • Presence or absence of required documentation noted in Compatibility Spreadsheet (CS) • Second scan of documents • Full details of response to <i>Compatibility Questions</i>, with document reference noted in CS (links and references included) • Hard copy document pages labelled • Potential gaps noted in CS
First Review Meeting with City	<ul style="list-style-type: none"> • Mid-way Ramboll internal CAP review group meeting to oversee document scan. Discuss with C40 any missing documentation or ambiguous materials and/or compatible areas. • Contact/meet with cities to ensure that the Review Team have all necessary documents, nothing is outstanding. Also use this communication to ask any questions identified in the initial scan which would help with gaps analysis of the cities. • Presentation of scan results and SC to City – identification of potential gaps and advice to City on actions to fill gaps • Opportunity for additional input for City to address gaps • Additional documentation provided by The City • Finalisation of documentation analysis
Compatibility Spreadsheet Revisions	<ul style="list-style-type: none"> • Second Ramboll internal CAP review group meeting to oversee document scan results • Meeting with C40 to discuss scan and results • Ramboll first revisions to CS • Draft City Repot
Finalisation of City CAP Review Report and Compatibility Spreadsheet	<ul style="list-style-type: none"> • Finalisation of City CAP Review Report and City Compatibility Spreadsheet
Final City Meeting	<ul style="list-style-type: none"> • City meeting to review Final Report and outcomes • Opportunity to review findings and raise any outstanding issues • Go over final process with the City to discuss final results and findings

3. HIGHLIGHTS OF CITY CAP

Stockholm has a relatively long history of work in the climate change and environmental space. The City's first comprehensive environmental program was adopted in 1976, and Stockholm has released regular programs ever since. In 1996, before many other cities and countries were focused on the issue of implementing carbon reduction schemes, Stockholm's Environmental and Health Protection Administration began to formulate an initial action plan for the environmental program to include emissions reductions. This plan was submitted to ruling bodies and city public sector companies and departments in 1997, and in 1998, Stockholm formally adopted its first action plan to reduce greenhouse gases (*The Action Plan Against Greenhouse Gases 1997-2000*).

The ninth *Stockholm Environmental Program* was released in 2016, and covers 2016-2019. The tenth *Stockholm Environmental Program* is currently in development, and will be released in 2020, to cover the next election cycle period until 2023.

As it currently stands, there are a range of documents which together form the basis for the Stockholm Climate Action Plan. The *Stockholm Environmental Program* covers a range of identified City sectors, targets, actions, responsibilities, and outlines the process needed to implement actions and achieve targets.

The *Comprehensive Plan for the City of Stockholm* outlines demographics and statistics for the City, along with planning and development strategy. This aligns with Stockholm's *Vision 2040*, a four-part strategy for focusing on growth, development, sustainability and livability, with the ultimate objective of *A Stockholm for Everyone*. Eco-Smart Stockholm is a key component of this strategy, and encompasses work around climate mitigation and adaptation actions within the City.

Additional documentation, including annually published *Reporting of Energy Consumption and Greenhouse Gas Emissions* and *Waste Management Plan for Stockholm 2017-2020* provide information on progress around mitigation actions thus far, with strategy and targets for future actions. *City-wide Risk and Vulnerability for the City of Stockholm (2010)*, *Climate Adaptation Process (2015)* and *Climate Adaptation in Stockholm (2017)*, outline climate adaptation actions and priorities.

Meanwhile, *Strategy for a Fossil-Fuel Free Stockholm 2040 (2016)* and *Stockholm Path to Fossil-Fuel Free (2018)* break down the strategy for what actions need to be achieved to hit the fossil-fuel free target, with the *Budget 2018-2020* providing information on resource allocation, government responsibility and administrative oversight for the implementation of these actions.

City collaborative programs, such as *Climate Pact*, which was established in 2007 as a collaboration between the City and private/industrial sector, are also essential elements to achieving the CAP goals. There has been consistent growth and adoption of this work, as demonstrated by the fact that the *Climate Pact* began with seven companies signing on to work with Stockholm on climate efforts. The current number of companies participating in *Climate Pact* at the publishing of this report was 236.

RESULTS OF REVIEW

3.1 Explanation of the outcomes process

To give a graphic representation of each city's progress, the Review Team (Ramboll) developed a diagram outlining progress achieved against each of the sub-categories by pillar. Each category and sub-category was carefully identified through a process of dialogue and analysis as being necessary to have in a robust and effective city Climate Action Plan. The dialogue has been with the review team comprising the City, C40 and Ramboll.

The city's CAP had been assessed against the categories of the CAPF using the following layers as indicators of compatibility:

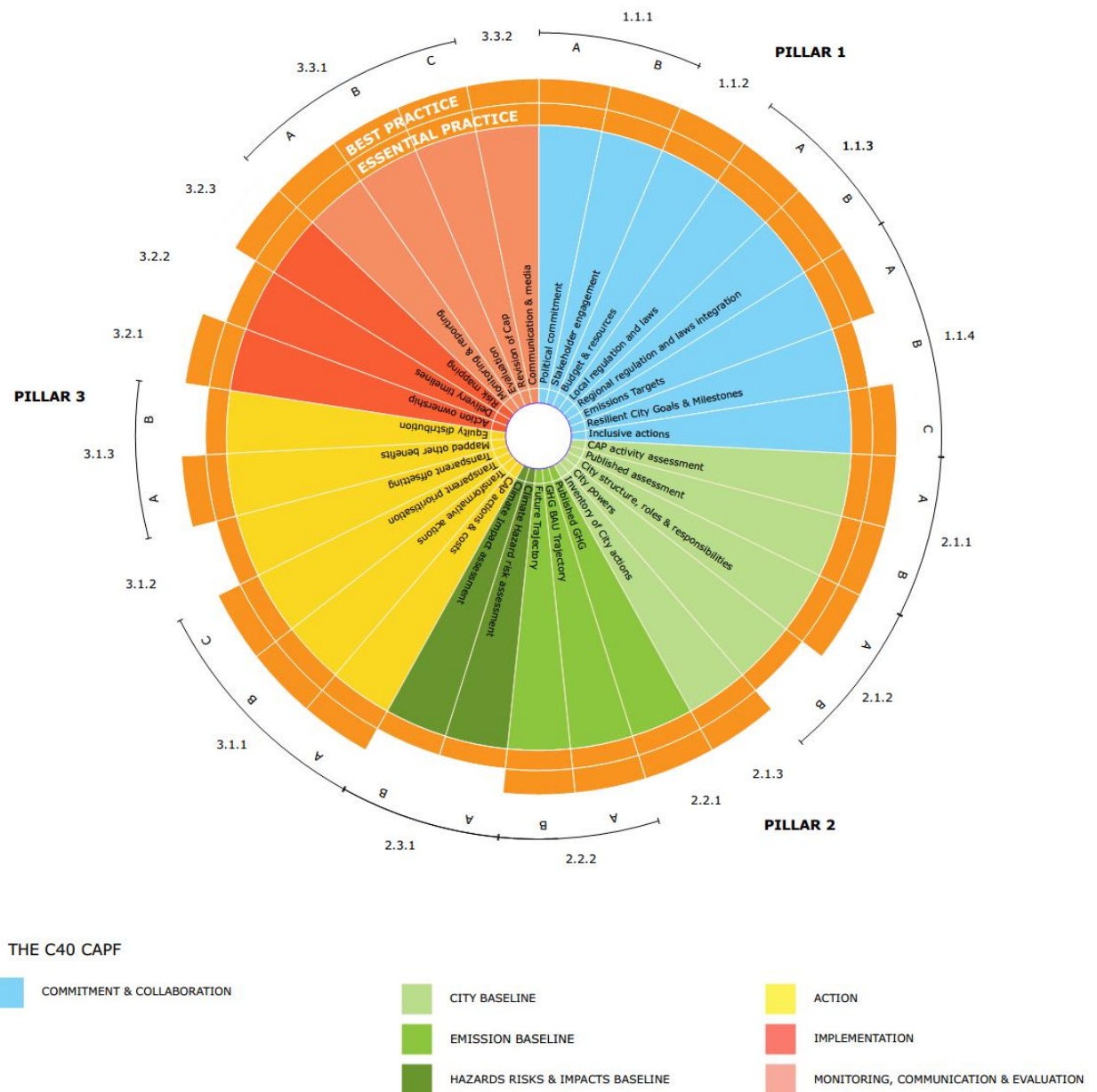
- E (Essential Practice): The city's climate actions met the essential requirements of the assessed CAPF category to be deemed as Paris compatible.
- GF/BP (Go further/Best Practice): The city's climate actions demonstrates items that are highly recommended for inclusion in a plan; they are above and beyond what is essential to the formation of a robust and effective city Climate Action Plan under C40's CAPF and some C40 cities are already leading on these best practices.

