SCENARIOS FORUM 2022

Scenarios Forum 2022 program

Program overview

Day 1: Monday, June 20, 2022

				Theatersaal	Marschallzim. 1	Marschallzim. 2	Kaminzimmer	Franz Josef	Wodak	Gvishiani
Opening Plenary	9:00	10:30		**Opening Plenary**						
	10:30	11:00	Coffee Break							
Plenary	11:00	12:30		**Plenary 1**						
Lunch	12:30	14:30	Lunch Break							
Parallel 1	14:30	16:00	Parallel 1	Adaptation ID #15 (R)	Communication ID #201 (W)	Regional socio-economic -1 ID #26 (R)	Transport ID #24 (W)	Modeling SDGs ID #47 (R)	Cross-border ID #69 (R)	Agriculture ID #83 (W)
	16:00	16:30	Coffee Break							
Parallel 2	16:30	18:00	Parallel 2	Biodiversity ID #50 (R)	AR7 recommendations ID #63 (W)	Regional socio-economic -2 ID #26 (R)	Gender equality ID #94 (W) / Climate change gender ID #93 (W)	Global South ID #56 (R)	Physical Storylines ID #51 (R)	SSP Uncertainties (45 minutes) ID #30 (R)
	18:00	18:30	Parallel 2 extension							Beyond illustrative (45 minutes) ID #32 (W)
Reception	18:00	19:30	Poster session							

The Forum is presented by the International Committee on New Integrated Climate Change Assessment Scenarios (ICONICS) and hosted by the International Institute for Applied Systems Analysis (IIASA).

Day 2: Tuesday, June 21, 2022

				Theatersaal	Marschallzim. 1	Marschallzim. 2	Kaminzimmer	Franz Josef	Wodak	Gvishiani
Plenary	9:00	10:30		**Plenary 2**						
	10:30	11:00	Coffee Break							
Parallel 3	11:00	12:30	Parallel 3	Demographic projections ID #85 (R)	Distributional impacts ID #25 (R)	Integrated Scenarios ID #22 (R)	Reflexivity ID #12 (W)	Mitig/Adapt Capacity ID #82 (R)	CDR ID #20 (W)	Oceans + 30 min ID #203 (W)
Lunch	12:30	14:30	Lunch Break							
Parallel 4	14:30	16:00	Parallel 4	Feasibility -1 ID #48 (R)	Pop and economic projections ID #17 (W)	Human-Earth ID # 42 (R)	Development process ID #202 (W)	Materials ID #43 (R)	Non-CO2 emissions ID #6 (R)	Finance -1 ID #10 (R)
	16:00	16:30	Coffee Break							
Parallel 5	16:30	18:00	Parallel 5	Feasibility -2 ID #48 (R)	CMIP6/7 ID #16 (W)	National Scale ID # 8 (R)	Non-state actors Workshop ID #21 (W)	Digitalization ID #66 (R) / Lifestyle ID #64 (R)	Stakeholder participation ID #29 (W)	Finance -2 ID #10 (W)
Dinner	18:00	21:00	Conference Dinner							

Day 3: Wednesday, June 22, 2022

				Theatersaal	Marschallzim. 1	Marschallzim. 2	Kaminzimmer	Franz Josef	Wodak	Gvishiani
Parallel 6	9:00	10:30	Parallel 6	Emulators -1 ID #46 (R)	Beyond GDP ID #38 (W)	National Decarbonization -1 ID #7 (R)	Low Energy Demand ID #70 (W)	Target-seeking ID #52 (R)	Migration -1 ID #31 (R)	Socio-political ID #23 (W)
	10:30	11:00	Coffee Break							
Parallel 7	11:00	12:30	Parallel 7	Emulators -2 +45 min ID #46 (R)	Climate and Biodiversity ID #59 (W)	National Decarbonization -2 ID #7 (R)	Post-growth ID #37 (R)	Subnational decarbonization ID #104 (R)	Migration -2 ID #31 (R)	
Lunch	12:30	14:30	Lunch Break							
Plenary	14:30	16:00		**Plenary 3**						
	16:00	16:30	Coffee Break							
Closing plenary	16:30	18:00		**Closing Plenary**						

Overview of Sessions

Topic	Research Session or Workshop session	ID	Short Title	Session Full Title
Across scales	Workshop	24	Transport	Scenario development and modeling that bridges scales and communities: the rich diversity of global transport futures
	Research	8	National Scale	Challenges and opportunities in constructing national scale scenarios from the SSPs/RCPs
	Research	26	Regional socio-economic	Applying global socio-economic scenarios for regional climate change impact and adaptation analysis
Communication / Scenario Users	Workshop	201	Communication	Synthesis and communication of climate change risks in scientific assessments
	Workshop	21	Non-state actors	What do non-state actors (e.g., corporations, NGOs, financial institutions, etc.) need from climate change scenarios?
	Research	52	Target-seeking	Interacting with integrated assessment models for target-seeking under uncertainty
	Workshop	10	Finance	Building better climate scenarios for supervisors, private sector financial institutions, and development institutions
	Research	30	SSP Uncertainties	Interpreting and debiasing uncertainties in SSP-based model ensembles
	Workshop	63	AR7 recommendations	Scenarios in IPCC assessments: lessons from AR6 and recommendations for AR7
Earth System Modeling	Workshop	203	Oceans	Blue scenarios: ocean and fisheries in Earth System models
	Workshop	16	CMIP6/7	Scenarios in CMIP6 and CMIP7: lessons learned and new design considerations.
	Research	42	Human-Earth	Advances in human-Earth System interactions in scenario development
	Research	46	Emulators	Emulators: new methods and role in integrating research across climate research communities
	Research	51	Physical Storylines	Physical climate storylines: applications and perspectives

Ecological	Workshop	83	Agriculture	Representative Agricultural Pathways – Cross-scale and trans-disciplinary storylines for agricultural development and decision-making
	Research	50	Biodiversity	New and on-going work on scenarios for biodiversity & nature contributions to people
	Workshop	59	Climate and Biodiversity	Catalyzing climate and biodiversity coupled scenarios for assessments and policy
Impacts/vulnerability/ adaptation	Research	15	Adaptation	Quantitative scenarios for adaptation and adaptive capacity
	Workshop	32	Beyond illustrative	Beyond illustrative scenarios - novel approaches to assess future climate risks
	Research	69	Cross-border	Exploring and expanding the cross-border dimensions of the SSPs
	Workshop	93	Climate change gender	Addressing the gender dimension in socioeconomic scenarios, Part I: impacts of climate change and policy on gender inequality
Mitigation/energy	Research	64	Lifestyle	Future lifestyle changes at different geographical scales and in response to societal shocks (e.g., Covid-19)
	Research	66	Digitalization	Digitalization scenarios and implications for climate change
	Workshop	20	CDR	Improving the representations of Carbon Dioxide Removal (CDR) options in the SSPs
	Research	43	Materials	Scenarios of material stocks, flows, services, and practices: exploring nexus approaches to address climate change, air pollution and sustainability.
	Workshop	70	Low Energy Demand	Narratives for scenarios and pathways to provide decent levels of energy services at low demand of energy and resources
	Research	6	Non-CO2 emissions	The role of non-CO2 greenhouse gas emissions in mitigation scenarios and climate change
	Research	7	National Decarbonization	National deep decarbonization scenarios: policy analysis and global narratives
	Research	48	Feasibility	Feasibility of scenarios
	Research	56	Global South	Assessing the impacts of the Global Energy Transition in the global south
	Research	104	Subnational	Regional and subnational scenarios of decarbonization and sustainable development

Population/gender/Socioeconomic change	Workshop	17	Pop and economic projections	Updating the population and economic projections in the SSPs
	Research	85	Demographic projections	Multiscale and multidimensional demographic projections for the extended global scenario frameworks
	Workshop	23	Socio-political	Improving the representation and usability of socio-political factors in the Shared Socioeconomic Pathways (SSPs)
	Research	82	Mitig/Adapt capacity	Qualitative and quantitative approaches to represent regional capacity for mitigation and adaptation in the Shared Socioeconomic Pathways (SSPs)
	Research	31	Migration	Scenario-based approaches to modeling migration futures
	Workshop	94	Gender equality	Addressing the gender dimension in socioeconomic scenarios, Part II: promoting gender equality as a driver of change
	Research	25	Distributional impacts	Poverty, inequality, distributional impacts of climate change mitigation and impacts
	Research	37	Post-growth	Economic pluralism and post-growth scenarios
	Workshop	38	Beyond GDP	Beyond GDP: economic dimensions of integrated assessment scenarios
Scenario methodology	Workshop	12	Reflexivity	Reflexivity for sustainable and equitable futures: broadening scenario inputs for linkages across methods, scales, and levels
	Research	22	Integrated Scenarios	Integrated scenarios of impacts, mitigation and adaptation
	Workshop	29	Stakeholder participation	Learnings from stakeholder participation for the development and implementation of scenarios and long-term pathways towards sustainable systems.
	Research	47	Modeling SDGs	Modelling integrated scenarios for reaching climate and sustainable development goals
	Workshop	202	Development process	Improving the scenario development process

Scenarios Forum: detailed program

Session ID # 15: Quantitative scenarios for adaptation and adaptive capacity

06/20/2022, 14:30 - 16:00

Laxenburg Conference Center - Theatersaal

Lead organizer(s): Nicole van Maanen[1], Tabea Lissner[1], and Marina Andrijevic[2]

Institutional Affiliation(s): Climate Analytics[1] and International Institute for Applied Systems Analysis[2]

Session Type: Research Session

Session Description:
In this session, we call for submissions from researchers and practitioners working on quantitative approaches to assess concepts relevant to better understanding adaptation broadly, and within the context of Shared Socioeconomic Pathways (SSPs) specifically.
Adaptation is currently underrepresented in quantitative global assessments of climate change. At the same time, adaptation is pivotal for reducing the magnitude of damages caused by extreme weather events, or slow onset climate change such as sea level rise. By not accounting for possible pathways of adaptation or when just assuming a certain level of adaptation will take place, models could risk to underestimate climate impacts, as well as possibly downplay the urgency and the extent of mitigation that is required.
Compared to mitigation, adaptation and adaptive capacity are more challenging to define, as adaptation is primarily context-specific, interacts on many scales, involves various stakeholders and actors, and provides more local rather than global benefits. Whether and to what extent an adaptation option can be deployed depends on adaptive capacity, which in turn depends on the present and future socio-economic conditions of countries. In this context, “adaptation challenges” pillar of the SSPs should be advanced to address the gap in research which is currently missing quantitative assessments of adaptation pathways and adaptive capacity. Quantifying adaptive capacity in a fashion suitable for inclusion into climate impact models and integrated assessment models is an important step towards better-constrained estimates of the future co-evolution of impacts and adaptation. Proposals on how to assess adaptive capacity have become available (e.g., Andrijevic *et al.*, 2021), but an inclusion by the modelling community is the next necessary step. To that end, we would particularly encourage submissions from researchers and practitioners working directly within modelling community to understand the entry-points in IAMs and/or other impact models.

Presenters:

Sepehr Marzi, Fincons SpA external service provider of European Commission Joint Research Centre
Oral presentation: INFORM Risk. Climate Change: assessing the Enhanced Coping Capacity required to counteract the adverse impacts of Amplified Climate-Related Hazards.

Vanessa Völz, Global Climate Forum e.V. Berlin
Oral presentation: Using learning scenarios to quantify future adaptation.

Esther Boere, International Institute for Applied Systems Analysis (IIASA)
Oral presentation: Integrated climate change impacts and adaptations of agriculture, forestry and fisheries in Europe, and their impacts on the economy and the environment.

Kai Wan, University of Edinburgh
Oral presentation: Projection of heat-health burden in Scotland under aligned scenarios of climate, population and adaptation

Eva Preinfalk, Wegener Center for Climate and Global Change (University of Graz)
Oral presentation: The macroeconomic and budgetary implications of public climate change adaptation in EU Member States – the case for Austria, Spain & the Netherlands.

Giacomo Falchetta, Centro Euro-Mediterraneo sui Cambiamenti Climatici (Università Ca'Foscari Venezia) and RFF-CMCC European Institute on Economics and the Environment
Poster presentation: Household-level scenarios of air conditioning-induced electricity consumption.

Simon Lloyd, ISGlobal (Barcelona Institute for Global Health)
Poster presentation: The influence of socio-demographics on heat-related mortality in Europe: towards a model that accounts for social adaptation under the SSPs.

Session ID # 201: Synthesis and communication of climate change risks in scientific assessments

06/20/2022, 14:30 - 16:00

Laxenburg Conference Center - Marschallzimmer 1

Lead organizer(s): Brian O'Neill[1] and Lena Reimann[2]

Institutional Affiliation(s): Pacific Northwest National Laboratory[1] and Vrije Universiteit Amsterdam[2]

Session Type: Workshop Session

Session Description:
Assessments of the scientific literature on climate change impacts and risks requires drawing on a wide variety of studies that use different methodologies and examine many different types of impacts to different regions, sectors, and population groups. Risks will further depend on levels and rates of climate change, societal conditions, and assumed adaptation efforts and effectiveness. Accurately synthesizing and clearly communicating these risks is therefore complex and difficult. The use of scenarios is one means of carrying out such synthesis, by combining results from various impact studies to produce a cohesive vision of how the world may unfold in terms of the consequences of climate change. Alternatives include assessing and synthesizing impacts by global warming level, time period, or specified levels of exposure, vulnerability, or adaptation.
This workshop session will explore the various approaches to synthesizing and communicating climate change impacts, with an eye toward identifying the strengths and weaknesses of scenario-related approaches and how they could be improved. It will consist of 4-5 short presentations followed by substantial discussion with all participants. We seek abstracts for brief presentations (or posters) that could include (but are not limited to) reflections on experience within existing climate impacts assessments from the IPCC, national institutions, or other organizations; relevant experience with assessments of other issues with impacts on society; and proposals for new approaches to synthesis and communication of scenario-based work. Note that abstracts on individual impact studies are not suitable for this session, which focuses on assessing large bodies of evidence.

Presenters:

Carl-Friedrich Schleussner, Climate Analytics
Oral presentation: Quantifying uncertainty in aggregated climate change risk assessments

Hans-Martin Füssel, European Environment Agency
Oral presentation: Scenario use in European climate hazard, impact and risk assessments

Jan C Minx, Mercator Research Institute on Global Commons and Climate Change
Oral presentation: A data science revolution for synthesizing scenario evidence in IPCC assessments

Brian O'Neill, Pacific Northwest National Laboratory
Oral presentation: Scenarios of outcomes for climate change impacts, mitigation, and adaptation

Veruska Muccione, University of Zurich
Oral presentation: From key risks to pathways for adaptation in Europe

Session ID # 26: Applying global socio-economic scenarios for regional climate change impact and adaptation analysis

06/20/2022, 14:30 - 16:00, 16:30 – 18:00

Laxenburg Conference Center - Marschallzimmer 2

Lead organizer(s): Kasper Kok[1] and Timothy Carter[2]

Institutional Affiliation(s): Wageningen University[1] and Research and Finnish Environment Institute[2]

Session Type: Research Session

Session Description:
The global Shared Socioeconomic Pathways (SSPs) have been developed to serve a variety of scenario needs for analysing future climate change, in particular for supporting adaptation and mitigation policy. Scenario application for supporting adaptation is primarily addressed by the impacts, adaptation and vulnerability (IAV) community. Since SSPs provide a global frame, their application in regional or sectoral IAV studies can potentially enhance comparability among studies. A key question is how the SSPs have been used to develop regional scenarios, particularly by the IAV community. A central challenge is that the relevance and credibility of global scenarios can seem remote from the complexity and uniqueness of local conditions and needs. This double session examines how such an apparent quandary can be reconciled. It first presents the state-of-the-art of regional SSP development, followed by an overview of how regional SSPs have been used in the IAV community, thus testing the applicability of downscaled SSPs. The session will start with results from a systematic review that has been undertaken including thousands of peer-reviewed papers, out of which about 170 were selected. The review focused on papers that developed the broader global qualitative component of the SSPs into regional scenarios. Two invited speakers will present downscaling efforts. Subsequently, this session invites abstracts that illustrate applications from the IAV community, stocktaking how SSPs were regionally/locally extended, for what purpose, and which methods were used. Some issues to explore include methods of co-developing scenarios for use in analyses for sectors versus systems versus regional units; combining top-down and bottom-up methods; scenario needs to support national and regional adaptation plans; future evolution of reference scenarios (SSPs) to serve IAV needs; regional scenarios for framing co-development of coherent regional mitigation and adaptation (and other) policies. The last part of the session allows for discussion on knowledge advancements.

