

Guidelines for co-production workshops with stakeholders from policy, business, and finance with a global perspective



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CONSORTIUM MEMBERS



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Executive Summary

This report provides guidelines for the co-production of knowledge between **global** stakeholders from policy, business and finance and scientists. The document has a focus on the co-production of knowledge with climate change scenarios, i.e. global climate change projections, impact projections, and mitigation scenarios.

Advice for coproduction with **regional** stakeholders:

If you are interested in how socio-economic scenarios for climate IAV (impact, adaptation, and vulnerability) assessment at the regional and local level can be co-produced between researchers with knowledge in IAV and scenario planning and stakeholders (including decision-makers) with domain expertise please refer to this sister resource from SENSES:

[Guidelines for co-production of local and regional scenarios and pathways for adaptation.](#)

Introduction: Stakeholder interaction



Orchestrating a sustainable, climate resilient transition across a broad range of key actors requires input from science that covers the multiple viewpoints and questions of these actors. Integrating external stakeholders in the generation process of scientific output comes with great benefits, but requires to leave the classic “linear model” of pure basic research. External partners need to be involved in the evaluation of scientific results as well as in co-production of new research.

However, scientists are in general not trained for such co-production processes. Additionally, they are under high pressure because they are expected to have highly relevant and cited publications, meet the quality standards of research, have good project management skills and at the same time submit new research proposals. As a result, there is a lack of time to exchange gained experience on stakeholder interactions and workshop organization. This manual developed at PIK provides guidelines for co-production with international stakeholders: policy makers, and actors from the finance and business sector with a global focus. Please note: in this document only female form was used. The authors mean both genders.

Special thanks: A lot of highly valuable information for this document was supported by the input of Julika Schmitz, professional facilitator, moderator and policy advisor. She helped a lot to get the spirit of successful co-production right and at the same time have a professional event planned down to the minute. Thanks a lot for the professional and inspiring support!

What this document is

A lean manual for scientists interested in co-production with little time

This manual is not intended to be an academic piece but rather a lean document for scientists with little time but great interest in co-production. With “scientists” we address both experienced as novice colleagues and partner institutions to have guidance for co-production processes, get new ideas and inspiration and to share knowledge on the organization of co-production workshops based on the experience gained within the SENSES project.

The SENSES project aimed to develop tools and approaches to make the new generation of climate change scenarios more accessible and comprehensible for industry, business and finance sectors. After identification of user needs, we provided stakeholders with tailored climate change scenario information and, thus, empowered them to incorporate scenarios in their work and develop short- and long-term adaptation measures.

This document is divided into three main sections that explain basics of co-production (Sec. 2. and 3.), how we did co-production in SENSES and how the SENES Toolkit can be used for co-production (Sec.4) and additional information for administration and logistics (Sec. 5). Theoretical information is rounded off with many practical examples and exercises in the main text and in the Appendix.

Examples within the document are placed in in boxes (as this sentence) to make the text more comprehensible.

What this document is *not*

A fully comprehensive manual on co-production

As mentioned the input for this document was developed within the SENSES project. By no means we claim that this document is comprehensively covering all relevant topics on co-production, participatory methods, and stakeholder engagement in general. For a comprehensive academic overview on co-production we refer the interested reader to the assessment of existing scenarios and [co-production techniques](#), a deliverable of the SENSES project. From there you will find a broad overview to all relevant papers and work that has been done in the field.

A manual for online co-production

To give this manual a general character, we don't refer to specialties of online events as this would require a separate document. Co-production methods described here are applicable for physical events in the first line. However, they can easily be used for online events with minimal adaptation.

1. Co-production



Producing high quality science is burdening enough, so why should you bother spending a lot of time with external people? Because facts alone won't suffice to make scientific results useful and silo thinking is poison for robust outcomes. If you want to make your research relevant and transfer it to actors outside academia, you have to leave your bubble and find, connect, and sharpen possible solutions. Scientific research has to be repeatedly tested and modified with help of society that is not only an addressee but an active partner.

1.1. What is co-production?

Co-production occurs when people with diverse viewpoints and abilities are purposefully included in a common creation process. It can be defined as “a meeting of minds coming together to find a shared solution”¹. The work process on a jointly agreed deliverable should be based on respect, trust and genuine listening².

In a science context, co-production means collaboration among scientists and stakeholders, who jointly define scope and context of the problem, research questions, methods and outputs, make scientific inferences and develop strategies for appropriate use of science³. Thus, co-production features a blend of expert and non-expert input of scientists, policy makers and potentially affected citizens for better exploration of future developments pathways.

For the example of the SENSES project climate change scenarios are in the centre. They allow to look into questions like “how does this world work” and “how could this world work”. Therefore, scenario development should enable creative thinking by including broader perspective and multiple viewpoints. Aspects like social values, political stability and environmental awareness can be defined through expert judgement while quantitative assessment (e.g. population growth) is based on modelling results. Two aspects of socio-economic scenarios can be developed separately and iteratively revised to increase internal consistency.

1.2. Why co-production?

Tackling climate change and its impacts needs well informed and concerted action between a variety of actors from different sectors of society. This situation creates a high demand for a transgressive expertise, which means scientists have to overcome boundaries between their specialised knowledge and context of its implication and cooperate with an extended stakeholder community.

At the same time finding sustainable solutions is aggravated by the fact that multiple aspects about future social, political, economic and technologic development are inherently uncertain. Thus, it is necessary to shift from reliable knowledge to socially robust knowledge where processes and products developed by science are further shaped by social, economic, cultural and political factors. One characteristic of socially robust knowledge is repeated testing, expansion and modification with help of society that is considered to be an active partner and not only an addressee. Apart from that, including various actors at local or societal context creates networks between diverse practices and institutions. As a result, research becomes more issue-driven and interactive and enables consideration of various needs which, in turn, increases relevance, applicability and acceptance of the results. Through these processes science can better address stakeholder reality and results are more likely to be translated into direct actions⁴.

To sum up, co-production has a number of important advantages⁵:

- **More ideas** through inclusion of participants with different backgrounds.
- **Various perspectives from different sectors of the affected community**, thus giving a clearer picture of the community context.
- **Buy-in and support from stakeholders** by making them an integral part of the project development. It becomes their project, and they'll do their best to make it a success.
- **Fairness** stakeholders can have a say in the development of a project that affects them.
- **Awareness of the potential concerns** since they can be expressed, discussed and solved before they become problems.
- **Strong position if there's opposition**. If you have all stakeholders on board, you will have more political and moral weight.
- **Network as a social capital**. Diverse groups that might not otherwise interact become connected and this is perhaps the most valuable aspect. It creates a strong community where people can know and value one another independent of their social class or income.
- **Increased credibility** for your institute as fair, ethical and transparent due to involvement and attention to the stakeholder concerns.
- **Increased chances for the success**. For all of the above reasons, it is far more likely that your project will have both the community support and relevant results.

1.3. How does co-production work?

Now that advantages of co-production are explained, the question is “how does it work?” Before we go into the technical and organizational details, we want to explain here the aspects for successful co-production from a higher perspective. This topic can probably not be treated comprehensively as there are too many aspects and also nuances to successful co-production. We want to give you a glimpse of our experience from the SENSES project what can make co-production successful.