3.2 Stockholm results

An initial review of documentation and actions from Stockholm presented a City which has implemented all of the essential measures for the creation of a robust and effective city Climate Action Plan.

Additionally, there were a number of subcategories which stood out as go further/best practice in each pillar. These areas and actions are outlined and further elaborated upon within each specific pillar section.

Figure 1: Results of the CAPF evaluation for Stockholm



4. PILLAR 1 – COMMITMENT & COLLABORATION

4.1 Pillar definition and priorities (8 sub-categories)

Pillar 1 focuses on City efforts around collaboration with internal and external stakeholders, and commitment toward achieving outcomes identified within the CAP and other City literature and documentation.

4.2 1.1.1(a) Political commitment to Paris Agreement

The City's vision should outline the main features of an emissions neutral and climate resilient city by 2050. The commitment should specifically endorse the Paris Agreement and the key components of this framework.

The City of Stockholm has achieved best practice within this subcategory by demonstrating a signed legislative commitment with cross-political and private sector support to deliver the plan and overarching goals of the Paris Agreement. This includes the adoption of "Strategy for a Fossil-Fuel Free Stockholm" in November 2016, which calls for the full elimination of all fossil fuels from the City by 2040. Additional signed commitments include staged reductions of CO₂ per capita year-on-year, with a current target of 2.3 tons CO₂ per capita by 2020. Sweden signed on to the Paris Agreement in 2016, and the Stockholm commitments are in line with this. Further carbon reduction commitments are implemented as part of the 4-year Stockholm Environment Plan process.

Exemplar examples:

The City of Stockholm has been actively pursuing efforts around climate and the environment for over forty years. Since 1976, the City has published the *Stockholm Environmental Program* (SEP) a comprehensive program addressing the current state of the environment within the region, as well as sectors, targets, actions and responsibilities for the following four years. The SEP is updated and re-issued every four years, in conjunction with the City election cycle.

The quality of life in Stockholm, both indoors and out, should be sustainable. The goal of the City's environmental work is clear and frames the challenge that the City's operations must accept. The overarching environmental goals are formulated together with other political goals in the City's budget. The function of the environmental programme is to break down the environmental goals of the City into smaller, clear goals that are easy to follow up for municipal operations. The environmental programme will then become a guiding document for the City's environmental work that all municipal committees and boards have to follow. Due to this integration of the environmental programme into the City's activity plans, the final level of ambition lies in the City budget." -The Stockholm Environment Programme, 2012-2015

The *Stockholm Environmental Program 2016-2019* was released in 2016, and the plan for 2020-2023 is currently under development. The SEP sets specific environmental targets for the City, such as per capita CO₂ reduction targets against current baseline, and traffic reduction, energy reduction and resource efficiency targets. Meanwhile, the City also releases an annual climate strategy which includes the actions necessary to reach these targets. The City has established a long-term target of being entirely fossil-fuel free by 2040.

Stockholm Environmental Program 2016-2019 mentions the importance of commitment from all sides for climate action:

To meet the challenges and reach stated climate goals requires a great capacity for innovation. Many of the challenges affecting the various sectors and the City require new forms of cooperation and new ways of thinking. Challenges can be overcome with the support of the City's innovation strategy that aims to create effective and creative collaboration between politics, business, government and research.

4.3 1.1.1(b)CAP Engagement with Stakeholders

Stakeholder engagement is critical to secure widespread support and buy-in of the Climate Action Plan. This engagement should be inclusive and the data and information gathered appropriate and comprehensive to develop actions. Delivery through partnerships is necessary.

The City of Stockholm has achieved go further/best practice within this subcategory, by demonstrating evidence of commitment from government, business and civil society stakeholders to actively collaborate in delivering the Climate Action Plan.

Exemplar examples:

Throughout the process of climate action within Stockholm, the City has involved outside stakeholders, including business, citizens and other outside organisations. The creation of Stockholm's *Vision 2040*, which includes "Eco-Smart Stockholm" as a core component, involved a series of dialogues and interactions with citizens, NGOs, private companies and outside experts. The City has explicitly stated the importance of involving multiple parties in the CAP process.

A climate-smart Stockholm means incorporating the climate goal into all municipal operations and assigning a clear responsibility to certain municipal committees and the boards of certain municipal companies to coordinate and promote action. Freedom from fossil fuels also requires close collaboration with residents, businesses and other public sector bodies at a time when the population is rising rapidly. Strategy for a Fossil-Fuel Free Stockholm by 2040 (2016)

One example of this collaboration is Stockholm's *Climate Pact*. The *Climate Pact* is an initiative aimed at encouraging collaboration from the business community in the city. The *Climate Pact* was first formed in 2007 with seven original corporate signing partners. *Climate Pact* is a platform for inspiration, a place to share good practices and provides an area for annual reporting on environmental work. Participating companies commit to the same goals as the City and are able to choose their own actions toward fulfilling their commitments. As of the writing of this report, the number of signatories to the Stockholm *Climate Pact* had grown to 236.

4.4 1.1.2 Budget and resources

Sufficient human capacity within government and from partners will be essential for delivering The Plan. The City should estimate the cost of delivering the plan and should be evident through the budget cycle for at least year one of the Plan, demonstrating that the City can start action immediately. A commitment for securing funding for subsequent years should also be evident. This may be through the City's own budgets, from partner organisations, or a mixture of sources.

The City of Stockholm achieved best practice on this subcategory by showing evidence of long term planning to secure funding from external organisations and investors, as well as innovative financing mechanisms. Budget cycles were taken into account during the programming of actions for implementation.

Exemplar examples

Stockholm has fully integrated the goals and targets of their CAP and all environmental planning into the City's overall administrative and planning processes. While explicit budget breakdowns are not identified within City materials, the overall review and implementation process is designed specifically to support the City's CAP actions and measures. The *City Budget* includes the *Stockholm Environment Program (SEP)*, which incorporates additional political process to monitor the progress of climate actions. This monitoring is done through an added line of reporting and monitoring.

The *City Budget* process is the resourcing mechanism for climate work in Stockholm. No one line in the budget is allocated to climate work, rather, climate work is recognized as an essential part of whole budget process, and is integrated in the city management process. Activities are tracked against the outcomes - i.e. emission reduction, rather than outputs of the activities. Additional resources are allocated as needed to achieve stated outcomes. For example, the City implemented a target of 10 per cent reduction in building energy use, which was noted as a stretch target. Additional resources were allocated by the City to the activities needed to achieve this target.

*Municipal committees are urged to make use of the funds specially earmarked for climate investments in the City's budgets up to and including 2018.
Strategy for a Fossil-Fuel Free Stockholm by 2040 (2016)*

The City hasn't yet produced a budget for the cost of all the actions reaching their set targets, but is taking steps to do so. A conducive national framework is making it much easier for the City to work on the CAP.

4.5 1.1.3(a) Targeted Regulations & Laws to Influence

A Climate Action Plan (CAP) should build on existing regulations, policies or plans and ensure that related institutions are engaged within the CAP process. The CAP should ensure that existing governance is strengthened by the CAP and opportunities for integration are maximized.

The City of Stockholm has achieved best practice in this subcategory, as there are demonstrated examples of regulations, laws, policies and plans that align with CAP goals. This is being done with the involvement (and budgetary commitment) of relevant Departments and agencies.

The alignment of Stockholm's CAP with existing regulations, laws, policies and plans demonstrates that the plan was developed in a way that aims to ensure integrity, accelerate action and strengthen current governance. The CAP especially draws upon existing governance and management strategies, to become a fully embedded and critical document for the City. The involvement and budgetary commitment of relevant departments and agencies, such as Environment and Health Administration and City Planning Administration, highlight the key role these play in the delivery of the CAP. Oversight by the City Executive Board, with additional assistance from the Executive Office, demonstrate Stockholm's efforts to integrate the CAP in the city's existing governing structures whilst embedding the climate change agenda in the work of relevant institutions and departments can be regarded a best practice action.