Presenters:

Abiy S. Kebede, Brunel University London
Oral presentation: Integrating multi-scale and participatory scenario methods for assessing climate change impacts and adaptation in coastal deltas: Lessons and outlook

Timothy Carter, Finnish Environment Institute (SYKE)
Oral presentation: Co-production of SSP-based integrated scenarios to support provincial climate change adaptation planning in Finland

Athanasios Vafeidis, Institute of Geography, Christian-Albrechts University Kiel
Oral presentation: Harmonizing the development of local socioeconomic scenarios: A participatory downscaling approach applied in five European case studies

Antje Katzschner, Ludwig-Maximilians-Universitaet Munich
Oral presentation: Challenges and advantages in the process of downscaling scenarios

Anita Lazurko, School of Environment, Resources, and Sustainability, University of Waterloo
Oral presentation: Projecting local climate resilient futures under the SSPs: Participatory cross-impact balances modelling in the Red River Basin

Kari Hyytiäinen, University of Helsinki
Oral presentation: Extending the Shared Socioeconomic Pathways for adaptation planning of blue tourism

Adam Daigneault, University of Maine
Oral presentation: Estimating Regional Forest Sector Impacts under varying Representative Concentration and Shared Socioeconomic Pathways

Hermine Mitter, University of Natural Resources and Life Sciences, Vienna; Department of Economics and Social Sciences; Institute for Sustainable Economic Development
Oral presentation: Downscaling Global Shared Socioeconomic Pathways for European and National Agriculture and Food Systems: The Eur-Agri-SSPs and the AT-Agri-SSPs

Kasper Kok, Wageningen University
Oral presentation: Beyond climate, narratives, and models: Novel methods to develop and use the SSPs in the Netherlands

Simona Pedde, Wageningen University and Research
Oral presentation: Applying global socio-economic scenarios for regional climate change impact and adaptation analysis

Heikki Lehtonen, Natural Resources Institute Finland (Luke)
Poster presentation: The value of proactive adaptation to climate change in Finnish agriculture in different socioeconomic scenarios

Jamie Jenkins, University of Helsinki
Poster presentation: Regionally Extended Shared Socioeconomic Pathways for the Offshore Wind Industry in Finland

Session ID # 24: Scenario development and modeling that bridges scales and communities: the rich diversity of global transport futures

06/20/2022, 14:30 - 16:00

Laxenburg Conference Center – Kaminzimmer

Lead organizer(s): David McCollum[1], Sonia Yeh[2], Paul Kishimoto[3], Bas van Ruijven[3], Roberto Schaeffer[4], Pelopidas Siskos[5]

Institutional Affiliation(s): Oak Ridge National Laboratory[1], Chalmers University[2], International Institute for Applied Systems Analysis[3], Alberto Luiz Coimbra Institute for Graduate Studies and Research in Engineering (COPPE)[4], and E3 Modelling[5]

Session Type: Workshop Session

Session Description:

Global transport comprises many identifiable systems and subsystems. These range in scope from 'micro' (individuals, neighborhoods, cities) to 'macro' (countries and world regions). Analysis of and scenarios for these systems often focus on specific geographic areas or transport modes—or, conversely, sacrifice resolution to span the global system. A similar type of partitioning tends to be seen in the study of alternative fuel pathways (biofuels, electricity, hydrogen, and e-fuels). These choices on scale and scope lead to research communities that can be fragmented.

A future low-carbon transport system could be comprised of a more diverse mix of fuels and technologies than we see today and is expected to interact more and more with the broader energy system. But how might the fuel/technology mix look within countries, and how will it compare between them? And how can scenarios and modeling account for heterogeneity across multiple scales and multiple strategies, particularly with work being conducted across disparate communities?

Scenarios provide one potential answer to these questions, if they, and the tools used to quantify them, could be developed jointly by researchers in different disciplines. Such collaborative activities would strengthen connections, promote dialogue, and harmonize efforts that would otherwise remain disconnected. Scenarios can serve as a common language for discussing phenomena across subsystems, thereby facilitating integration of disparate modeling paradigms and outcomes. Currently, nothing resembling a common scenarios process exists for the study of transport worldwide. While much of the global (macro) modeling community frames their narratives in terms of the Shared Socioeconomic Pathways (SSPs), local/national scenarios tend to be crafted with more micro-scale considerations (technology, policy, socio-economics) in mind. Reconciling these different perspectives presents a challenge, but also an opportunity, in the analysis of transport futures.

This session will bring together diverse viewpoints with the aim of advancing scenario-based transport research that serves the knowledge needs of equally diverse researchers and stakeholders. Toward that end, the session welcomes abstract submissions on:

- What is the current state of the science with respect to transport technology potentials and costs and the modeling of transport alongside other sectors, in global/national and city/regional settings?

- Can standard ‘handshakes’ be organized by researchers from different communities, in order to bridge qualitative trends and their modeling quantifications across scales and fuels/technologies?
- What are critical features for a common transport scenarios process that would ease multi-scale and multi-strategy analysis?

Presenters:

Ramya Natarajan, Center for Study of Science, Technology and Policy (CSTEP)
Oral presentation: Transport Sector Dynamics in India: Scenario Development and Analysis

Rafael Garaffa, European Commission - Joint Research Centre (JRC-Seville)
Oral presentation: Building baselines for air and land transport

Luis Martinez, ITF\OECD
Oral presentation: Integrate Transport Models for Assessing Cross-scale Common Scenarios: The ITF Approach

Matteo Muratori, National Renewable Energy Laboratory
Oral presentation: Scenarios of US transportation decarbonization

Roberto Schaeffer, Universidade Federal do Rio de Janeiro
Oral presentation: Scenarios for the simultaneous decarbonization of both aviation and shipping: An integrated perspective for the case of Brazil

Paul Wolfram, Joint Global Change Research Institute
Poster presentation: The value of hydrogen for climate change mitigation of the global transport sector

Session ID # 47: Modelling integrated scenarios for reaching climate and sustainable development goals

06/20/2022, 14:30 - 16:00

Laxenburg Conference Center - Franz Josef

Lead organizer(s): Bjoern Soergel[1], Elmar Kriegler[1], Sebastian Rauner[1], Detlef van Vuuren[2,3], Geanderson Ambrósio[2], and Bas van Ruijven[4]

Institutional Affiliation(s): Potsdam Institute for Climate Impact Research[1], Utrecht University[2], Netherlands Environmental Assessment Agency[3], and International Institute for Applied Systems Analysis[4]

Session Type: Research Session

Session Description:

The Sustainable Development Goals (SDGs) and the Paris Agreement set an ambitious agenda for human well-being within planetary boundaries. Given the narrow time horizon for delivering on climate action and progress towards the SDGs, there is an urgent need for pathways exploring how to advance these goals jointly. Requirements for modelling such sustainable development pathways (SDPs) are a fairly comprehensive coverage of the SDG target space, including interactions between targets [1,2,3].

Following the recent publication of a first model-based SDP scenario [4], this session aims to provide a forum for discussing the development of the next generation of SDP scenarios. By broadening and connecting the modelling communities developing such pathways, it also extends the existing SSP-RCP scenario framework with SDP scenarios.

The invited presentations will present i) first results from a multi-model comparison of a set of several SDP scenarios [5], reflecting different societal perspectives on how to pursue sustainable development, and ii) discuss recent methodological advances in integrated SDG modelling, as well as the need for future model development [6].

Submissions for presentations or posters can focus e.g. on the following topics: i) advancing integrated assessment models for SDG analyses, ii) model-based analysis of interactions between multiple sustainable development goals, or iii) target-seeking scenarios integrating climate and sustainable development targets.

Based on these inputs, the session aims to discuss how to arrive at robust insights about the interventions required to advance sustainable development, about synergies and trade-offs, and how such modelling work can inform policy processes.

[1] The World in 2050 report, http://pure.iiasa.ac.at/id/eprint/15347/1/TWI2050_Report081118-web-new.pdf

[2] van Vuuren *et al.* 2021, https://eartharxiv.org/repository/view/2386/

[3] van Soest *et al.* 2019, https://www.sciencedirect.com/science/article/pii/S2589791819300179

[4] Soergel *et al.* 2021, https://www.nature.com/articles/s41558-021-01098-3

[5] http://shape-project.org/

[6] http://www.sdg-futures.eu/

Presenters:

Poornima Kumar, CSTEP India
Oral presentation: Using the Sustainable Alternative Futures for India (SAFARI) model to explore integrated scenarios for reaching climate and sustainable development goals

Enayat A. Moallemi, Deakin University
Oral presentation: Diversifying models for analysing global change scenarios and sustainability pathways

Alize le Roux, Institute for Security Studies, African Futures and Innovation
Oral presentation: Forecasting Africa's Future

Bjoern Soergel, Potsdam Institute for Climate Impact Research (PIK)
Oral presentation: Sustainable Development Pathways reflecting different societal perspectives: First results from the SHAPE project

Detlef Van Vuuren, Utrecht University
Oral presentation: Sustainable development pathways – the current state and future prospects (first insights from the PICASSO project)

Session ID # 83: Representative Agricultural Pathways – Cross-scale and trans-disciplinary storylines for agricultural development and decision-making

06/20/2022, 14:30 - 16:00

The International Institute for Applied Systems Analysis (IIASA) – Gvishiani

Lead organizer(s): Alex Ruane[1] and Roberto Valdivia[2]

Institutional Affiliation(s): NASA Goddard Institute for Space Studies[1] and Oregon State University[2]

Session Type: Workshop Session

Session Description:
Countries are in the process of developing their National Adaptation Plans and Nationally Determined Contributions as part of their commitment to the Paris Agreement while at the same time, policy makers are developing strategies and interventions for agricultural development that could lead to achieving the Sustainable Development Goals. The next generation of development scenarios will benefit from an enhanced representation of the dynamic nature of agricultural production and food systems. The future of agricultural systems further influences (and is influenced by) economic growth, competition for land and water resources, rural/urban contrasts, producer/consumer divides and dietary demands across heterogenous populations. The Agricultural Model Intercomparison and Improvement Project (AgMIP) is an international community of 1200+ climate, crop, livestock, economics and health experts working to assess and address current and future agricultural development and food security challenges. AgMIP assessments augment the SSP-RCP framework with additional agricultural sector development pathways called Representative Agricultural Pathways (RAPs), which are designed to be compatible across different scales of application (from local to national and international). Examples of RAP information include illustrative pathways for food prices, agricultural fees and subsidies, risk management instruments, farm technology, and costs for equipment, labor and transportation. Conditions of agricultural systems at sub-national level are typically inadequately addressed by agricultural and climate change related action plans that would enable the implementation of the countries' Vision 2030. Recent work in the AgMIP Climate Change Adaptation and Resilience (CLARE) project indicates that national and sub-national detail is particularly important to evaluate specific systems transitions building, sustainable, climate resilient and just agricultural systems. This session welcomes contribution on how scenarios for the agricultural sector can be linked into broader scenario efforts, the use of RAPs in the AgMIP project and (discussion on) how RAPs and additional agricultural information may be connected to the next generation of scenarios.

Presenters:

Kaveri Ashok, Center for Study of Science, Technology and Policy (CSTEP)
Oral presentation: Sustainable alternative pathways for agriculture in India

Jonas Jägermeyr, Columbia University and NASA GISS
Oral presentation: Climate change implications for global agriculture under current practices and future management pathways

Mario Herrero, Cornell University
Oral presentation: The transition of the livestock sector under environmental, diet and health constraints.

Willem Verhagen, Frederick S Pardee Center for International Futures
Oral presentation: The future of food security along pathways of food supply, food access and inequality in food access

Subash Nataraja Pillai, ICAR-Indian Institute of Farming Systems Research
Oral presentation: Sustainable Agricultural Pathways for India under projected climate change scenario 2050s – Need for corrections under Pandemic situation

Sabine Homann-Kee Tui, International Crops Research Institute for the Semi-Arid Tropics
Oral presentation: Future scenarios to support national policy decision making: the AgMIP Representative Agricultural Pathways applications

Keith Wiebe, International Food Policy Research Institute (IFPRI)
Oral presentation: Enhanced foresight and engagement with decision makers to accelerate food, land, and water systems transformation in developing countries

Alexander Popp, Potsdam Institute for Climate Impact Research (PIK)
Oral presentation: From Shared Socioeconomic to Sustainable Development Pathways – the next step for global agricultural economic models

Davit Stepanyan, Johann Heinrich von Thünen-Institut
Poster presentation: Climate mitigation measures in European agriculture under uncertainty

Hamsa Ganapathi, Tufts University Friedman School of Nutrition Science and Policy
Poster presentation: Assessing extreme weather event scenarios using UNSEEN ensembles approach to inform agricultural community climate adapation practices

Session ID # 69: Exploring and expanding the cross-border dimensions of the SSPs

06/20/2022, 14:30 - 16:00

The International Institute for Applied Systems Analysis (IIASA) – Wodak

Lead organizer(s): Stefan Fronzek[1], Magnus Benzie[2], Henrik Carlsen[2], Timothy Carter[1], Christopher Reyer[3]

Institutional Affiliation(s): Finnish Environment Institute[1], Stockholm Environment Institute[2], Potsdam Institute for Climate Impact Research[3]

Session Type: Research Session

Session Description:
Climate change impacts, adaptation and vulnerability studies tend to confine their attention to impacts and responses within the same geographical region. However, this approach ignores cross-border climate change impacts that occur remotely from the location of their initial impact and that may severely disrupt societies and livelihoods, e.g. through international trade, financial markets and issues related to migration and security.
For example, the 2011 flood in Thailand destroyed industrial parks of the electronics sector with wide-ranging consequences for the economy globally through disruptions of supply chains. The potential impacts of a recurrence of a similar event in the future depend on the vulnerability of the region directly affected, but also on what kind of ties and connections with other parts of the world are in place – both aspects can vary greatly under alternative scenarios of the future.
This session attempts to explore how current scenario frameworks such as the Shared Socio-economic Pathways (SSPs) can be used and extended to explore the cross-border dimensions of climate change impacts. How may the connections between countries and regions evolve into the future, how might these affect the propagation of climate change risks across borders, and what are possible responses to these changing risks?
We welcome contributions on the following topics:

- Studies advancing scenario assumptions that determine the level of inter-regional connectivity and cooperation
- Quantitative and qualitative assessments of the effects of cross-border climate change impacts under different scenarios using indicator, model-based (e.g. trade, integrated assessment, migration models) or stakeholder-driven approaches
- Development and discussion of response options of actors at various scales to address cross-border impacts of climate change under a range of different scenarios

The session is organized by the EU-funded CASCADES project (CAScading Climate risks: towards ADaptive and resilient European Societies – www.cascades.eu).

Presenters:

Adrien Detges, adelphi
Oral presentation: A SSP perspective on cascading climate impacts on security and European foreign relations

Irene Monasterolo, EDHEC Business School, EDHEC-Risk Institute
Oral presentation: Assessing Financial Risks from Physical Climate Shocks: A Framework for Scenario Generation

Stefan Fronzek, Finnish Environment Institute
Oral presentation: Characterizing international connectivity in the SSPs for assessing future cross-border climate change impacts and responses

Fanny Groundstroem, University of Helsinki
Oral presentation: Implications of different global development pathways for adaptation to cross-border impacts of climate change in national low-carbon transitions

Nina Knittel, Wegener Center for Climate and Global Change, University of Graz
Oral presentation: The transmission of global climate change via international trade – Insights from a cross-sectoral impact assessment for Austria

Tom Wood, University of Sheffield
Poster presentation: Cross border impacts of extreme climate change scenarios on urban infrastructure systems

Session ID # 50: New and on-going work on scenarios for biodiversity & nature contributions to people

06/20/2022, 16:30 - 18:30

Laxenburg Conference Center – Theatersaal

Lead organizer(s): David Leclère[1] and Rob Alkemade[2]

Institutional Affiliation(s): International Institute for Applied Systems Analysis[1] and Wageningen University[2]

Session Type: Research Session

Session Description:
Models and scenarios are increasingly used in research and policy support contexts for biodiversity and nature contributions to people (NCP). While the SSP/RCP scenario framework was developed in the context of climate change, it is widely used to provide storylines and/or quantification to biodiversity & NCP-relevant scenarios as it provides the largest exploration of environmental change drivers to date, many being directly or indirectly relevant for biodiversity & NCP. At the same time, new scenario frameworks are developing to specifically foster biodiversity & NCP-relevant knowledge generation and decision-making support, such as the Nature Futures Framework (NFF), spurred by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). These scenario frameworks are applied for biodiversity & NCP in various contexts: scales, geographies, knowledge vs decision-making support, knowledge generation and decision-making practices, etc.
This research session aims to feature new and on-going scenario work that contributes to biodiversity & NCP knowledge generation and decision-making support. It welcomes submissions on biodiversity & NCP scenario development and application in a variety of contexts (scales, geographies, knowledge vs decision-making support, knowledge generation and decision-making practices). The session will feature 5 presentations and conclude with a discussion on advancements and challenges. It will be followed by a workshop session discussing the cross-fertilization and linking across scenario frameworks.

Presenters:

Sarah Jones, Alliance of Bioversity International & CIAT
Oral presentation: Pathways for food and land systems to contribute to global biodiversity targets

Bernd Lenzner, Bioinvasions, Global Change, Macroecology Group, University of Vienna
Oral presentation: Biological invasion scenarios – the neglected driver in biodiversity scenarios

Zuzana Harmackova, CzechGlobe & Stockholm Resilience Centre
Oral presentation: Linking multiple values of nature with future impacts: Value-based participatory scenario development for sustainable landscape governance

Olivier Maury, Institut de Recherche pour le Développement (IRD)

Oral presentation: Ocean System Pathways (OSP) for driving marine ecosystems & fisheries models.

