



Final report from the
international expert
panel to review

Mistra's research on climate change

February 2016

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The contents of this report are
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Content

1 Introduction and background	4	Annex 1: Members of climate review panel	15
About Mistra	5	Annex 2: Programmes and centres included in the review	16
The assessment process	5	Annex 3: Mistra SWECIA	19
2 Main Findings	7	Annex 4: Mistra Indigo (and Clipore)	23
3 Recommendations on Mistra’s climate change research activities	9	Annex 5: Mistra Future Forests	26
4 Topics for possible future climate change-related research programmes	11	Annex 6: Mistra Urban Futures (MUF)	29
Transformative changes in society in a future with strong mitigation goals: Sweden 2050	11	Annex 7: Mistra Arctic Sustainable Development (MASD)	32
Bio-economy in Sweden	12	Annex 8: Stockholm Resilience Centre (SRC), Mistra Future Fashion, Mistra Closing the Loop, Mistra Innovation and Mistra Entwined	35
Governance and policy implementation	12	Annex 9: Meetings with stakeholders	37
Adaptation	12		
International context	12		
List of acronyms and definitions	14		

This report describes the conclusions of the international expert panel during its work from October 2015 to February 2016. The report provides the main findings by the panel, recommendations on Mistra’s climate change-related research activities, as well as topics for possible future climate change-related research programmes.

1 Introduction and background

Science can play an important role in solving the climate change challenge, perhaps the most severe global challenge today. Science can inform policy decisions from global to local levels, design and evaluate mitigation and adaptation policies, and support technological development and innovation. In Sweden, Mistra, the Swedish Foundation for Strategic Environmental Research, has an important role as a funder of climate research and over the years has funded a number of long-term research programmes related to climate change.

To assess Mistra's efforts related to climate change, a panel of international experts (hereafter referred to as the expert panel or panel) was requested by Mistra to review the impact of ongoing and, to some extent, completed climate change-related research programmes and centres funded by Mistra (hereafter referred to collectively as programmes), and also to advise Mistra on possible topics for new climate change-related initiatives. The expert panel comprised eight persons (see Annex 1). The expert panel met in Stockholm on 6–7 October 2015, 4–6 November 2015, and 19–21 January 2016. In addition, there were significant written exchanges (e-mail) among panel members. An Interim Report was prepared by 1 December 2015. The Interim Report was made available to the relevant Mistra research programmes for comments. These comments were considered in the panel's preparation of this Final Report.

Mistra requested the expert panel to:

- ▶ “review the outcomes and impact of Mistra's ongoing and completed climate research programmes, including programmes with relevance to while not directly dealing with climate issues,
- ▶ reflect on the major climate change and climate policy challenges, looking beyond 2015 and COP 21 in Paris in December, and how these challenges can/must be tackled, and
- ▶ specify key knowledge gaps and outline the focus and the characteristics of a new Mistra climate initiative (taking Mistra's purpose, modus operandi and possible niches into account)”.

About Mistra

Mistra was established in 1994 and further information can be found at <http://www.mistra.org/>. The expert panel was informed about its statutes, funding, research programmes, the outcomes of previous reviews and Mistra's institutional set-up. The purpose of Mistra is to:

- a) fund world-class research of strategic importance for the environment,
- b) contribute to quality of life, solving key environmental problems and achieving sustainable development, and
- c) build bridges among academic disciplines, and between research and private sector, public agencies and other stakeholders.

The assessment process

Assessment or review of research programmes is common in Mistra, but this is the first time that a thematic area has been reviewed. A goal of this review was to develop recommendations for future Mistra climate-related research, but not to provide any definite judgment on the individual programmes that address climate change issues to a different degree and some of which are still ongoing. It was therefore agreed that the panel's main report should not include a review of each of the more than ten individual Mistra programmes related to climate change (see *Annex 2*), but rather focus on the cross-cutting outcomes.

In this context, it is also noted that the review criteria for the programme as a whole (see *Box 1*) may be different from the criteria valid at the time that the various individual programmes were conceived, and even if they were not different, they might be interpreted differently today.

The expert panel concluded that it was difficult to find indicators that could be used for assessing contributions to meeting the criteria. The panel therefore decided to focus on a qualitative rather than quantitative assessment for each criterion.

The programmes and centres with research activities related to climate change were invited to prepare summary reports to inform the expert panel about their work, including their own assessment in relation to the review criteria. The expert panel also had access to various publications including the programmes' annual reports (see *Annex 2*). In the course of the panel's work, mid-term reviews were also made available for some of the programmes.

To get further insight into some of the key programmes, representatives of five of the programmes met the panel (Mistra SWECIA, Mistra Indigo, Future Forests, Mistra Arctic Sustainable Development and Mistra Urban Futures) to present a brief summary of their work, and this was followed by questions and answers. They were also invited to submit any further points that they would like to make in a brief written submission to the panel. Brief assessments of each of these five programmes are annexed to this report (*Annexes 3–7*).

Very brief descriptions of five programmes (Stockholm Resilience Centre, Mistra Future Fashion, Mistra

BOX 1

Assessment criteria for the review

1. SOCIETAL IMPACT

How has the funded research contributed to climate change mitigation and adaptation, a low carbon economy, and the advancement of climate policy? Have the funded programmes had the intended effect? Have they been of strategic importance?

2. CUTTING-EDGE RESEARCH

Are the funded programmes at the cutting edge of climate and climate policy research?

3. COMPETITIVENESS

How has the research contributed to Sweden's (and, when appropriate, also to Europe's) competitiveness and wealth?

4. CAPACITY BUILDING

How has the funded research contributed to capacity building, both academic (strong and sustainable research environments) and know-how and expertise useful to society?

5. INTERNATIONAL PARTNERSHIPS

How successful have the programmes been in establishing partnerships with leading international climate research institutes, policy think tanks and intergovernmental organizations?

Closing the Loop, Mistra Innovation, and Entwined) not included in the face-to-face meetings are given in *Annex 8*.

The involvement of stakeholders is an important feature of Mistra programmes. Therefore the expert panel met with representatives of the following stakeholders: Swedish Society for Nature Conservation, Swedish Ministry of the Environment and Energy, National Knowledge Centre for Climate Adaptation/Swedish Meteorological and Hydrological Institute, Sveaskog (state owned forest company), and the European Commission. A summary of information provided by these stakeholder representatives is included as *Annex 9*.

The expert panel also met with representatives from a few stakeholders to hear their views on future research needs¹.

¹ The Cross-Party Committee on Environmental Objectives of the Swedish Parliament (Anders Wijkman, Chair) and the Swedish climate change negotiating team in Paris (Anna Lindstedt, Climate Ambassador and Chief Negotiator, and Anders Turesson, Special Advisor, Swedish Ministry of the Environment and Energy)

2 Main Findings

The main findings by the expert panel are presented below. Numbers in parentheses after a finding indicate to which of the five review criteria (see Box 1) the observation mainly applies.

- (i)** The expert panel notes with appreciation the quality and breadth of climate change-related programmes funded by Mistra, covering a wide range of topics from engineering-based analysis of the circular economy or material use in fashion to climate policy and politics, and spanning local Swedish to global scales.
- (ii)** Mistra is an important and distinctive source of funding for climate change research in Sweden. In particular, this distinctiveness arises from an emphasis on interdisciplinary research and stakeholder engagement, and the significant length of funding that is usually offered. The panel notes that several Mistra programmes have been successful in obtaining significant additional financing, thus leveraging Mistra’s funding and engaging other actors. (1, 3, 4)
- (iii)** One of the most attractive aspects of Mistra programmes is the relatively long-term nature of the programmes (normally eight years with a mid-term review). This enables Mistra to set strategic directions, which allows for building the sustained networks, capacity and partnerships required in interdisciplinary research that also involves stakeholders. (2, 4)
- (iv)** It is not always clear how the expertise, networks, knowledge and tools generated during a Mistra programme can be maintained after that funding ends, which may adversely affect the legacy of Mistra programme investments. (1, 2, 4)
- (v)** Although the quality (relative to the five criteria) of the research is variable, Mistra funding has contributed to the formation of several excellent research partnerships (“centres of excellence”). Much of this would not have taken place without Mistra funding. (1–5)
- (vi)** Mistra aims to fund high impact research that contributes to solving environmental problems and that benefits Swedish society and beyond. The panel notes that this often requires scientific excellence combined with stakeholder engagement, which may not necessarily align with the traditional academic definition of “cutting edge” research. (2)
- (vii)** Views gathered from a number of programmes suggest that the administrative requirements associated with a Mistra grant are higher than with some other Swedish funders. However, some programmes also reported that having stringent requirements, e.g., for proposals and reporting, can encourage accountability and facilitate project management.
- (viii)** The panel notes the importance of involvement of Mistra programmes in partnerships with leading international climate research institutes, policy

think tanks and intergovernmental organisations. The extent and character of this varies from programme to programme. (5)