Exemplar examples:

As mentioned in the previous subcategory, the City Budget has fully integrated CAP actions and activities into the overall City planning process. There is a mandate from the City Council to prioritise the alignment of City policies and regulations to align with the achievement of these targets.

The City has shown an active commitment to CAP activities and is leading by example. This is demonstrated by a stated target of achieving a fully fossil-fuel free City-owned infrastructure by 2030, with a fossil-fuel free target of 2040 for the rest of the City. The SEP is integrated within the City Budget, and there is written commitment from the City to implement policies/laws and allocate resources to achieving the CAP targets. Revised procurement policies aligned with the aims of the CAP are another example of City actions and legislation that have been updated to align with the goals and targets of the City CAP.

4.6 1.1.3(b) Identification of Other Relevant Plans/Actions/Commitments

The Climate Action Plan should build on or exceed relevant existing commitments (e.g. Nationally Determined Commitments), regulations, policies or plans of other tiers of government and non-governmental institutions, and ensure that relevant institutions are engaged with the City's Climate Action Plan.

The City of Stockholm achieved go further/best practice within this subcategory by explaining how the City has and will continue to lobby for changes to national or sub-national regulations, laws, policies or plans where they might pose a challenge to their CAP delivery. This is heavily outlined within the *Strategy for a Fossil-Fuel Free Stockholm by 2040*, and demonstrated by recommendations for additional local and nation tax credits on things like renewable energy sources, ambitious targets that strive beyond the national commitment to the Paris Agreement, such as the elimination of fossil fuels in City-owned assets by 2030.

The *Stockholm Environmental Program 2016-2019* highlights outside engagement in the CAP by outlining additional committees and companies engaged in and responsible for implementation of CAP targets.

Exemplar examples:

The City of Stockholm has worked to lobby for regional and national legislative changes within Sweden, and has worked to place itself as a leader in the climate space, while recognizing the importance of outside collaboration and perspective.

It is also important to consider the regional perspective. The goal of a fossil-fuel free Stockholm must not be achieved by relocating emissions in other

municipalities. On the contrary, Stockholm's actions should inspire others and mobilise a coordinated response of similar measures elsewhere in the region. The City of Stockholm also contributes to regional planning to phase out fossil fuels...Many of the measures that need to be taken by 2040 are outside the purview of the city for this reason, the long-term strategy includes a number of investigative assignments, the aim of which is ultimately to influence Swedish and European legislation. Strategy for a Fossil-Fuel Free Stockholm by 2040

The City has advocated for changes to the Energy Tax Act and rules for transferring energy between buildings, as well as additional changes to regional and national energy policy. These steps have been identified as necessary for advancing the viability and adoption of renewable energy alternatives.

Stockholm has additional policies that are linked to national objectives. These include environmental resource efficient cycle policies linked to the national waste plan, *From Waste to Resource*, and overall national objectives for an improved urban environment. The City's sustainable energy consumption targets are also linked to the national objectives of reduced climate impacts, fresh air, a good built environment, ozone layer concerns and natural acidification targets.

4.7 1.1.4 (a) Interim Emissions Targets

Targets or carbon budget and milestones should be based on the City's emissions inventory and modelling, outlining a staged reduction in total emissions through to 2050 and providing a clear illustration of anticipated progress. Targets should be set in relation to the administrative boundary and include an ambitious interim target. Where possible, sectoral targets and actions should be set, which should sum to the final city-wide emissions neutrality scenario. Regular reporting of progress against targets will be important to promote progress towards emissions neutrality and encourage further action.

The City of Stockholm has achieved go further/best practice in this subcategory, by identifying targets and milestones for specific major climate actions, projects and programs.

The City of Stockholm's emissions targets and milestones have been based upon robust scientific evidence, including previous GHG emissions inventories and emissions reductions models. The CAP showcases comprehensive and detailed pathways to achieving their goals, with examples outlined in the *Stockholm Environment Strategy (SEP)* and the *Strategy for a Fossil-Fuel Free Stockholm by 2040*, which explores sector-specific GHG emissions reduction scenarios.

Stock-taking and reflection on set emissions targets is encouraged and facilitated through regular updates of key CAP documents.

The respective committees and boards involved in the environment programme account for how they contribute to the set targets and goals, and report on the progress of their work through business plans that encompass updates on agreed targets and indicators. Stockholm Environment Program 2016-2019

Stockholm qualifies as a go further/best practice example, as the city not only ensures that emissions targets are backed up by scientific evidence, but also enforces regular reporting and progress measurement.

Exemplar examples:

The City publishes the *Stockholm Environment Program* (SEP) every 4 years to coincide with the City election cycle. The City is currently on the 9th of these SEP's (2016-2019). Within the current SEP, the strategy for emissions reduction and mitigation actions is divided into 6 target areas:

- sustainable energy
- eco-friendly transport
- sustainable land and water use
- resource-efficient cycle
- toxic Stockholm
- healthy indoor.

The SEP further identifies measures to be taken to achieve targets for each of these areas, and allocates responsibility for implementing them. There is an interim emissions target of 2.3 tons CO₂e per capita, which is a steady decline from 1990 emissions figures. *Strategy for a Fossil-Fuel Free Stockholm 2040* outlines steps for each area, and gives targets for emissions reductions, broken down by measures/actions. An overall target is specified, and the review process for the SEP takes into account the work needed to achieve this overall target.

4.8 1.1.4(b) Interim Resilience Targets

Goals and milestones should be based on the City's climate change scenarios and hazard or risk assessments, outlining the adaptation requirements for specific time periods through to 2050. Goals may be stated in relation to the city as a whole, for specific sectors, communities and actions, providing a clear illustration of anticipated progress.

The City of Stockholm has achieved essential practice in this subcategory, as it has developed a Climate Adaptation Plan outlining goals and milestones to present a realistic picture of projected climate change scenarios and adaptation requirements. However, there is still work to be done for the adaptation planning to assess comprehensive climate scenarios and targets in the short, medium and long term.

The City of Stockholm has demonstrated a commitment to addressing climate risk and resilience throughout the CAP. *City-wide risk and vulnerability for the city of Stockholm in 2010 (2011)* identified five distinctive climate risk scenarios (Interruptions in telecommunications, extreme flooding of Salt Lake, extreme flooding of Salt Lake in 2030, heatwaves and heatwaves in 2030) and preparedness for these events. The document also discussed City responsibilities in dealing with climate risk and resilience, highlighting the role of risk and vulnerability analysis.

The City of Stockholm, like many other players in the country, has a responsibility to reduce (climate) risks and to be better prepared should a crisis occur...In order to improve the City's preparedness for serious and extraordinary events, the City has implemented extensive work on risk and vulnerability analysis (RSA).

The City has focused on a number of specific areas in addressing resilience, including work by Stockholm Water and Waste AB to develop a torrential model for mapping flood risk in the city during extreme rainfall. The Stockholm Royal Seaport and new sea locks are other examples of work focused on addressing potential climate risks within the city.

4.9 1.1.4(c) Inclusive Action and Co-benefit Aspirations

Goals and objectives are to be developed for other social, economic or environmental benefits associated with climate actions, such as health, employment, air quality and/or equity. These goals and objectives will help to embed climate action as an integrated agenda within City priorities. An inclusive approach to delivering benefits across the City population is required.

The city of Stockholm has demonstrated that it perceives climate action as an integral part of the wider development agenda. Synergies across different sectors are crucial for the creation of co-benefits in the city's urban development. Stockholm identifies in its CAP the links between social welfare, economic prosperity and environmental sustainability, as highlighted in the *Vision 2040: A Stockholm for Everyone* document. By identifying inclusive goals and objectives for specific benefits at the city, businesses and community action level, Stockholm demonstrates leadership within this subcategory and can be regarded a best-practice example.

Exemplar example:

Vision 2040: A Stockholm for Everyone lays out 4 major parts of the holistic plan for the City going forward. These are 1. A Stockholm that stands united. 2. Financially sustainable Stockholm. 3. Eco-smart Stockholm, 4. Democratically sustainable Stockholm.

Stockholm and WSP released a report in March 2018, *Actions to Reduce Climate Change – Cost Effectiveness and Synergies*. This report includes an identification and assessment of the benefits associated with 22 measures within the CAP. The document emphasises the importance of additional impacts and benefits beyond straightforward economic value calculations, and qualifies this, by saying:

The highest-priority investments are investment that will allow the City to continue to grow. For example, investment in housing and infrastructure, but also investments that lead to reduced energy consumption and reduced greenhouse gas emissions are highlighted.