Maria Gasalla, University of Sao Paulo
Oral presentation: Scenarios of the sustainable use of wild species

Kazuaki Tsuchiya, National Institute for Environmental Studies
Oral presentation: Towards the development of integrated scenarios for biodiversity and climate change: exploring uncertainties in global protected area expansion and land use change

Patrick José von Jeetze, Potsdam Institute for Climate Impact Research (PIK)
Oral presentation: Taking the landscape perspective for safeguarding nature's contributions to people in the global land system

Martin Schönhart, University of Natural Resources and Life Sciences, Vienna
Poster presentation: Participatory scenario design for ecosystem services and biodiversity assessments in four European case study landscapes

Tana Qian, National Institute for Environmental Studies
Poster presentation: Estimating the potential of waste residual woody biomass for regional woody bioelectricity generation in Aizu region, Japan

Session ID # 63: Scenarios in IPCC assessments: lessons from AR6 and recommendations for AR7

06/20/2022, 16:30 - 18:00

Laxenburg Conference Center - Marschallzimmer 1

Lead organizer(s): Jan Fuglestvedt[1] and Anna Pirani[2]

Institutional Affiliation(s): CICERO Center for International Climate Research[1] and The Abdus Salam International Centre for Theoretical Physics, Trieste[2]

Session Type: Workshop Session

Session Description:
The use of scenarios has been an integrating and cross-cutting element across the Working Groups (WGs) in the 6th cycle of the IPCC (AR6), with three Special Reports overseen by the three Working Groups (WGs), as well as the three WG reports and the coming Synthesis Report. Stronger collaboration and linkages across communities were developed thanks to the cross-cutting nature of the three Special Reports, and this was followed up in the writing of the three WG reports. IPCC WGI considered a core set of scenarios from the SSP framework from CMIP6, supplemented by RCPs from CMIP5. WGII used both SSPs and RCPs, and WGIII used scenarios from a database containing more than 2000 scenarios, complemented by bottom-up approaches.
The session will address the role of scenarios for the development of key findings from the WG reports and discuss knowledge gaps and challenges in the context of new and emerging research. Topics will include emissions, climate responses, risks and development pathways, on both near-term and long-term time scales, regional climate changes and impacts and costs and benefits of mitigation and adaptation in the context of sustainable development. Lessons learned that are useful for the AR7 cycle and beyond will be considered. The workshop will end with a discussion between the panel and all session participants of ideas and recommendations for strengthened coordination across the IPCC and its underlying scientific and technical communities and will address how the use of scenarios can support addressing important climate research questions and the coming assessments from the IPCC.
This session will not be open to submissions of abstracts for oral presentations, but invites submissions for posters. The workshop will include approximately 4 invited speakers/panelists from various backgrounds and communities representing different perspectives and the breadth of the scenario assessment within the AR6. Each panelist will give a short presentation on successes and challenges in how scenarios facilitated and/or integrated the assessment in AR6, as well as key recommendations for AR7 based on that experience.

Presenters:

Anna Pirani, The Abdus Salam International Centre for Theoretical Physics, Trieste
Oral presentation: intro about AR6 (i.e., SRs and WG reports)

Jochem Marotzke, Max Planck Institute for Meteorology, **June-Yi Lee**, Pusan National University
Oral presentation: WGI, SyR

Steven Rose, Electric Power Research Institute (EPRI)
Oral presentation: WGII

Keywan Riahi, IIASA, **Roberto Schaeffer**, COPPE, **Edward Byers**, IIASA
Oral presentation: WGIII

Claudia Tebaldi, Lawrence Berkeley National Laboratory
Oral presentation

Edward Byers, International Institute for Applied Systems Analysis (IIASA), **Roberto Schaeffer**, COPPE
Poster presentation: Coordinated scenario assessments in the IPCC for improved cross-chapter and -WG collaboration

Jim Skea, Imperial College London
Poster presentation: Understanding and enhancing the IPCC scenario landscape

Session ID # 93 Addressing the gender dimension in socioeconomic scenarios, Part I: impacts of climate change and policy on gender inequality

06/20/2022, 16:30 - 18:30

Laxenburg Conference Center – Kaminzimmer

Lead organizer(s): Caroline Zimm[1] and Anne Goujon[1]

Institutional Affiliation(s): International Institute for Applied Systems Analysis[1]

Session Type: Workshop Session

Session Description:
While it is recognized that gender matters in climate change mitigation and adaptation efforts and human development, to date it has been challenging to empirically address the gender dimension in socioeconomic scenarios – both regarding impacts of climate change and related policies on gender (in)equality, as well as the impact of gender (in)equality as a driver of change. Accounting for gender differentials in policy is essential because women generally have reduced access to socioeconomic resources, services and social protection. A growing body of gender-focused analysis highlights both the disproportionate vulnerability faced by women during shocks (i.e, induced by climate change or COVID-19), and the disproportionate impact that investments can have on their development prospects. Meanwhile, risk perceptions and climate-related attitudes and behavior vary by gender.
Explicitly accounting for gender differentials in future socioeconomic scenarios requires both baseline empirical evidence and a scenario design that is gender-responsive. Gender- and sex-disaggregated data are becoming available from various sources. Nevertheless, there has been limited attention to sex-specific outcomes in long-range projections and scenario frameworks (e.g., SSPs). Much of our analysis may partially misrepresents outcomes related to half the global population and potentially sustainable human development policies. Accounting for gender heterogeneity enables more realistic representation of current and future socioeconomic development relevant to sustainable development.
This workshop is the first session of a two-workshop series exploring the progress, challenges, and opportunities associated with gender- or sex-disaggregate indicators in long-range projection and scenario analysis. In Part I we focus on the impacts of climate change and policy on gender inequality. This workshop aims to explore current empirical work which explicitly addresses the gender dimension in climate-related development issues (e.g., gender sensitive scenarios). We welcome abstract submissions on research and analysis, or evidence-based practice related to gender- or sex-differential impacts of climate change and other disruptions.
Note: please see Part II of this session (ID 94: Addressing the gender dimension in socioeconomic scenarios, Part II: promoting gender equality as a driver of change) in Population/Gender/Socioeconomic Change

Presenters:

Daniele Malerba, German Development Institute (DIE)
Oral presentation: Inequality and gender disparities in India – the impact of climate policies and revenue recycling schemes

Raya Muttarak, University of Bologna/International Institute for Applied Systems Analysis (IIASA)
Oral presentation: Why sex/gender-disaggregated data and analysis matter for scenarios building and how do we get there?

Mohammod Irfan, Pardee Center for International Futures, University of Denver
Poster presentation: e is the new title: Gender Inequality in Education: Projections along the Shared Socioeconomic Pathways (SSP) Scenarios

Session ID # 94: Addressing the gender dimension in socioeconomic scenarios, Part II: promoting gender equality as a driver of change

06/20/2022, 16:30 - 18:30

Laxenburg Conference Center – Kaminzimmer

Lead organizer(s): Anne Goujon[1] and Caroline Zimm[1]

Institutional Affiliation(s): International Institute for Applied Systems Analysis[1]

Session Type: Workshop Session

Session Description:
While it is recognized that gender matters in climate change mitigation and adaptation efforts and human development, to date it has been challenging to empirically address the gender dimension in socioeconomic scenarios – both regarding impacts of climate change and related policies on gender (in)equality, as well as the impact of gender (in)equality as a driver of change. Accounting for gender differentials in policy is essential because women generally have reduced access to socioeconomic resources, services and social protection. A growing body of analysis highlights both the disproportionate vulnerability faced by women during shocks (i.e, induced by climate change or COVID-19), and the disproportionate impact that investments can have on their development prospects. Meanwhile, risk perceptions and climate-related attitudes and behavior vary by gender.
Explicitly accounting for gender differentials in future socioeconomic scenarios requires both baseline empirical evidence and a scenario design that is gender-responsive. Sex-disaggregated data are becoming available from various sources. Nevertheless, there has been limited attention to sex-specific outcomes in long-range projections and scenario frameworks, meaning our analysis may partially misrepresents outcomes related to half the global population. Accounting for gender heterogeneity enables more realistic representation of current and future socioeconomic development relevant to sustainable development.
This workshop is the second session of a two-workshop series exploring the progress, challenges, and opportunities associated with gender- or sex-disaggregate indicators in long-range projection and scenario analysis. In Part II we focus on gender inequality as a driver of change. This workshop aims to discuss and explore the ways forward to addressing gender disaggregated scenarios on climate change and SDG achievement. We welcome abstract submissions on research and analysis, or evidence-based practice related to the impact that improvements in gender equality have on questions of climate mitigation and adaptation, and on human, social, and economic development more broadly.
Note: please see Part I of this session (ID 93: Addressing the gender dimension in socioeconomic scenarios, Part I: Impacts of climate change and policy on gender inequality) in Impacts/Vulnerability/Adaptation.

Presenters:

Marina Andrijevic, International Institute for Applied Systems Analysis (IIASA)
Oral presentation: All brains in action: Gender equality, education, and mitigation ambition

Wolfgang Lutz, Anne Goujon, International Institute for Applied Systems Analysis (IIASA)
Oral presentation: Differentiation by gender in demographic drivers and well-being outcomes

Felix Creutzig, MCC Berlin and TU Berlin
Oral presentation: Quality of governance, gender equality, and just outcomes: a virtuous cycle

Osprey Orielle Lake, University of California at Davis
Oral presentation: Gender diversity in leadership reduces emissions. What does this mean for our models, and for climate communications in general?

Mathilde Rainard, University of Leeds
Oral presentation: How does gender equality relate to environmental performances of countries?

Marina Andrijevic, International Institute for Applied Systems Analysis (IIASA)
Poster presentation: Overcoming gender inequality for climate resilient development

Camille Belmin, Potsdam Institute for Climate Impact research
Poster presentation: Scaling-up girls' education through the carbon market? A case study on rural Zambia.

Session ID # 56: Assessing the impacts of the Global Energy Transition in the global south

06/20/2022, 16:30 - 18:00

Laxenburg Conference Center - Franz Josef

Lead organizer(s): Jude Kurniawan[1], Andreas Goldthau[2], and Maria Apergi[1]

Institutional Affiliation(s): Institute for Advanced Sustainability Studies, Potsdam[1], Willy Brandt School of Public Policy, University of Erfurt[2]

Session Type: Research Session

Session Description:
To achieve the Paris climate target of "well below 2 degrees" of global warming, the global energy system needs to decarbonize. This means switching from a fossil fuel-based system to one that relies on renewables and low carbon technologies. While the push in the global energy transition is ongoing delivering numerous benefits, it is also creating new inequalities. The risks posed by this transformation will impact especially countries of the Global South, in part due to the lack of access to technologies and capital. What, then, can be done to ensure that these countries can also make the transition to a low-carbon economy? Although energy transition scenario studies may adopt a global perspective, the focus will be on countries of the Global South. This session invites oral and *Poster presentation*s on methodological insights for analyzing the social dimensions of the global energy transitions, touching on various issues including the politics of climate change mitigation; questions related to distributional justice; the political economy of national decarbonization; and the opportunities and barriers in the present of the systemic change. In this session we will discuss pertinent aspects including financial flows, the economics of going low carbon, and the role of technology and policy.

Presenters:

Hsing-Hsuan Chen, Copernicus Institute of Sustainable Development, Faculty of Geosciences, Utrecht University
Oral presentation: Using decomposition analysis to identify major contributors to carbon neutrality across sectors in OECD and non-OECD regions

Esther Schuch, Institute for Advanced Sustainability Studies (IASS)
Oral presentation: Breaking the Carbon Lock-In: A scenario analysis of the Malaysian energy transition

Giacomo Falchetta, International Institute for Applied Systems Analysis (IIASA)
Oral presentation: Scenarios of solar irrigation uptake in Africa and their development potential

Hui Yang, The Pennsylvania State University
Oral presentation: The critical role of socio-demographic factors in determining the future health burden from ambient particulate matter

Adam Suski, Technical University of Denmark
Poster presentation: Power system expansion planning in the presence of uncertainty and climate change: The case study of Ecuador

Dorothee Flaig, Universität Hohenheim
Poster presentation: Impact of EU CBAM on the oil market and related socio-economic implications for the Global South

Session ID # 30: Interpreting and debiasing uncertainties in SSP-based model ensembles

06/20/2022, 16:30 - 17:15

The International Institute for Applied Systems Analysis (IIASA) - Gvishiani

Lead organizer(s): Massimo Tavoni[1], Celine Guivarch[2], and Ben Sanderson[3]

Institutional Affiliation(s): RFF-CMCC European Institute on Economics and the Environment[1], International Research Center on Environment and Development (CIRED)[2], and CICERO Center for International Climate Research[3]

Session Type: Research Session

Session Description:
The increasing relevance of modelled pathways for climate policy making is evident from the rapidly rising number of scenarios reviewed by the IPCC. The SSP framework is one of the cornerstones of community exercises involving multiple models. SSPs provide coordinated guidelines for running model comparisons and for spanning future socio-technical uncertainties. Despite their importance, the SSPs span a relatively small set of uncertainties, and many driving factors are limited to the current century. Furthermore, model comparisons based on SSPs do not directly address model uncertainty. Models do not constitute independent estimates and uncertainty is influenced by both choices made in the model comparison project construction and in the design of scenario intercomparison exercises. The difficulty of separating effects of SSP, target and model structure poses a challenge for the statistical interpretation of scenario ensembles, and for their use to inform climate policy via illustrative pathways. This session discusses ways to explore a wider range of uncertainties and to improve the statistical understanding of scenarios ensembles. The session welcomes contributions from the climate, impact and mitigation modelling community on independence weighting, and use of clustering methods on output and input to classify model family trees and methods based on assessment of common heritage and SSP. It also encourages discussion of use of machine learning approaches for scenario classification, uncertainty quantification and reduction. Finally, methodological contributions of uncertainty analysis and proposed revised experimental designs to improve the predictive power and robustness of ensembles in the short term while retaining the capacity to explore a vast space of outcomes in the longer period are welcome.

Presenters:

Thomas Le Gallic, CIRED, CNRS
Oral presentation: What can we learn from the way milestones are sequenced on the road to net-zero?

Jennifer Morris, MIT
Oral presentation: Combining Probabilistic Uncertainty Quantification and Scenario Discovery Techniques

Chris Smith, University of Leeds / International Institute for Applied Systems Analysis (IIASA)
Oral presentation: A framework for downweighting similar scenarios in integrated assessment model ensembles

Carl Schleussner, Climate Analytics
Poster presentation: Emission pathways reflecting the Paris Agreement climate objectives

Session ID # 20: Improving the representations of Carbon Dioxide Removal (CDR) options in the SSPs

06/21/2022, 11:00 - 12:30

The International Institute for Applied Systems Analysis (IIASA) – Wodak

Lead organizer(s): Keywan Riahi[1], Haewon McJeon[2], and Frances Wang[3]

Institutional Affiliations: International Institute for Applied Systems Analysis[1], Pacific Northwest National Laboratory[2,1], and ClimateWorks Foundation[3]

Session Type: Workshop Session

Session Description:
This workshop sessions discusses the role of carbon dioxide removal (CDR) options in reaching stringent climate targets and how to improve the representation of CDR in the SSPs and the underlying emissions models. Limiting global warming to 1.5℃ will require large-scale carbon dioxide removal (CDR) to aid in deep decarbonization towards net zero CO2 emissions, and to reverse accumulated emissions in the longer term. Most integrated assessment modeling scenarios to date have emphasized afforestation or bioenergy with carbon capture and afforestation. As the negative side-effects of relying on large-scale land-intensive strategies (tens of Gt-CO2/year) have become clear, several recent studies have suggested alternative approaches for carbon removal including direct air capture, direct ocean capture, accelerated weathering, and increasing soil carbon density. This session aims to provide a forum for modeling teams, technology experts, and stakeholders to exchange ideas and improve representation of CDR in the SSPs and other integrated modeling scenarios. We welcome abstract submissions featuring new scenario analysis on carbon removal technologies and their potential side-effects and co-benefits that could influence their deployment at global and regional scales. Additionally, we welcome submissions with a social science, policy or technology focus that may help to understand the pace of deployment, public perception and other conditions under which CDR options may deploy into the market.
CDR might be needed to limit warming to well below 2C. Many CDR options are however not well represented in the SSPs or most of the related climate change pathways and models. This session tries to identify community activities to improve our understanding of CDR and how to include them better into the SSP framework.
'The session will include four complementary presentations (12 + 3 min) on key dimensions of future CDR deployment, followed by a discussion about possible community activities to improve their representation in the SSPs and related models.

Presenters:

Oliver Geden, German Institute for International and Security Affairs (SWP)
Oral presentation: How to prepare for an increasing normalization and politicization of CDR (and its modelling) in climate policy debates?

Jan C. Minx, Mercator Research Institute on Global Commons and Climate Change

Oral presentation: The State of Carbon Dioxide Removal: A Global Status Report & Data Platform that can benefit the scenarios process

Jay Fuhrman, Pacific Northwest National Laboratory
Oral presentation: Integrated Assessment Modeling of a Comprehensive Suite of CO2 Removal Technologies towards a 1.5 degree Future

Joni Jupesta, Research Institute of Innovative Technology for the Earth (RITE)
Oral presentation: Carbon Dioxide Removals (CDR) from technology diffusion, innovation, and life-cycle assessments perspectives

Benjamin K. Sovacool, Aarhus University
Poster presentation: Determining our climate future: Expert predictions about negative emissions and solar geoengineering pathways

Garrett Guard, American University, Institute for Carbon Removal Law and Policy
Poster presentation: Assessing a wider range of CDR technological portfolios across differing energy demand futures

Gaurav Ganti, Climate Analytics / Humboldt Universität zu Berlin
Poster presentation: Equitable carbon dioxide removal scenarios

Nadine Mengis, GEOMAR, Helmholtz Centre for Ocean Research Kiel
Poster presentation: Multi-dimensional, comparative assessment of CDR options for Germany

Session ID # 32: Beyond illustrative scenarios - novel approaches to assess future climate risks

06/20/2022, 17:15 - 18:00

The International Institute for Applied Systems Analysis (IIASA) - Gvishiani

Lead organizer(s): Carl-Friedrich Schleussner[1] and Joeri Rogelj[2, 3]

Institutional Affiliation(s): Climate Analytics[1], International Institute for Applied Systems Analysis[2], and Imperial College London[3]

Session Type: Workshop Session

Session Description:
Climate science often uses static illustrative scenarios to understand the impacts of a wide range of emission trajectories and associated warming outcomes. These scenarios are useful to align assumptions across research communities, but there is a risk that they become outdated and constrain the scope of research endeavors. With 90% of global emissions covered by net zero pledges, the policy discourse has shifted away from questions that pitch mitigation versus no-mitigation, to questions of how much mitigation, by whom, how fast and with which technologies. In this context, also the separate consideration of climate change adaptation and mitigation questions is increasingly left behind in favor of exploring questions of low-carbon climate resilient development. This new focus and dynamism in climate policy requires climate science to respond. Novel, versatile scenario approaches that can explore the implications of various portfolios of mitigation and adaptation measures are necessary, with a key component being a dynamic representation of the climate system that links them. Ultimately, such approaches will improve the integration of climate impacts into integrated assessment models, thereby paving the way for a true cross-working group integration in scenario development. In this session, we want to explore the latest advancements in integrating mitigation and adaptation questions in scenario development, as well as key research questions that would benefit from such an advance. This includes approaches towards improved climate impact integration in scenario development, how specific scenario components - such as land-based CO2 removal - can impact adaptation and mitigation, climate emulator development and integration, assessments of climate impacts for warming rates or temperature overshoots, and key questions this research can contribute to, such as those related to loss and damage or financial risk assessment.

