Arctic Scenarios Workshop (19-20 May 2014, IIASA, Austria)

Organisers: Arctic Monitoring and Assessment Programme (AMAP)
International Institute for Applied Systems Analysis (IIASA)
Date: 19-20 May, 2014
Location: IIASA, Schlossplatz 1, Laxenburg. (outside Vienna, Austria)
Participants: Scenario experts, Arctic experts, AACA co-chairs and authors

The **objective** is to develop a generalized scenario framework for consistent and comparable pan-Arctic and regional Arctic scenarios (**2 day workshop**).

The **outputs** will build lasting collaboration between major Arctic projects:

- The Arctic Council "Adaptation Actions for the Changing Arctic" (AACA) project
- The IIASA "Arctic Futures Project" (AFP) project.

Background
A vast and rapid transformation of the Arctic and surrounding areas is taking place. Climate, environmental, and socio-economic drivers may interact and amplify, making decision making in a rapidly changing Arctic difficult and uncertain. Changes may increase existing pressures in the Arctic, while others may bring new opportunities.

Given the significance of the challenges and opportunities, the Arctic Council, IIASA, and others have initiated holistic projects on the Arctic region. These projects have a need for regional scenarios.

Key projects
The objective of AACA is to enable more informed, timely and responsive decision making in a rapidly changing Arctic. AACA will produce knowledge to assist decision makers and stakeholders in three pilot regions in developing adaptation strategies to better deal with climate change and other pertinent stressors. The three pilot regions – Barents, Baffin Bay/Davis Strait, and the Bering/Beaufort/Chukchi – will be supplemented by a pan-Arctic study, leading to four reports to be delivered in 2016/7.

The objective of the IIASA Arctic Futures Project (AFP) is a holistic assessment on the Arctic. The project will involve stakeholders, such as policy and businesses, in dialogue already from the planning stage, through implementation to final aims. The project cuts across the expertise of several IIASA programs: ASA, ENE, ESM, MAG, POP and RPV.

The need for scenarios
The necessary adaptation actions for a changing Arctic depend on global and regional socio-economic developments, in addition to inherent uncertainties in predicting the future climate. The climate modelling and Integrated Assessment Modelling communities have developed four "pathways" (Representative Concentration Pathways,

RCPs) to represent potential future climatic conditions. These pathways are consistent with a variety of underlying socio-economic and political developments.

The RCPs are only "hypothetical" pathways, and the Integrated Assessment Modelling is now developing the shared socio-economic pathways (SSPs) and Shared Policy Assumptions (SPAs) that lead to the RCPs. The combination of global SSPs, SPAs, and RCPs set "boundary conditions" or "external drivers" for potential socio-economic developments (scenarios) in the Arctic. The regional Arctic scenarios should be consistent with, or extended from, the global SSPs and SPAs.

Draft SSP narratives are in place, and it would be ideal to have a clear picture ***before the IIASA meeting*** *of which global narratives are most relevant for the Arctic and give the most interesting storylines when extended to the Arctic (****see homework****).*

The IIASA meeting can then focus on discussing extended SSPs and SPAs for the Arctic (day 1) and how to apply them in each region and sector (day 2).

The regional scenarios do not necessarily imply the need for additional climate modelling, but the extended SSPs and SPAs will explore potential futures and therefore help inform the design and implementation of future adaptation actions.

This workshop will focus on developing a conceptual framework and regional scenario methodologies that can be used in the Arctic. The outputs can then be applied in a variety of Arctic projects at the sector/region level to complete their scenario work, preferably in collaboration with stakeholder input. The advantage of a common framework is to allow comparability across a wide range of projects.

The concept of the workshop and breakout groups:

- Step 1: Get familiar with the overall SSP concepts and the global storylines
- Step 2: Define a list of basic elements or characteristics that the Arctic scenarios would need to cover. These should be elements that would be varied across different Arctic scenarios and thus provide the main dimensions across which Artic scenarios would be differentiated. Typical elements could be the degree to which energy resources will be tapped in the Arctic; the degree of the climate change impacts; whether the shipping routes are becoming ice free or not; geopolitical developments in the Arctic, etc.
- Step 3: The breakouts then discuss how the elements would fit into the overall SSP storylines. For example, it is much more likely that the resources of the Arctic are tapped in SSP3 (which is fragmented world heavily relying on fossil fuels) compared to SSP1 (where sustainability plays a critical role).
- Step 4: Finally, a limited set of the SSPs that are most useful for Arctic analysis are selected. These SSPs are extended to include the main elements of the Arctic region and sectors in a way that is consistent with the overall global context provided by different SSPs.

Homework before workshop (files attached)

1. Doc2: The SSP narratives (**DO NOT CIRCULATE**)
2. Background reading on SSP/RCPs
    - Doc3a: The Boulder SSP Workshop Report provides some background on the overall SSP process, initial storylines/characteristics, some guidance for the use of the SSPs, and plans of the community
    - Doc3b: Describes the overall scenario matrix of the RCP/SSP framework
    - Doc3c: Description of the main concepts of SSPs
    - Additional reading: Special Issue on the New Scenarios
    - Additional reading: Summary of the parallel process
3. Doc4: Background document on global and Arctic scenarios and characteristics
4. Prepare initial thoughts on which SSPs are most relevant for Arctic scenarios

Chairs/Rapporteurs (tentative teams)

The chairs and rapporteurs act in teams of two, with one Arctic and one scenario expert. The teams are free to decide who chairs and who reports. We may not need all teams in all breakout sessions.