- **Define rules for stakeholder management**

Transparency and humanness should be combined with formal rules and structure². Basic rules for stakeholder management are⁵:

- Treating them with respect. Respect also means to prepare well and see that these stakeholders are giving some of their lifetime to your project. If stakeholders get the feeling this is just a compulsory exercise and not really useful, you will experience that they quickly lose interest in your project.
- Maintaining their enthusiasm with praise and appreciation, and continual reminders of the effort’s accomplishments.
- Finding tasks for them that catch their interest and use their talents.
- Providing them with relevant information, training, mentoring or other support.
- If possible, employing them in the conception, planning, implementation, and evaluation of your project from its beginning.
- Engaging them in decision-making. Stakeholders should talk most of the time at workshops and scientists should listen more.
- Helping stakeholders with little power or influence learn how to gain and exercise influence by working together and developing their personal and political skills as well as critical thinking.

- **Create connectivity and build trust**

Make sure that you invite experts from different disciplines to make cross-sector and cross-cultural connections. Attend to people’s desire to make a difference – the emotional component of sustainability is important! Creating networks can be compared to building bridges: stakeholders on one side and scientists on the other side. Acknowledge the difference - you come from different worlds with different languages. You may have a common problem, but different interests. Therefore, give space to create mutual understanding, start small and be patient.

Respect for different opinions and effort to find a common ground are essential. Ideally opinions can be expressed openly and thinking is shared, well aware of the broad spectrum of perceptions in such a group. Remember that stakeholders need to build trust, co-production processes bare a lot of conflict potential since diverse groups come together to reach a

common objective. However, if managed correctly, these conflicts will result in new creative solutions.

- **Embrace systemic change**

Co-production is about uptake of new input and perspectives. Some scientists can see this as a threat to their established methodology or even to their scientific results. If the co-production process aims to create change, people should be willing to get out of the comfort zones, which can mean model approaches have to be re-evaluated, extended and potentially reworked. Be prepared for this. The better your science works under multiple perspectives and questions the more robust (and relevant) your research can be. It is not about devaluing your past results, it is about enhancing them and making them fit for future.

- **Strive for resonance**

A resonant co-creation situation is something not easily to be described. We try to characterize this situation by a productive, respectful atmosphere that allows synchronicity and flow between participants. It requires that the co-production facilitators are observing and listening well and make sure the rules of interaction are respected. This creates a space where – despite different perspectives and opinions - ideas are openly exchanged, burning questions not held back, and new approaches developed commonly. Ideally, collective intelligence allows that the whole of the exercise is greater than the sum of its parts.

- **Enjoy the process**

Co-production is rather a process than the product. And such processes are not perfect. That is why a bit of disruption should be allowed here. Provide space for creative learning and a caretaker who carries the process and keeps the communication flow going, e.g. the project coordinator.

2. What are you looking for?

Setting up your co-production process



This chapter is leading you through the process of co-production. First, it explains how to identify relevant stakeholders and what the important criteria for a stakeholder pool are. Then, it concentrates on methods of convincing potential partners to join your project and describes essential aspects of a successful invitation. Apart from that, we outline benefits of stakeholder analysis like mapping and designing a communication plan and how it can be applied within your project.

2.1. Define goals and formats for your co-production process

For each project you need an issue-fit, a partner-fit and a roadmap. Assume you already have a promising research topic and now you need to identify partners and the strategy to reach project goals. The objective of the analysis should be clearly stated so all parties understand the purpose of the co-produced scientific results.

An approach to define your goals and the way to them can be to apply the following technique: imagine for a moment that your project has already been successfully finished and you have achieved your aim. Ask yourself:

- How did you do this? What would the optimal outcome be?
- What and who helped you on which step?

You might try an outcome exercise with your project team described in 4.1. It can be used as a brainstorming variation to overcome mental blockades which are normal when you are in front of something completely new or demanding. Answers help you find a partner-fit and develop a roadmap thus, to define the goal for the co-production process, but also to fix time-frames and locations.

! Reflect which level of co-production should happen. Do you strive for profound change or do you want to achieve an iteration of your ongoing work?

Inviting stakeholders can for example be a purely consultative approach (feedback from stakeholders), co-production of small aspects or co-production of the entire research question.

In the SENSES project the consortium also had an intense discussion whether we should produce completely new scenarios with the stakeholders. Or if it would be of higher good to stop the scenario production process for once in this project and rather aim for a smaller iteration step and focus on their communication and actual applicability.

Depending on the goal multiple levels of co-production and participation can happen.

- **Participation types⁶:**
 - **Passive** participation, in which the objective is just to inform people.
 - **Active** participation to support the decisions, where stakeholders are used to promote and articulate the chosen decisions.
 - **Interactive** participation, where stakeholders share the diagnostic and analytical methods and tools or results.
 - **Self-organisation**, where the lessons from the participatory process are transformed into decisions by the stakeholders themselves.

If your goal is dissemination of your project results, this involves only passive participation of stakeholders. In this case, don't waste your time on preparing co-creative workshops as you don't want to learn from stakeholders. Better focus on organisation of an open science conference where you introduce your results to scientists, NGO's, practitioners and broad

public. Also think of a coherent communication strategy through social media and define which channels you would use for which public groups.

To define quality criteria of the co-production process we refer to the work of Schuck-Zoeller et al.⁷. This is especially valuable if you include them right from the start and design your co-production process accordingly. If define this criteria in the middle of the process this is very likely too late and you cannot work towards them, anymore.

2.2. Who are you looking for?

This chapter is built up by asking you guiding questions that will navigate you through the process of search for relevant stakeholders. Take your time for answering them because it will help you gain clarity on your project needs.

Note, that there are two types of stakeholders: internal and external. We are used to think of stakeholders as third party participants as e.g. decision-makers in the business, financial or policy sector. But it is crucial to consider your own colleagues, institutes' administration, caterer and all others involved at different levels as internal stakeholders. They have an immense influence on your project. If you realise, what their own goals are and try to create an overlap, you simultaneously ensure a better project outcome.

- **What are important criteria for a stakeholder pool?**

Your stakeholder pool should be well-balanced and diverse. Try to avoid to invite the same people you involved in the last project just because it's the easiest way. You should consider inviting stakeholders e.g. balanced across all sectors that are related to the spectrum of your scientific work (e.g. political, regulatory, financial, scientific, business etc.). Ideally, your stakeholder pool would also contain people with different levels of interest and influence (Figure 1). Various methods exist to identify, analyse and select representative stakeholders. The stakeholder analysis typology of Reed et al.⁸ describes the main methods for: i) identifying stakeholders; ii) differentiating between and categorizing stakeholders; and iii) investigating relationships between stakeholders. Selection criteria may include quotas for age, gender, organizational affiliation, key sectors, and/or geographical scope of activity. Identifying stakeholders can be an iterative process, during which stakeholders can be added as the analysis continues⁹. Further criteria should be strongly associated with racial diversity, gender, age, countries of origin, language, social roles, education, skills, income and countless other domains¹⁰. Undoubtedly, diversity might bare potential for friction and conflict but it is an asset for multi-stakeholder partnerships fostering creativity in the pursuit for solutions¹¹. Of course, there is no such thing as a perfect diversity, so you always have to weigh what is possible.

- **How do you practically identify and manage relevant stakeholders?**

“If you want to have good ideas, you must have many ideas.”

Linus Pauling

Stakeholder identification is an iterative process that can be done at various project stages. Start an analysis with a brainstorming session with your project team. Get together, take your time and start whiteboarding people that will be in one or another way affected by your project and those who are relevant to your science.

Here are some questions that might help you gather ideas:

- Who are the stakeholders that have the most influence on the project?
- Who are the stakeholders that are most knowledgeable of the target subject (e.g. renewable energy sector, finance, ...)
- What stakeholders are best connected in a specific sector? Who can serve as multipliers in a sector?
- Which groups exist in a specific area or sector, which should we cover?
- Who has strong interest in using our scientific results (e.g. climate change scenarios)?
- To whom might the participation of the co-production process be of high ideal value (~emotional)?
- What are top motivations for each stakeholder?
- Who would be a good project / science ambassador?
- Which stakeholders will be most affected by the project?
- Who has financial interest?