Presenters:

Benjamin Sanderson, CICERO
Oral presentation: Reversing the scenario logic: mapping impacts back to compatible scenarios

Jeremy Fyke, Environment and Climate Change Canada
Oral presentation: Addressing the “Which scenario should I use?” question: a demonstration of probabilistic emission projections for real-world risk-based adaptation decision making

Wim Thiery, VUB
Oral presentation: The kids aren't alright

Session ID # 85: Multiscale and multidimensional demographic projections for the extended global scenario frameworks

06/21/2022, 11:00 - 12:30

Laxenburg Conference Center - Theatersaal

Lead organizer(s): Leiwen Jiang[1], Samir KC[2], and Bryan Jones[3]

Institutional Affiliation(s): Shanghai University[1], International Institute for Applied Systems Analysis[2], and City University of New York[3]

Session Type: Research Session

Session Description:
Population dynamics has been a key element in developing socioeconomic and environmental scenarios, including the Shared Socioeconomic Pathways (SSPs) for addressing climate change mitigation and adaption challenges. Over the past years, many efforts have been invested in updating and extending demographic projections of the global basic SSP scenarios, acknowledging the importance of changing population size, characteristics, spatial distributions and their associated production and consumption behavior. This session seeks to extend and improve the existing population scenarios that explicitly assess demographic and spatial heterogeneity. They are projections of changes in not only population sizes, compositions by age, sex, education, rural-urban residence, household structure, and income, but also their distributions across national, subnational, and spatial scales. By examining the available methods and data for producing the multiscale and multi-dimensional projections and discussing the methodological differences, it helps understand the challenges and implications associated with demographic scenarios over small areas and long time-horizons. The session also aims to update and explore new development in the research community to consider the feedback of external forces such as climate change, conflict, and COVID-19 pandemic on population dynamics. This is in line with the new initiatives in the integrated assessment modeling community to better account for interactions and causal mechanisms between different sectors and systems. Thirdly, the session invites novel, interdisciplinary, and evidence-based research submissions that develop localized sociodemographic scenarios tailored to specific communities and apply them to supporting community-based policies for building resilience through an equity and well-being enhancement lens.

Presenters:

Iulia Marginean, Center for International Climate Research (CICERO)
Oral presentation: Quantifying future vulnerability to climate change: The importance of high-resolution population projections.

Samir KC, International Institute for Applied Systems Analysis (IIASA) and ADRI/SHU
Oral presentation: Population heterogeneity under SSPs at the sub-national level in India and China

Lena Reimann, Institute for Environmental Studies (IVM), Vrije Universiteit Amsterdam

Oral presentation: Developing high-resolution SSP-based population projections accounting for internal migration and spatial development patterns

Leiwen Jiang, Population Council and ADRI/SHU
Oral presentation: Multiscale demographic projections for climate change scenarios framework

Camille Belmin, Potsdam Institute for Climate Impact research
Oral presentation: Integrating energy access as a determinant of fertility in population projections: can universal access to energy lead to long-term energy savings?

Mehdi Mikou, CIRED
Poster presentation: Projecting high resolution gridded datasets for income and population disaggregated by age and gender in Europe

Session ID # 25: Poverty, inequality, distributional impacts of climate change mitigation and impacts

06/21/2022, 11:00 - 12:30

Laxenburg Conference Center - Marschallzimmer 1

Lead organizer(s): Shinichiro Fujimori[1], Bjoern Soergel[2], Jihoon Min[3]

Institutional Affiliation(s): Kyoto University[1], Potsdam Institute for Climate Impact Research[2], and International Institute for Applied Systems Analysis[3]

Session Type: Research Session

Session Description:
A number of scenario based studies dealing with interactions between climate change mitigation and poverty (inequality) with numerical models have recently emerged1, 2, 3. While energy and land-use system transformation is required to reduce GHG emissions, identification of the poverty implications of such transformation as well as countermeasures to eradicate poverty or to reduce inequality should be considered alongside the climate policies, for example through national and international redistribution of carbon pricing revenues. Given that the goals of poverty, inequality and climate are separately emphasized by the SDG, this is an even more important task for the research community.
In this session, we, first, exchange information regarding latest scenarios and the modelling on poverty and inequality. Then, we discuss the required research directions for future scenarios of poverty and income inequality. To do this, we begin with the climate change mitigation and poverty interaction, but work towards a quantification of climate change impacts (and those avoided through mitigation). We also consider the link to multi-dimensional poverty, including aspects such as hunger, energy access, or health. We discuss advantages and disadvantages of using the current SSP-RCP scenario framework. In parallel, the modeling techniques and required data for the further improvement of representation of poverty and inequality would be also discussed.
We finally anticipate the following items and insights.
- Recommendation of poverty and inequality assessment research in terms of the future scenarios.
- cover the full SSP-RCP matrix? Or deviate from the original SSP-RCP?
- How we should handle the baseline, climate mitigation and impacts concept within poverty and inequality research?
- Potential improvement of representation poverty and equality and its required data.

Presenters:

Bramka Arga Jafino, Deltares
Oral presentation: Climate change impacts on global poverty and shared prosperity in 2050 and how better development can mitigate them

Jarmo Kikstra, International Institute for Applied Systems Analysis (IIASA) / Imperial College London

Oral presentation: Multidimensional deprivations using Decent Living Standards with a focus on energy needs

Shiya Zhao, Kyoto University
Oral presentation: Poverty and equity implications of national climate change mitigation policies in line with the Paris Agreement

Kanishka Narayan, Pacific Northwest National Lab (PNNL), Joint Global Change Research Institute (JGCRI
Oral presentation: A PCA driven approach to representing and projecting net income deciles

Nicolas Taconet, PIK
Oral presentation: Managing within-region inequalities on the way to low carbon economies

Johannes Emmerling, RFF-CMCC European Institute on Economics and the Environment
Oral presentation: The impact of climate change, policies, and redistribution on within-country inequality

Shonali Pachauri, International Institute for Applied Systems Analysis (IIASA)
Poster presentation: Income growth and spread needed to make the universal modern energy access goal affordable for all

Session ID # 22: Integrated scenarios of impacts, mitigation and adaptation

06/21/2022, 11:00 - 12:30

Laxenburg Conference Center - Marschallzimmer 2

Lead organizer(s): Franziska Piontek[1], Celine Guivarch[2], Jun'ya Takakura[3], Detlef van Vuuren[4], Massimo Tavoni[5], Kiyoshi Takahashi[3]

Institutional Affiliation(s): Potsdam Institute for Climate Impact Research[1], International Center for Development and Environment[2], National Institute for Environmental Studies Japan[3], Netherlands Environmental Assessment Agency[4], and RFF-CMCC European Institute on Economics and the Environment[5]

Session Type: Research Session

Session Description:
The SSP framework separates the exploration of mitigation pathways and the assessment of climate change impacts. However, there is an increasing demand to quantify avoided impacts as benefits of mitigation in a consistent, integrated framework. Furthermore, impacts from climate change affect energy demand patterns, demographic and economic development prospects, costs and potentials of mitigation options such as biomass-energy and more. Finally, adaptation is a dimension rarely explicitly considered in existing integrated approaches. While there has been substantial progress in IAM-based impact assessment, there are many remaining challenges. Therefore, there is a need to foster further integration of impacts, adaptation and mitigation in scenarios and models with the goal to quantify scenarios that consistently represent mitigation and adaptation possibilities together with the impacts of a warming world, as well as synergies and trade-offs with development goals. This session will feature presentations of recent advances for joint climate impact-mitigation-adaptation modelling and assessment focusing mainly on detailed process-based IAMs but other forms of IAMs are also within the scope. It will facilitate the discussion of questions like
- how to approach the large uncertainty from climate and associated impact assessments and its implications for projections of socio-economic development;
- how to reconcile top-down and bottom-up impact estimates;
- how to improve the uptake of impact research into IAMs and economic modelling, in particular consistency between scenarios and data sets and integration of high resolution spatio-temporal data;
- how to include risks (esp. from extremes and compound events);
- how to include adaptation, both autonomous for more realistic baselines and specific adaptation as part of the SPA framework.
This research session is complemented by a workshop session focusing on practical aspects of linking impact and IAM modeling.

Presenters:

Francesco Pietro Colelli, Ca' Foscari University and CMCC
Oral presentation: Energy needs for adaptation significantly impact mitigation pathways

Alexandre Koberle, Grantham Institute, Imperial College London
Oral presentation: Temperature-clustered scenarios for integrated assessment of mitigation and adaptation policy options

Adriano Vinca, International Institute for Applied Systems Analysis (IIASA)
Oral presentation: Including water, energy and land climate impacts and adaptation strategies in IAM scenarios

Ol Perkins, King's College London
Oral presentation: Capturing land system dynamics in the SSPs through geospatial behavioural models

Ramiro Parrado, Centro Euro-Mediterraneo sui Cambiamenti Climatici (CMCC)
Poster presentation: Estimating climate change damage functions from impact models for integrated assessment

Session ID # 51: Physical climate storylines: applications and perspectives

06/20/2022, 16:30 - 18:00

Laxenburg Conference Center – Wodak

Lead organizer(s): Marina Baldissera Pacchetti[1] and Suraje Dessai[1]

Institutional Affiliation(s): University of Leeds[1]

Session Type: Research Session

Session Description:
This session aims at collecting perspectives on physical climate storylines, a recently developed approach to address climate risk amongst other issues related to the interpretation and use of model projections and the related uncertainty. Physical climate storylines are physically self-consistent unfolding of past events, or plausible future events.
Physical climate storylines are described as tools for different purposes: for example, the IPCC AR6 WG1 suggests that they can be used for the exploration of low likelihood, high impact events (IPCC, WG1, §4.8), of cross-scale interactions for the purpose of informing adaptation (§10.3.4.2), as pseudo-global warming studies (§10.3.2.2), as information distillation exercises for stakeholders (§10.5.3) where sometimes climate information is integrated with socio-economic information and delivered the form of narratives delivered through climate services (Cross-Chapter Box 12.2), or as an alternative approach to attribution studies (§11.2.4).
In the context of climate related risk, storylines intend to inform stakeholders about the possible impacts of climate hazards by either complementing or replacing probabilistic approaches to represent uncertainty about future climate. Storylines focus on plausibility rather than probability and can offer an alternative way of dealing with deep uncertainty that is more accessible to local decision makers.
Many physical climate storylines are developed with the aim of incorporating stakeholder perspectives either by addressing questions identified by stakeholders or by co-producing storylines with stakeholders themselves. Storylines can combine climate and socio-economic information relevant to stakeholders to facilitate decision-making, thereby overlapping with scenario approaches.
For this session, we encourage submissions that develop one of the following: (i) physical climate storylines to address information needs of stakeholders for climate risk assessment and management, (ii) critical/evaluative perspectives on existing physical climate storylines (iii) comparative evaluations of physical climate storylines and scenarios, (iv) perspectives on the physical climate storyline approach in general.

Presenters:

Henrique M. D. Goulart, Deltares
Oral presentation: Storylines of weather-induced shocks to the soybean supply chain under climate change and different socioeconomic policies

Nina Pirttioja, Finnish Environment Institute (SYKE)

Oral presentation: Exploring methods of co-creating climate and impact storylines to complement SSP-based scenarios for informing regional adaptation planning

Theodore Shepherd, University of Reading
Oral presentation: Physical climate storylines: not 'Just So Stories'

Taro Kunimitsu, CICERO Center for International Climate Research
Poster presentation: The use of Bayesian networks in physical climate storylines

Session ID # 82: Qualitative and quantitative approaches to represent regional capacity for mitigation and adaptation in the Shared Socioeconomic Pathways (SSPs)

06/21/2022, 11:00 - 12:30

Laxenburg Conference Center - Franz Josef

Lead organizer(s): Elina Brutschin[1], Silvia Pianta[2], and Felix Schenuit[3]

Institutional Affiliation(s): International Institute for Applied Systems Analysis[1], RFF-CMCC European Institute on Economics and the Environment[2], and Hamburg University[3]

Session Type: Research Session

Session Description:
Integrated Assessment Models (IAM) are the primary tool for developing global and regional emission trajectories and carbon budgets that limit global warming in line with the Paris Agreement. However, these trajectories rely mostly on assumptions about technological and economic constraints/capacities and do not take into account possible constraints that might be imposed by regional variation in institutional and societal capacities that determine the political conditions for the implementation of more stringent climate action, effective climate adaptation, and alignment with achieving key SDGs.
Currently, institutions and governance are embedded in the narratives associated with the Shared Socioeconomic Pathways (SSP); however, this information is qualitative and can only be incorporated indirectly, for example, techno-economic assumptions can be adjusted from variation in institutional and social narratives. At the same time, there are newer approaches that are leveraging political and social sciences to improve the conceptualization and quantification of institutions and other societal constraints. For this research session we are inviting proposals that are looking into one of the following areas: (a) theoretical work pertaining to the conceptualization of state capacity, governance and institutions as it relates to climate action, (b) empirical work that proposes innovative operationalization of state capacity related concepts and historically analyzes key drivers and (c) qualitative and quantitative work incorporating institutions into projections and scenarios.

Presenters:

Lola Nacke, Chalmers University of Technology
Oral presentation: Using coal compensation schemes to understand national capacity for coal phase-out

Ines Dombrowsky, German Development Institute / Deutsches Institut für Entwicklungspolitik (DIE)
Oral presentation: Policy mixes for the implementation of the Paris Agreement and the 2030 Agenda

Felix Schenuit, German Institute for International and Security Affairs

Oral presentation: Towards politically robust mitigation pathways: Assessing 'mitigation capacity' in the context of carbon dioxide removal

Marina Andrijevic, International Institute for Applied Systems Analysis (IIASA)
Oral presentation: Future cooling gap in shared socioeconomic pathways

Florian Humpenöder, Potsdam Institute for Climate Impact Research (PIK)
Oral presentation: Low- and middle-income regions are key for reducing land-related GHG emissions

Silvia Pianta, RFF-CMCC European Institute on Economics and the Environment
Oral presentation: Emissions lock-in, capacity, and public opinion: How social and political science can inform climate modeling efforts

Jonathan Moyer, University of Denver / Pardee Center
Oral presentation: Geopolitical implications of future patterns of socioeconomic development

Session ID # 12: Reflexivity for sustainable and equitable futures: broadening scenario inputs for linkages across methods, scales, and levels

06/21/2022, 11:00 - 12:30

The International Institute for Applied Systems Analysis (IIASA) – Kaminzimmer

Lead organizer(s): Anita Lazurko[1] and Vanessa Schweizer[1]

Institutional Affiliation(s): University of Waterloo, Canada[1]

Session Type: Workshop Session

Session Description:
Scenarios are an important tool to anticipate trajectories of socio-environmental systems and to navigate transformations to sustainability. Amid such complex, uncertain, and potentially contested processes of change, scenario development requires reflexive processes that are open to a wide range of inputs. This drive toward more reflexive and inclusive scenario practice is reflected in emerging scenario research, which focuses on reconciling alternative forms of knowledge (e.g., qualitative and quantitative), linking global to sub-global scales, and combining bottom-up with top-down drivers of change. For example, emerging semi-quantitative methods like Cross-Impact Balances help systematically link drivers of change at different scales that are represented by both qualitative and quantitative data.
The opportunities and challenges associated with "opening up" scenario practice can be framed as a form of reflexive boundary selection, where the up-front choice of scenario framework and method creates a sweeping limit around the scope of future conditions and values considered in the detailed processes that follow. This delimitation may constrain the consideration of extreme scenarios that are increasingly plausible under 21st century conditions and to exclude ambitious or pluralistic visions of a sustainable future.
This session aims to 1) explore the need for more reflexive scenario research and practice and 2) highlight methods and case studies that address this need. Organizers invite abstracts that have successfully applied greater reflexivity in scenario development by widening the range of methods, inputs, or drivers of change included in the process, such as by using semi-quantitative or linked qualitative-quantitative methods and/or by connecting drivers of change across scales or levels. After introducing an emerging framework for reflexive scenario practice in sustainability science, 4 to 5 panelists will present their work. Through a Q&A and breakout groups, participants will interact with the panelists to discuss: what opportunities and challenges exist for more reflexive and inclusive scenarios, particularly when linking across knowledge types, scales, and levels?