- (ix) Mistra has funded non-Swedish research organisations as part of programmes being led by Swedish researchers. The panel encourages international scientific cooperation while observing that it can be difficult to demonstrate objectively the contribution of the research outside Sweden to Mistra goals. (1, 4, 5)
- (x) A newly introduced programme, the Mistra Fellowship, which provides opportunities for Swedish researchers to work with groups in other countries for a limited time, is an interesting and positive development. (5)
- (xi) Mistra's use of Programme Boards, in essence a group of experts and stakeholders, has been effective in providing high-level guidance and input to the scientific work plans. The role of board members in disseminating research results is also an important contribution to achieving programme outcomes. (1)
- (xii) The panel notes that bringing together social and natural sciences is essential for addressing some of the complex problems arising from climate change. Experience from Mistra programmes demonstrates that this collaboration can be challenging and time-consuming. Although it may adversely affect publication opportunities in disciplinary academic journals, such collaboration from the outset has contributed to the success of some Mistra programmes. (1–5)
- (xiii) Mistra programmes aim for societal impact by providing information to stakeholders through personal contacts, meetings and conferences, and with written material including policy briefs, scientific and non-scientific publications. The panel welcomes the fact that some programmes have also actively engaged stakeholders early on in development of programmes to increase their relevance and impact. (1)
- (xiv) The panel notes that many stakeholders valued personal interactions, presentations and the ability to question researchers more than written materials when learning about research results. (1)
- (xv) The panel found it difficult to evaluate the direct impact of Mistra programmes on competitiveness. It notes that several programmes contribute indirectly to the competitiveness and well-being of Swedish society by improving its preparedness and resilience through an enhanced understanding of climate change impacts and responses, which can lead to increased social license to implement climate change mitigation activities. (3)

3 Recommendations on Mistra's climate change research activities

The Expert Panel recommends that:

1. Mistra should continue its good work related to research on climate change issues and at the same time aim to seek further opportunities to improve the impacts of Mistra programmes.
2. Mistra should consider giving increased attention to synthesising research outcomes from and across programmes, e.g., to inform stakeholders better.
3. Mistra should consult further with its programmes to identify what additional value could be realised through enhanced cooperation between programmes and should provide assistance that could encourage and facilitate such cooperation, avoiding overlaps and competition, e.g., in stakeholder engagement activities.
4. Mistra should maintain its stringent requirements for project proposals, planning and reporting. Programme plans should allow sufficient time to achieve transdisciplinary objectives and incorporate a risk assessment with contingency measures.
5. Connections with international partners and research programmes, initiatives and networks should be further strengthened in future Mistra programmes, taking into account the transferability of Swedish knowledge to other countries and vice versa. Collaborations within Europe could be particularly relevant to foster policy impacts.
6. Mistra should explore different international partnership arrangements between Swedish and non-Swedish researchers to meet its objectives, such as scientific excellence, societal impacts and capacity building. One new possibility could be joint research calls with non-Swedish funders.
7. The Mistra Fellowship, providing opportunities for Swedish researchers to work with groups in other countries for a limited time, should be expanded to fund leading international experts to spend some time in a Swedish organisation bringing in world-leading expertise (in the short term) and helping to build domestic capacity (in the longer term).
8. Where excellence has been achieved and the need for the research and the dissemination and application of its results remains, Mistra should enhance its efforts together with programme teams to secure the legacy of its research investments. This could include arrangements with other funding agencies, ministries, universities and research institutions, and the private sector to ensure that the relevant expertise, networks, knowledge and tools generated during Mistra programmes are maintained.

- 9.** Mistra should explore how tools, data and other programme results (websites, etc.) can be made widely available, e.g., by ensuring that published papers continue to have open access and through open access data repositories and national information portals. Tools and databases should be tailored to user needs (e.g., documentation, user interfaces, websites) and, where the opportunity for additional impact exists, maintained after programme completion. Mistra should request that proposals describe a process for the maintenance of programme outcomes after the funding ends.
- 10.** Mistra should further enhance the involvement of stakeholders in its climate research programmes, matching levels of engagement with programme stages. The different levels of engagement range from providing information all the way through to sharing decision-making, depending on the goals of the activities. This should be considered at all stages of programmes from the development of calls for proposals through programme delivery, communication of results and advice on potential follow-up. Stakeholder involvement on programme boards is essential.
- 11.** Mistra should encourage and support communications training to scientists who interact with the policy community, media and other stakeholders to enhance the impact of research results.
- 12.** Mistra should work together with its programmes and draw on international experience to develop guidance on best practice in terms of indicators for Mistra's evaluation criteria that balance rigour with burden. Particular attention should be given to developing indicators for assessing societal impact, competitiveness and capacity building, the criteria that the panel found most difficult to evaluate. Additionally, Mistra should improve the communication of its expectations tailored to each programme.

4 Topics for possible future climate change-related research programmes

The topics below are considered relevant for Swedish research related to climate change based on Mistra's past climate change activities, research needs identified by stakeholders, the outcome of COP 21 in Paris and the expert panel's own assessment of knowledge gaps. The selection has taken into account the characteristics that distinguish Mistra from other Swedish research funders; namely the interdisciplinary and long-term nature of the research programmes and the importance placed on stakeholder engagement.

Impacts and outcomes of work on the suggested topics would also benefit from the results of research on the effectiveness of science communication and on appropriate ways of implementing multi- and interdisciplinary research and of involving stakeholders (transdisciplinary research).

The topics have been grouped under five main headings but the elements can also be recombined in the development of Mistra calls for proposals. The listing below does not indicate any order of priority.

Transformative changes in society in a future with strong mitigation goals: Sweden 2050

- ▶ The technological, social and economic transitions for Sweden to create the first fossil fuel free welfare state: What are the pathways? How are the impacts distributed across society? What are their implications for consumption- and production-based emission estimates? Where are the opportunities and barriers nationally and internationally? What are the implications of the pathway to Sweden 2050 for the Swedish contribution to the EU's successive Nationally Determined Contributions and other environmental objectives?
- ▶ Transformation of the focus from quantitative growth to qualitative growth and sustainable development, e.g., addressing pathways, indicators, acceptance and competitiveness. Assessments should go beyond traditional concepts, methods and tools in economics, bringing in insights from fields such as other social sciences and the natural sciences.
- ▶ Decarbonising Swedish manufacturing and building: moving away from materials with high fossil fuel inputs or high process emissions, as well as re-use and recycling of materials; development of new technologies, practices, codes and policies; influencing consumer behaviour and acceptance.
- ▶ Decarbonising the Swedish food system: energy and emissions balances of alternative strategies to providing food for Sweden (including production, retail and transport) and links to food security and self-sufficiency; consumer behaviour (incl. waste reduction) and acceptance of a low carbon diet.