This will lead to a list of potential stakeholders that can potentially enrich your project and which you can contact in the next step. If you want to go a step further - in business - stakeholder analysis is often applied. Here we have adapted it for scientific purposes. When you have a list, align stakeholders into level of interest and involvement (Figure 1). This method is also called stakeholder mapping which is a visual representation of a stakeholder analysis. It helps to find out who will have most influence on your project and who will be most affected by it. Add names to the matrix and review this map once in a while because the situation might change. When you finish the alignment, your key stakeholders will be in the upper right quadrant. For more detailed information on stakeholder identification, classification and analysis see Ballejos and Montagna¹².

The benefit of mapping is that you use your resources in a reasonable way not wasting your time. Also, you avoid “overcommunicating” to those who are not interested. Of course, it requires time but mapping provides you with a systematic approach and helps to set priorities.

Stakeholder Map: Who Needs What

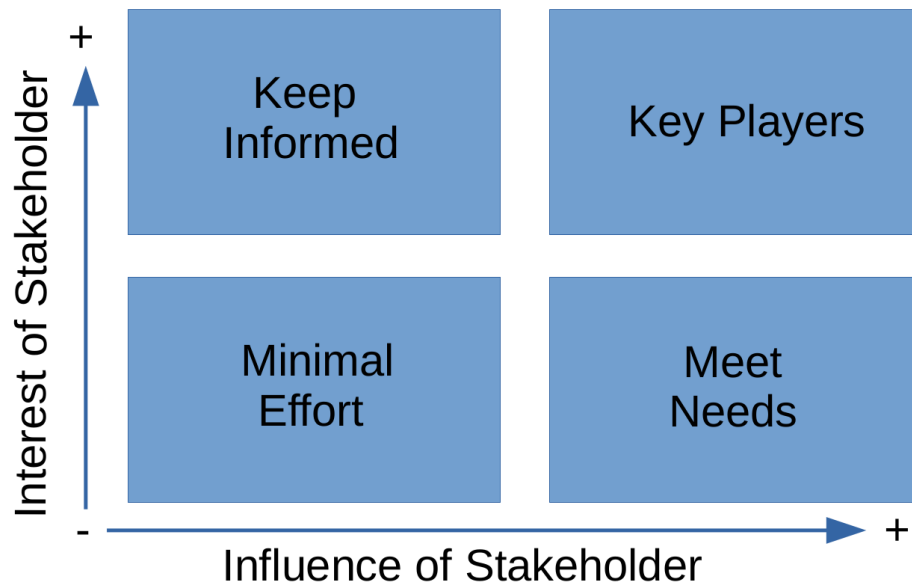


Figure 1: Stakeholder map which captures each stakeholder's relative importance and needs visually.

2.3. How do you engage stakeholders in your project?

“Contacts only harm the one who does not have them.”

Unknown

First of all, think of your network. Every person has a network and if you don't have one it means you just never thought of it. There is a 6-Handshakes theory according to which all people are only six or even less social connections away from each other. Have you ever thought that all employees are only one handshake away from Pope Francis and Angela Merkel? However, be careful not to overstrain your network: don't invite important stakeholders for small occasions.

What are the ways of making the first contact?

- **Through existing networks**

During the brainstorming process described in 2.1 you might automatically discover points of contact with the selected stakeholders. If not, invest some time to ask colleagues, project partners and previous colleagues if they know somebody in your specific area of interest. Consider asking people you meet at conferences or workshops. Usually, the search doesn't last more than one or two weeks if you communicate your needs to your network.

Of course, you can piggyback stakeholders from early projects. But be careful here: even if you already shared projects, the benefit for stakeholders must be very clear in each case, because once they are stakeholders they are contacted very often. So, you need to give them with a very good reason to make the journey to the next workshop.

You can also ask existing stakeholders if they can recommend stakeholders from their networks.

- **Through cold calling**

If your existing network is missing essential stakeholders, representatives can be contacted directly through an invitation email or letter.

A structure of such an email is described in 4.3 and an example from SENSES is given in 4.4. Additionally, some essential aspects of an invitation are specified below. These are especially valuable for a cold-calling. However, most of the information is also relevant for the invitation of stakeholders from your network.

What are the essential aspects of an invitation?

- **Be personal**

The invitation is one of the most important steps in getting stakeholders engaged and it might be your only chance to convince a stakeholder to participate. That is why this letter should be tailored to particular expectations, goals and benefits for EXACTLY this person / her institution

/ her company. The more specific you are, the more probable it is that the answer will be positive, because people can sense you haven't just sent out a mass email and that their contribution in this workshop will be of value to the project, to themselves and their institution.

- **Make it your elevator pitch**

You may consider an invitation as an elevator pitch for your project. Imagine that an elevator ride with your institute's chef is the only chance when you can introduce your brilliant idea to this person. Since you only have one or two minutes time your speech should be short and precise, point out the importance of your project and arise interest for another meeting. To reach these key points, you can use the AIDA model (Figure 1Figure 2) which is one of the best-known marketing models. It is based on the idea, that you first catch attention to create awareness, second, drive interest by e.g. proposing a solution to a specific problem, third, generate a desire to participate by listing the benefits and at last, say what the next necessary step is.

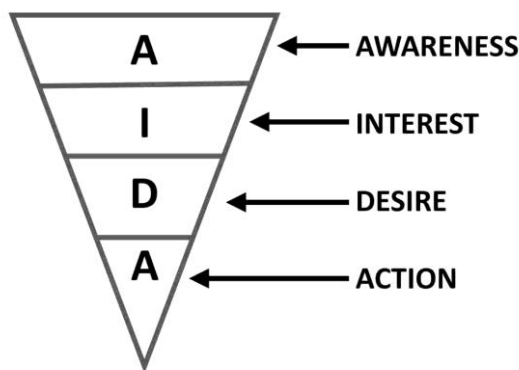


Figure 2: AIDA model can be used when writing an invitation letter to stakeholders¹

Here is an example of a short elevator pitch for SENSES project, developed according to the AIDA model

Awareness:

SENSES project makes climate change scenarios more comprehensible and accessible to a broader public.

Interest:

Climate change scenarios provide information how socio-economic factors (e.g. population, energy, finance, transport) can change in the face of global warming. Decision makers can benefit substantially from having access to this data and thus, potential futures.

Desire:

After identifying your needs as a climate scenario user we will provide you with the first-hand targeted scenarios for your business sector which gives you the possibility to be better adapted to climate change.

Action:

We would be delighted to welcome you in the round of our stakeholders. Please fill in our survey or send us an email.

¹ AIDA-modellen by Roger Pihl, licensed under [CC BY NC SA 3.0](https://creativecommons.org/licenses/by-nc-sa/3.0/)

2.4. How do you maintain communication with stakeholders?

Obviously, a lot of stakeholders join such projects because of the reputation of the conducting institutes being a reliable science partner. All the more we have to make sure that stakeholders don't drop out and stay until the end of a project.

Having a proper communication strategy helps on the one hand to avoid email fatigue and, on the other hand, keep highly engaged stakeholders well-informed about the progress. Both can be reached with a communication plan (Figure 3) which can be developed based on your map described in 2.1.