Presenters:

Geronimo Gussmann, Global Climate Forum e.V.
Oral presentation: Co-developing sea-level rise adaptation scenarios for the Maldives

Sean Low, Aarhus University
Oral presentation: Models of Anticipation: Challenging modes of global environmental assessment by expert networks in climate intervention technologies

Anita Lazurko, School of Environment, Resources, and Sustainability, University of Waterloo
Oral presentation: Boundaries of the future: A framework for reflexive scenario practice in sustainability research

Lukasz Jarzabek, Centre for Systems Solutions
Oral presentation: Social Simulations for Exploring Sustainable Futures

Patrick Keys, School of Global Environmental Sustainability, Colorado State University
Oral presentation: Challenges and Opportunities for Futures Research in the Anthropocene

Naomi Rubenstein, International Institute for Applied Systems Analysis (IIASA)
Poster presentation: Exploratory scenarios for transformational intervention planning in the Flood Resilience Measurement for Communities program

Session ID # 203: Blue scenarios: ocean and fisheries in Earth System models

06/21/2022, 11:00 - 12:30

The International Institute for Applied Systems Analysis (IIASA) - Gvishiani

Lead organizer(s): Mary Gasalla[1] and Jessica Strefler[2]

Institutional Affiliation(s): University of Sao Paolo[1] and Potsdam Institute for Climate Impact Research[2]

Session Type: Workshop Session

Session Description:
Oceans cover most of the surface of our planet and are home to a wide variety of current and future human activities and environmental concerns. Yet, there are important gaps in the incorporation of scenarios, especially the SSPs, in ocean and fisheries research. This workshop will address the use of scenarios in ocean and fisheries research and their incorporation in Integrated Assessment Models and Earth System Models. The session will explore the scenarios covering the sustainable use of blue resources, the role of ocean-based carbon dioxide removal, and how to make progress on the use of scenarios. This session invites contributions and examples of the use of scenarios, particularly SSPs for the “blue sector”, including methodological progress, co-benefits, research gaps, ocean-based carbon dioxide removal. While addressing methodological options in climate, biodiversity and socioeconomic development scenarios, the workshop also welcomes examples of scenarios based on both qualitative narratives and earth system modeling approaches.

Presenters:

Derek P. Tittensor, Dalhousie University
Oral presentation: The Fisheries and Marine Ecosystem Model Intercomparison Project (FishMIP): past, present, and future

Nadine Mengis, GEOMAR, Helmholtz Centre for Ocean Research Kiel
Oral presentation: Representing marine Carbon Dioxide Removal options in future scenario designs - why, when and how?

David Keller, GEOMAR, Helmholtz Centre for Ocean Research Kiel
Oral presentation: Ocean-based CO2 removal in the Carbon Dioxide Removal Model Intercomparison Project

Miranda Boettcher, German Institute for International and Security Affairs (SWP)
Oral presentation: Broadening blue (carbon) futures: how qualitative foresight can complement quantitative scenarios on the “blue” frontier of carbon-dioxide removal

Mary S. Wisz, World Maritime University

Oral presentation: Participatory scenario building to reduce uncertainties in the ocean twilight zone

William Cheung, Institute for the Oceans and Fisheries, The University of British Columbia
Oral presentation: Exploring future seafood sustainability under scenarios of climate change and socio-economic development

Estee Vermeulen (Miltz), One Ocean Hub, Nelson Mandela University, Gqeberha, South Africa
Poster presentation: Applying System Dynamics Modelling to Support Marine Spatial Planning in Algoa Bay, South Africa.

Guillermo Ortuño Crespo, Stockholm Resilience Centre
Oral presentation: Envisioning futures for transformed human-nature relationships on the high seas

Shujuan Xia, National Institute for Environmental Studies, Japan
Poster presentation: Benefits of moving to diets with more fish

Session ID # 48: Feasibility of scenarios

06/21/2022, 14:30 - 16:00, 16:30 - 18:00

Laxenburg Conference Center – Theatersaal

Lead organizer(s): Aleh Cherp[1] and Jessica Jewell[2]

Institutional Affiliation(s): Central European University[1] and Chalmers University of Technology[2]

Session Type: Research Session

Session Description:
The policy impact and relevance of transition scenarios depends, in large part, on whether they are viewed as 'feasible', i.e. likely to unfold in the real world rather than only in the world of models. Yet, the science of assessing feasibility of scenarios is just emerging and at the moment struggling with a number of conceptual and methodological challenges. This session will discuss these challenges with reference to specific cases of assessing feasibility of national or global scenarios (pathways, roadmaps, etc.) as well as sectoral transitions relevant for addressing global long-term sustainability challenges. The session will not be able to accommodate narrow discussions of technical, economic or geophysical feasibility of specific technologies. The presentators are encouraged to focus on the following questions: "how is feasibility defined?", "how is feasibility assessed?", "how are the results of feasibility assessment used?". More theoretical presentations on conceptualising feasibility and exploring the principles of sound feasibility assessment are also invited.

Presenters:

Theresa Scavenius, Aalborg University
Oral presentation: Feasibility, policy-guidance, and machine-learning analysis of the IPCC approach

Vadim Vinichenko, Chalmers University of Technology
Oral presentation: Nuclear and renewables: comparison of historical growth and climate stabilisation scenarios

Jessica Jewell, Chalmers University of Technology
Oral presentation: Conceptual and methodological advances in feasibility assessment: feasibility ladder and feasibility spaces

Oliver Geden, German Institute for International and Security Affairs (SWP)
Oral presentation: Assessing political feasibility frontiers: the case of CDR in the European Union

Elina Brutschin, International Institute for Applied Systems Analysis (IIASA)
Oral presentation: Lessons learned from systematic evaluations of IAM scenarios

Shinichiro Asayama, National Institute for Environmental Studies

Oral presentation: The politics of crafting and assessing feasible scenarios: muddled between 'plausibility' and 'desirability' of projected futures

Adrian Odenweller, Potsdam Institute for Climate Impact Research
Oral presentation: Probabilistic feasibility spaces for analysing the upscaling of energy technologies: the case of
green hydrogen

Vivien Fisch-Romito, Renewable Energy Systems, Institute for Environmental Sciences (ISE), Section of Earth and Environmental Sciences, University of Geneva
Oral presentation: Insights from hindcasting on modeling socio-technical feasibility of EU climate objectives in the power sector

Roger Pielke, University of Colorado Boulder
Oral presentation: Plausible 2005-2050 emissions scenarios project between 2 and 3 degrees C of warming by 2100

Gregor Semieniuk, University of Massachusetts Amherst
Oral presentation: Plausible energy demand patterns in a growing global economy with climate policy

Masahiro Suzuki, Central European University
Poster presentation: Speed of energy transitions: Comparing the historical and required speed of energy transitions and analysing the feasibility of G7 achieving their climate targets

Rachel Freeman, University College London
Poster presentation: Reflections from a socio-politically driven model on the feasibility of energy transition pathways

Session ID # 17: Updating the population and economic projections in the SSPs

06/21/2022, 14:30 - 16:00

Laxenburg Conference Center - Marschallzimmer 1

Lead organizer(s): Rob Dellink[1] and Samir KC[2]

Institutional Affiliation(s): OECD[1] and International Institute for Applied Systems Analysis[2]

Session Type: Workshop Session

Session Description:
The Shared Socioeconomic Pathways (SSPs) are underpinned by projections of population by age, sex, and educational attainment, as well as by projections of economic activity. Since the original projections were published, there have been significant developments that imply new population and economics projections would be quantitatively and qualitatively different. This session presents an analysis of how updated tools, newer data, and state-of-the-art assumptions affect the long-term projections of the socioeconomic drivers in each of the SSP scenarios, using the original storylines.
This session aims first to explore advancements made in the past decade and new approaches in population forecasting, including projections of demographic heterogeneity. Updated population dynamics scenario projections will be presented building on the assessment of future fertility, mortality, and migration. This session seeks to identify state of the art assumptions and scenarios for fertility, mortality, and migration, including new developments in the demographic community that can feed into the SSP scenarios.
Next, updated economic projections will be presented, exploring how recent economic trends and updated short-term economic forecasts affect the long-term GDP scenarios. The session will highlight the role of key assumptions on income convergence, trade openness, and the role of natural resource rents in making long-term economic scenarios.
Third, a dedicated part of the discussion will center on the long-term projections on the recovery from COVID-19 and the effects of uncertainty surrounding this on the long-term socioeconomic drivers.
This session will highlight how state-of-the-art future projections of environmental pressure, not least of greenhouse gas emissions, may benefit from a new generation of population and economic projections for the SSPs. It will also show how a full set of updated population and economic scenario assessments can improve on more ad-hoc updates of population and economic projections using only a recalibration to the latest economic data.

Presenters:

Wolfgang Lutz, International Institute for Applied Systems Analysis (IIASA)
Oral presentation: Alternative approaches to population forecasting and dealing with demographic heterogeneity

Samir KC, International Institute for Applied Systems Analysis (IIASA), Wittgenstein Center and Shanghai University

Oral presentation: Updating SSPs' population and human capital projections

Rob Dellink, OECD
Oral presentation: Updating the economic drivers in the SSPs

Johannes Koch, Potsdam Institute for Climate Impact Research
Oral presentation: Update of Ssp GDP Projections: Capturing Recent Changes in National Accounting, PPP Conversion and Covid 19 Impacts

Mohammod Irfan, Pardee Center for International Futures, University of Denver
Poster presentation: Projection of Schooling Flows under SSP Scenarios

Session ID # 42: Advances in human-Earth System interactions in scenario development

06/21/2022, 14:30 - 16:00

Laxenburg Conference Center - Marschallzimmer 2

Lead organizer(s): Tokuta Yokohata[1], Chris Smith[2], Hannah Liddy[3,4], Kaoru Tachiiri[5], and Jarmo Kikstra[2,6]

Institutional Affiliation(s): National Institute for Environmental Studies Japan[1], International Institute for Applied Systems Analysis[2], Columbia University[3], NASA Goddard Institute for Space Studies[4], Japan Agency for Marine-Earth Science and Technology[5], and Imperial College London[6]

Session Type: Research Session

Session Description:
In the scenario development of IPCC AR6, socio-economic scenarios (Shared Socio-economic Pathways (SSPs)) were developed by the integrated assessment modelling (IAM) community. Subsequently, in a coordinated effort emissions and concentrations pathways from SSP-RCP scenarios were used by Earth System Models, providing a link between socioeconomic scenarios and detailed climate research. At present this linkage is mostly one-directional. For instance, the SSP design explicitly excluded any climate impacts, and thus potential feedbacks from climatic characteristics to socioeconomic development are not taken into account. At present, the inclusion of more human-Earth system interactions is being actively discussed in multiple communities.
Implications where climate feedbacks may be important include energy supply/demand, food security and wider land use changes, water availability, air quality, climate damages, and population dynamics. Climate change, if included in the design of future scenarios, would therefore affect basic components of IAM scenarios like population and GDP pathways that normally serve as input data. One emerging way to study such complex interactions is to develop coupled models that consider the interaction and feedback between the human-earth system.
In this session, presentations on the linking of models for human activities and the natural environment with various complexities and different strategies are welcomed. Additionally, we would like to solicit from scenario developers and users where climate modelling efforts could be more focused and useful and call for greater collaboration between IAM and Earth System Model groups in scenario development.

Presenters:

Thomas Gasser, International Institute for Applied Systems Analysis (IIASA)
Oral presentation: Mitigation pathways robust to Earth system uncertainty under cost-benefit and cost-effective paradigms

Kaoru Tachiiri, Japan Agency for Marine-Earth Science and Technology
Oral presentation: Evaluating the interaction between Earth and socio-economic system by using a loosely coupled model

Alan Di Vittorio, Lawrence Berkeley National Laboratory
Oral presentation: The role of coupled human-environment modeling in scenario development

Sibel Eker, Radboud University & International Institute for Applied Systems Analysis (IIASA)
Oral presentation: Using simple integrated assessment models to explore human and earth system feedbacks

Peter Alexander, University of Edinburgh
Oral presentation: Land-use change drivers, interactions, and impacts: The Land System Modular Model (LandSyMM)

Ol Perkins, King's College London
Poster presentation: Capturing human-Earth system interactions through behavioural land system model coupling: the case of landscape fire

Yangyang Xu, University of California San Diego
Poster presentation: Modelling human–natural systems interactions with implications for twenty-first-century warming

Session ID # 202: Improving the scenario development process

06/21/2022, 14:30 - 16:00

Laxenburg Conference Center - Kaminzimmer

Lead organizer(s): Detlef van Vuuren[1], Bas van Ruijven[2], Brian O'Neill[3]

Institutional Affiliation(s): Netherlands Environmental Assessment Agency[1], International Institute for Applied Systems Analysis[2], and Pacific Northwest National Laboratory[3]

Session Type: Workshop Session

Session Description:
An important recommendation of the 2020 paper on the "Achievements and needs for the climate change scenario framework," which synthesized the insights from the first Scenarios Forum, was to improve the scenario development process. This recommendation included a range of topics, such as connecting the SSP-RCP framework to other scenario activities, define and promote the use of Shared Policy Assumptions (SPAs) for both mitigation and adaptation, make the scenario development process as inclusive as possible, and establishing a process for regular updates of the scenario framework. While some of these topics are partly discussed in other sessions throughout the Scenarios Forum, this session aims at a dedicated discussion on how the scenario framework and development process can be improved. The goal of this workshop session is to assess examples of progress on these topics, consider weaknesses in the framework, and identify concrete proposals on how the scenario process can be improved on these dimensions while relying on voluntary efforts from the scenarios community.
This session welcomes contributions that show examples of improvements of the scenario process or propose how the scenario framework or development process can be improved on these dimensions. This includes, for example, proposals on the development of adaptation SPAs, proposals on making the SSP/RCP framework more suitable for applications beyond climate, examples of perspectives/scenarios that currently are not contained in the Scenarios Framework, and considerations for establishing a regular update process for the scenarios framework.

Presenters:

Nicolas Siorak, Em-Lyon, Gsda, SAE institute
Oral presentation: Towards devil scenarios?

Claudi Tebaldi, Lawrence Berkeley National Laboratory
Oral presentation: Climate impacts in baseline scenarios: Why? Which? How?

Jennifer Morris, MIT
Oral presentation: In search of a scenario reflecting current and future pressures and trends

Carole Green, University of Washington
Oral presentation: Guiding Future Research and Scenario Development: The Continued Shared Socioeconomic Pathway (SSP) Literature Database

Vanessa Schweizer, University of Waterloo
Oral presentation: Using limits to adaptation and Reasons for Concern to contextualize guidance on baseline scenarios for IAV use

Dandan Yu, Nanjing Institute of Environmental Sciences (NIES), Ministry of Ecology and Environment of China
Poster presentation: Developing scenarios and models of biodiversity and ecosystem services in China

Siir Kilkis, The Scientific and Technological Research Council of Turkey
Poster presentation: Urban Emissions Scenarios for Urban Systems: Advances and Ways Forward within the SSP-RCP Framework

Session ID # 43: Scenarios of material stocks, flows, services, and practices: exploring nexus approaches to address climate change, air pollution and sustainability

06/21/2022, 14:30 - 16:00

Laxenburg Conference Center - Franz Josef

Lead organizer(s): Adriana Gómez Sanabria[1], Helmut Haberl[2], Edgar Hertwich[3], Oreane Edelenbosch[4], Gamze Ümlü[1], Jihoon Min[1], and Dominik Widenhofer[2]

Institutional Affiliation(s): International Institute for Applied Systems Analysis[1], University of Natural Resources and Life Sciences, Austria (BOKU)[2], Norwegian University of Science and Technology[3], Copernicus Institute of Sustainable Development, Utrecht University[4]

Session Type: Research Session

Session Description:
This session will focus on exploring approaches to analyse society-nature interactions and their implications for material cycles, GHG, air pollution, waste and sustainable development. The 'stocks-flows-services/ practices' approach connects biophysical stocks (e.g., buildings, infrastructure and machinery) and flows involved in social metabolism to the delivery of services. It can help to analyse relationships between resource use and the practices of everyday life. It is well known that material extraction and processing is a significant cause of environmental impacts and resource inputs ultimately translate into wastes and emissions i.e., pollution. Furthermore, current research of consumption practices focuses on structure-agency issues at the heart of socio-metabolic research. However, in current climate and sustainability scenarios, material demand is often directly related to economic indicators and as such cross-sectoral interactions between material stock and flows are not account for. Moreover, consistent representations of circular strategies (extraction, production, manufacturing, use, end of life, waste management) and consumer practices are still at a very early stage in scenario narratives. Better understanding these systemic interrelations is particularly important when aiming to forge demand-side solutions that address critical social goals such as eradicating poverty and hunger while at the same time reducing resource use in absolute terms, as required e.g., for meeting the Paris climate goals. This session aims to bring together different research communities to build and discuss consistent scenarios that might enable societies to satisfy human needs without compromising the climate and sustainability.