- ▶ Climate change and a Swedish “Blue Economy”: interdependence of healthy seas (ocean acidification), well-managed coastlines (sea level rise), and strong, decarbonised coastal and marine economies (fishery sector, aquaculture, maritime transport, vital coastal communities, tourism).
-

Bio-economy in Sweden

- ▶ Decarbonisation of the economy with special focus on the role of forests in Sweden and transfer of knowledge and technology to other countries with boreal forests.
 - ▶ Potential use of long-lived wood products to reduce emissions from uses of other materials, e.g., concrete, steel, plastics.
 - ▶ The contribution of land use to emission reduction pathways, negative emissions, food security, biodiversity and pollution.
 - ▶ Socio-economic implications, e.g., competitiveness, job creation, trade balances, relationship with fossil fuel prices and investments in stranded assets. Assessments should go beyond traditional concepts, methods and tools in economics bringing in insights from fields such as other social sciences and the natural sciences.
-

Governance and policy implementation

- ▶ The role of authorities at all levels in Sweden and the EU; interaction of all levels of governance and policy areas in implementing the *Sweden 2050* and bio-economy transformation pathways.
 - ▶ Good practices for the engagement of non-governmental actors in implementing pathways.
 - ▶ How can small businesses plan for and adapt to the new reality of a fossil fuel-free future and what are the opportunities and barriers? This focus is to make sure that small businesses do not get left behind compared to large businesses that have strategic planning capacity and expertise.
 - ▶ Effective finance, policy instruments and business models in support of pathways to a low carbon economy.
-

Adaptation

- ▶ Climate change impacts on vulnerable groups in society in Sweden.
 - ▶ Adaptation and resilience in Swedish cities and municipalities, including infrastructure with long life time, costs and multiple benefits of adaptation measures, planning for extreme events and disaster risk response.
 - ▶ Moving from incremental adaptation to larger scale, systemic, transformational changes.
 - ▶ Analysis of direct and indirect climate impacts, both opportunities and risks, on Swedish society and competitiveness.
-

International context

- ▶ Sweden’s role in supporting developing countries with the development and implementation of their successive Nationally Determined Contributions: climate finance, knowledge transfer, technology transfer (leap-frogging), capacity building and governance.

- ▶ Climate change-related food and water crises, resource conflicts, security issues and migration: risks, impacts and responses.
 - ▶ Which additional measures may be required to ensure that independently-developed bottom-up approaches will meet the temperature targets of the Paris Agreement?
 - ▶ Transparency of and confidence in the post-2020 climate regime: how to achieve and sustain systems for the measurement, reporting and verification of emissions reductions and other elements under the Paris Agreement.
-

List of acronyms and definitions

CEPS: Centre for European Policy Studies

Clipore: Mistra's Climate Policy Research Programme

COP: Conference of the Parties under the United Nations Framework Convention on Climate Change (UNFCCC)²

EU ETS: European Union Emissions Trading System

ICLEI: Local Governments for Sustainability (founded in 1990 as the International Council for Local Environmental Initiatives)

IIASA: International Institute for Applied Systems Analysis (Laxenburg, Austria)

IPCC: Intergovernmental Panel on Climate Change

IPCC AR5: IPCC's Fifth Assessment Report (2013-2014)

IPCC SRES: IPCC's Special Report on Emissions Scenarios

IVL: Swedish Environmental Research Institute

LIP: Local Interaction Platform

LPJ-GUESS: Lund-Potsdam-Jena General Ecosystem Simulator³

MAF: Mistra Arctic Futures

MASD: Mistra Arctic Sustainable Development

Mistra: Stiftelsen för miljöstrategisk forskning (Swedish Foundation for Strategic Environmental Research)

Mistra Indigo: Instrument Design for Global Climate Change Mitigation

MUF: Mistra Urban Futures

NGO: Non-Governmental Organisation

RFF: Resources for the Future

SEI: Stockholm Environment Institute

Sida: Swedish International Development Cooperation Agency

SMHI: Swedish Meteorological and Hydrological Institute

SRC: Stockholm Resilience Centre

SWECIA: Swedish research programme on Climate, Impacts and Adaptation

² COP 21 took place in Paris, France, 30 November to 11 December 2015 and adopted the Paris Agreement

³ A process-based dynamic vegetation-terrestrial ecosystem model designed for regional or global studies

Annex 1:

Members of climate review panel

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Annex 2:

Programmes and centres included in the review

Programme/Centre Status	Mistra's total financial contribution (SEK*) Funding period	Short description	Submitted material for the review
Mistra-SWECIA (Swedish Research Programme on Climate, Impacts and Adaptation) Ongoing	87m 2008-2015	This programme develops research-based documentation for decisions on climate change, its impacts and the process of climate adaptation. It has a special focus on forestry.	Report prepared for the review Annexes: <ul style="list-style-type: none"> ▶ Annual reports ▶ Programme plan, Phase I ▶ Programme plan, Phase II ▶ Progress report (2011) ▶ Report no. 5, The climate and the economy
Mistra Indigo (Instrument Design for Global Climate Mitigation) Ongoing	24m 2012-2015	Research on the design and the selection of environmental policy instruments to promote long-term, cost-effective global mitigation of climate change, taking into account the uncertain international policy situation	Combined Indigo and Clipore Report prepared for the review Annexes: <ul style="list-style-type: none"> ▶ Annual Report 2014 ▶ Policy Paper 5. Europe's Choice – Facts and Function of the EU Emission Trading System ▶ Policy Paper 2. What is the Value of Being First – Perspective From the California and Sweden Experience ▶ European Climate Platform: 10th anniversary ▶ 'Climate Policy Options and Consequences in the International Spotlight'
Clipore (Climate Policy Research Programme) Completed	111m 2004-2011	Clipore preceded Mistra Indigo and was a broad climate policy research programme that included economic instruments, technology policy, governance and leadership, and climate policy in developing countries.	Combined Indigo and Clipore Report prepared for the review Annexes: <ul style="list-style-type: none"> ▶ Annual report 2009 ▶ Clipore Key Research Findings 2004-2011 ▶ Special issue of Ambio (Vol. 41 Supplement 1 2012)

Programme/Centre Status	Mistra's total financial contribution (SEK*) Funding period	Short description	Submitted material for the review
Future Forests Ongoing	111m 2009–2016	Future Forests develops knowledge for sustainable management of forests preparing for a future characterised by globalisation and climate change.	Report prepared for the review Annexes: ▶ Programme plan 2013–2016 ▶ Future Forests Magazine 2013
Stockholm Resilience Centre (SRC) Ongoing	198m 2007–2018	SRC (at Stockholm University) advances research on the governance of social-ecological systems with a special emphasis on resilience.	Report prepared for the review Annex: ▶ Annual Report 2014
Mistra Arctic Sustainable Development (MASD) Ongoing	30m 2014–2018	The main theme of this programme is governance of the European Arctic mainland region. Seven different economic or municipal sectors are in focus, namely mining, forestry, oil and gas exploration, fishing, reindeer husbandry, tourism industry and municipal planning.	Report prepared for the review Annexes: ▶ Annual Report 2014 ▶ Programme Plan
Mistra Arctic Futures (MAF) Completed	38m 2011–2013	Mistra Arctic Futures preceded MASD, and was an interdisciplinary and social-science-oriented research programme with five distinct research projects that would contribute to strengthening the knowledge base on questions of particular relevance for development in the Arctic but with global relevance as well.	Report prepared for the review
Mistra Urban Futures (MUF) Ongoing	155m 2010–2019	Mistra Urban Futures is an international centre for sustainable urban development. The centre has four local platforms in Cape Town, Kisumu, Gothenburg and Manchester.	Report prepared for the review
Mistra Future Fashion Ongoing	80m 2011–2019	The programme delivers insights and solutions that will be used by the Swedish fashion industry and other stakeholders to significantly improve the environmental performance and strengthen their global competitiveness.	▶ 'Future Fashion Manifesto' ▶ Annual Report 2014
Entwined (Environment and Trade in a World of Interdependence) Completed	53m 2007–2013	The programme ENTWINED, Environment and Trade in a World of Interdependence, had as its main aim to investigate how to better integrate environmental aspects into international trade negotiations in an increasingly entwined global economy.	Report prepared for the review

Continues on next page ▶

Programme/Centre Status	Mistra's total financial contribution (SEK*) Funding period	Short description	Submitted material for the review
Mistra Closing the loop Ongoing	36m 2012–2014	This programme, comprising seven individual projects, is developing methods that will increase the proportion of industrial waste that is recovered or recycled.	Report prepared for the review
Mistra Innovation Ongoing	88m 2012–2019	Mistra Innovation supports the development of innovative ideas through the interaction of small and medium sized enterprises (SMEs) with universities and other research institutes.	Summaries of five of the projects within the programme

*1 SEK corresponds to approximately 0.1 EUR or USD

Annex 3:

Mistra SWECIA

Expert panel comments

General issues

- ▶ SWECIA is a research programme on climate, impacts and adaptation, including and connecting disciplinary research on climate science, biology/ecology, economics, and social sciences. It aims to create a capacity for advanced analysis and consistent assessment of climate, economy and impacts, for a significant part relying on a toolbox of models to achieve the aims. It runs from 2008-2015 with a mid-term review in 2011 and has a Mistra contribution of 87M SEK.
- ▶ The material provided to the expert panel before its 1st meeting included annual SWECIA reports, the programme plan for Phase II (2012-2015), and selected publications. The Programme Director, Markku Rummukainen and Ben Smith, a member of the project management group presented the programme achievements and answered questions from the panel during the meeting. The report of the 2011 mid-term review and the SWECIA Programme plans for Phase I and Phase II were provided to the team at the meeting, but after these presentations. Shortly after the meeting, the programme team submitted one page with additional information responding to issues raised during the Q&A session and in a response to the panel's Interim Report, the SWECIA team provided additional information for the panel to take into account.
- ▶ The group of SWECIA researchers as a whole continues to include world-class scientists in their area of work, a competent programme manager and management group, and a balanced Programme Board suitably covering the scope and focus of the programme. Information provided to the panel indicated that staff changes may have slowed down progress in some areas.
- ▶ While it is noted that at the time of the first meeting of the panel, the programme was scheduled to continue for another 3 months in which much reporting and synthesising work is planned, the expert panel notes several problems in meeting the SWECIA objectives. The general impression of the expert panel is that the level of ambition of SWECIA may have been too high as compared to available time and resources, an issue that was previously raised by the mid-term expert panel.
- ▶ SWECIA in Phase II has focused on the important forestry sector as recommended by the mid-term evaluation. Taking into account the high ambitions and complex nature of the programme, the expert panel considers this a good choice.

Societal impacts

- ▶ The expert panel is pleased to note that SWECIA, by concentrating its efforts on the forestry sector, has indeed implemented useful stakeholder interactions during Phase II. Because SWECIA is coming to an end, the commitment of these stakeholders and hence the continuity of the network however is still uncertain.
- ▶ The expert panel noted that limited information was provided about SWECIA collaboration with other Mistra-funded programmes, e.g., with Future Forests (see Annex 5), which has overlapping objectives and hence similar stakeholders. Information received after the panel's second meeting indicated that collaboration between these programmes in synthesising programme results is planned.
- ▶ Phase II of SWECIA has three areas of focus and five specific projects⁴. Of these projects, actual stakeholder involvement was mainly implemented in Component III and to a more limited extent in Component I, focusing on the forestry sector. For the other components and associated projects, societal impacts are mainly resulting from outreach activities by the project team and are constrained by the fact that many of the methods and tools were still under development and not ready for application for concrete stakeholder questions.
- ▶ The expert panel concludes that SWECIA has successfully focused on information and consultation for various programme components. Compared to Component III, societal actors do not seem to have been involved to the same extent in designing the SWECIA components I and II toolbox, although the researchers stated that they have been mindful of possible relevant policy questions.
- ▶ The large number of presentations reported to the panel given during the eight year SWECIA programme includes an increasing audience of societal stakeholders in addition to scientific audiences. Many of such presentations were not specifically about SWECIA or its findings, but about climate change in general, which is very useful but cannot be fully ascribed to SWECIA as a research programme. It does confirm however the stature of the researchers involved in SWECIA.
- ▶ An expected outcome of SWECIA Phase II was the “development and demonstration of the utility of a sustained interactive model for outreach, decision-support and communication on climate change and adaptation”. While steps in this direction have been taken, the selective nature and the relatively late start of some of the stakeholder interactions do not yet ensure a “sustained” platform. The Panel notes that the recent establishment of a National Knowledge Centre for Climate Adaptation – not directly linked to SWECIA – may serve as such an interactive model.

Cutting edge research

- ▶ The foreseen SWECIA outcomes of “forging a core group of interdisciplinary Swedish climate scientists with established collaboration and a demonstrated ability to produce top-class research” and “contributions to the development of solid Swedish capacity for integrated model-based analysis of climate change, related impacts and economic assessments of such change” have been achieved. This is partly demonstrated by the fact that researchers active in SWECIA were invited to be part of international scientific endeavours such as the IPCC. However as the SWECIA report to Mistra suggests: “some of the research goals that had been set remained within basic research, and might not come to extensive use during the overall programme period”. This last statement confirms the panel's

⁴ Component I: Regional adaptation (1. Research on climate change adaptation processes; 2. Research on regional climate modelling: high resolution climate projections, impact modelling and risk assessment); Component II: Global drivers (3. Climate-economy modelling, 4. Global Climate Projections, 5. Land-use narratives); Component III: Partner-driven studies and synthesis.

impression that the expectations outlined at the start of the project and revised at the time of the mid-term review in terms of testing and application of the research results have not yet been fully met. Reasons may include factors such as an underestimation of the time needed for complex modelling, building stakeholder networks and international collaborations.

- ▶ In some areas SWECIA work has consolidated the cutting edge nature of some of the research, such as for climate modelling and global vegetation modelling. In other areas (e.g., (macro-) economics, adaptation, agent-based modelling, and indirect impacts) the expert panel considers that this is not currently the case, but work in progress may change this.
- ▶ The ambition to arrive at full interdisciplinary integration of the three main SWECIA themes: climate, impacts and adaptation is, in the view of the panel, not yet met, with a few exceptions.
- ▶ Building on the Regional Integrated model of Climate and the Economy (RICE) and other existing macro-economic climate models gave SWECIA a well-established starting point, but it is not clear to the panel how SWECIA has pushed forward the frontiers of knowledge. Moreover the practical applications of such stylised tools for real-world complexities should be treated with caution. Collaboration with other Mistra-funded teams involved in other Swedish environmental economics programmes such as Clipore/Mistra Indigo and Mistra Entwined and the associated institutions is not mentioned.
- ▶ Taking into account work of more than a decade ago, e.g., on downscaling the IPCC SRES scenarios, the expert panel has reservations about the meaningfulness of downscaling of socio-economic indicators to a high resolution grid in SWECIA's multiregional model, and suggests great caution in applying and communicating results of such efforts, e.g., to avoid implausible outcomes when downscaling average economic or population indicators from large world regions to (sub-) national and grid level.
- ▶ Activities such as analyses of indirect impacts and agent-based modelling are emerging themes, and SWECIA scientists should be able to catch up quickly and then make advances. So far, advances in SWECIA Phase II seem to be below original expectations in SWECIA's revised programme plan since no significant output has yet been published.
- ▶ The reported SWECIA output in terms of numbers of publications is significant. A significant number of the publications appear to be only partially related to the interdisciplinary goals of the programme. The research reported also involves related but parallel programmes.
- ▶ The SWECIA report notes for the Integrated Assessment Modelling framework that “the set of applications that are around the corner is large” but then mentions adding “more sectors” and “scientific analyses”, without articulating specific societal questions (or scientific questions for that matter) that the framework would help to address, suggesting a mainly science-driven rather than a mainly policy-driven approach.

Competitiveness

- ▶ The Mistra criterion “competitiveness” is particularly hard to evaluate for any research programme and because a precise definition of the criterion is missing, SWECIA does not use such indicators (neither does Mistra), but claims improved knowledge of climate change impacts and adaptation as a factor strengthening resilience and hence protecting competitiveness of the Swedish forestry sector.

Capacity building

- ▶ Through collaboration between senior and junior scientists SWECIA is fostering capacity in universities and research institutions in the area of climate, impacts and adaptation, for example as reflected by a significant number of PhD students.
- ▶ SWECIA's stakeholder engagement work in the forestry sector and additional outreach to other sectors and different government levels through presentations and participation of SWECIA staff in meetings and workshops fosters enhanced knowledge about climate, impacts and adaptation in relevant societal groups. As the research further matures, these capacity building activities can further be strengthened. The involvement of various SWECIA partners in Swedish academic programmes and institutions has already facilitated inclusion of SWECIA tools in academic curricula, even if this had not yet been planned explicitly.
- ▶ SWECIA reported to the panel that “the programme's economists did not have prior background in either climate research or environmental economics in general”. Mistra funding therefore contributed to building climate economics capacity in SWECIA.