It is advisable to ask stakeholders directly about their expectations and interests. One possible way would be developing a questionnaire for them or discussing the following questions at a kick-off workshop:

- Why are you interested in this project?
- What are your expectations?
- Which deliverables are you most interested in?
- What inspired you to get involved?
- What do you hope this project will change after launch?
- If you have any worries about the project – why?
- Do you prefer in-person meetings, phone calls, emails?
- How often do you want to be contacted?

Don't underestimate the emotional aspect here – those who are emotionally involved (e.g. because they want to tackle climate change and are convinced that this is possible) are the ones who might invest most of the time in your project voluntarily. These are stakeholders that you need to pay most attention to unfold their potential. When your questions are answered, you might change the position of some stakeholders on your map (Figure 1).

If you don't manage to keep a stakeholder communication plan, keep in mind to rather send less emails than too many. Make sure messages are targeted and delivered timely. In SENSES we sent three to five emails per year (one before the workshop, one after with minutes, additional emails only for big outcomes like launches, final thank you email).

Stakeholder	Sector	Power/Interest	Stakeholder goal	Communication channel	Frequency	Contact details	Notes
XX	Business	High/high	Adaptation of business to climate change	Meetings, presentations, phone calls	Every 3 months
XY	Finance	High/low	Get first information about scenarios	Emails	Every 6 months		
XZ	Broad public	Low/high	Personal conviction	Emails, phone calls	Every 3 months		
...							

Figure 3: An example of a stakeholder communication plan.

3. Co-production workshops



Developing a co-production workshop requires some preparation and thoughts since you cannot simply stick to the old patterns and should avoid to “have sessions of scientific talks interrupted only by coffee breaks”. The preparation and running process is described in a way, that it can be applied to most scientific co-production events. We start with description of the key strategical issues and continue with a list and a general explanation of the important elements when running a co-production workshop, such as rules, openers, definition of roles and much more that can be applied to such events.

3.1. Preparing an individual workshop

Workshop organisation is a very broad topic and each event type has its own specifics. E.g. there is a huge difference between an open-science conference and a stakeholder workshop. Here the focus is mainly on organisation of stakeholder workshops, however, most of the information applies for different event types.

- **What brings maximal benefit for all?**

Success of a project or workshop relies much on the involvement of its participants. This involvement is fostered if all participants feel there is a high extent of mutual benefit. So it is essential to have goals and deliverables that are shared by all parties. Think of the possible and potential overlaps between stakeholder groups as showed on **Error! Reference source not found.** Sometimes, it is helpful to ask participants about their specific interest and expectations in advance via e-mail or during the registration process, then you reduce the risk of disappointment. You should avoid to see stakeholder participation as compulsory duty where you are obliged to inform public actors about your research and answer their questions.

You can think ahead – “Where do you have blank spots in your research, where could input from outside help you to fill them? Could you convey them and stakeholders provide you with input, even with data for this? Should you present a specific perspective of your scientific results to validate them against their real-world applicability? Likewise you should check about the benefit for your stakeholders. What is of highest interest to them at this stage of the project? Does it make sense to introduce the complete research approach to the stakeholders or should you rather co-produce on a specific aspect of your research, which finally matches their focus of interest? Are they novices and should you rather spend more time on getting their input about basic concepts and at later workshops focus on specific aspects? What would make them come stay with your project over the entire planned co-production process?

Take a step back and think well about what is of maximal benefit for all of you. This could also in some cases mean that doing less is more.

A simple example for maximal benefit was the final workshop of the SENSES project: we had to conduct an evaluation (didactic concept, visualizations, etc) of the produced toolkit. Many financial actors signed up for this workshop. So we structured the evaluation process such that all concepts we tested contained to some extent information that was relevant to financial actors. Like this we could evaluate the visualisations and didactic concept of the toolkit and still our stakeholders were very satisfied as they learned a lot about climate change scenarios in doing this evaluation with us.

- **What is the goal of your event and why is it important?**

“Reaching goals isn’t for pessimistic people”

France Anne-Dominic Córdova

Ask yourself what the goal for this particular event is. The engagement of participants is strongly linked to the feeling that they are contributing in your workshop to something of relevance and if their lifetime is spent well. The SMART method can be helpful to concretize your goals (Figure 4). It considers essential elements of setting objectives that we often forget. If your goal is “smart”, you know in the end if you could reach it and at which rate. Thus, you (and ideally your stakeholders) know how success is defined, as due to this method you are being very specific and realistic with your expectations. However, an organisation process requires a lot of flexibility and adaptation to unforeseen changes. That is why you might need to adapt your initial goal at a later stage.



Figure 4: SMART describes a process of setting goals².

Example goal for a stakeholder workshop:

Specific



“Stakeholders should use climate scenarios after the workshop.”



“During the kick-off workshop we will identify stakeholders’ needs.”

Measurable



“We will include stakeholders from all sectors.”



“We will focus on stakeholders from the most important sectors and have five to seven representatives from each sector.”

Attainable



“We will improve scenario use.”



“We will determine key indicators of climate change scenarios and employ them in the new tools until the next stakeholder workshop.”

² SMART goals by Dungdm93, licensed under [CC-BY-SA-4.0](https://creativecommons.org/licenses/by-sa/4.0/)

Relevant



“Stakeholders should understand the importance of our research.”



“Through identification of stakeholders’ needs we can develop targeted scenarios that will be better accepted by stakeholders.”

Time based



“The kick-off workshop will last two days because this is the maximum time that stakeholders can invest.”

So, the final goal could be:

“During a two-days-kick-off workshop, that will be attended by five to seven representatives from the most important sectors, we will identify key indicators and employ them in a new tool until the next workshop, thus, increasing the overall scenario identification.”

- **Agenda**

“Less is more.”

Ludwig Mies van der Rohe

Your goals will shape the development of the workshop agenda, but also the question who your target audience is. Define stakeholder groups that are interested, affected or have the most influence on your workshop. To avoid stakeholder fatigue it is crucial not only to adapt the agenda to your needs but to also double check, whether what you plan to do provides mutual benefit for science as well as for stakeholders.

When drafting the agenda we recommend – for simplicity - you to start with determining fixed times for breaks, i.e. two coffee breaks per day (one in the morning and one in the afternoon) and suitable times for having lunch and dinner. This will automatically divide your agenda into modules that will be interrupted by breaks. We also recommend you to plan one hour for arrival and registration of participants before the beginning of your event, in combination with a welcome coffee. Through this you will create a welcoming atmosphere, let participants drink a coffee after the registration, ask questions and start networking that will be appreciated by the most.



Plan to the minute and enjoy!

Continue with drafting workshop modules and assigning each with a clear objective, necessary input and expected output. The objectives of the workshop modules should be in line with an overarching goal of the whole event. It is highly recommended to prepare a process description (as explained in 4.5), that details the content and goals of the individual workshop modules, but also timing, roles & responsibilities (see below), and required materials. Having a structured process description helps to sharpen goals, but also to have realistic planning and not to run into time bottlenecks that can stall proper discussion and exchange.



A general rule of thumb for successful co-production is that the most speaking time should be given to stakeholders.

A frequent mistake is to invite stakeholders and just give talks about current scientific results and only let them comment in large rounds on what they heard. This can be unsatisfying for all parties. Also try to integrate a variation of participation types (as described in 1.3) because talks (one-sided communication) in general are more tiring than interactive elements. Of course, talks are necessary to give the participants the required introductions but they should be focussed on user questions and kept to a minimum. Thus, plan enough time for exchange in the workshop modules. E.g. if you have than 10 participants and each should speak only 5 minutes this makes already 50 minutes. Frequently the amount of time to have *everybody* heard is underestimated.