In-depth analysis of specific measures within the WSP report incorporate social and environmental synergistic benefits, along with expected CO₂e savings, municipal and general economic costs. Throughout provided documentation, there is an effort to highlight an inclusive approach to delivering actions, and to embed all actions within the overall City agenda.

5. PILLAR 2 – CHALLENGES & OPPORTUNITES

5.1 Pillar definition and priorities (10 sub-categories)

This component of the CAPF focuses on baselines, inventories, and identification of responsibilities for various agencies and organisations across the city, with respect to the potential for contribution to climate mitigation and adaptation efforts.

5.2 2.1.1(a) Environment & Climate Indicators

Environmental indicators that provide the context for climate action are the focus of this sub category. Cities may choose to include wider indicators of environmental quality according to local priorities.

The City of Stockholm achieved best practice in this subcategory, as the CAP provided a detailed baseline, covering resource management as relevant to climate, including energy and water sources and consumption, solid waste volumes and disposal methods. Information provided within each four-year *Stockholm Environmental Program*, as well as major sections of the *Comprehensive Plan for the City of Stockholm* include baseline climate conditions, with provides the basis for recommended actions and targets. The city of Stockholm demonstrates thorough understanding in and analysis of the environmental indicators, as well as associated challenges and opportunities. Stockholm provides regular updates on the state of the City environment, which highlights that consistent monitoring and progress evaluation are well-established processes in the City.

Exemplar examples

The *Stockholm Environment Program* includes comprehensive current environment and climate indicators, included as an appendix to the main document. Section 4 of the document (Sustainable use of land and water) also includes extensive detail on both the current environment, and future targets and objectives.

The *Comprehensive Plan for the City of Stockholm* includes information on noise mapping, air quality, water quality and availability, soil quality, and the potential for flooding throughout the metropolitan area.

Stockholm also releases an annual report of energy consumption and GHG emissions. This tracks emissions by sector, and is updated to reflect the latest available information. The process uses GPC reporting inventories. Additionally, the *Waste Management Strategy for Stockholm* is a 3-year plan that gives an overview of all waste sources and expected impacts from actions.

5.3 2.1.1(b) Socioeconomic Indicators

An overview of The City's contextual data, trends and/or information that are relevant to delivering climate action, presented across economic and social indicators is needed. The full list of indicators should be informed by the city's local priorities and cover all communities in the city. The Sustainable Development Goals may be a useful framework to establish the indicators of greatest priority to each city.

The City of Stockholm achieved go further/best practice within this subcategory, as a socio-economic baseline of the City is available, including analytical detail about trends including population and demographics, sustainable city and community development and economic growth. This information is provided throughout CAP documentation, and summarized in the

Comprehensive Plan for the City of Stockholm, which provides existing information, along with extensive projections and strategies for future city demographics and development plans and opportunities.

Exemplar Examples:

The *Budget 2018-2020* includes information on the period from 2018-2020 covering estimates around climate, environment, education, construction and equality. Many elements of the UN Sustainable Development Goals are included within this document, though they aren't explicitly mentioned as such. *Budget 2018-2020* includes information on historic and forecasted trends, based on existing context.

Stockholm also focuses on City development in the context of smart growth strategies, with a focus on all citizens.

In years to come, Stockholm will have a strong focus on residential construction. Today's housing shortage limits the city's development and economic growth. The housing crisis will be faced by many, not least the groups with a weak economy, young people, students and newcomers. For business and educational institutions, access to housing is crucial. To attract the right skills, there is a need to be able to offer Stockholm housing in various price ranges and tenure. The city has increased the pace of housing construction and is testing new solutions for groups with a weak position on the housing market. Comprehensive Plan for the City of Stockholm

The *Comprehensive Plan* includes relevant information and statistics outlining trends and future projections, and integrates social, environmental, economic and cultural priorities.

5.4 2.1.2(a) Clear Administrative Structure

The CAP should include a focus on identification of the governance and administrative structures of the city, including mapping the roles and operational responsibilities relevant to the delivery of climate action. The scope of the CAP should be clearly established, in terms of whether it is limited to city government functions or encompasses non-government organisations within the city.

The City of Stockholm achieved go further/best practice in this subcategory, as the CAP and additional material provided a detailed mapping of decision making and operational roles and responsibilities across the City's governance bodies, showing their relevance to delivering the CAP. Responsibilities highlighted in the *Stockholm Budget 2018-2020*, as well as explanations provided by the City Climate Unit outline the specific administrative structure, as well as process for ensuring compliance with Stockholm CAP targets.

Exemplar examples:

Overall responsibility for CAP actions is dictated throughout the CAP literature, and is explicitly described in the *Budget 2018-2020*:

The Executive Office is has primary responsibility over...management, development and monitoring of the City's climate work...The municipal government should promote and ensure that the actions and investigations as part of Stockholm's Environmental Program 2016-2019 and Strategy for a fossil-fuel free Stockholm 2040 are part of overall City operations, and that the interim target of 2.2 tonnes of CO₂ per capita is reached by 2019. The

municipal government will conduct a review of the strategy in light of the investigative guidelines, and revise guidelines for the City's own energy use.

The *Strategy for a fossil-fuel free Stockholm 2040* also outlines overall responsibility for measures associated with climate actions in the plan:

Each of the committees and the board of each company involved is responsible for ratifying, implementing and following up measures that will lead to the required reduction in emissions. This includes responsibility for analyzing which measures are most cost-effective for the City. The Environment Program's emissions ceiling of 2.2 tonnes of CO₂e applies to all committees and company boards.

Fossil-free Stockholm 2040 also includes clear responsibility for each action, as all actions include a "tasked to:" section.

5.5 2.1.2(b) Power of City to Implement

City powers may be defined as operation of assets or services, policy/ regulations, control budgets for particular assets or services, or vision setting. Powers may also be framed in different ways. Articulating the City's powers in each action area is useful.

The City of Stockholm achieved essential practice in this subcategory, as related documentation provided an assessment of the powers of City Government and other stakeholders by individual assets, sectors, systems and functions. Individual responsibilities and powers are outlined in the *Budget 2018-2020*, and the full process is overseen by the City Executive Board, with assistance from the Executive Office and other smaller groups within the Climate Unit who are tasked with assisting and ensuring the delivery of identified environmental objectives.

Exemplar examples:

Inclusion into the C40 Cities program requires the completion of a "City Powers" document, such as the one developed by C40. This document outlines each city's administrative powers, and achieves the objectives laid out in the related subcategory. Stockholm has completed this. Additionally, the City of Stockholm has reported that the City owns all the land within Stockholm and therefore has considerable power over buildings and the urban fabric. Stockholm has "Eco Districts," where they can specify level of energy efficiency required in buildings. These, and other governance strategies, including the power of city taxation and a close connection with local companies and residents give Stockholm greater power than some other cities, and decreases a dependence on national funds to achieve City objectives.

5.6 2.1.3 Actions Baseline

The City's existing climate actions serve as a baseline for framing further action and communicating the City's goals in a cohesive way. The baseline will detail actions that are already in progress or committed. Identification of actions at a regional or national level that will contribute to the City's goals is needed. The contribution of these actions to the City's targets may be quantified in terms of their emissions reduction or risk reduction potential.

The City of Stockholm achieved go further/best practice in this subcategory, as known climate actions that are currently being implemented or planned by the City Government and the wider public sector, non-governmental and private sectors are outlined in the plan. CAP actions are outlined and generally quantified in terms of costs and/or emissions reductions or impact potential

within various documents (*Strategy for Fossil-Fuel Free Stockholm 2040, Stockholm Environment Program, Actions to Reduce Climate Change*).

Exemplar examples:

The Stockholm Environmental Programme 2016-2019 outlines the actions baseline for meeting the objectives of the City's CAP. They are broken into:

1. Sustainable Energy
2. Eco-friendly Transport
3. Sustainable land and water use
4. Resource efficient cycle
5. Toxic Stockholm
6. Healthy Indoor.

Each category is further divided into milestones, which outline individual outlines for the categories. For example, in order to address the priority of preventing vulnerabilities within the urban environment as a result of a changing climate, Stockholm includes measures such as comprehensive storm water management planning for new construction and refurbished buildings, and new buildings will be designed at higher levels to avoid floods or rising sea levels.