International partnerships

- ▶ In particular through the consolidation and strengthening of the EC-Earth (SMHI) and LPJ-GUESS models (Lund University) and the adaptation work (SEI), much of the SWECIA work on methods and tools is well connected to international networks in the relevant areas.

Annex 4:

Mistra Indigo (and Clipore)

Expert panel comments

Background

- ▶ This review is based on the following sources of information:
 - ▶ a report submitted by the Mistra Indigo research team covering the work of both Mistra Clipore and Mistra Indigo over the period from 2004 to 2015;
 - ▶ a meeting between the expert panel and Lars Zetterberg (Project leader of Clipore and Principal investigator in Mistra Indigo) and Inge Horkeby (Chairman of the Programme Board of both Clipore and Mistra Indigo) and a short summary note of key points provided by them afterwards; and
 - ▶ various other reports and papers produced by the Clipore and Indigo research programmes.
- ▶ Clipore was a seven year (2004-2011), 106 MSEK, research programme hosted by IVL Swedish Environmental Research Institute and with the involvement of a further eight organisations (four based outside Sweden). This has been followed by a four year (2012 – 2015) programme called Mistra Indigo (24.5 MSEK), also led by IVL with a further two partners (University of Gothenburg, and Resources for the Future (RFF)). As Clipore ended some time ago and was already subject to a programme review, the main focus of this note is on Mistra Indigo.
- ▶ Both Clipore and Mistra Indigo were intended to support international climate change negotiations, agreements and policies through social science research. While Clipore had a strongly interdisciplinary approach involving political science, economics, engineering and physics, Mistra Indigo has primarily focused on economics-related research.

Societal impact

- ▶ A high societal impact is reported by the programmes themselves, but without quantifiable metrics it is difficult for the expert panel to make an independent assessment across all the activities of the programmes.
- ▶ Both Clipore and Mistra Indigo have focussed on climate policy developments in Europe and North America. The role of carbon markets has been a strong feature of the work, with considerable effort spent analysing various aspects of the EU emissions trading scheme (EU ETS) and, more recently, various emission trading programmes in the US. Several researchers have been involved in national and international expert groups including the IPCC.
- ▶ The EU focused work has had significant impact in Sweden, with the programmes' teams having very high-level interactions with both government and industry figures. A particular highlight would appear to be discussions during 2012-14

with the Swedish Environment minister and her staff, which helped to inform Sweden's position on changes to the EU ETS.

- ▶ The broader impact of the two programmes on climate policy in Europe is harder to identify because of the many researchers and other actors involved in the debate. The programmes have been very clear on the need for the auctioning of permits under the EU ETS - but this message does not seem to have been fully taken on board by policy-makers. The researchers claim more success in helping to shape the design of the Market Stability Reserve and there is certainly evidence that they strongly influenced the Swedish position on this topic.
- ▶ Mistra-funded researchers at RFF have also been influential in the debate in North America, in particular around the design of the Emissions Trading System in California and the Regional Greenhouse Gas Initiative (RGGI, a cooperative effort among nine US states). However, it is less clear to what extent this impact was as a direct result of Mistra funding, given the substantial resources and influence that RFF already have.

Cutting-edge research

- ▶ The funding from Mistra has clearly allowed Swedish researchers to engage in some internationally significant research activities relating to carbon markets, including working with world-leading experts.
- ▶ The volume of academic output from the programmes is substantial, with a significant number of papers in top journals and a large number of policy briefs and documents. The programmes have also identified a number of papers that they believe have particular scientific or policy importance. These papers often have multiple authors, including frequently some who are not funded by Mistra. While this demonstrates that Mistra researchers have good collaborative links to a wide range of other (international) experts, it also makes it difficult to tell what has been the precise scientific contribution of the Mistra-funded work.
- ▶ In discussions with the expert panel, the programme representatives noted that they had experienced a tension between undertaking cutting-edge scientific research and providing results that were of immediate practical value to the climate policy debate.

Competitiveness

- ▶ Measuring the impact of the research on competitiveness and wealth is clearly not straightforward. However, the programme report notes that the research has considered industrial competitiveness through developing, analysing and promoting the introduction of policies that are harmonised and neutral from a competitiveness viewpoint. Certainly, it would seem logical that to the extent Mistra research has helped to design well-functioning and economically-efficient carbon markets and other climate policies both in Europe and North America, then this should help promote competitiveness and wealth.

Capacity building

- ▶ The Clipore and Mistra Indigo programmes have helped significantly in building the capacity of Swedish researchers in techniques relevant to the economic analysis of climate policies. There would now seem to be a vibrant research community in this area, with a growing international reputation.
- ▶ Two researchers engaged in the programmes have received their PhDs based on work at least partially funded by Mistra and a number of scientists have undertaken exchange visits, including a successful fellowship at the Centre for European Studies (CEPS). Several research assistants that were involved

in the programmes have gone on to pursue PhD degrees at world-renowned universities.

- ▶ Some evidence was presented by the programme that their work has led to a stakeholder community (both industry and policy-makers) that is both more engaged in debates about climate policy instruments and better informed about the pros and cons of different options.
- ▶ A key challenge for the researchers involved in Mistra Indigo is how to sustain their research, and so maintain their expertise, after the end of the programme later this year. While Mistra has plans to continue research in the climate change area, it is not clear whether this will offer opportunities for the continuation of economics research on climate policy.

International partnerships

- ▶ The programmes have been very successful in establishing partnerships with a number of leading European and North American research institutes and think-tanks including RFF and CEPS. The link with RFF has been vital in getting influence in the US and the link to CEPS in the European Climate Platform has helped communicate Clipore and Mistra Indigo results to a wide set of European policy-makers and stakeholders.
- ▶ In addition, Clipore and Mistra Indigo researchers have been contributing authors to the IPCC's Fifth Assessment Report (AR5) and have built links with a range of European research institutes.
- ▶ A key challenge for the Swedish researchers will be how to continue these links if direct funding by Mistra of international research institutes is no longer available. Do the Swedish organisations now have sufficient research standing such that they are desirable partners in international collaborative projects?
- ▶ Finally, it is worth noting that the programme representatives felt that there could have been value in stronger co-operation with other Mistra climate change programmes, although they also acknowledged the challenges of working with researchers from different disciplines.

Annex 5:

Mistra Future Forests

Expert panel comments

Background

- ▶ The international expert panel received a report summarising the activities of Mistra Future Forests prior to the hearing, the presentation by Programme Director Annika Nordin and Deputy Programme Director Camilla Sandström at the first hearing, and a 1-page summary after the meeting following up on specific questions raised by the expert panel.
- ▶ Mistra Future Forests was started in 2009, is currently in its 7th year, and is expected to complete its activities in 2016.
- ▶ The mission of Future Forests is “to provide a scientifically robust knowledge base for sustainable management of forests preparing for a future characterized by globalization and climate change.” To achieve this goal, the Future Forests team brought together scientists and stakeholders from a wide range of Swedish society and abroad and embarked on a truly interdisciplinary research programme accompanied by effective stakeholder engagements to help extract views on the future of Sweden’s forest sector.
- ▶ Total funding for Future Forests is 255.2 million SEK, of which Mistra provided 111.2 million SEK (44%), the forest sector 78 million SEK (31%) and the Universities 66 million SEK (26%). Clearly the funds provided by Mistra have been leveraged very well with leveraged funds representing 129% of the funds provided by Mistra.
- ▶ Following Future Forests’ mid-term review in 2012 the programme was re-organised in the second phase to further increase efficiencies. Those scientists who performed well in the first phase were assigned greater responsibility in the second phase.
- ▶ The expert panel commends Future Forests as a well-managed programme whose leadership has been responsive to external comments and changing circumstances to ensure that the programme continues to deliver on its aims.

Societal Impacts

- ▶ Societal impacts are difficult to quantify and Mistra does not provide any consistent indicators to measure project outcome and longer-term impacts. However, the Future Forests team has conducted and published significant amounts of new research findings, and has translated the results of their work into over 430 presentations. The expert panel notes that the active engagement of stakeholders from all ranges of society throughout all project stages clearly contributes to information dissemination and has an impact on society’s views of future

management of Swedish forests. Moreover, the production of a technical magazine that summarises research results and other relevant topics and that is distributed twice per year to the 230,000 Swedish forest owners will also affect society's views of climate change, its impacts, adaptation and mitigation options and future contributions of the Swedish forest sector towards a low carbon economy.