In the design of your modules think of a common thread that will run through the modules and connect them. One possibility could be using an output of the first module as an input into following modules. Consistency between the workshop elements is important for the overall impression and aftermath that an event has on participants and determines, whether an event makes a clear and structured impression or seems rather fragmented. If you plan several workshops with same stakeholders, also think what would be the connection between the workshops.



Less is more. It is challenging to find a balance between not overtaxing and undertaxing stakeholders. Step by step discuss which co-production method is suitable for which objective and available time.

After defining the modules and their objectives, you can assign responsibilities for further module development between the consortium members.

- **Define and divide the roles**

Defining the roles in a workshop and its individual units is very important for a professional implementation of your event. A central role is of course that of the moderator in a specific workshop session. Within a co-production process a moderator can be responsible for introduction of speakers and Q&A sessions. But she also has to take over a chair and facilitator roles. Workshop facilitation is “the act of providing unobtrusive, objective guidance to a group in order to collaboratively progress towards a goal”¹³.

Often a chair is confused with facilitator but the difference is that the chair is responsible for the content (“what is being discussed”, e.g. agenda issues) whereas a facilitator is managing the process (“how the topic is managed”). The facilitator ensures that discussions flow logically and build on one another (topic management). Apart from that, a facilitator manages how the group members interact with each other and empowers all meeting members to participate (relationship management). Facilitator role deals with conflict as a natural component of reaching a consensus whereas a chair would often terminate a discussion if a conflict arises¹⁴. The chair is often biased towards one opinion, may influence the decision and concentrate power with a “command and control” style which can shut down a group within minutes whereas a moderator is neutral and is not getting in content of discussions relying on the group to decide.

So which role suits best for a particular session? A moderator can combine both roles, taking a chair role when starting a meeting and dealing with agenda, and switch to facilitator role for getting feedback, problem solving and making decisions.

A good moderator ensures that there is decision or conclusion in the end that is clear for everyone. When spontaneous ideas pop up, the moderator should create commitment and ask whether implementation is realistic and what timeframe is necessary.

Keep in mind that moderation can also be external and add considerable value to your process. However you have to consider these costs in your budget if it should be the case.

Apart from moderator, define who can take roles of observer, timekeeper, technical host and notetaker. Having these roles clearly defined helps to keep the workshop running smoothly. The observer should be someone who knows what the workshop is about and can intervene if moderator does not notice something.

3.2. Running the workshop

“I’ve learned that people will forget what you said, people will forget what you did, but people will never forget how you made them feel.”

Maya Angelou

Define the rules and communicate them at the beginning of workshop

It is recommended to use the Chatham House Rule: “When a meeting, or part thereof, is held under the rule, participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed”¹⁵. This rule is applied around the world to encourage inclusive and open dialogue in meetings.

Apart from that, you can apply the following brainstorming rules for the whole workshop¹⁶:

- Avoid making judgements and exercising criticism.
- Encourage wild ideas.
- Aim for quantity.
- Build on each others’ ideas.
- Be visual.
- One conversation at a time, avoid interrupting.
- Stay focused on the topic and keep your goal in mind.

Ensure that there is no language barrier and that everything discussed is understood by all participants. Encourage stakeholders to ask questions since there is no such thing as a stupid question and the quest for knowledge includes failure. Make sure you communicate these rules clearly at the beginning.

Set the stage

The common mistake is to give a lot of information in a very concentrated way at the beginning. This is overwhelming and you might miss the chance to open up your stakeholders step by step to the topic. Therefore, for a co-production workshop it is very important to have a one (or even two) hour opener to let people “arrive mentally”, and to switch from their daily working context to the context of your co-production workshop. Avoid starting with dense classic scientific talks. On contrary, let participants interact and present themselves.

- **Openers and icebreakers**

An opener can very well have nothing to do with the actual topic of the workshop. It is there rather to create an atmosphere of being welcome and connected to the other participants, and supporting to let go of their daily worries and routines, but to open them up for a new experience and new perspectives. This enhances creativity and innovative ideas. Also using space is important, make people move through the room, bring them together, take them apart, make them a bit exhausted already at the beginning, this helps them to leave their daily business behind and to arrive in this new situation. Do something they don't do every day, but make sure it is appropriate. A common icebreaker could be an **introduction game** where participants start to get to know each other by answering questions, moving through the room and forming groups (as described in 4.6) or letting stakeholders draw a **map of connections** on a whiteboard together (Figure 5). Connections can be everything: professional skills, hobbies, interests, languages, countries of origin, eating or other habits. For creating of a map put names of all participants in circles. A first person names a term, e.g. expertise in climate scenario development or yoga or ... and other participants say, if it is the case, a line is drawn between these and the term is written next to it as in Figure 5.

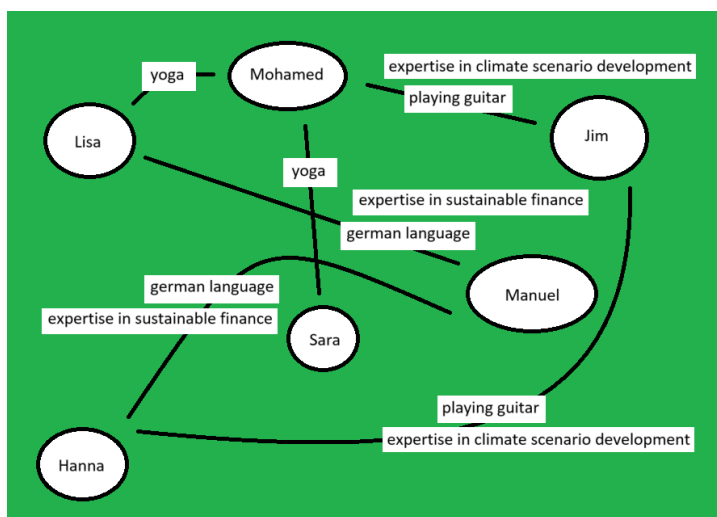


Figure 5: Map of connections between participants.

Both are networking exercises demonstrating to participants that they are already connected in many ways and not just strangers. They create a nice atmosphere of inclusiveness and leave no one behind.

Both are networking exercises demonstrating to participants that they are already connected in many ways and not just strangers. They create a nice atmosphere of inclusiveness and leave no one behind.

- **Introduction of participants**

Now that you had a first warmup round, participants should introduce themselves. The following example can serve as such an exercise. It consists of two elements: **a painting part (A)** and **an interview part (B)**. For painting (A), each participant receives a pen and a sheet of

paper and should find a partner that she doesn't know yet. The task is to paint a portrait of a partner *without looking down* during one minute. After one minute she should write down the name under the portrait and then the roles are switched. The portraits are then collected by moderator.

The painting part is followed by an interview of each stakeholder (B). Participants build groups of two. Each group gets two cards (Figure 6) and a pen. One starts interviewing and writes down the answers. After five minutes the roles switch. When the cards are filled out, they are connected with portraits produced before. Then, stakeholders present their partners during one minute until all are introduced. You might consider to ask all participants to form a circle during the introduction round to enable better exchange. After the exercise, the cards are placed on a whiteboard. Note that you might want to put other interview questions on your card, e.g.:

- My perfect working day looks like this ... ; my horror day looks like this...
- makes me happy.
- ... makes me unhappy / puts me out of balance, stresses me out.
- Conditions, under which I can make full use of my strengths and maximize my potential.
- Conditions, under which I cannot use my strengths, under which my potential falls by the wayside.
- You can talk to me about ... for hours.
- In collaboration I believe in ... (e.g. equality, competition).
- Use me for ... (I am really strong in this).
- I will be satisfied at the end of the workshop if I/we....
- This is how I prefer to communicate ... (place and style).
- I do not like to communicate like this
- Please give me feedback in the following way ... (preferred channel, when and where).
- Please do not give feedback like this ...