Specific actions, such as reducing the return temperatures for district heating, which currently covers 80 per cent of dwellings within the City, are also outlined within *Actions to Reduce Climate Change – Cost Effectiveness and Synergies*. Return temperature reduction is estimated to produce a saving of 32,000 ton CO₂-e, while replacing mercury street lights with LED technology accounts for annual savings of approximately 360 tons of CO₂-e.

5.7 2.2.1 Emissions Inventory

City climate action plans should include locally appropriate greenhouse gas emissions baseline datasets. This is used to prioritise action, set goals and targets, and to measure progress. This will include as a minimum, scope 1 emissions, scope 2 emissions and 3 emissions.

The City of Stockholm achieved go further/best practice in this subcategory, as the City publishes annual CO₂ emissions inventories. These are reviewed and revised annually, with additional information and updated methodology as this becomes available. Since 2016, the annual emissions inventories utilize the Global Protocol for Community-Scale Greenhouse gas emission inventories (GPC), in accordance with the Stockholm Environment and Health Committee decision. Calculations are based on available statistics and model calculations in which information about energy consumption and emissions in the City of Stockholm comes from several sources, such as SCB (Statistics Sweden), RUS (Regional Development and Cooperation in the environmental system), as well as various corporate environmental reports.

Exemplar examples:

The *Stockholm Environment Program, Monitoring of Stockholm's Environmental Program 2016, Reporting of Energy Consumption and Greenhouse Gas Emissions in 2017* and *Waste Management Strategy 2017-2020* outline a comprehensive emissions inventory for the City. This information is used as the basis for prioritizing actions within the CAP.

5.8 2.2.2(a) Modelling of Greenhouse Gas Business as Usual Trajectory

A business as usual (BAU) emissions pathway should be included to help frame action and support target setting. The city's chosen methodology is to be clearly described, and any emissions savings quoted against this pathway are calculated consistently with this definition.

The City of Stockholm achieved go further/best practice in this subcategory, as it has published a "business-as-usual" trajectory, incorporating estimated impacts of existing and planned policies, such as those considered in the actions baseline and wider city context. The trajectory is reviewed on a regular basis.

Exemplar examples:

Strategy for a fossil-fuel free Stockholm 2040 outlines comprehensive emissions tracking from 1990-2015, broken into transport, heating, and other electric/gas, as well as total CO₂ tons per capita. *Strategy for a fossil-fuel free Stockholm 2040* also specifically mentions that the strategy is limited to energy use within the geographical boundary of the City, and that while Stockholm aims to reduce consumption-based emissions through information and mandatory impositions, these activities fall outside the scope of the strategy. *Strategy for a fossil-fuel free Stockholm 2040* also states that emissions are estimated using the City's current calculation method, with an LCA supplement.

Emissions for the target year 2015 have been calculated using the new method, according to the GPC GHG emission inventories. Reporting of energy consumption and GHG emission in 2016

The *Waste Management plan for Stockholm 2017-2020* includes comprehensive figures outlining types and quantities of waste within the City, along with goals and estimates based on different CAP scenarios.

5.9 2.2.2(b) Modelling of Greenhouse Gas Trajectory with Action

Plans will include an evidence-based target emissions trajectory or carbon budget that is in line with the 2050 targets stated under Pillar 1, and which aligns with the city's interim target and actions identified under Pillar 3. The target trajectory may acknowledge the limits to the city's own ability to reduce emissions within its boundary. In this case it will investigate the means to achieve the final emissions reduction through the use of offsetting funds or action inside or outside the city limits (See Pillar 1).

The City of Stockholm achieved go further/best practice in this subcategory by providing an evidence-based city-level trajectory to 2040 or earlier which is aligned with the City's interim emissions targets in Pillar 1 and actions identified under Pillar 3. This information is analyzed and presented as a graph with projections for CO₂ emissions, aligned with actions, within *Stockholm Path to Fossil-Fuel Free (2018)*.

Exemplar examples:

Strategy for a fossil-fuel free Stockholm 2040 includes a trajectory for CO₂e per capita through 2039, based on an even pace of emissions reductions. The estimate also includes provision for a four-year revision schedule to ensure that trajectories incorporate data as it becomes available. The current trajectory shows emissions falling from 2.3 to 0.4 CO₂e per capita by 2039. Individual measures within *Strategy for a fossil-fuel free Stockholm 2040* include expected emissions reduction potential, to either 2020, 2040, or another year as determined by the action outcomes.

The trajectory and estimates have recently been revised and published in the 2018 document, *Stockholm Path to Fossil-Fuel Free*.

5.10 2.3.1(a) Climate Hazard Assessment

A climate action plan should include an assessment of the climate-related physical events affecting the whole city, including all communities. Hazards may include meteorological, climatological, hydrological, geophysical, or biological events and should acknowledge variability in hazard exposure across the city. The hazard assessment should identify the most frequent, severe and widespread hazards and those likely to cause the greatest impact. This information should be used to inform adaptation action (risk reduction and response). The assessment should take into account the city's historic trends and current situation, as well as future scenarios based on available scientific evidence through to at least 2050.

The City of Stockholm has achieved essential practice within this subcategory, as the City has assessed the changing frequency, severity and scale of relevant climate hazards on the City, and has used this as a baseline for identifying adaptation actions.

Stockholm has produced documentation, including *Future Climate in Stockholm: According to RCP scenarios (2015)* which examines the changing climate within the City and surrounding areas. This document examines observed data averages between 1961-1990, 1991-2013, and includes estimates for climate conditions between 2021-2050 and 2069-2098.

While *Future Climate in Stockholm* evaluates the potential likelihood of overall climate averages, it does not include a section on the potential impacts of these events and changes, including the potential financial, environmental or social severity of associated impacts. Within *Climate Adaptation in Stockholm (2017)* the City outlines an intention to address both risks and impacts from climate change:

A changing climate can have major consequences for Stockholm, and create new conditions for the City's development. How robust the City is to extreme weather events and rising average temperatures will depend on how well prepared we are. Climate change is a complex challenge that leaves few unaffected in a dense city environment like Stockholm...The City must still develop scenarios and from these undertake risk and vulnerability analysis to identify vulnerable areas and activities to enhance our ability to handle them as they come...The City of Stockholm is working on climate adaptation to continuously identify risks and develop effective measures to reduce the City's vulnerability to climate change. It is a complex challenge, and to achieve success, great emphasis has been given to establish adaptation as a separate work area.

5.11 2.3.1(b) Impact Assessment

Impact assessment looks at the impact an extreme event could have on relevant systems and sectors such as: urban planning, environmental quality, food, ICT, transport, energy, water, waste, public health, and economy, among others. The assessment would consider the vulnerability, the capacity of systems to adapt in the face of hazards, and also the potential impact in terms of number of people affected, cost of damage, days' service lost, etc. The impact assessment would consider hazards experienced today and projections through to 2050 as a minimum.

While the City of Stockholm has not yet undertaken a comprehensive risk assessment to fully address the potential impacts of climate hazards within the City, discussion and interpretation of

published documentation from the City confirms that Stockholm has achieved essential practice in this subcategory. Although it has not conducted a qualitative assessment of the impact to city systems and sectors based on the hazards identified in the hazard assessment, the City has demonstrated a recognition of the processes necessary to undergo comprehensive impact assessment, and have stated the need for these processes.

City-wide Risk and Vulnerability for the City of Stockholm in 2010 (2011), Climate Adaptation Process (2015), Climate Adaptation in Stockholm (2017) and Environmental, Climate and Investments in Stockholm (2017) comprise a documented understanding of the importance of addressing and acknowledging the potential risks and impacts associated with climate change for the City of Stockholm.

Actions needed to strengthen essential practice in this subcategory

While the intent to establish best practice processes and assessments is recognised, Stockholm still needs to do the work of analysing and reporting on the potential of these comprehensive risk and impacts.

Even though the City has not yet undertaken the process for an impact assessment from potential climate risks, CAP documents, specifically those mentioned in the previous section demonstrate an awareness of the process needed to complete this work. The City should prioritise the impact assessment process as a component to ongoing climate work, and look to other cities that have implemented comprehensive climate risk and impact assessments for examples of how to do so.

Recommendation: Ensure that the recommended climate risk assessment incorporates potential economic, social and environmental impacts from identified hazards.

6. PILLAR 3 – ACCELERATION & IMPLEMENTATION

6.1 Pillar definition, priorities and results summary (x subcategories)

Pillar 3 focuses on the implementation of identified climate actions, as well as the acceleration toward achieving outcomes identified within the CAP and other city literature and documentation. Methodology, outreach, measurement, evaluation and revision are priorities of this Pillar.