Presenters:

Antoine Teixeira, ADEME – CIRED
Oral presentation: The future carbon footprint of materials as a bottleneck for the transition to Net-Zero Emissions – case study on France

Stefan Pauliuk, Industrial Ecology Group, Faculty of Environment and Natural Resources, University of Freiburg
Oral presentation: Cutting down or letting grow? Scenarios for future use of timber in long-lived construction materials

Veronika Gaube, Institute of Social Ecology, BOKU Vienna
Oral presentation: Understanding linkages between stocks, flows, services and practices using agent-based and system-dynamic models

Adriana Gómez Sanabria, International Institute for Applied Systems Analysis (IIASA)
Oral presentation: Potential for future reductions of global GHG and air pollutants from circular waste management systems

Edgar Hertwich, NTNU (Norwegian University of Science and Technology)
Oral presentation: Material efficiency as part of the Sustainable Development Pathways

Ankita Gaur, University College Cork
Oral presentation: Analysing and predicting the impact of spatial settlement pattern and interdependencies on energy service demands to aid deep mitigation pathway development

Kimon Keramidas, University of Grenoble-Alpes
Poster presentation: Estimation approaches for materials demand, recycling and substitution using the POLES model

Session ID # 6: The role of non-CO2 greenhouse gas emissions in mitigation scenarios and climate change

06/21/2022, 14:30 - 16:00

The International Institute for Applied Systems Analysis (IIASA) – Wodak

Lead organizer(s): Lena Höglund-Isaksson[1]

Institutional Affiliation(s): International Institute for Applied Systems Analysis[1]

Session Type: Research Session

Session Description:
The urgency of mitigating non-CO2 greenhouse gas emissions methane, nitrous oxide and fluorinated gases (HFCs, PFCs and SF6) in addition to deep decarbonization of energy systems, is becoming increasingly evident if the world is to stay below 1.5 degrees warming both in the short- and long- terms. The idea of this session is to bring together researchers from the three communities (a) non-CO2 emission and mitigation scenarios, (b) earth system models and climate change impacts, and (c) technical opportunities for direct atmospheric removal of methane, with a purpose to improve the understanding of how different opportunities to limit warming from short-lived climate forcers can enable safe warming levels in the next few decades, while not forgetting the necessity of energy transformations and CO2 emission reductions to ensure safe warming levels in the mid- to long terms. This session therefore welcomes contributions on global and regional projections of non-CO2 emissions, mitigation potentials and costs, assessments of potentials for atmospheric removal of non-CO2 GHGs, and the timing and treatment of non-CO2 emissions in climate change mitigation scenarios, and their impacts on climate change in (reduced form) climate models. We also welcome contributions on the identification of policies and regulatory instruments in support of a continuous maintenance of safe levels of warming in both the short- and long terms, e.g., studies investigating implications of using single policy instruments to jointly address short- and long-lived gases.

Presenters:

Daniel Johansson, Chalmers
Oral presentation: The social cost of methane in a scenario context

Yang Ou, Joint Global Change Research Institute, Pacific Northwest National Laboratory, USA
Oral presentation: Beyond Decarbonization: Deep Mitigation of All Greenhouse Gases towards 1.5°C and 2°C future

Mathijs Harmsen, PBL Netherlands Environmental Assessment Agency
Oral presentation: Uncertainty in non-CO2 greenhouse gas mitigation: Make-or-break for global climate policy feasibility

Jared Creason, RTI International
Oral presentation: Projections of Global Baseline Emissions and Mitigation Potential for Non-CO2 Greenhouse Gases under Alternative Socioeconomic Scenarios

Laura Wilcox, University of Reading
Oral presentation: Rapidly evolving anthropogenic aerosol emissions induce strong and regionally heterogeneous climate impacts on the way to a net-zero world

Stefan Frank, International Institute for Applied Systems Analysis (IIASA)
Poster presentation: Land-based emission reduction potentials and their role for the transition towards climate neutrality

Session ID # 10: Building better climate scenarios for supervisors, private sector financial institutions, and development institutions

06/21/2022, 14:30 - 16:00, 16:30 - 18:00

The International Institute for Applied Systems Analysis (IIASA) - Gvishiani

Lead organizer(s): James Edmonds[1], David Carlin[2], Bas van Ruijven[3], Seth Monteith[4], Leon Clarke[5], Yu Sha[1], Christoph Bertram[6]

Institutional Affiliation(s): Pacific Northwest National Laboratory[1], UN Environment Programme-Finance Initiative (UNEP FI)[2], International Institute for Applied Systems Analysis[3], ClimateWorks Foundation[4], University of Maryland[5], and Potsdam Institute for Climate Impact Research[6]

Session Type: Research/Workshop Session

Session Description:
This workshop session seeks to bring together producers and users of climate scenarios for a constructive dialogue about how these scenarios are being used in the financial sector and the role of finance within the scenarios themselves. The workshop will explore the needs of scenario users including financial supervisors, private sector financial institutions and development banks. The workshop session will also explore the abilities and challenges of scenario creators in addressing these needs. Finally, the workshop will cover the role of finance in climate scenarios: both how it is modeled and where the greatest needs for capital exist within the transition. This session aims to begin a continuing dialogue between scenario producers and users that will generate recommendations for future climate scenario development and application.

Presenters:

Xianfu Lu, Climate Investment Funds (CIF)
Oral presentation: Enabling Climate-Resilient Investment Decision-Making in MDBs: the role of scenario information

Nicola Ranger, Smith School of Enterprise and Environment, University of Oxford (and World Bank)
Oral presentation: Bank Stress Testing of Physical Risks under Climate Change Macro Scenarios: Application within the Philippines FSAP

Stefano Battiston, Univ. of Zurich
Oral presentation: Accounting for finance is key for climate mitigation pathways

Theresa Lober, Bank of England/NGFS
Oral presentation: Setting the scene: why financial supervisors are using scenarios and how the NGFS scenarios are being applied

Christoph Bertram, PIK

Oral presentation: The development of the NGFS IAM models for financial supervisors and institutions

Edo Schets, Bank of England/NGFS
Oral presentation.

Adele Morris, Federal Reserve Board of Governors
Oral presentation.

Session ID # 16: Scenarios in CMIP6 and CMIP7: lessons learned and new design considerations

06/21/2022, 16:30 - 18:00

Laxenburg Conference Center - Marschallzimmer 1

Lead organizer(s): Claudia Tebaldi[1], Bjørn H. Samset[2], Brian O'Neill[3], Jean-Francois Lamarque[4], Detlef van Vuuren[5], and Laura Wilcox[7]

Institutional Affiliation(s): Lawrence Berkeley National Laboratory[1], CICERO Center for International Climate Research[2], Pacific Northwest National Laboratory[3], Climate & Global Dynamics (CGD-NCAR)[4] Netherlands Environmental Assessment Agency[5], University of Reading[7]

Session Type: Workshop Session

Session Description:
Scenarios have played a central role in CMIP6 activities, with the ScenarioMIP design built around the SSP-RCP framework and several other MIPs using SSP-based scenarios and variants to explore a range of scientific questions about future climate changes.The results have underpinned future projections assessed by the IPCC AR6 WG1 report, and many papers are being written about future climate change and its impacts based on the results from ScenarioMIP.
At this time, we can start to take stock of what worked, and what made the process more difficult. We can address questions about number and type of scenarios prescribed, the process that furnished forcing input to ESMs, and the utility of the set of scenarios for both Earth system and impacts research. For instance, some of the trajectories chosen for CMIP6 are distinct mainly in terms of total radiative forcing, not because of pathway shape or composition of individual forcing agents. It may be useful to consider how to better explore the shape of forcing pathways (e.g., more overshoots, regional heterogeneity), and their nature (e.g., the role of aerosols, whose changes on decadal timescales can dominate the climate response to anthropogenic emissions; the effects of different land-use change patterns).
The session will include invited speakers addressing lessons learned in the preparation, use and analysis of experiments from ScenarioMIP (and possibly paired MIPs). A panel discussion will then look towards the next iteration of ScenarioMIP addressing fundamental questions about usefulness, number, range, shape and mix of forcing agents in scenarios for CMIP7. Opinions will be elicited in the discussion process from the three research communities involved: scenario modelers (IAM community), Earth system modelers and VIA researchers.

Presenters:

Benjamin Sanderson, CICERO
Oral presentation: Scenario design considerations in CMIP7 to better inform robust net-zero strategy

Matthew Gidden, International Institute for Applied Systems Analysis (IIASA)
Oral presentation: The economic-climate model interface: modeller perspectives on CMIP6 looking towards CMIP7

Jean-Francois Lamarque, NCAR
Oral presentation: Planning for the next phases of CMIP

Claudia Tebaldi, LBNL
Oral presentation: Introduction to session

Goran Georgievski, Max Planck Institute for Meteorology
Poster presentation: Adaptive emission scenario simulations with the MPI Earth System Model

Session ID # 8: Challenges and opportunities in constructing national scale scenarios from the SSPs/RCPs

06/21/2022, 16:30 - 18:00

Laxenburg Conference Center - Marschallzimmer 2

Lead organizer(s): Mark Rounsevell[1,2], Paula Harrison[3], and Rob Dunford-Brown[3]

Institutional Affiliation(s): Karlsruhe Institute of Technology[1], the University of Edinburgh[2], and UK Centre for Ecology and Hydrology[3]

Session Type: Research Session

Session Description:
The SSP/RCP framework, whilst originally developed at the global scale (O'Neil *et al.*, 2020), has been interpreted extensively at the national scale (e.g. Pedde *et al.*, 2021), often to inform both research and policy in support of climate change adaptation and mitigation actions. These interpretations involve a range of different methods in the development of both qualitative and quantitative interpretations of key socio-economic and climate change variables, often embedded within participatory processes that engage with key stakeholders (Kok *et al.*, 2019). National scale RCP/SSP-based scenarios are critical in engaging with national governments since it is these governments who ultimately have the capacity to implement policy in response to the climate change crisis. Scenario analyses provide the basis for exploring alternative socio-economic development trajectories and the consequences of these trajectories for national economies.
This session will explore examples of the construction of both qualitative and quantitative scenarios from the SSPs/RCPs in different national contexts. This includes studies focused on interpreting the drivers of socio-economic change, quantitative modelling of future socio-economic indicators, and participatory approaches to storyline development. In particular, the session will address the questions:

1. How can the regional applicability of the SSPs/RCPs be improved?
2. Should we be aiming for consistency or diversity in methods for downscaling SSPs/RCPs to improve comparability across scales and studies?

We invite abstract submissions on how SSP/RCP scenarios have been constructed at the national scale for different countries. The session will comprise a mix of 2 invited, and 2-3 selected presentations as well as a panel discussion of the session speakers.

References: Kok, *et al.* (2019). Reg Env Chang 19, 643–654; O'Neil *et al.* (2020). Nat Clim Chang, 10, 1074-1084; Pedde *et al.* (2021). Sci Tot Env, 756, 143172. 12

Presenters:

Paula Harrison, UK Centre for Ecology & Hydrology
Oral presentation: Qualitative and quantitative methods in the development of national scale SSPs for the UK

Anna Lipsanen, Finnish Environment Institute (SYKE)

Oral presentation: Downscaling global SSP narratives for the Finnish health and social welfare sector to inform climate change adaptation

Adrien Chevallier, MARBEC, Ifremer, IRD, Université de Montpellier, CNRS
Oral presentation: National stakeholders' projections of the societal and environmental consequences of global change on six iconic marine socio-ecosystems

Andy Challinor, Institute for Climate and Atmospheric Science, School of Earth and Environment, University of Leeds, United Kingdom
Oral presentation: Stakeholder-driven scenarios for national scale climate-smart nutrition security

Lena Gubler, Swiss Federal Institute for Forest, Snow and Landscape Research WSL
Poster presentation: Developing SSP-Narratives for Switzerland

Lara Welder, Climate Analytics gGmbH
Poster presentation: Downscaling 1.5°C Paris-Agreement Compatible Pathways to inform National Decarbonisation Strategies

Fabio Sferra, International Institute for Applied Systems Analysis (IIASA)
Poster presentation: Downscaling IAMs results to the country level – a new algorithm

Simona Pedde, Wageningen University and Research
Poster presentation: Extended and multiscale SSPs – can we define them as "consistent" and "relevant"? Lessons learnt from 7 regional extensions

Session ID # 21: What do non-state actors (e.g., corporations, NGOs, financial institutions, etc.) need from climate change scenarios?

06/21/2022, 16:30 - 18:00

Laxenburg Conference Center – Kaminzimmer

Lead organizer(s): Katie Mulvaney[1] and Nemi Vora[2]

Institutional Affiliation(s): RMI[1] and Amazon[2]

Session Type: Workshop Session

Session Description:
Non-state actors (corporations, NGOs, investors, financial institutions, civil society, sub-national governments, and philanthropies) are increasingly using SSP narratives and scenarios to make critical decisions on climate change risk as well as mitigation and adaptation actions. Improving the relevance of climate change scenario applications for users was an important recommendation coming out of the 2019 Scenarios Forum (as highlighted in O'Neill *et al.* 2020, Nature Climate Change). Equipped with the right information these non-state actors, in collaboration with national governments and through coalition-building, could help set off tipping points that accelerate policy and technological transitions to limit warming to 1.5°C. The objective of this workshop session is to begin a conversation on what will help make SSP-RCP scenarios more relevant by highlighting the perspectives of non-state actors on how scenarios are already being used in decision making processes and identifying bottlenecks. Potential outcomes from this workshop could include a compilation of needs, details on salient output metrics for non-state actors, initiation of guidelines for downscaling results of global scenarios, or identification of scenario co-production opportunities. Therefore, we seek proposals on a range of topics across climate change adaptation and mitigation. Examples include: how corporations are using scenarios to quantify and adapt to future shocks as they pertain to private sector supply chains; how scenarios can be used by sectoral change initiatives in the energy system transition; the use of scenarios in the financial sector; etc.

Presenters:

Edo Schets, Bank of England
Oral presentation: The good, the bad and the hot house world: underpinnings of the NGFS climate scenarios

Francesca Desmarais, Falck
Oral presentation: The power of design — engaging decision makers by merging the SSP narratives with design practices

Andres Chang, Science Based Targets initiative / CDP
Oral presentation: Business Net Zero: How Scenarios Are Informing The Next Generation of Science-Based Targets

Derek Pankratz, Deloitte

Oral presentation.

Madeleine McPherson, University of Victoria
Poster presentation: What do non-state actors (e.g., corporations, NGOs, financial institutions, etc.) need from climate change scenarios?

Session ID # 66: Digitalization scenarios and implications for climate change

06/21/2022, 16:30 - 18:00

Laxenburg Conference Center - Franz Josef

Lead organizer(s): Charlie Wilson[1], Laurent Drouet[2], Felix Creutzig[3], Zoi Vrontisi[4], and Elena Verdolini[2]

Institutional Affiliation(s): University of Oxford[1], RFF-CMCC European Institute on Economics and the Environment[2], TU Berlin[3], and E3 Modelling[4]

Session Type: Research Session

Session Description:
Digitalisation is a powerful and pervasive 'megatrend' shaping social and economic activity across the world. Digital devices, hardware, infrastructure, and general-purpose applications like the internet and artificial intelligence continue to transform how we work, live, interact, organise, participate, shop, and relax, and how goods and services are provided and consumed.
The net impacts of digitalisation on mitigation and adaptation of climate change remain highly uncertain. For example, digitalisation can help reduce energy demand by enabling shared and reduced mobility, smart metering, and data analytics. Conversely, digitalisation can increase electricity demand in growing IT sectors: data centres, network connections, cryptocurrencies are just a few of the examples. Digitalisation also has system wide impacts through changing patterns of consumption, political agency, and social organisation. Through these different forms of impact, digitalisation may have dramatically divergent consequences, steering us towards a digital utopia of efficient service provision in optimised systems … or a digital dystopia of corporate exploitation and runaway energy demand. This bifurcation in future trajectories is shaped by institutions and governance of data, privacy, market power, democratic participation, skills, and sovereign rights in a digital age. A systematic exploration of scenario narratives for digitalisation in the Anthropocene is a necessary precursor to robust quantitative modelling of emission impacts. This session will explore how the development of digitalisation narratives can support the modelling and assessment of digital transformation in a decarbonizing energy sector and the economy-wide low carbon transition.

Presenters:

Felix Creutzig, MCC Berlin and TU Berlin
Oral presentation: Digitalization and the Anthropocene

Tim Foxon, SPRU, University of Sussex
Oral presentation: Socially- and individually-oriented pathways for the impacts of digitalisation on energy demand

Doris Fuchs, Westfälische Wilhelms-Universität Münster
Oral presentation: AI – Narratives and governance of AI and sustainability

Session ID # 64: Future lifestyle changes at different geographical scales and in response to societal shocks (e.g., Covid-19)

06/21/2022, 16:30 - 18:00

Laxenburg Conference Center - Franz Josef

Lead organizer(s): Nicole van den Berg[1], Johannes Morfeldt[2], Oreane Edelenbosch[1], Daniel Johansson[2], Charlie Wilson[3], and Jörgen Larsson[2]

Institutional Affiliation(s): Utrecht University[1], Chalmers University of Technology[2], and Oxford University[3]

Session Type: Research Session

Session Description:
Lifestyle changes and demand-side transformations are critical enablers of stringent mitigation pathways in line with Paris Agreement targets. IAMs are traditionally stronger on supply-side measures and technological development than modelling diverse demand-side transformations. Potentials for transformations differ across countries and regions and can be affected by societal trends, policies, and norms. Nevertheless, they can significantly reduce emissions by decreasing product and service demand and enabling more energy-efficient services. It is critical to explore how demand-side transformations can be stronger represented within IAMs and how hybrid approaches, i.e. combined scenario and model approaches where IAM-outputs are used to describe the development in the "rest of the world" and where national scale scenarios and models are used for capturing the local specific context and the fine-scale nature of demand-side transformations.
Pandemics and other societal shocks have dramatic effects on social and economic activity. The policy responses triggered by Covid-19 forcibly changed lifestyles. However, change in the material and social fabric of life is strongly path-dependent. Long-lived infrastructures endure, and institutions provide stability. Daily practices are habitual, as are organisational modes of thinking and planning. Following a shock, the response of locked-in systems is to seek a return to stability - the 'old normal.' But humans' capacity to adapt allows for new lifestyle practices to emerge and embed, such as homeworking, e-retail, localised movement, e-health, and food preparation. Societal shocks can shape lifestyles over the medium-to-long term with related impacts on energy, materials and carbon emissions.
This session aims to explore the geographical and contextual detail needed for modelling lifestyle changes and demand-side transformations. We encourage presentations and posters on:

1. Scaling up demand-side transformations from national to regional and global levels and hybrid modelling using rest-of-world pathways to assess local developments.
2. Incorporating societal shocks, such as impacts of Covid-19, in modelling over decadal timescales.
3. Interlinking input-output analysis with IAMs to better understand rebound effects when assessing demand reductions.