- ▶ The ability of the Future Forest team to include both social scientists and natural scientists from the beginning is an important achievement that has contributed to the wide reach of their results.

Cutting edge research

- ▶ The Future Forest project has been exceptionally productive listing over 250 peer-reviewed publications on its website from 2009 onwards: <http://www.slu.se/en/collaborative-centres-and-projects/future-forests/publications/peer-reviewed-publications/>, some of which have been published in high-impact journals. Many of the publications are on specific, disciplinary issues in a variety of disciplines.
- ▶ These publications cover a wide-range of topics including: forest stream ecology and biochemistry, biodiversity, climate change impacts on forests, root diseases, silvicultural treatments, climate change mitigation options, bioenergy; stakeholder engagement, and governance.
- ▶ The Programme Director highlighted the plan to produce several interdisciplinary synthesis and summary papers in the last year of the programme. The research for such papers has been conducted and the expert panel encourages the Future Forests team to complete these papers prior to the end of the project. Such synthesis papers would further add to the value and impacts of the programme and while they may not be publishable in “cutting edge” scientific journals (which focus on single disciplines) their findings will be of considerable interest to both the scientific and policy communities. Following the second meeting of the panel, Future Forests published a Special Issue in the open access journal *Ambio* (<http://link.springer.com/journal/13280/45/2/suppl/page/1>). The Special Issue consists of 14 inter- and multidisciplinary scientific articles by Future Forests researchers.
- ▶ In addition to domestic seminars and presentations Future Forests also had an international impact through their publications (see below) and seminars at international conferences (IUFRO World Congress 2014, FAO World Forestry Congress 2015).
- ▶ Perhaps the most “cutting edge” impacts of the Future Forests project lie in the work on stakeholder engagement in the visioning of alternative forest futures and the steps required (back-casting) to achieve such outcomes in the face of a changing climate.

Competitiveness

- ▶ The forest sector has historically contributed very significantly to Sweden's society. As it has grown to one of the most productive forest sectors in the world, an understanding of the costs of the emphasis on forest productivity and timber-focused management has evolved. For example, implications for biodiversity, risk of disturbances such as wind throw and insects, and competing interests such as recreation or reindeer herding need to be considered as the future role of the Swedish forest sector is considered. Future Forests is the largest forest research initiative in the history of Sweden and it has taken a novel and effective approach to stakeholder engagement and interdisciplinary research.

- ▶ The development of scientific research findings, tools (e.g., for hydrological mapping and for decision support based on future projections of forest growth), the magazine summarising results for private land owners, and other activities are all pointing at contributions to enhance the competitiveness of the Swedish forest sector.
- ▶ Perhaps of greatest significance are the contributions of Future Forests to maintain and enhance the social licence for the Swedish forest sector to continue to operate by helping to identify and describe alternative pathways and by contributing to develop common ground and consensus on adaptive management approaches that take into consideration various objectives, including climate change mitigation and adaptation.

Capacity building

- ▶ The report to the expert panel highlights some of the main achievements of the Future Forests research network that includes over 70 researchers in 16 different departments at 8 major universities in Sweden and abroad.
- ▶ The expert panel noted that while two of the Mistra-funded programmes (Future Forests and SWECIA) addressed forests, the activities of the two programmes were not well coordinated by either Mistra or the leadership of the two programmes. Some informal cooperation (e.g., participation in field trips) and sharing of results did occur, but given the scale of the two programmes further cooperation, facilitated by the Mistra secretariat, could have been beneficial to help meet Mistra's objectives.
- ▶ One of the key challenges will be to find mechanisms to sustain the effective elements of this important research network. Discontinuing all Mistra research funding in 2016 could prove highly disruptive and discouraging in particular to those young Swedish researchers who have made significant contributions to the programme and to Sweden's competitiveness in the global forest sector.

International partnerships

- ▶ Future Forests has engaged in several international partnerships, most notably a joint project with a team at the International Institute of Applied Systems Analysis (IIASA) to assess the potential future contribution of changes in Swedish Forests to the global forest sector through IIASA's GLOBBIOM cluster of models. The collaboration included analytical modelling work and the publication of an 11-chapter book on "*The future use of Nordic forests - a global perspective*" (<http://www.springer.com/us/book/9783319142173>).
- ▶ Future Forests is also involved in international projects with the European Forest Institute (EFI), the International Union of Forest Research Organisations (IUFRO) and the International Boreal Forest Research Association (IBFRA). All of these contribute to a better international appreciation of the Swedish forest sector and the exchange of information related to the future management of boreal forests in Sweden and other circumboreal countries.

Annex 6:

Mistra Urban Futures (MUF)

Expert panel comments

Background

- ▶ The expert panel listened to a presentation by David Simon, director of Mistra Urban Futures (MUF), via video/telephone with opportunity for questions after the presentation.
- ▶ Prior to the presentation, the panel received for review two documents:
 - ▶ The MUF impact report “Climate Change and Mistra Urban Futures”
 - ▶ A MUF policy brief: “Understanding climate adaptation and transformation challenges in African cities”
- ▶ After the presentation, the panel received additional background documents:
 - ▶ Mistra Urban Futures Progress Report 2010-2014 <http://www.mistraurbanfutures.org/sites/default/files/mistraurbanfutures-progressreport-digital.pdf>
 - ▶ Mistra Urban Futures mid-term evaluation and final field work evaluation report, May 2015
- ▶ The panel did not interview stakeholders of the centre.
- ▶ MUF began in 2010, with a two-year planning grant from Mistra. MUF has completed the first operational phase of the project, with a mid-term review in 2015. The second phase runs from 2016-2019.
- ▶ MUF is coordinated by a consortium of institutions called the Gothenburg Consortium,⁵ hosted by Chalmers University of Technology, with four local interaction platforms (LIPs) in Gothenburg, Sweden; Manchester, England; Kisumu, Kenya; and Cape Town, South Africa. Mistra’s funding of Urban Futures is mainly for the Gothenburg LIP. Other LIPs are required to co-fund the centre (approximately with 20 % of the total budget for the centre). Sida (the Swedish International Development Cooperation Agency) provides funding mainly for Kisumu and Cape Town.
- ▶ MUF is not specifically focused on the question of climate change. According to its director, “its principal focus is locally appropriate knowledge generation for promoting transitions to sustainable urban development through co-production. Climate/environmental change is one aspect of this, addressed in different ways in each LIP during Phase 2.” In its Phase 2, the centre’s objectives are to:

⁵ The Gothenburg Consortium: Chalmers University of Technology, Göteborg Region Association of Local Authorities (GR), City of Gothenburg, University of Gothenburg, IVL Swedish Environmental Research Institute, the County Administration Board of Västra Götaland, Region Västra Götaland. There are also four associated partners: the Swedish Transport Administration, the Swedish National Board of Housing, Building and Planning, SP Technical Research Institute of Sweden and White Architects.

- ▶ deliver evidence-based outcomes that address the challenges facing cities, and which make a difference in practice, and
 - ▶ diversify the centre’s research base and forge strategic partnerships with selected international organisations.
- ▶ A motivating question for the climate-relevant work of MUF might be: “How can towns and cities undertake adaptive transformations towards sustainability in order to cope with climate change?” (MUF impact report)

Societal impact

- ▶ The first phase of the centre has apparently been successful in co-production/co-creation of knowledge with a broad range of stakeholders across the four LIPs.
- ▶ The MUF impact report states that “[i]n Sweden, particularly the WISE ⁶ project has had a significant impact, as it has succeeded to reach also a wider audience through media, including television and papers.”
- ▶ The emphasis on stakeholder involvement and co-creation is very interesting and positive. While only successes and outcomes are reported, there is much to learn also from failures and the processes involved. Future products of the centre could include exploration of these as well. In subsequent communication with the expert panel, MUF notes that these issues “are all receiving direct research attention either in current work or planned for 2016 – as detailed in our Strategic Plan (both the original and recently revised versions) and the Centre Operating Plan 2016.”