Across the categories and sub categories in this Pillar of the CAPF, there is alignment with all of the 'essential' requirements. As in the first two Pillars, there are a number of go further/best practice examples which are highlighted within the applicable subcategories and should be examined as examples for other cities to emulate.

6.2 3.1.1(a) Actions are robust & costed

Actions should be clearly linked to a robust evidence base (as outlined under Pillar 2). Mitigation actions should be focused in a range of sectors identified as having high existing emissions and strong potential for action. Adaptation actions should be focused on reducing risk and building resilience in the systems and communities that are most vulnerable now and in 2050.

The City of Stockholm achieved go further/best practice within this category on mitigation actions by providing a detailed list of inclusive mitigation actions across sectors and communities, and providing cost attributions with city costing procedures. There is additional work to be done around climate adaptation measures.

Exemplar examples:

The *Stockholm Environment Program 2016-2019* outlines general actions to reach CAP goals, and *Strategy for a fossil-fuel free Stockholm 2040* highlights measures needed to achieve the 2020 milestone target, as well as steps that will be taken to achieve freedom from fossil fuels by 2040.

The City of Stockholm has expressed the importance of the integration of CAP measures into the City's everyday governance and operating process, emphasising that sustainability, climate mitigation and adaptation actions are a core component of the City's administrative process. As such, Stockholm's *Budget 2018-2020* lays out line item budgets for each of the governing committees and agencies within the City. Organisations which are responsible for delivering outlined climate measures are expected to do so within the context of regular operations. While overall budgets for each organisation are identified, specific costs are not a component of this document, and are not identified within supplied documentation.

In 2018, WSP and the City of Stockholm released *Actions to Reduce Climate Change – Cost Effectiveness and Synergies*. This work was undertaken to examine the methodology used for prioritisation and to ensure that measures proposed and implemented by the City were analysed for cost-effectiveness. The report also incorporates the socio-economic method as a way to capture synergies between climate action and other societal goals. Twenty-two specific measures were examined in the report, with a specific focus on the following metrics:

- Direct investment costs in the form of purchases
- Changes in operating costs such as a decreased energy demand or additional labour resources
- Increased revenue in the form of things like parking fees (with a consideration for the costs and benefits of other stakeholders involved – for example, those paying the increased parking fees)

- Other actors operating costs, for example reduced heating costs
- Change in travel time (increased number of buses, changes in traffic conditions, etc.)
- Impact on emissions from car traffic, such as noise and air pollution.

6.3 3.1.1(b) Transformative & Systemic Actions

To reach the ambitious objectives of the Paris Agreement, major actions are needed in the short-term that will transform whole systems to be low carbon and resilient and which are implemented at a city-wide scale. Transformative actions should seek to influence action taken by other actors by initiating wholesale market transformation, systemic and cultural change within the city and beyond. Examples include a switch to 100 per cent renewable energy supplies, or net zero carbon building codes.

The City of Stockholm achieved go further/best practice in this subcategory, by identifying transformative actions across a range of systems and sectors in the City, such as the integration of climate and emissions reduction targets into all city planning processes, and emphasizing a complete transition to a fossil-fuel free city by 2040. This work is done by leveraging opportunities for joint resourcing between the City departments and other actors, including local government departments, businesses that have signed on to the Climate Pact, and community groups. The overall goals and objectives for this transformative strategy are outlined in the *Vision 2040* and *Comprehensive Plan for the City of Stockholm*.

Exemplar examples:

While Stockholm didn't specifically use the word "transformative" to describe the actions included in the City's CAP, the language and actions list presented by the City is generally transformative in nature. *Strategy for a fossil-fuel free Stockholm 2040*, *Vision 2040* and associated initiatives are examples of documents designed to focus on transformative climate actions. Opportunities are identified for joint resourcing between city departments and other sectors, as many of the actions and responsible organisations are outlined within *Strategy for a fossil-fuel free Stockholm 2040* by sector.

6.4 3.1.1(c) Transparent Methodology

A method of prioritising actions will ensure the highest-impact are delivered first. Mitigation actions should be a combination of short term and longer term actions, with the largest scale and most ambitious actions scheduled early in the timeline. Adaptation actions should be focused on the most urgent and high impact risks facing the city. The CAP should clearly explain the prioritisation process.

The City of Stockholm has achieved go further/best practice on this subcategory, as actions have been prioritised based on their impact on City and sectoral emissions reductions, and their ability to reduce risk, and the City's powers to achieve change. Prioritisation also considers wider impacts or benefits relevant to the City's context, and prioritisation is clearly related to the emissions and risk scenarios presented under Pillar 2.

Exemplar examples:

Documents address transparency of the CAP process in a variety of areas.

Work on the City's environmental goals should be followed by the public, policy makers and other stakeholders. Since 2003, there has been an environmental barometer on the city's website, where the targets are reported

in a transparent manner by means of assessments and indicators...The principles of the targets are based on rankings that 1. minimise energy, 2. recycle energy, 3. use renewable energy sources. Stockholm Environmental Plan 2016-2019

Measures laid down in the strategy are those over which the municipal authorities and companies have the greatest power to act, those that will lead to the greatest reduction and those where the consequences of implementation are otherwise deemed to be acceptable. Strategy for a Fossil-Fuel Free Stockholm 2040

Vision 2040: A Stockholm for Everyone addresses multiple stakeholder dialogue processes as components of longer term sustainability strategies within the City. Strategy for a fossil-fuel free Stockholm 2040 states:

Measures designed to achieve the 2020 milestone target are more action-oriented, those for a fossil-fuel free Stockholm by 2040 are more strategic in character.

6.5 3.1.2 Residual Emissions

The CAP should maximise efforts to deliver action within the City. However, after all actions within a climate action plan have been deployed, a city may still have residual emissions. The quantity of residual emissions expected following emissions reduction actions through to 2050 should be calculated and monitored as part of the CAP.

The City of Stockholm has achieved essential practice in this subcategory, as the City has estimated the volume of residual emissions currently expected following direct in city emissions reduction actions. This has been done through 2040, with an understanding that the City has committed to the ultimate goal of full carbon neutrality by 2050, and emerging evidence should be used to re-examine targets every four years, in conjunction with the City's Environmental Program to provide revised, up-to-date results.

Currently, Stockholm's future GHG emissions trajectory includes approximately 0.4 tons CO₂e per capita beyond 2040. To offset these emissions, the City has stated an intention to investigate and potentially implement major processes involving carbon capture and storage, as well as biochar:

Calculations suggest that some fossil energy will still be used in 2040, primarily in shipping and aviation, where the City's powers to implement change are limited, but also in the form of fossil-based plastics in waste incineration facilities. Measures to compensate for the climate impact of these remaining emissions include carbon sinks that absorb carbon dioxide from the atmosphere. The oceans and vegetation are the planet's greatest carbon sinks, but it is possible to create the corresponding effect, for example by removing carbon dioxide from the flue gases of CHP plants and depositing it permanently in the ground or the sea in a process known as carbon capture and storage (CCS). Another method involves the use of a hydrothermal carbonization process to transform organic material into biochar that can subsequently be used as a soil conditioner. The City of Stockholm is working together with a prize-winning pilot facility for biochar. In addition to the positive climate effects, biochar improves soil fertility, and reduces nutrient leach and the risk of eutrophication. Strategy for a fossil-fuel free Stockholm 2040

3.1.3(a) Co-benefit Identification

Potential social, economic and environmental benefits of climate actions should be identified in line with the city's local priorities, and used as a framework for evaluating the wider benefits of actions in the Climate Action Plan. These benefits should be communicated (see 3.1.1).

The City of Stockholm achieved go further/best practice within this subcategory, as wider social, economic and environmental benefits of climate action have been identified within the CAP and supporting documentation, and these benefits align with local priorities. Extensive co-benefit ambition is outlined in Pillar 1, subcategory 1.1.4(c). Documentation within the CAP identifies environmental co-benefits from actions such as cleaner water and air, social benefits including reduction in traffic congestion, reliability of energy supply and enhanced home comfort, and economic benefits such as reduced costs for homeowners, tenants, and other building/asset owners.

Additional examples of co-benefits from the CAP include bio-gas as a by-product of environmentally friendly disposal of organic waste materials, and integrated planning where the city combines elements of socio-economic profitability, urban improvement, as well as livability, neighbourhood attractiveness and relationships.