These exercises function as icebreakers and aim to reveal a person behind a stakeholder, but also to learn how they potentially can contribute and what expectations they have.

We recommend you to develop a process description with the project team as described in 4.5 for each exercise/ game.

If you have time you can also introduce the consortium one by one to the stakeholders. A compromise could be to introduce teams of the individual institutions and to rather work with name badges for individual names and positions.

Name:

Sending Country:



Function:

The form is divided into two main sections. The left section contains a large black outline of a person's head and shoulders, set against a background of diagonal lines. Below this icon is a green bar with the text "A typical statement about me". The right section contains three green bars with the following text: "I would like to learn in the course of the SENSES project", "I can share experience on", and "Favorite Tools and strategies".

Figure 6: Interview card for each participant that should be filled out by an interviewer. (Credits of card: [Marzavan](#)). Creates a nice atmosphere and delivers a lot of valuable information at the same time.

- **Introduction of the project – giving a sense of purpose and potential**

Introduce the project and its aims. If people see the potential of your project they are more willing to contribute. Also starting with the end, the desired outcome, helps us to focus. Tell people why they are here, why they are important and what they can contribute. Make sure you give a vision of your co-production process. Having the purpose and the potential clear has a very engaging effect on the participants, as they know their contribution will be useful. The vision will basically encompass what you defined in your smart analysis (3.1) and stakeholder analysis (2.2). So this is not about hot air, but showing that you have concrete goals and aims, also describing where the space for innovation and stakeholder input is, how and where their contribution makes sense.

If you are in the middle of the project, you would probably more remind the stakeholders of the vision of the project and present intermediate result. Here the trick to foster engagement is then to link back the outcome to the vision, to make the purpose of your scientific results clear. Your stakeholders have potentially forgotten details to a large extent since the last workshop, bring it to the forefront for them again.

Co-production units

The activities of a workshop follow directly from the workshop goals. Form follows function, after you have decided on the topics by the design of the agenda here some information how the content and knowledge can actually be co-produced.

Choose procedures that correspond to your objective. William Faulkner once said, “In writing, you must kill your darlings.” This means that storytellers should cut the parts of their stories that don’t serve the reader — no matter how near and dear to their heart. Specifically, for your event this means: if something isn’t relevant to your audience — let it go¹⁷. The methods used should be adapted to the time and means available. Select concrete, appropriable tools that encourage reflection and group expertise and turn audience members into active participants. You can use simple tools like real-time polling and group exercises but also more complex approaches. The SENSES [co-production techniques finder](#) gives a great overview of proven co-production techniques.

Prepare, but don’t overprepare. Leave some room for the insights, observe the learning and production process and enjoy it.

- **How to get everybody involved?**

If there are open discussion rounds, then you risk to only have the same people talking over and over again. These could be senior and respected stakeholders that dominate the group. If this is the case, those that are new to the topic and which you might actually want to draw in, will probably remain silent in order not to embarrass themselves. All the activities mentioned in this chapter are built up on including every participant in a conversation. Another methods could be:

- Brainstorming or other exercises with use of sticky notes.

Participants are given time to reflect on a question and note their ideas on sticky notes. Then they introduce them to a group and put a note on the board.

- Breakout groups
- Real time polling
- Sketches

“Crazy 8s” is a helpful technique for smaller groups to generate ideas. Have everyone fold a sheet of paper in half, and in half again, until you have eight sections. Encourage participants to draw one idea in each box and try to fill all eight sections within 10-15 min¹⁸.

- **Provide structure**

Before you co-produce information always provide structure of your scientific focus. Clarify the scope of this exercise to the stakeholders and to what extent they can contribute to your science. There is a certain danger in letting stakeholders brainstorm too broadly and then having results that actually cannot be taken up as the scope of your research is too narrow or has a different focus. If stakeholder notice that they contribute very engaged but their input finds no uptake chances become high that they get disappointed and you lose them in the course of the project. Free floating brainstorming however can be a motivating exercise as an opener or icebreaker, but the co-production of knowledge should be as targeted as possible to the actual scientific focus.

- **Become concrete - getting the picture painted is paramount**

Wherever possible try to work with posters, post-its, etc. Try to become as concrete as possible. Figures of future innovations, connecting structures or other concepts and the concrete denomination help to overcome the ambiguity of discussions among a multitude of people. Ideas fly back and forth, but things remain potentially vague. If participants need to give their ideas concrete names or even shapes, the better the group can find out if they really talk about the same, and share the same basis. This steps helps not only to understand each other better, but goes a step further because it connects the actual groups.

- **How to collect and give feedback?**

*„Often, feedback says more about the one who gives it,
than about the one who gets it.“*

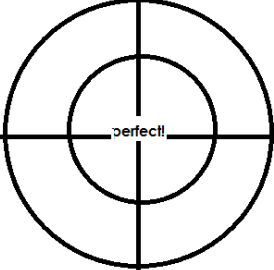
Peter Becker

Most institutions have now incorporated elements of quality management in their everyday operations. It means that they try to optimize and improve their processes on different institutional levels, e.g. there are evaluations after a lecture course etc. And feedback is a key component of an improvement process. But if given or received by an unexperienced person, it might contain some "explosives". If necessary, a moderator should explain to participants how their feedback should be:

- Voluntarily.
- Descriptive, not judgmental.
- Specific not general.
- Appropriate (choice of words).
- Useful: take into account the needs of all persons involved.
- Relate to behaviours that the recipient can change.
- Not demand change, but desire it.
- Give (new) information.

Feedback round can be creative. In the Appendix we describe a Traffic-light method (4.2) and more ways of collecting feedback have been explained by Bieschke-Behm¹⁹.

Feedback doesn't have to be collected only in the end of the workshop or project. For a moderator and the project team it is helpful and insightful to get feedback after a specific session or talk to find out if stakeholders understood the information presented to them and found it relevant (Figure 7). Then you have feedback to a specific workshop part which gives you a possibility to adapt.

too technical	too simplistic
	
not informative	not relevant

Open questions
next Steps

Figure 7: A quick way of collecting feedback after a particular session.

3.3. Co-production of climate change scenario knowledge in SENSES project

This chapter shows how we did co-production in the SENSES project with climate policy makers and businesses at the global level. The SENSES project recognises the applicability of co-production techniques for both scenario development and the production of climate information based on existing scenarios. Here co-production is mainly used for an iterative interaction process to better identify user needs and understand how different user groups *want to use* the scenario information.

Scope of the SENSES project

The overarching goal of the SENSES project is to develop a tailor-made, user determined Climate Change Scenario Toolkit ("[SENSES Toolkit](#), see detailed explanation later in this chapter under "Co-production with the SENSES Toolkit") connecting the new generation of climate community (CC) scenarios to selected user and stakeholder groups. The new generation of climate community scenarios allows these user groups to gain relevant insights into adaptation to climate change, mitigation of climate change and residual climate impacts. The Toolkit translates this complex scientific scenario information for the following three key user groups:

- national and international climate policy makers,
- regional climate scenario users, and
- business and finance actors, particularly those with long term planning horizons.