Presenters:

Johannes Morfeldt, Chalmers University of Technology
Oral presentation: A hybrid method for developing Swedish consumption-based emission scenarios

Hayley Steele, University of California at Davis
Oral presentation: Should future scenarios factor in the impact of racism upon emissions?

Nicole van den Berg, Utrecht University
Oral presentation: (Path)ways to a lower carbon footprint? the impact of sustainable lifestyle scenarios in reaching climate targets

Mel George, Center for Global Sustainability, Univ. of Maryland - College Park
Poster presentation: Distributional Impacts of Varying Levels of Lifestyle Changes and Societal Transformations in 1.5C pathways

Isabela Schmidt Tagomori, PBL Netherlands Environmental Assessment Agency
Poster presentation: Contribution of lifestyle changes to climate change mitigation

Oreane Edelenbosch, Utrecht University
Poster presentation: Lifestyle changes in post-Covid-19 futures

Session ID # 29: Learnings from stakeholder participation for the development and implementation of scenarios and long-term pathways towards sustainable systems

06/21/2022, 16:30 - 18:00

The International Institute for Applied Systems Analysis (IIASA) - Wodak

Lead organizer(s): Jeffrey M. Bielicki[1], Maria Diaz[2], Jan Steinhauser[3], and Douglas Jackson-Smith[1]

Institutional Affiliation(s): Ohio State University[1], Sustainable Development Solutions Network[2], International Institute for Applied Systems Analysis[3]

Session Type: Workshop Session

Session Description:
Modelers and the integrated assessment models they create and use have fundamental roles at the interface where science and policy influence each other. Effective scenarios for these efforts contain reasonably plausible combinations of factors that reflect different perspectives on past, present, and future developments; they can help provide context for decision-making and intervention strategies for complex political, social, economic, and environmental uncertainty over various spatial and temporal scales. Scenarios—especially model-based scenarios like the popular RCP-SSP framework—set a pathway on a trajectory that can help guide policy for mitigating undesirable long-term outcomes.
In this workshop, we seek to elevate discussion and analysis of the scenario development process. Scenarios are often constructed by input from stakeholders with diverse perspectives and backgrounds, including using participatory methods. Yet subjective assessments underly scenario construction. Plausibility depends on perspective, and views on what is needed for decision-making as well as potential intervention strategies are also human constructs. As a result, the scenario development process is often a social process that occurs through the exchange between experts, academics, and others. The perspectives and dynamics of those 'in the room' matter, and the methods, open-access tools, and inputs from various stakeholders are as essential as selecting for and cultivating productively critical and flexible dialog, decision-making, transparency, and constructive group processes.
Participants are invited to: i) share experiences where pathways were used as a framework for engaging stakeholders in the design of scenarios, in particular for climate and land-use systems; ii) discuss challenges and how they were addressed (e.g., working with stakeholders to address limited understanding of complex models, misalignment between short-term national pledges and long-term global objectives (i.e., SDGs, Paris Agreement)); iii) showcase how participatory modeling influenced the ambition of national policies and strategies.

Presenters:

Torres Gunfaus Marta, IDB
Oral presentation: Long-Term Climate Strategies in Latin America: What can we learn from the voice of the actors who have participated in their formulation?

Federico Frank, INTA (Instituto Nacional de Tecnología Agropecuaria)
Oral presentation: A multi-model approach to explore sustainable food and land use pathways for Argentina

Taran Faehn, Research Department of Statistics Norway
Oral presentation: Plausible futures: Systemising different international contexts for Norway's climate strategies

Ana Paula Aguiar, Stockholm Resilience Centre, Stockholm University
Oral presentation: Widened co-creation processes for target-seeking climate and sustainable development scenarios

Alison Smith, University of Oxford
Oral presentation: Stakeholder engagement in the UK: developing sustainable food and land use pathways with the FABLE model

Edward Torres Maia, Oswaldo Cruz Foundation (Fiocruz)
Poster presentation: Fiocruz Method of Future Intelligence - Prospective Dialogues Methodology for 2030 Agenda and its SDGs

Session ID # 46: Emulators: new methods and role in integrating research across climate research communities

06/22/2022, 9:00 - 10:30, 11:00 - 12:30

Laxenburg Conference Center - Theatersaal

Lead organizer(s): Sonia Seneviratne[1], Claudia Tedbaldi[2]

Institutional Affiliation(s): ETH Zurich[1] and Lawrence Berkeley National Laboratory[2]

Session Type: Research Session

Session Description:
Emulators, either simpler physics-based climate models or algorithmic representation of complex models' output in a computationally efficient manner, play a central role in exploring scenarios: They are used by the Vulnerability, Impact and Adaptation (VIA) research community to determine risk of impacts and by the mitigation and Integrated Assessment Model (IAM) research community to derive the implications of alternative pathways, thus supplementing what could not be done with computationally costly Earth System Models (ESMs). In the IPCC AR6 report, emulators in the form of simple models have played a central role in assessing the likely range of future projections of global temperature by allowing the exploration of uncertainty dimensions like model structural choices, and in particular equilibrium climate sensitivity. In this role the connection between WG1, WG2, and WG3 have been facilitated, but there is potential for more integration, including through the emulation of regional climate changes.
Our session invites contributions from developers of new methods of both types, i.e., emulators in the form of simple models, and ESM emulators, including emulators representing regional climate changes, extremes and impacts, and their inclusion in IAMs. We also want to hear from users of emulators in the VIA and IAM research communities. We are particularly interested in addressing the potential of emulators of ESM output to facilitate the further connection between WG1, WG2, and WG3, ahead of the next IPCC report. We hope that the session will spur ideas and ways by which new scenarios' climate output could be more promptly available to impact and mitigation researchers, so that the same set of scenarios would be more easily and systematically explored across the whole IPCC report.

Presenters:

Chris Wells, University of Leeds
Oral presentation: Near-term regional climate change projections using climate emulators

Shruti Nath, Climate Analytics
Oral presentation: Towards integration of LCLM feedbacks within climate models: an emulator approach

Claudia Tebaldi, PNNL
Oral presentation: STITCHES: a comprehensive option for Earth System Model emulation for impacts research, and its implications for designing future ESM scenario experiments

Thomas Bossy, Laboratoire des sciences du climat et de l'environnement (LSCE)
Oral presentation: Pathfinder: a model and framework to explore emission pathways limiting climate impacts

Stuart Jenkins, University of Oxford
Oral presentation: An emulator of an Integrated Assessment Model's carbon price, CO2 production, carbon capture and storage, and CO2 emissions timeseries

Chris Smith, University of Leeds / International Institute for Applied Systems Analysis (IIASA)
Oral presentation: FaIR v2: A reduced-complexity climate model for scenario evaluation and integrated assessment

Yann Quilcaille, ETH Zurich
Oral presentation: Emulating spatially resolved annual maximum temperatures of Earth system models using MESMER-X

Zeke Hausfather, Berkeley Earth
Oral presentation: A probabilistic exploration of climate outcomes under current policies and commitments

Camilla Mathison, UK Met Office
Poster presentation: Is the 1.5C climate target still alive post COP-26?

Session ID # 38: Beyond GDP: economic dimensions of integrated assessment scenarios

06/22/2022, 9:00 - 10:30

Laxenburg Conference Center - Marschallzimmer 1

Lead organizer(s): Rob Dellink[1] and Dominique van de Mensbrugghe[2]

Institutional Affiliation(s): OECD[1] and Perdue University[2]

Session Type: Workshop Session

Session Description:
Integrated assessment scenarios such as the Shared Socioeconomic Pathways (SSPs) are underpinned by projections of economic activity. Often, the economic dimension is limited to projections of GDP and income per capita. This session will discuss both the need and opportunities for providing broader and deeper economic projections for climate change and related integrated assessment modelling scenarios.
First, the session will look at the role of changes in the sectoral structure in the economy. Clearly, different economic activities are not projected to grow at equal speed, and as sectoral emission intensities vary widely across sectors, a sectoral approach can provide much better links with environmental pressures, including greenhouse gas and air pollutant emissions. Second, international trade matches regional consumption and production patterns. Exports of natural resources (including fossil fuels) also play a big role in macroeconomic development of resource-rich countries. Finally, the session will discuss the opportunities and pitfalls in downscaling economic projections to the local scale. The session will explicitly link these proposed economic projections to the SSPs.
The goal of the session is to highlight how deeper and broader economic projections can improve the quantification of integrated assessment scenarios more broadly. We expect the outcome to be a combination of recommendations for integrated assessment modellers on how to use more detailed insights from economic projections, and recommendations for economic modellers on how to ensure their tools and projections are useful for integration in integrated assessment models.

Presenters:

Lionel Fontagne, Bank of France, CEPII and Paris School of Economic
Oral presentation: A Dynamic Path to a Low Carbon Economy

Steven Rose, Electric Power Research Institute (EPRI)
Oral presentation: Quantifying uncertainty in global and sub-global socioeconomic and greenhouse gas emissions futures

Rob Dellink, OECD
Oral presentation: The economic drivers of environmental change: the role of baseline projectons

Marijke Kuiper, Wageningen Economic Research, Wageningen University & Research

Oral presentation: Deepening the economic contribution to integrated assessments scenarios by adding more detailed labour projections as drivers of structural change

Session ID # 7: National deep decarbonization scenarios: policy analysis and global narratives

06/22/2022, 9:00 - 10:30, 11:00 - 12:30

Laxenburg Conference Center - Marschallzimmer 2

Lead organizer(s): Johannes Svensson[1] and Daniel Buira[2]

Institutional Affiliation(s): IDDRI, France[1] and Tempus Analitica[2]

Session Type: Research Session

Session Description:
This session will discuss country-driven national deep decarbonisation scenarios consistent with global carbon neutrality between 2050 and 2070, in line with IPCC estimates of required emission reductions for achieving the Paris Agreement global mitigation target (Rogelj *et al.*, 2018). The focus will be on the policy lessons that can be derived for national decision-making regarding synergies and trade-offs with country non-climate objectives, and on priority short-term policies and actions, with a focus on where shifts from current paths are most required. In addition to insights from individual country-scale analyses, the session will discuss how high-resolution national pathways defined in a bottom-up manner can inform global climate dialogues through the global enablers the national pathways depend upon (paper currently in process). This session will be an opportunity to reflect on the methodological challenges faced when developing national scenarios, capturing a broad set of key national circumstances, with the primary objectives to inform in-country and international stakeholder consultation. These objectives require adopting a pathways design framework articulating detailed national narratives and dashboards in an iterative process guided by global benchmarks with detailed accounts of sectoral transformations (Waisman *et al.*, 2019; Lefèvre *et al.*, 2020; Svensson *et al.*, 2021). The session will also discuss the methodological challenges of a bottom-up approach to the articulation between global and national scenarios, including the characteristics necessary in national pathways to be used by such an approach. The objective of this approach is to elaborate global narratives resulting from the international enablers emerging from national scenarios, and it is complementary to the widely used SSP/RCP/SPA scenario framework (Kriegler *et al.*, 2014; Riahi *et al.*, 2017; van Vuuren *et al.*, 2017; O'Neill *et al.*, 2020), using global scenarios as boundary conditions and consistency checks to national scenarios (van Vuuren *et al.*, 2017).

Presenters:

Matthias Weitzel, European Commission - Joint Research Centre (JRC-Seville)
Oral presentation: Taking stock of the ambition gap: implications of the Glasgow pledges for deep decarbonisation scenarios

Marta Torres-Gunfaus, IDDRI
Oral presentation: What does carbon neutrality mean for transformative development and policy action in large emerging economies? Methodological insights drawn from bottom-up national analyses

Johannes Svensson, IDDRI
Oral presentation: Global Narratives: a bottom-up and policy relevant approach to bridging insights from national and global decarbonisation pathways

Amit Garg, Indian Institute of Management, Ahmedabad
Oral presentation: Indian Deep Decarbonization Scenarios informing Global Stocktake 2023

Haewon McJeon, PNNL/UMD
Oral presentation: Integrated Assessment Modeling for the U.S. Long-Term Strategy towards Net-Zero Emissions

Gunnar Luderer, Potsdam Institute for Climate Impact Research
Oral presentation: Pathways towards reaching climate neutrality in Germany by 2045

Hannah Daly, University College Cork
Oral presentation: Retooling a national energy systems model to map necessary rapid socio-technical transitions for climate mitigation

Femke Nijsse, University of Exeter
Oral presentation: Deep decarbonisation with a solar-dominated baseline

Session ID # 70: Narratives for scenarios and pathways to provide decent levels of energy services at low demand of energy and resources

06/22/2022, 9:00 - 10:30

Laxenburg Conference Center – Kaminzimmer

Lead organizer(s): Yamina Saheb[1], Gregory Nemet[2], Leila Niamir[3], Alessio Mastrucci[4], and Bas van Ruijven[4]

Institutional Affiliation(s): Sciences Po[1], Paris, University of Wisconsin, Madison[2], Mercator Research Institute on Global Commons and Climate Change (MCC)-Berlin[3], and International Institute for Applied Systems Analysis[4]

Session Type: Workshop Session

Session Description:
This workshop session will generate ideas for narratives and scenarios that reduce the demand for energy, materials, land, water, and resources in end use sectors, while providing decent levels of energy services. The overall goal is to gather input to develop a more robust set of pathways for how the combination of high energy service provision, and low resource demand could realistically come about over the next three decades. Specific foci include assessment of decent living standards and sufficiency; social and technological innovation including through digitalisation; as well as system change, infrastructure, and novel services; and how each play a role in facilitating low energy demand outcomes.
An important focus of the discussion will be on the importance of sufficiency, technological, and social innovations in demand reduction. Sufficiency is defined as a set of policy measures and daily practices which avoid the demand for energy, materials, land, water, and other natural resources, while delivering wellbeing for all within planetary boundaries (Saheb 2021).
As background, The French negawatt scenario (Negawatt 2003) (Negawatt 2011) (Negawatt 2017) is the first known scenario to go beyond efficiency improvement to reduce energy demand. The last update of this scenario shows high mitigation potential of consumption-based emissions and those related to the use of materials (Negawatt 2022). (ADEME 2022) and (RTE 2021) show similar results. At a global level, (Grubler *et al.* 2018) (Millward-Hopkins *et al.* 2020) (Kuhnhenn *et al.* 2020) (Fishman *et al.* 2021) found large mid-century mitigation potential from the adoption of sufficiency measures, behavioural, social and technological innovations and (Mastrucci *et al.* 2021) reached similar conclusions for global heating and cooling demand while (Barrett *et al.* 2021) showed similar results from in-depth analysis of low-energy demand futures specific to the UK.

Presenters:

Arnulf Grubler, International Institute for Applied Systems Analysis (IIASA)
Oral presentation

Yves Marignac, Association négaWatt
Oral presentation: Energy sufficiency as the first pillar of ambitious decarbonisation and deep sustainability pathways: modelling experience from France and prospects for Europe

Andre Sanchez Montoya, Copenhagen Business School
Oral presentation: Make Room: Social Practice Design as a Green Transition Tool for Sufficient Living

Benigna Boza-Kiss, International Institute for Applied Systems Analysis (IIASA)
Oral presentation: Low energy demand and decent living scenarios in buildings

Aimée Aguilar Jaber, OECD
Oral presentation: A mind-set shift to unlock the potential of high-well-being, low demand systems: will modelling foster or hinder?

Barbara Nicoloso, Virage Energie
Oral presentation: Energy transition through sufficiency: a net-zero pathway emission for the Hauts-de-France region.

Session ID # 52: Interacting with integrated assessment models for target-seeking under uncertainty

06/22/2022, 9:00 - 10:30

Laxenburg Conference Center - Franz Josef

Lead organizer(s): Sibel Eker[1], Sarah Cornell[2], Merle Rémy[3], and Jan Kwakkel[4]

Institutional Affiliation(s): Radboud University[1], Stockholm University[2], Institute for Advanced Sustainability Studies, Potsdam[3], and Delft University of Technology[4]

Session Type: Research Session

Session Description:
Large integrated assessment models have been immensely useful in developing possible climate mitigation pathways, influencing political agendas and providing policy advice. But now, the 2030 Agenda highlights the urgent need to improve upon the well-established climate change scenario framework by capturing more diverse relevant perspectives, reflecting uncertainty ranges, and enhancing scenario relevance to users especially in policy analysis for coherence and implementation. There is demand for new target-seeking scenarios that achieve multiple interacting social, economic and ecological goals as well as meeting the Paris climate targets. An expanding international community of stakeholders, spanning world regions and sectors of societal action, is interested in scenario-based analysis to explore how interactions among these globally agreed goals shape future pathways to sustainable development. But large IAMs struggle to engage stakeholders actively in scenario development and to incorporate diverse uncertainties. In this session, we will explore ways to capture future uncertainties and diverse perspectives, through the use of simple IAMs to complement larger ones, combined with methods of decision-making under deep uncertainty, and through engaging stakeholders more actively in co-created scenario development processes. With invited speakers and open submissions, the session will present examples of research and science-society forums that can help improve today's scenario frameworks and interactive environments, so that they do better at reflecting the complexity and deep uncertainty of the world's often divergent societal perspectives and the necessary shifts in global governance for a sustainable future.