Exemplar examples:

Stockholm includes the examination of co-benefits from CAP measures throughout published documentation. The WSP report, *Actions to Reduce Climate Change – Cost Effectiveness and Synergies* identifies benefits from each of the 22 included actions. These are qualified, but not quantified, with improved air quality being the most common “synergy” resulting from measure implementation. *Actions to Reduce Climate Change* emphasises the importance of maintaining a focus on broad social goals within the context of CAP work. The *Stockholm Environmental Plan 2016-2019* mentions integrated planning where the city combines elements of socio-economic profitability, urban improvement, as well as liveability, neighbourhood attractiveness and relationships.

Co-benefits at a specific technical level are examined within *Strategy for a Fossil-Fuel Free Stockholm 2040*. Examples include the use of non-reusable plastic being burned as fuel, rather than left in landfill, and the creation of biogas from the digestion of sewage sludge and household organic waste.

6.6 3.1.3(b) Equitable Benefits

The CAP examines fair, inclusive and equitable distribution of benefits being achieved cross the suite of mitigation and adaptation actions. Particular attention will be given to vulnerable and minority groups, and existing inequality in the city, based on evidence (Pillar 2). An assessment of the collective benefits of the Plan should show that inclusivity (the inclusion of those who would otherwise be excluded or marginalised) is to be considered.

The city of Stockholm understands that climate change affects the population unequally. Often poorer and marginalized communities are hit harder by the impacts of a changing climate. Documentation within the CAP demonstrate a recognition that equity and inclusivity are vital components of holistic climate action planning. This is emphasized in Stockholm’s *Vision 2040*, which outlines that “*the city's development is fully inclusive...It is a promise to all residents to give everyone equal opportunities.*” By taking equity and inclusivity into account across the suite of actions, and discussing specific vulnerabilities and inequities, the City of Stockholm has achieved essential practice on this subcategory.

Stockholm's *Budget 2018-2020* discusses the importance of equity within the City:

Our City should be an equitable city, with declining inequality. In a city for all, it should not matter where you come from, but rather where you are going. The City needs to focus on poverty, lack of housing and social vulnerability, which limits Stockholmer's opportunities. The City should improve efforts to help people obtain jobs, and ensure that those who are employed have decent working conditions. Discrimination is never acceptable in Stockholm. Support should be provided to increase adult education, with targeted investments carried out for vulnerable groups in the labour market. There is a focus on outreach activities specifically intended for young people to have a better shot at a job or an education.

These priorities are echoed throughout Stockholm's climate and CAP documentation, and CAP actions are a major component of the *Vision 2040: A Stockholm for Everyone*. While "Eco-Smart Stockholm" is the pillar within this document most closely related to climate actions, the focus on maintaining equality and support for vulnerable residents throughout the City is a major theme throughout all CAP documentation.

6.7 3.2.1 Identification of Owners

The framework considers city powers to implement actions directly, or to find ways to deliver action through others. Drawing on the city's Powers baseline (see 2.1.2), the CAP should set out the actions which the city has power to implement directly and the actions where different powers must be used to effect action (e.g. by setting legislation, controlling budgets, offering incentives, etc.). The roles of other actors should be clearly defined, and actions should have a named organisation as action owner.

The City of Stockholm achieved best practice in this subcategory, as the *Budget 2018-2020* and other CAP documentation identifies where both internal and external partners can own and deliver climate actions. Additional partner organisations outside of City Government have been engaged and agreed in principle to contribute to the delivery of climate actions.

Exemplar examples:

Stockholm's CAP includes the identification of responsible parties for all identified CAP measures. Within *Strategy for a Fossil-Fuel Free Stockholm 2040*, each measure includes a "tasked to:" section, specifying which agency, group, or organisation is responsible for the delivery of the specific action. Overall administrative ownership and powers mapping is shown in both the *Stockholm Environmental Plan 2016-2019* and the *Budget 2018-2020*.

6.8 3.2.2 Timelines Mapped

The CAP framework includes monitoring the CAP and tracking of 2050 targets. Each action should have a timeframe for implementation.

The City of Stockholm achieved essential practice in this category for mitigation actions, as action delivery timescales are clearly linked to 2050 emissions trajectory. However, there is still work to be done for the City to achieve essential practice for adaptation in this subcategory.

As all CAP work is undertaken as an integrated component of overall City work. All committees, boards and organisations responsible for individual actions will also be responsible for producing corresponding business plans, showing the timelines and progress of work.

As of the release of this report, the majority of identified measures were described as either “action-oriented,” and intended to be achieved as part of the City’s 2020 target, or “strategic,” and incorporated as a component of the longer 2040 goal. While the *Budget 2018-2020* outlines specific targets and timelines through 2020, timelines for longer term strategic goals have yet to be identified and published, though there was indication that the City has implemented regular monitoring and review processes to ensure that all goals are re-assessed on a regular basis.

Specific timelines were not included with adaptation measures, and this presents an opportunity to incorporate methods for defining delivery timescales across the suite of CAP action, encompassing both mitigation and adaptation measures.

6.9 3.2.3 Risk Assessment

This category relates to challenges and risks involved in delivering any climate action. A Paris-compatible Climate Action Plan should include a risk mapping and risk management process to assess potential delivery issues and put in place solutions to overcome them.

The City of Stockholm achieved best practice in this subcategory, as it has incorporated the common Internal Management System process, in line with international standards for project risk management (ISO31000). This system is in line with all City actions, and is used to ensure proper evaluation and management of possible unintended consequences of specific actions.

Exemplar examples:

Ensuring that CAP actions are integrated into the overall city budgeting process and form a comprehensive city governance and administrative strategy is essential to the overall success of the CAP. Throughout available documentation, Stockholm provides information around potential limitations, unexpected outcomes, and risks associated with proposed CAP measures. The City also mentions the ways in which overall City planning metrics are integrated.

The measures proposed by the strategy are in line with the Stockholm Environmental Program and are therefore implemented in the City’s integrated management system (IMS). This places responsibility for implementation and follow-up with the respective committees and the business plans of the boards concerned. Follow-up takes place in connection with reports and activity in the same way as other activities and budget issues are monitored. When necessary, the City Executive Board may call upon committees and boards and urge them to take the necessary action to achieve the required reductions in emissions. Strategy for a Fossil-Fuel Free Stockholm by 2040

A regular and documented process of review, as well as transparency within the process all help to ensure that risks are mitigated, and actions are accomplished in line with targets and expectations.

6.10 3.3.1(a) Monitoring of Implementation

An effective CAP will have a process for monitoring the extent to which actions in the Plan are being delivered according to the proposed timeline, and whether milestones are being met. Performance indicators may be used to track progress over time.

The City of Stockholm has achieved best practice in this subcategory, by creating a common platform for all City Departments to monitor and update information about actions on a rolling basis. The result of this reporting is the *Stockholm Environmental Program*, which is published every 4 years. The report outlines sectors, targets, actions, responsibilities and how targets will be achieved. The Budget 2018-2020 also includes wording outlining how management and monitoring is conducted. Reporting on energy and GHG consumption takes place every year, and is outlined in a report to the Environmental Health Committee on an annual basis.

Exemplar examples:

As highlighted throughout this report, Stockholm incorporates standard monitoring, evaluation and review processes throughout CAP measures, which have been integrated into the City governance process.

All committees and boards will show in their business plans how they intend to help the City reach these objectives, through a process of monitoring and indicators of work progress. The City's environmental program is integrated into the City's superior systems for management and monitoring of all activities and finances (ILS). The integration, implementation and monitoring of environmental programs targets takes place in each agency and board plan. Stockholm's Environmental Program 2016-2019

Additional examples of monitoring and implementation responsibilities for all City Committees and company boards include:

- work in accordance with ILS and determine the activity-specific monitoring and goals based on the City Council's orientation objectives and operational goals, with regard to relevant policy documents.
- establish the Board/General Board's annual targets for the municipal council indicators and possible mandatory indicators. Boards and Agency's actions shall otherwise define the indicators required to monitor their activity-specific objectives as well as their own activities.
- ensure that the activities of specific objectives are followed up with a good opportunity to measure earnings. The analyses of overall outcomes and forecasts shall be delivered in regular reports every four months, with an annual report. These will be duly substantiated and reflect both the development of the City as a whole, and impacts on different groups and areas within the City.
- develop an internal plan by materiality and risk analysis in connection with business planning. This risk analysis should also contain measures intended to minimise any potential risks.