The stakeholders

For policy makers, climate change scenarios have a successful history, as exemplified by their use in assessments of the Intergovernmental Panel of Climate Change^{20,21}, international climate negotiations, recent formulation of national mid-century strategies and adaptation planning. Demand for climate change scenarios is growing by policy makers and other civil society actors to address questions about policy entry points to deep decarbonisation pathways²², the impact of delayed action²³⁻²⁵, extent of technology transformations, the necessity, availability, and side-effects of carbon dioxide removal techniques²⁶⁻²⁸, demand side versus supply side options for mitigation^{29,30}, and implications for sustainable development^{31,32} and inequality^{33,34}. Up to now policy makers have mostly received support from this area via assessment reports, policy briefs or direct ad hoc advice. A foundation for systematized scenario-based advice has been lacking so far.

A growing and influential user-group comes from the business and finance sectors. These groups demand climate change scenarios to inform alignment measurement and risk assessment³⁵⁻³⁷. For alignment measurement, corporate strategies are evaluated against pathways limiting global surface warming to well below 2°C³⁸ (e.g. by the Science Based

Targets Initiative (SBTI) and the carbon disclosure project (CDP)). The interest for risk assessment is two-fold: exposure of people and assets to a changing climate frequently named “physical risk assessment”, but also risk by anticipated climate regimes also called “transition risk assessment”. Especially central banks and regulators, but also private consulting companies push this strand forward (e.g. the Task-Force on Climate-Related Financial Disclosures (TCFD) and the Network for Greening the Financial System (NGFS)). Financial markets influence substantial amounts of CO₂ emissions and are considered as “very rapid” social tipping element for stabilizing Earth’s climate³⁹. They should receive support from the best science available.

The co-production process in SENSES

The SENSES project followed an iterative interaction process, to better identify the user needs and to understand how the various user groups want to use scenario information⁴⁰. As explained before, the co-production methodology and units below aim at co-producing new knowledge based on *existing scenarios* together with stakeholders and to empower new and traditional users alike to incorporate climate scenarios in their work for a broader uptake. If a reader is interested in co-producing climate scenarios, we refer to the work of Schmid et al.⁴¹. In the following we exemplify how co-production was carried out in the SENSES project. We explicitly do not describe every step that was undertaken in the four workshops that were conducted over the period of three years, but rather explain how individual milestones were achieved and how we put theory described above into practice.

Introducing the project & setting the stage

After an icebreaker and a general introduction of the participants (as described in 3.2), it is important to take time to convey to participants which goals are pursued in this co-production effort and why it actually matters that they are here.

- **What is this project and what are climate change scenarios?**

For this a presentation introducing the project should be followed by an excursion what climate change scenarios are, if users are not yet familiar with them. It is important that users contextualize climate change scenarios correctly. Here the [Climate Change Scenario Primer](#) in the toolkit is a great source to make people understand the idea of scenarios. Alternatively, one can also ask the participants to read through the primer before the workshop.

- **Raising the potential of project and participants**

An exercise that invites the participants to ignite about the potential of the project but also about their individual agency can be an opener of the workshop. Stakeholders were asked to think about how 2020 is considered in the climate community as “the game changer year” and to answer the questions on Figure 8 on post-its individually.

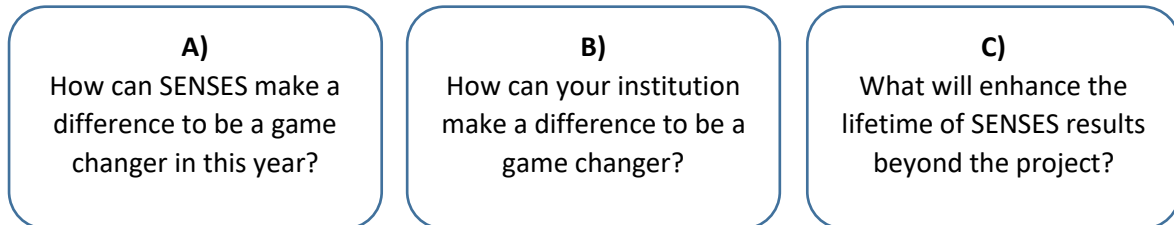


Figure 8: Questions to stakeholders within an opener exercise.

The answers were then clustered by the session facilitator. Clustering helps to understand the central topics that occupy the participants’ minds. For example a remarkable great overlap for question A) was that many stakeholders agreed that SENSES was on a good way and would become a real change maker in the moment it pushed even more in providing information that was relevant, i.e. directly connected to the participants’ reality. Question B) in turn was very helpful to inspire users to see themselves as agents to distribute the scientific insights and to develop ownership to the project. For the project team of course it is a valuable insight where the produced results can dock and flourish in the respective user institutions.

Elicitation of user needs

In order to elicit the needs of the three user groups a series of methods were applied which are described below.

- **Online survey**

To cope with the small time window the stakeholders are available at workshops, a survey was designed. Basic information on their level of experience and interests was gathered by the survey in preparation of the actual workshop.

In detail the following blocks were interrogated:

1. Background information on scenarios
Experience with climate change projections, climate impact scenarios and mitigation scenarios. Therein detailed interests and potential trust building factors in terms of meta-data.
2. Favourable spatial and temporal resolution.
3. Experience in visualization and potential use cases.
4. Expectancies for the co-production approach.

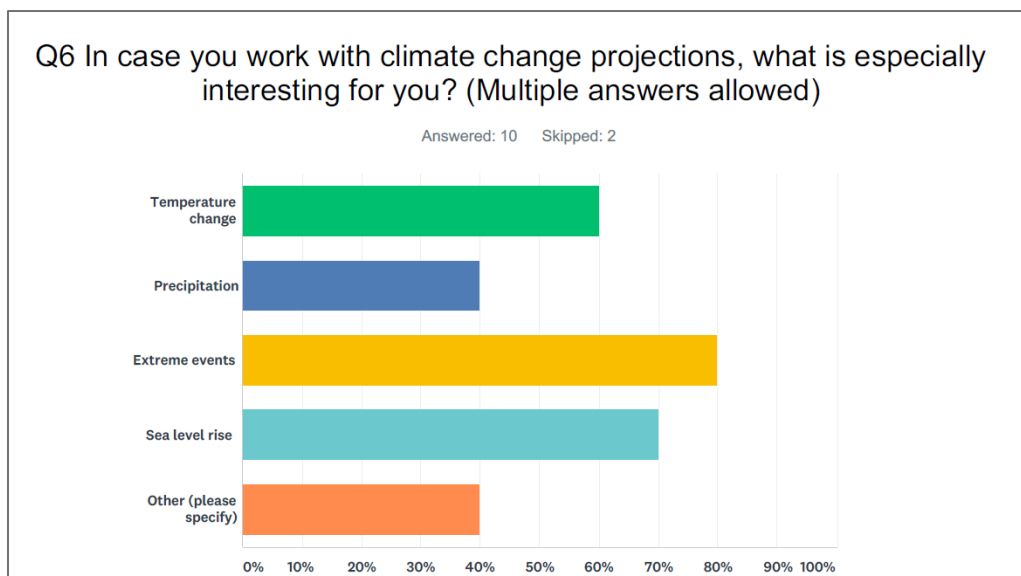


Figure 9: Snapshot of Survey sent to participants before workshop.

The entire Survey can be downloaded [here](#) (PW: SENSES). Our colleagues from [Climate Analytics](#) gave us permission to also share a survey they used in our sister project [ISlopedia](#). They also include a stakeholder mapping and further advanced measures. We highly recommend to take a look [at this work](#) (PW: SENSES).