Cutting-edge research

- ▶ As noted above, MUF uses a distinct methodology of co-production and co-creation of knowledge with stakeholders, which seems to be quite successful.
- ▶ The distinct methodology would appropriately require different metrics for evaluation of “cutting edge”-ness than more conventional methods based on quantity and quality of mainstream academic publications, or direct impacts on decision-making or policy-making. As the mid-term evaluation of the centre notes: “a rather narrowly interpreted ‘technical’ evaluation based solely on ‘scientific’ outputs is not an appropriate means of assessing whether MUF is meeting its goals. Not only do these miss key aspects of the co-production agenda, but also we consider that there are time-frame limitations to any assessment of the quantity and quality of peer-reviewed publications at this point in the programme (how much can really have been initiated, researched, written, and published in 3-4 years?).”
- ▶ MUF is currently pursuing policy work regarding adaptation and transformation challenges in African cities, having hosted an international workshop on the topic. The centre has put out a range of publications, from less academic policy briefs to books, articles in peer-reviewed journals, and an edited volume in “Current Opinion in Environmental Sustainability”. While there seem to be relatively few academic publications of the centre that might be traditionally considered cutting edge, the comment above from the mid-term evaluation can help put the work of MUF into a broader academic context.

Competitiveness

- ▶ The MUF Impact Report states that “Mistra Urban Futures has been selected as a “good practice” within EU’s “Responsible Research and Innovation” concept and strategies. This implies a potential for innovative uses and outcomes of the

⁶ Well-being in Sustainable Cities.

Centre’s research and knowledge production; a potential that may be further developed during Phase II (2016-2019)”

Capacity building

- ▶ The MUF approach of co-production and co-creation of knowledge provides substantial opportunity for capacity building of stakeholders.
- ▶ Both of MUF’s local innovation platforms in Africa train a number of PhDs annually.

International partnerships

- ▶ The panel noted that in the area of urban (sustainable) development there is a plethora of international urban collaborative networks, e.g., C40 Cities Climate Change Leadership Group, Connecting Delta Cities, ICLEI (Local Governments for Sustainability) and the Covenant of Mayors. The panel supports the desire expressed by MUF’s director David Simon to make more significant efforts in the second phase to engage with the existing networks that work on cities, such as ICLEI.
- ▶ The panel noted that while each of the activities across the LIPs seemed useful in their own right, the overarching goals, coherence, knowledge transferability and mutual learning between the different regions could be more apparent. This observation is complementary to that provided by the mid-term evaluation, which recommended that the centre should “engage with global agendas by prioritising translating scaling up, and making LIP and cross-LIP findings relevant and applicable. ... Given the length of time taken to establish a common vision and approach, and the inevitable constraints, particularly in relation to the capacities of the secretariat to engage with LIPs, we recommend prioritising the sub-objective of strengthening collaboration between existing LIPs over the suggestion to create more new LIPs.” The panel encourages much greater clarity on the benefits that can be gained by sharing knowledge between the existing four LIPs and also encourages more joint activities to realise these benefits. In his reflection on the panel’s interim report, the centre’s director noted that comparative research, utilising and adding value to the work of the individual LIPs, will be a key dimension of their future work.
- ▶ MUF noted the difficulties in engaging with too many institutions at once and have taken an organisational decision to develop fewer but deeper relationships. The panel agreed with this decision, cautioning against over-extending the number of partnerships / countries before having greater clarity on the benefits gained from interactions between the existing LIPs.

General conclusions

- ▶ The panel noted that there seem to be unrealised opportunities for integrating adaptation, mitigation and other urban goals (including accessibility and fairness/equity) in all regions.
- ▶ In general, the panel supported the way that Mistra funding is used to promote networking, knowledge sharing and joint other activities that provide wider benefits than can be achieved by the locally-based projects acting alone.

Annex 7:

Mistra Arctic Sustainable Development (MASD)

Expert panel comments

Background

- ▶ The expert panel listened to a presentation by Carina Keskitalo, MASD programme manager, with opportunity for questions after the presentation.
- ▶ The panel received for review prior to the presentation four documents:
 - ▶ Evaluation report: MASD research on climate change, undated
 - ▶ MASD Annual Report 2014
 - ▶ MASD Programme Plan 2014
 - ▶ Evaluation Report on Mistra Arctic Futures Research on climate change, undated
- ▶ After the presentation, the panel received additional background documents
 - ▶ MASD Call for the proposals 2012
- ▶ The panel did not interview stakeholders of the programme.
- ▶ After the Interim Report, the panel received additional documents: Two book outlines: 'Institutional change or inertia? Understanding societal change and vulnerability in northern Europe' and 'Research Handbook on Climate Change Adaptation Policy: Acknowledging the social as inherent to the environmental' that draw up on the work carried out in MASD and involve researchers in the programme.
- ▶ MASD began in 2014 and the main theme of the programme is governance in the mainland European Arctic that is studied by focusing on resource use in the region. MASD aims to boost knowledge of aspects of long-term sustainable development in the Arctic Regions and to help bring about adequate and effective application of research findings in policy and decision-making processes relating to development in the Arctic. The programme conducts mainly social science and humanities' research and emphasises their importance in tackling climate change.
- ▶ The programme was preceded by Mistra Arctic Futures (MAF, 2011-2013) an interdisciplinary and social-science-oriented research programme with five distinct research projects aiming to increase Swedish knowledge to support political decision making in the European Arctic. MASD studies the cross-cutting issues that emerged during MAF.

- ▶ MASD is coordinated by the Arctic Research Centre at Umeå University and has KTH Royal Institute of Technology, Stockholm Environmental Institute (SEI), and the Stockholm International Peace Research Institute (SIPRI) as programme partners.
- ▶ MASD has links with Mistra's Future Forests, Stockholm Resilience Centre and SWECIA through individual researchers' involvement in these programmes.
- ▶ In many cases it is difficult to attribute activities and research specifically to the MASD programme as there are a lot of joint activities and publications with other projects that are not funded by Mistra.

Societal impact

- ▶ The panel noted that despite engagement with stakeholders at the local, national and international level the societal impacts of the MASD (and MAF) programme, there is not yet any evidence of the societal impacts in the Swedish society and beyond.
- ▶ MASD's engagement with the Arctic Council and the IPCC may have some indirect impacts on policies and practices in Sweden, but the panel has not received any evidence of these.
- ▶ It is not clear to the expert panel who are users of MASD research.
- ▶ MASD's focus on resource use and its sustainability has potential to be policy relevant.
- ▶ MASD held a workshop on participatory scenario planning methodology in Pajala in April 2015. The workshop was attended by 35 people, half of whom were practitioners. According to MASD's own report the practitioners involved in the workshop considered the methodology 'as eye opening in relation to issues that may affect long-term planning'.

Cutting-edge research

- ▶ The programme has put out a range of publications: discussion briefs, book chapters, articles in peer-reviewed journals, two forthcoming books and has given a number of presentations at academic conferences and public events.
- ▶ The programme has contributed to the Arctic Human Development Report and Prof Keskitalo was a contributing author to the IPCC AR5.
- ▶ MASD has been actively developing a participatory scenario methodology for the Arctic region.

Competitiveness

- ▶ MASD's focus on resource use and its sustainability in the Arctic has potential to improve regional and local competitiveness. The panel has no evidence of MASD impact on competitiveness.

Capacity building

- ▶ MASD trains a number of PhDs and some of them are local Saami people from the Arctic region.
- ▶ MASD has contributed to the understanding of climate change adaptation (and mitigation) as a social science problem.
- ▶ Stakeholder workshops have been held with the aim to build capacity among local actors, but the panel has received no evidence of the effectiveness of this capacity building.

International partnerships

- ▶ The programme involves researchers from Sweden, Norway, Finland and Russia. The expert panel welcomes collaborations across the entire European Arctic.
- ▶ The programme engages actively with the project Adaptation Action for a Changing Arctic (AACCA) under the auspices of the Arctic Council. Several joint seminars have been held.
- ▶ There is some collaboration with the World Wildlife Fund (WWF) on ecosystem services (the ecosystems work of MASD builds on a previous contract with WWF).
- ▶ MASD has some involvement in the Arctic Resilience Report through some of the researchers from SEI who are involved in both projects. This Arctic Council project is carried out by an international consortium and is led by SEI and Stockholm Resilience Centre (SRC, a centre initiated by Mistra), therefore creating indirect links between the two Mistra funded activities.