6.11 3.3.1(b) Evaluation of Impact

There is an intent that the impact of actions will be measured based on the reduction in greenhouse gas emissions, reduction in climate risk and inclusive delivery of wider social and economic benefits. The CAP will set out a process by which impact will be evaluated. This information will inform regular revisions of the Climate Action Plan. Evaluation processes will be guided by the methodologies used to determine the city's 2050 emissions trajectory and climate risk profile (Pillar 2). These baseline datasets will provide the benchmark against which to measure the impact of actions over time.

The City of Stockholm has achieved go further/best practice in this subcategory, as emissions reduction impacts of actions are recalculated and updated on an annual basis. The risk reduction impacts are recalculated on a 4-yearly basis through the *Stockholm Environmental Program* process, with quarterly and annual reporting from each individual committee and board. Progress is publicly reported.

6.12 3.3.1(c) Review and Revision of CAP

A process of measurement and evaluation should feed into continuous review and revision of the Climate Action Plan over time, ensuring a reflective and iterative planning process. A timeline for review and revision should be clearly set out in the CAP, with the process for revision clearly based on monitoring and evaluation processes.

The City of Stockholm achieved best practice on this subcategory, as the CAP commits to a four-year process of full review and revision, informed by evidence from monitoring and evaluation, with annual reporting of energy consumption and greenhouse gas emissions compiled and published every year. The four-year environmental review process has been in place since the 1970's, and within recent years, and the Sweden's commitment to alignment with the Paris Agreement, this process has expanded to encompass a focus on climate change mitigation and adaptation priorities.

Exemplar examples:

The City commits to regular review and revision of the *Stockholm Environment Program*, which includes progress to date, the current state of targets, measures and actions implemented and marked for additional consideration. Additionally, Stockholm releases annual reporting on energy consumption and GHG emissions within the City.

The *Budget 2018-2020* includes language around review of the CAP process within the City:

The Municipal Government should promote and ensure that the actions and investigations as part of Stockholm's Environment Program 2016-2019 and Strategy for a Fossil-Fuel Free Stockholm 2040 are part of the City's operations, and that the interim target of 2.2 tonnes of CO₂e per inhabitant is reached by 2019. The Municipal Government will conduct a review of the strategy in light of the investigative mission, and revise the guidelines for the City's own energy accordingly. Work on climate adaptation is also part of this process. Vulnerabilities due to heavy rains and high water levels are a particularly high priority to identify and fix, and the City should develop a strategy to deal with torrential rainfall. The City Council has a special responsibility for coordinating the City's efforts in the climate area and also coordinates efforts with external actors, including regional areas.

6.13 3.3.2 Communication & Outreach

City climate action plans should include comprehensive communication, outreach and advocacy programs that target stakeholders within the city government, other government, and non-government sectors (communities, business and other civil society stakeholders). This should be done to ensure that the CAP is accessible to all relevant stakeholders, and the impact of the plan is maximized through public awareness and engagement.

The City of Stockholm achieved go further/best practice in this subcategory, as it outlined plans for ongoing communications updating the community on progress, outcomes and updates to the plan to enable other actors and partners to play their part in delivering the Plan.

Stockholm has established a number of ways to work to communicate the strategy and actions around the CAP. The City has received *Energy and Climate Advice (ECA)* grants from the National Government, which are intended to promote the objectives of the CAP to citizens and SMEs within Stockholm. Activities funded by the ECA include:

- Informational websites
- An advice call center
- Information Campaigns
- On-site energy saving advice to housing associations.

Another way that Stockholm communicates climate work is through the program *Climate Smart Stockholmers (CSS)*. CSS is funded by the City Budget, with a mission to communicate the City's work to reduce GHG emissions, and provide advice to citizens on how to reduce their individual climate impact. Example activities include:

- Annual campaigns focusing on issues such as the climate impact of food in schools
- Production of informational materials
- Participation in City festivals and other events
- Information on the City's website.

7. OVERALL RECOMMENDATIONS FOR THE CITY

The major strengths of Stockholm's Climate Action Plan are comprehensive integration of the plan into regular systems of ongoing governance and administration within the City, as well as a recognition of the plan alongside additional social, economic and environmental outcomes associated with a successful livable city.

As part of a fully effective and Paris compliant CAP, Stockholm should progress plans to undertake and deliver a comprehensive climate risk adaptation assessment. As with other CAP actions, this should be fully integrated and incorporated into future City planning process to ensure positive and efficient development. This will also make it easier to ensure that adaptation and mitigation actions take place in conjunction with one another. A comprehensive assessment of the impact of potential climate risks should be included in this process as well.

While published documentation recognizes the importance of many of the core components of a robust and effective CAP, there is room to incorporate additional quantification of measures and outcomes to make the job of delivering the plan clearer. Stockholm should work to ensure that co-benefits and potential positive outcomes from implemented measures are continually communicated, both in general and specific terms, as this both increases support for actions within the City, and provides documentation of best practice examples for other cities to emulate. Stockholm is encouraged to share lessons learned from its journey toward carbon neutrality, as other cities from around the world will benefit from a collaborative approach and common knowledge framework incorporating solutions and learnings from global examples.

8. APPENDIX 1: METHODOLOGY PROCESS

Suggested CAP Review Process for each city (at 7/12/17)

1. City documentation received from C40
2. Initial Scan of documents - Ramboll Team member allocated for initial review.
 - a. Presence or absence of required documentation noted in Compliance Spreadsheet (CS)
 - b. Initial Ramboll Team member scan of documents, also use of key word coding software
 - c. Full details of response to compliance question, with document reference noted in CS (links and references included)
 - d. Hard copy document pages labelled
 - e. Potential gaps noted
3. Mid-way Ramboll internal CAP review group meeting to oversee document scan. Discuss with C40 any missing documentation or ambiguous materials and/or compliance areas.
4. Contact/meet with cities to ensure that we have all necessary documents, nothing is outstanding. Also use this communication to ask any questions identified in the initial scan which would help with gaps analysis of the cities.
5. Ramboll team member finalisation of document scan
6. Second Ramboll internal CAP review group meeting to oversee document scan results
7. Meeting with C40 to discuss scan and results
8. Ramboll first revisions to CS
9. Presentation of scan results and SC to City – identification of potential gaps and advice to City on actions to fill gaps
10. Opportunity for additional input for City to address gaps
11. Ramboll second revisions to CS
12. Ramboll preparation of draft City CAP Review Report
13. Presentation to City and C40 of CAP Review Report
14. Finalisation of CAP Review Report

9. APPENDIX 2 – LIST OF REFERENCED DOCUMENTS

Future Climate in Stockholm – According to RCP Scenarios. (2015)

Waste Management Plan for Stockholm 2017-2020 (2016)

Climate Adaptation in Stockholm (2017)

Stockholm's Program for Procurement and Purchasing (2017)

Stockholm's Guidelines for Direct Supply and Purchasing (2014)

Strategy for a Fossil-Fuel Free Stockholm by 2040 (2016)

Stockholm Budget 2018-2020 (2017)

The Stockholm Environment Programme 2012-2015

Stockholm's Environmental Program 2016-2019

GreenIT: Green IT Strategy for the City of Stockholm (2008)

Environmental, Climate and Investments in Stockholm (2016)

Reporting of Energy Consumption and GHG Emissions by 2011 and a New Calculation Methodology (2012)

Reporting of Energy Consumption and GHG Emissions by 2012

Reporting of Energy Consumption and GHG Emissions by 2013 (2014)

Reporting of Energy Consumption and GHG Emissions by 2014

Reporting of Energy Consumption and GHG Emissions in 2016

Reporting of Energy Consumption and GHG Emissions in 2017

Good Practice Guide: Municipal Building Efficiency (C40 Cities Climate Leadership Group 2016)

Systematic Climate Work in Stockholm

Stockholm Cloudburst Modelling 2018

Vision 2040: A Stockholm for Everyone (2016)

Stockholm's Path to Fossil-Fuel Free (2018)

City-wide Risk and Vulnerability for the City of Stockholm in 2010 (2011)

Actions to Reduce Climate Change: Cost Effectiveness and Synergies (2018)

Comprehensive Plan for the City of Stockholm (2018)

10. APPENDIX 3 – CAPF COMPATIBILITY SPREADSHEET



Stockholm CAP
Framework Spreadsl