- Keywan Riahi and Marianne Kroglund
- Amy Lauren Lovecraft and Ben Preston
- Bas van Ruijven and Glen Peters
- Nebojsa Nakicenovic / Volker Krey and Rikke Jacobsen

Deliverables

- Qualitative Arctic scenarios consistent with the global SSPs that can be applied by AACA, AFP, and other Arctic projects
- Clear work plans, identified contributors, and timelines for:
    - A meeting report/paper outlining the background, methodology, storylines, etc.
    - Further develop the Arctic scenarios for direct application in the AACA and AFP projects
    - Where appropriate, plans for quantification of the scenarios and ultimately modelling

Monday 19 May 2014

Chairs: Morten Oslen and Jon L. Fuglestad	*Welcome and introduction*	
	0900	Welcome and short introductions **(Nebojsa Nakicenovic, IIASA; Morten S. Olsen, AMAP chair)**
	0915	Adaptation Actions for a Changing Arctic (**Glen Peters, AACA**)
	0930	IIASA Arctic Futures Project (**Anni Reissell, IIASA**)
	0945	Objectives, agenda, and deliverables (**Glen Peters, AACA; Keywan Riahi, IIASA**)
	Global scenarios, global drivers (the new scenario process)	
	1000	Global scenarios: From SRES to RCPs (**Nebojsa Nakicenovic, IIASA**)
	1020	Framing talk: The RCPs and SSPs (**Keywan Riahi, IIASA**)
	1040	SSP narratives/storylines (**Bas van Ruijven, NCAR**)
	1100	Quantitative SSPs (population, demographics, GDP, energy, land use) (**Detlef van Vuuren, PBL**)
	Break	
	Characteristics of different Arctic regions, and the need for Arctic scenarios	
	1145	Barents (**Marianne Kroglund, AACA**)
	1200	Baffin Bay / Davis Strait (**Rikke Jacobsen, AACA**)
	1215	Bering/Beaufort/Chukchi (**Ashley Gaden /Amy Lauren Lovecraft, AACA**)
	Lunch	
Chairs: Glen Peters and Keywan Riahi	*1300 Break out groups to identify key elements of Arctic scenarios*	
	• What should be the main elements (factors) of Arctic scenarios? • What are alternative future states of these elements? • Examples elements/factors include: governance, resource demand, climate, etc	
	1430 Plenary Discussion: Reporting on the key elements of Arctic scenarios	
	1500 Break out groups on Shared Socio-Economic Pathways (SSP) extended to the Arctic	
	• Group 1 (top-down): What SSPs align with the key elements of Arctic scenarios? Which future states of the different key elements of Artic scenarios would be consistent with the different SSP worlds? What SSPs should be extended to the Arctic? • Group 2 (bottom-up): Develop a limited set of independent scenarios of the Arctic (storylines), thinking broader than the SSP narratives. What are the extremes of the key elements identified in the scenario? What questions can these scenarios address?	
	1600 Plenary Discussion: Selecting SSPs to extend to the Arctic	
	• What would be the main elements of a limited set of Arctic scenarios? • Are the scenarios from Group 1 and Group 2 complementary or diverging? • Do the scenarios align with the global SSPs? • How can top-down and bottom-up approaches be harmonised? • Are all SSPs feasible for all RCPs? • What SSP/RCP combinations are best suited to the Arctic? • Select a limited number of SSPs to move apply in Day 2	
	1700	End of Day 1
		Dinner
		Break out leaders to prepare notes for Day 2

Tuesday 20 May 2014

Chair: Lars-Otto Reiersen	*Important scenario elements and example applications*	
	0900	The importance of resilience in scenarios (**Marcus Carson, SEI**)
	0920	Impacts of climate change on ecosystems (**Michael Obersteiner, IIASA**)
	0940	Key aerosol and methane emission sources and mitigation opportunities in the Arctic included in recent GAINS global scenarios (**Zbigniew Klimont/Lena Hoglund, IIASA**)
	1000	Consistently linking global to regional scenarios for IAV (**Ben Preston, ORNL**)
	Break	
Chairs: Glen Peters Keywan Riahi	*Plenary: Summary of Day 1 discussions. Priorities for Day 2.*	
	Break out groups selecting and extending the SSPs to the Arctic	
	• The priorities will dependent on the outcomes of the first day • Continue to extend the (selected) SSPs to give Arctic storylines • Detail elements in the global SSPs that need to extended to the Arctic • Explore SSP/RCP combinations in more detail • Initial text on Arctic SSP storyline text	
	Lunch	
Chair: Lars-Otto Reiersen	*Examples of Arctic scenarios*	
	1300	Pan-Eurasian experiment scenarios (**Hanna K. Lappalainen, Uni of Helsinki**)
	1315	Scenarios in the MISTRA project (**Annika Nilsson, SEI**)
	1330	Regional scenario development in Northern Alaska (**Amy Lauren Lovecraft, University of Alaska**)
	1345	Scenarios of Arctic shipping and petroleum (**Glen Peters, CICERO)**
Chairs: Glen Peters and Keywan Riahi	*Break out groups on Arctic scenarios*	
	• Apply the conceptual framework developed on Day 1 and 2 in regional groups • How will the Arctic scenarios be used in projects? • Is there sufficient detail in the storylines to use the scenarios? • How will/can the qualitative scenarios be used/quantified? • Test/apply the scenarios regionally and translate into report/paper sections • Do the extended SSPs need to be updated after testing?	
	Plenary discussion of work plans, contributors, timelines, etc	
	1600	• Document on extending the global SSPs to the Arctic • Format of document (report/paper, Table of Contents, identify writing team, timeline) • What more do we need to complete the report? • What elements need further discussion? • Future activities (quantification of the storylines, modelling runs, etc) • Future collaboration and linkages, identify synergies, etc • Potential follow up event in conjunction with IIASA/IPCC event in Fall 2014
	1700	End of Workshop