Annex 8:

Stockholm Resilience Centre (SRC), Mistra Future Fashion, Mistra Closing the Loop, Mistra Innovation and Mistra Entwined

Expert panel brief comments

Stockholm Resilience Centre

The Stockholm Resilience Centre (SRC) was established in 2007 as a joint initiative between Stockholm University, the Beijer International Institute of Ecological Economics at The Royal Swedish Academy of Sciences, and the Stockholm Environment Institute (SEI). A long-term grant from Mistra facilitated the establishment. The SRC is placed under the Faculty of Science at Stockholm University but governed by an independent, international board, responsible for the strategic direction of the Centre. It currently has approximately 120 members of staff.

Research conducted by the SRC is not predominantly focused on climate change, but climate change is an integral part of sustainability science on biosphere stewardship. Since its inception the SRC has developed into a world-leading academic institution on biosphere stewardship, including its pioneering work on the Planetary Boundaries concept. The SRC has an extensive international network, including research institutes, international research programmes and international organizations linking policy and science. The expert panel finds the number and quality of projects carried out within SCR impressive.

While the Mistra funding was essential in the first years, Mistra's funding today constitutes about 15 per cent of the total turnover of SRC. This illustrates SRC's success in attracting other sources of funding. As an example, the SRC has recently received a new large grant from Sida.

The expert panel notes that the SRC has been a very successful engagement from Mistra. It is noted that Mistra's grant ends in 2018, but the panel further notes that there are prospects for continued activities by SCR with core funding from other sources.

Mistra Future Fashion

Mistra Future Fashion is an innovative programme running 2011-2019 and exploring sustainability issues related to the fashion industry in Sweden and beyond. The main focus of the programme is on sustainable and long-lasting materials and garments, recycling fibres and reducing waste (circular economy approach)

and sustainable shopping. The programme has a strong climate change focus by exploring possibilities of reducing the carbon footprint of the fashion industry throughout its supply chain. The programme has excellent stakeholder engagement (including industry co-funding and engagement with multinational H&M), some academic collaboration outside Sweden and satisfies well all five assessment criteria of the expert panel, including a high potential for increasing the competitiveness and sustainability of the Swedish Fashion industry.

Mistra Closing the Loop

Closing the Loop is an interdisciplinary programme, with seven distinct projects and involving 50 organisations/companies, about how industrial residues and by-products can be returned to society as valuable resources. The programme is not directly aimed at climate change issues, but the results have the potential to contribute to sustainable use of natural resources, reduced negative effects on the environment, and climate change mitigation.

Mistra Innovation

The purpose of Mistra Innovation is to encourage the development of innovative ideas through the interaction of small and medium sized enterprises with universities and other research institutes. The programme should lead to products, processes and services that reduce the environmental impact. Examples of projects are GreenGasoline and Industrial heating in the food industry. The programme has not submitted any overall assessment in relation to the criteria. The descriptions received illustrate potential positive effects on climate change mitigation, but do not allow any further assessment by the panel.

Mistra Entwined

Mistra's programme on Environment and Trade in a World of Interdependence (Entwined) ran from 2007 to 2013 and explored how to achieve better integration of environmental aspects into international trade negotiations. The programme had a strong climate change focus by exploring carbon leakage, border adjustment measures and green industrial policy (mainly eco-labelling) from economic, legal and political perspectives. The leading partners were Gothenburg University, Resources for the Future (USA) and the International Institute for Sustainable Development (Switzerland). Entwined shared some of the researchers with the Mistra Clipore and Indigo programmes and some of the Entwined studies built on the research of these programmes.

The Entwined programme had excellent outreach (workshops, media coverage), collaborated with many international organisations, encouraged collaborations at individual researcher level, published peer-reviewed journal articles and working papers, produced several Policy Briefs and a final synthesis report, and trained some PhD students. Given this, the expert panel concludes that it is likely that the Entwined programme raised awareness about links between climate change and trade policies in Sweden and beyond.

Annex 9:

Meetings with stakeholders

The expert panel met the following stakeholder representatives:

Sven Hunhammar, Head of Climate, Energy and Transport Department, Swedish Society for Nature Conservation, a leading Swedish NGO;

Anders Turesson, former Swedish Climate Change Chief Negotiator, Ministry of the Environment and Energy; formerly chair of Clipore;

Lotta Johansson, Scientific Coordinator, National Knowledge Centre for Climate Change Adaptation, Swedish Meteorological and Hydrological Institute;

Olof Johansson, Director of Environmental Affairs, Sveaskog (State-owned forest company); also member of the Board of Future Forests;

Artur Runge-Metzger, Director of International and Climate Strategy, DG Climate Action, European Commission (by video link).

The aim of the interviews was to find out about contacts with Mistra programmes, what use had been made of them by the individual and their organisation and any suggestions for improvements in the future. A particular concern was to identify specific examples of the societal impact of the Mistra programmes and how they contributed to competitiveness.

Key points raised by stakeholders were:

Awareness about Mistra

- ▶ There is a range of stakeholder involvement in Mistra including civil society and industry as well as government at all levels;
- ▶ Stakeholders had a variable recognition of Mistra, depending on their personal experience;
- ▶ All appreciated Mistra funding and the value of a strong research base in Sweden for their work;
- ▶ Science has a profound impact on national and EU positions on climate change policy, especially in Sweden; without extensive research, “we would not be where we are today”.

Coherence

- ▶ Connections between the various Mistra programmes were not obvious to stakeholders and it was hard for them to identify an over-arching strategic focus for Mistra as a whole;
- ▶ Coordination of various funding sources and the strategic direction of Swedish research funding could be improved;

- ▶ Do researchers ask the right questions? Should the research agenda be policy-driven or driven by scientific interests? It could be both but needs to be balanced.

Policy impacts

- ▶ International collaborations are key for making progress on climate policy;
- ▶ European collaboration by Mistra's Clipore/Indigo served not only Sweden but also the EU well;
- ▶ Because of its strategic nature and strong knowledge base, Mistra Future Forests was able to have an impact on the discussion that is a necessary prelude to policy and decision making; it played an important role for forest owners; it demonstrates the strength of work that connects climate adaptation and mitigation.

Competitiveness

- ▶ The stakeholders all found it hard to judge Mistra programmes' impact on competitiveness;

Communication

- ▶ Researchers are important rather than research per se to support policy advice, i.e., using scientists as a direct source of information;
- ▶ Personal contacts and briefings are most effective for high-level people who are pressed for time, whether negotiators, NGOs, industry or policymakers;
- ▶ Mistra provides a range of information products as well as a variety of meeting places for informed discussions between stakeholders and the scientific community that are much appreciated by national and international decision makers.
- ▶ Future Forest achieved outreach to thousands of forest owners, including through the dissemination of written information;
- ▶ Fruitful stakeholder meetings take time and resources but were good investments because people feel engaged.

Possible improvements

- ▶ Research findings need to be synthesised;
- ▶ Accessibility to the data and tools produced in Mistra programmes needs to be maintained for the longer term;
- ▶ Mistra should consider how best to disseminate information and make findings accessible, including using national web portals; this should be built into programmes at an early stage;
- ▶ Mistra can help scientists communicate better through training in communication and media skills;
- ▶ Could the Mistra Boards be expanded to involve more diversity of views and stakeholder interests and to integrate them into the planning process?
- ▶ Stakeholders acknowledge that there is a lot of knowledge about climate change but there are questions of implementation of mitigation and adaptation activities, i.e., why are findings not used? More social science research is needed on e.g., effectiveness of policy instruments;
- ▶ Mistra programmes already integrate natural science and social science research to a varying extent and this can be deepened.

 Mistra has over the last decade financed a portfolio of climate research programmes. Many of them are recently ended or about to end. In order to open up for future initiatives, Mistra has asked a panel of international experts to review the research and its impact.

This final report provides findings and recommendations by the panel, including topics for possible future climate change-related research.