Presenters:

Georgios Xexakis, University of Geneva; HOLISTIC S.A.
Oral presentation: Are interactive scenario tools an effective solution for expanding the uncertainty space and communicating the results of integrated assessment modeling?

Damla Akoluk, Delft University of Technology
Oral presentation: Exploring the distributive justice principles in integrated assessment models: a trade-off analysis on interregional justice

Falk Schmidt, Institute for Advanced Sustainability Studies (IASS)

Oral presentation: Co-creating target-seeking scenarios for climate and sustainable development goals

Henri Drake, Princeton University
Oral presentation: A simple model for assessing climate control trade-offs and responding to unanticipated climate outcomes

David Groves, **Jia Li**, World Bank
Oral presentation: Using IAM scenarios to guide the assessment of carbon lock-in and Paris-aligned global development

Claudia Wieners, Utrecht University
Poster presentation: Integrated Assessment Modelling of solar geoengineering: Simple experiments in the DICE model

Session ID # 23: Improving the representation and usability of socio-political factors in the Shared Socioeconomic Pathways (SSPs)

06/22/2022, 9:00 - 10:30

The International Institute for Applied Systems Analysis (IIASA) - Gvishiani

Lead organizer(s): Ariel Macaspac Hernandez[1], Elisabeth Gilmore[2], Halvard Buhaug[3], Håvard Hegre[4], and Elmar Kriegler[5]

Institutional Affiliation(s): German Development Institute[1], Carleton University[2], Peace Research Institute Oslo (PRIO)[3], Uppsala University[4], Potsdam Institute for Climate Impact Research[5]

Session Type: Workshop Session

Session Description:
Socio-political factors, underpinned by institutions and governance, affect the vulnerability from climate hazards as well as the capacity to implement effective responses to climate change, including mitigation, adaptation, and achievement of the SDGs.
Presently, in the Shared Socioeconomic Pathways (SSPs), the political dimensions of development are described in aggregate assumptions about political changes in accompanying storylines. The implication is that the challenges posed by climate change and to the achievement of the SDGs, especially those that are known to be sensitive to the political context, such as food and economic security, may be poorly characterized or - more problematically – underestimated. In this roundtable, we discuss how to improve the representation of socio-political factors in scenarios by elaborating the evidence for characteristics of political context that may be critical for the evaluation of climate impacts and the effectiveness of mitigation and adaptation actions and opportunities for approaches to integrate these factors into the SSPs.
Two invited presenters will motivate these efforts that better harness the knowledge from political and social sciences. First, conceptual frameworks and theoretical models are needed to contextualize the various socio-political factors that better capture historical experiences, especially those that will most likely define variations between countries. For example, a former colony that emerged from a violent civil war and is highly vulnerable to climate change will have a distinct set of values and resource provisions that will inform its capacity for societal transformation. Second, socio-political dimensions can be better quantified along the existing SSPs to improve internal consistency and integration with modeling efforts.
The panel is relevant for modelers, social scientists and users. As socio-political trends and factors mediated by institutions are key to transformative actions, modelers can gain insight into how to include these factors in their scenarios. For social scientists, the panel can be beneficial by complementing systematic inquiry of “what it is” with “what ought to be” and “how to get there from here”. Taken together, this collaboration will enhance “goal-oriented” thinking in social science and the usability and salience of IAM efforts.

Presenters:

Theresa Scavenius, Aalborg University
Oral presentation: The predictive capacity of the social sciences

Ariel Macaspac Hernandez, German Development Institute
Oral presentation: "Transformative" scenarios and models – Ten questions on how to improve the scientific representation of governance factors in sustainable development pathways

Julia Leininger, **Christopher Wingens**, German Development Institute
Oral presentation: Institutions in integrated scenarios for reaching climate and sustainable development goals

Ian Hughes, MaREI Centre, University College Cork
Oral presentation: DIIS Scenarios for Whole of Society Transformation

Halvard Buhaug, Peace Research Insitute Oslo (PRIO)
Oral presentation: Accounting for political sources of vulnerability in the SSPs

Elmar Kriegler, PIK
Oral presentation: Experiences and lessons learnt from SHAPE

Staffan I. Lindberg, University of Gothenburg
Oral presentation

Session ID # 31: Scenario-based approaches to modeling migration futures

06/22/2022, 9:00 - 10:30, 11:00 - 12:30

The International Institute for Applied Systems Analysis (IIASA) - Wodak

Lead organizer(s): Carsten Keßler[1] and Alex de Sherbinin[2]

Institutional Affiliation(s): Bochum University of Applied Sciences[1] and Columbia Climate School[2]

Session Type: Research Session

Session Description:
The proliferation of scenario-based research around the climate crisis and global socio- economic development has led to an uptake of scenario-based approaches in migration studies. This includes a growing number of efforts to model internal and international migration either using the shared socioeconomic pathways (SSP) as a basis for projecting mobility or in ways that contribute to the SSPs directly (e.g., as a component of future country-level population projections). Relative to fertility and mortality, migration is the most dynamic and potentially hard to predict population dynamic to model. At the same time, new scenario frameworks are under development that focus on specific regions or social/political aspects of migration, as more disciplines are starting to utilize scenario-based research. The goal of this session is a) to provide a forum to discuss scenario-based migration research combining SSPs and RCPs from a variety of perspectives, and b) to enable a transdisciplinary exchange on migration scenarios including, but not limited to, social and political scientists, demographers, as well as experts in modelling and spatial analysis. To achieve this goal, we particularly invite submissions that go beyond a pure modeling perspective and also consider the cultural, social, and political realities of migration, including, but not limited to, aspects of educational attainment, the labor market, immigration policy, or the role of diasporas. In addition to two invited talks, the session will feature three paper presentations selected from the submissions, and a poster session for the remaining accepted papers. The session will be concluded with an open discussion to identify research gaps derived from the transdisciplinary perspectives from migration experts from different disciplines, aiming to develop best practices for the use of the SSPs across different disciplines and identify gaps that should be addressed in future scenarios.

Presenters:

Roman Hoffmann, International Institute for Applied Systems Analysis (IIASA)
Oral presentation: Climate Change, Desertification, and Internal Migration: Evidence from Global Census Data

Karolina Sobczak-Szelc, Center for Advanced Studies of Population and Religion (CASPAR), Cracow University of Economics, Centre of Migration Studies, University of Warsaw
Oral presentation: The role of qualitative research in creation of storyline of the shared socioeconomic pathways on the example of three case studies from Tunisia

Alex de Sherbinin, CIESIN, Columbia Climate School

Oral presentation: Internal climate migration scenarios using a spatial population gravity modeling approach

Gabriele Standardi, Euro-Mediterranean Center on Climate Change (CMCC)
Oral presentation: A CGE model framework for the combined assessment of future migration patterns and economic effects under climate change scenarios

Hélène Benveniste, Harvard University
Oral presentation: Tracing international migration in projections of income and inequality across the Shared Socioeconomic Pathways

Lena Reimann, Institute for Environmental Studies (IVM), Vrije Universiteit Amsterdam
Oral presentation: Exploring spatial feedbacks between sea-level rise, adaptation policies, and migration – An application of the RCP-SSP-SPA scenario framework

Fabien Cottier, Lamont-Doherty Earth Observatory, Columbia Climate School
Oral presentation: International climate migration scenarios using a gravity modeling approach

Michaël Boissonneault, Netherlands Interdisciplinary Demographic Institute (NIDI-KNAW)
Oral presentation: The use of scenario planning for exploring the future of migration: insights from an expert survey

Lucas Kluge, Potsdam Institute for Climate Impact Research
Oral presentation: A dynamic global model of bilateral migration by place of birth, age and education groups

Lars Tierolf, Vrije Universiteit
Oral presentation: A global agent-based model of migration and adaptation decisions in face of sea level rise

Session ID # 59: Catalyzing climate and biodiversity coupled scenarios for assessments and policy

06/22/2022, 11:00 - 12:30

Laxenburg Conference Center - Marschallzimmer 1

Lead organizer(s): HyeJin Kim[1], Paula Harrison[2], Laura Pereira[3]

Institutional Affiliation(s): Martin Luther University Halle-Wittenberg[1] and UK Centre for Ecology & Hydrology[2], University of the Witwatersrand, South Africa[3]

Session Type: Workshop Session

Session Description:
O'Neil *et al.* (2021) in "Achievements and needs for the climate change scenario framework" highlighted the need to improve relevance of climate scenarios beyond the climate research community. The SSP-RCP scenarios have been applied in biodiversity and ecosystem services models (e.g. BES-SIM), but the lack of biodiversity interventions in the SSP scenarios reduced their relevance for IPBES assessments (Rosa *et al.* 2020). IPBES is therefore developing its own scenarios and modelling framework – Natures Futures Framework (NFF) – that places nature and people at the center and facilitates the inclusion of diverse worldviews (Pereira *et al.* 2020). Similarly, communities such as TWI2050 and FABLE working on Sustainable Development Goals (SDGs) have used a mix of SSP-RCP and other scenario frameworks with different successes and challenges. In this light, this session brings together the leading experts from these communities to discuss how various scenarios and modelling frameworks and ongoing efforts could be coupled (or mapped to each other) to improve their effectiveness in informing multiple policy agendas (e.g. Paris Agreement, CBD post 2020 biodiversity framework, and SDGs).
The aim of this workshop is to explore ways to cross-fertilize the SSP-RCP and NFF scenario frameworks and to catalyze collaboration in broader scenario and modelling communities going forward. The discussion will focus on the needs, challenges and opportunities for better linking scenario frameworks to IPBES/IPCC assessments and relevant policy goals. It welcomes submissions for panel members who would be willing to prompt an interactive discussion with the audience by sharing their experiences working across different scenario frameworks in a variety of contexts (scales, geographies, assessment vs decision support) and/or in linking scenarios to inform policy goals. The workshop will be preceded by the research session on new and ongoing work on scenarios for biodiversity and nature contributions to people.

References: O'Neill, B. C. et al (2020). Nat. Clim. Chang. 10, 1074–1084, Pereira, L. M. et al (2020). People and Nature 2, 1172–1195, Rosa, I. M. D. et al (2020). Global Ecology and Conservation 22, e00886.

Presenters:

Laura Pereira, Global Change Institute, Wits University
Oral presentation: Operationalizing the Nature Futures Framework using illustrative narratives

Mark Rounsevell, Karlsruhe Institute of Technology

Oral presentation: Mapping the RCPs and SSPs onto the Nature Futures Framework at the global scale

Rob Alkemade, PBL Netherlands Environmental Assessment Agency
Oral presentation: Exploring the Nature Futures Framework with the IMAGE-GLOBIO models

Alexander Popp, Potsdam Institute for Climate Impact Research (PIK)
Oral presentation: Integrated strategies are key to avoid trade-offs between climate and biodiversity protection

Simona Pedde, Wageningen University and Research
Oral presentation: Participatory and extended SSPs. Can these seed a link between SSPs and NFF?

HyeJin Kim, Martin Luther University Halle-Wittenberg, German Centre for Integrative Biodiversity Research (iDiv)
Poster presentation: Towards a better future for biodiversity and people: modelling Nature Futures

Lilith Kramer, Netherlands Institute of Ecology (NIOO-KNAW)
Poster presentation: Modelling nature futures of freshwater systems

Session ID # 37: Economic pluralism and post-growth scenarios

06/22/2022, 11:00 - 12:30

Laxenburg Conference Center – Kaminzimmer

Lead organizer(s): Jarmo Kikstra[1,2], Jason Hickel[3,4], and Bjoern Soergel[5]

Institutional Affiliation(s): International Institute for Applied Systems Analysis[1], Imperial College London[2], London School of Economics[3], Autonomous University of Barcelona[4], and Potsdam Institute for Climate Impact Research[5]

Session Type: Research Session

Session Description:
This session aims to explore the tools for including diverse economic theories in scenarios and for developing post-growth economic futures. The session will explore the steps to build useful post-growth narratives as well as the requirements to allow for their model quantifications, and potential barriers to be overcome. It will discuss whether current integrated assessment models (IAMs) are capable of sufficiently providing such model quantifications.

The vast majority of existing climate change mitigation scenarios feature strong global growth in terms of gross domestic product (GDP). This generally includes continued growth in regions where economic capacity is already more than sufficient to meet human needs at a high standard. The growing affluence in these scenarios stimulates increases in resource use and pollution [1].

Mitigation scenarios based on SSPs subsequently generally rely on either high rates of decoupling of GDP from energy and material throughput [e.g., 2], or project a large upscaling of negative emission capabilities in the second half of the century, both of which raises potential feasibility concerns [e.g., 3]. At the same time, besides lacking detail on the decoupling of energy demand and GDP, demand-side mitigation options have long been underexplored in IAM scenarios [3].

This research session invites presentations that focus on reviewing or introducing useful datasets and modelling methods that can be used to translate narratives of alternative economic developments into quantifications of scenarios. More specifically, presentations from integrated assessment modelling, social metabolism, industrial ecology, ecological economics and related disciplines are welcome.

In particular, this session would discuss the different aspects, both social and technical, involved in developing: – Post-growth and degrowth scenarios: exploring and utilising potentials to reduce energy use and material throughput while maintaining strong social outcomes, assessing the consequences for aggregate economic output – Convergence scenarios: reducing inequalities in resource and energy use both between countries and within countries.

References
[1] Wiedmann, Thomas, *et al.* "Scientists' warning on affluence." Nature communications 11.1 (2020): 1-10.
[2] Grubler, Arnulf, *et al.* "A low energy demand scenario for meeting the 1.5 C target and sustainable development goals without negative emission technologies." Nature energy 3.6 (2018): 515-527.
[3] Brutschin, Elina, *et al.* "A multidimensional feasibility evaluation of low-carbon scenarios." Environmental Research Letters 16.6 (2021): 064069.

Presenters:

Julien Lefèvre, CIRED (International Environment and Development Research Center)
Oral presentation: Modelling post-growth mitigation scenarios with Integrated Assessment Models: capabilities and gaps

Mengyu Li, ISA, School of Physics, The University of Sydney, NSW 2006
Oral presentation: Integrated Assessment Modeling of post-growth scenarios

Bjoern Soergel, David Meng-Chuen Chen, Potsdam Institute for Climate Impact Research (PIK)
Oral presentation: Modelling post-growth energy and land futures

Eric Kemp-Benedict, Stockholm Environment Institute
Oral presentation: Withdrawing from the industrial economy: Quantifying SSP1 via labor participation

Session ID # 104: Regional and subnational scenarios of decarbonization and sustainable development

06/22/2022, 11:00 - 12:30

Laxenburg Conference Center - Franz Josef

Lead organizer(s): Gokul Iyer[1], Ryna Cui[2], and Vaibhav Chaturvedi[3]

Institutional Affiliation(s): Pacific Northwest National Laboratory[1], University of Maryland[2], and CEEW India[3]

Session Type: Research Session

Session Description:
As countries develop near- and long- term decarbonization strategies, decision-makers are interested in understanding the implications of national climate strategies at regional and subnational scales. Of key interest is to understand institutional and political economy issues surrounding transitions toward a low-carbon economy and the implications of those transitions for sustainable development priorities including but not limited to human health, employment, and equity at these scales. Existing scenarios literature largely focuses on global and national pathways toward deep decarbonization. Yet, a burgeoning literature is exploring regional and subnational scenarios in the U.S., China, Latin America and Caribbean, and other key emitting countries across the globe. This session will solicit presentations and posters based on recent and ongoing studies on regional and subnational scenarios focused on long-term decarbonization strategies. This session will also include presentations on implications of national decarbonization goals at subnational scales for various human and natural systems such as energy, water, land, and economy and the subsequent consequences for sustainable development priorities such as employment, human heath, economic development, food security, and water scarcity at those scales. While targeted at quantitative scenarios developed by integrated assessment models, the session will also be open to studies based on other methodologies, including qualitative methodologies and combined qualitative and quantitative scenario approaches.

Presenters:

Alicia Zhao, Center for Global Sustainability, School of Public Policy, University of Maryland, College Park, MD
Oral presentation: Integrated Assessment Modeling of Federal and Subnational Climate Actions for Reducing the U.S. Emission by 50-52%

Jonas Hörsch, Climate Analytics
Oral presentation: Sub-national employment opportunities of coal-to-renewable electricity system transitions under a global model scenario

Edmundo Molina Pérez, Tecnológico de Monterrey
Oral presentation: Advancing the design of national decarbonization strategies for an uncertain future

Olga Ivanova, PBL Netherlands Environmental Assessment Agency
Oral presentation: Impact of regional energy transition on the labour market

Wenjia Cai, Tsinghua University
Oral presentation: Incorporating the health co-benefits into technology pathways to achieve China's carbon neutrality target: a modelling study

Sha Yu, University of Maryland
Poster presentation: Multi-objective environmental policies: co-benefits between air quality and climate policies

The Forum is presented by the International Committee on New Integrated Climate Change Assessment Scenarios (ICONICS) and hosted by the International Institute for Applied Systems Analysis (IIASA).