Summary:

With the help of the survey, the team could find out up front what types of climate change scenarios the stakeholders were already familiar with and what was of their highest interest. Policy stakeholders were interested second most in impact scenarios whereas the business stakeholders more in climate change projections. In general, the stakeholders showed rather similar interests. Not surprising, the business stakeholders clearly favoured monetary related topics. Nonetheless, policy stakeholders were also highly interested in investment strategies etc., but had a much broader spectrum of relevant topics. The idea of having meta-data available as trust building measure was highly welcomed. The experience with visualization means is high already and stakeholders are very optimistic about the format of co-production.

! At the time we conducted the survey (2017) data protection was not as well regulated as it is now. Please make sure you comply with data protection requirements and protect the information of your participants accordingly. E.g. we conducted the survey with a commercial survey online tool, where servers are hosted in the US.

- **Kick-off workshop – Brainstorming & clustering of central topics**

In a co-production session we asked stakeholders to formulate their most important factors for working with scenarios and write them down on post-its. Then they were clustered by the facilitator in discussion with the participants as shown on Figure 10Figure 12.

Summary:

Candidate topics for learn modules to establish comprehensive policy and finance portals



The following central topics were selected for the stakeholder groups that will be pursued. Some of these topics can be of interest to both groups.

For the **policy** stakeholder group the following topics are of relevance:

- **Global stocktake** - Are we doing enough? What are alternatives? What is the collective outcome of the NDCs in terms of global emissions in 2030? What strengthening of action after 2030 would be required to reach the 1.5°C and 2°C goals after targeting the NDCs by 2030?
- **National and sectoral decarbonisation pathways** - What are global and national sector transition roadmaps until 2050 consistent with the Paris climate goals?
- **Demand side measures and their impact** - What is the potential of behavioural changes, energy and food demand etc.?
- **Land transition** - What is the role of land use change for reaching the Paris climate goals (reducing agricultural emissions, eliminating deforestation and enhancing terrestrial carbon sink)? How can demands on the land be reduced and balanced?

For the **finance** stakeholder group the two following topics are considered:

- **Transition risk** - Under which conditions are specific sectors (e.g., oil and gas industry) exposed to greater/lower financial risks? Under which conditions can shocks occur? What is the role of aspects like delayed action, stringent policies, availability of CDR (carbon dioxide removal)?
- **Investment opportunities and alignment** – Which investments need to be made to achieve stringent climate abatement? How can the transition be shaped in a positive way? In which sectors and for which technologies do actual opportunities occur?

A joint and very important topic for **both stakeholder groups** is that of physical risk:

- **Physical risk** - What is the risk induced by permanent changes in weather patterns and extreme events? How much land area is affected by extreme events? How many people are exposed to those?



Figure 10: The participants writing on post-its.



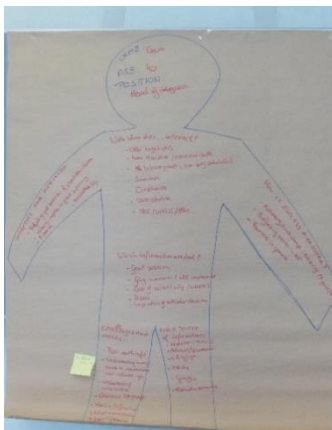
Figure 11: Post-its without clustering



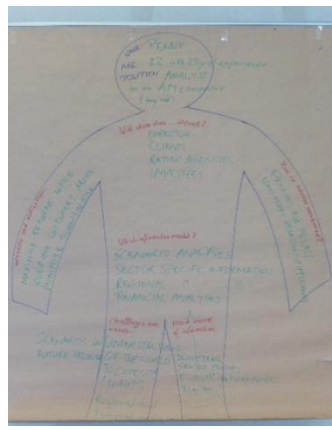
Figure 12: Clustering process

- **Creation of a representative user: persona**

Personas are commonly used as stereotypes of individual user groups in the development of applications and services. We used the creation of such personas to find out about the needs and motivations of the present stakeholders in a manageable manner and again to foster exchange. Stakeholders were asked to team up in their respective panel: either the policy panel, business panel, or finance panel. Each panel created a persona for their group (see examples on Figure 13). They help to understand needs, experiences, behaviours and goals. The great advantage is that such a persona is a simplified character, but is directly co-created by the stakeholders and summarizes properties that the stakeholders would agree on with all their knowledge and experience.



Gaia, persona of policy panel.



Penny, persona of finance panel.



Elona Musk, business panel.

Figure 13: Personas created by different stakeholder groups

For this purpose the panel groups define for their persona the following attributes: name, age, and position. Further they answer the following questions for the fictive persona:

1. What are the interests and motivation of ...?
2. With whom does ... interact?
3. Which information does ... need to deliver to this people?
4. What is the main source of information for ...?
5. How is success in the world of ... measured?
6. What are the challenges and needs for ...?



You can find the detailed description of persona exercise in 4.7.

Results of the policy panel

Persona: Gaia (40), Head of delegation

1. What are the interests and motivation of ...?	2. With whom does ... interact?	3. Which information does ... need to deliver to this people?
<ul style="list-style-type: none"> - Reflecting government position and stakeholder interests - Making progress in global diplomacy - Finance 	<ul style="list-style-type: none"> - Other negotiators - Home ministries / associated departments - Interest groups (non-party stakeholders) - Scientists - Constituents - Own advisors - IPCC, UNFCCC, IPBeg 	<ul style="list-style-type: none"> - Government position - GHG inventories, Nationally determined contributions implements - Cost of actions (mitigation/adaptation) - Risks - Implications of particular decisions

4. What is the main source of information for ...?	5. How is success in the world of ... measured?	6. What are the challenges and needs for ...?
<ul style="list-style-type: none"> - Advisor/secretariat - Briefings - Media - Google - Executive summaries 	<ul style="list-style-type: none"> - Addressing climate change/Archiving PA goals/SDGs - Reflecting position in text - Fairness in process 	<ul style="list-style-type: none"> - Too much information - Understanding scenarios/access to understandable and relevant information - Understanding uncertainties - Common language - Media/influencers - What action makes biggest difference? - Pressure

Results of the finance panel

Penny (22, with 26 years work experience 😊), Analyst in an asset management company

1. What are the interests and motivation of ...?	2. With whom does ... interact?	3. Which information does ... need to deliver to this people?
<ul style="list-style-type: none"> - Maximize return while keeping customers alive - Minimize down-size risk 	<ul style="list-style-type: none"> - Director - Clients - Rating agencies - Investees 	<ul style="list-style-type: none"> - Scenario analyses - Sector specific information - Regional specific information - Financial analyses
4. What is the main source of information for ...?	5. How is success in the world of ... measured?	6. What are the challenges and needs for ...?
<ul style="list-style-type: none"> - Bloomberg - Senses studies - Clients' information - Investees' information 	<ul style="list-style-type: none"> - Money, "Pennies for Penny" - Long-term relationship (clients) 	<ul style="list-style-type: none"> - Understanding of the world to cope with (input) - Regional and temporal scales to factor in - All variables to factor in - Scenarios on future believes

Results of the business panel

Persona: Elona Musk (37) Strategist and doer

1. What are the interests and motivation of ...?	2. With whom does ... interact?	3. Which information does ... need to deliver to this people?
<ul style="list-style-type: none"> - Change the world - Money from the public sector for funding - Prove business opportunity - Create value - Make money - Long term and short term success of business 	<ul style="list-style-type: none"> - Herself: very self-confident, wants to create - Her teams - Action networks (global, wherever worthwhile) - Investors - Policy makers - Leadership team 	<ul style="list-style-type: none"> - Granular detailed visions of future - Risks and opportunities behind scenarios - Assumptions - Credibility - Raw data - Term specific data
4. What is the main source of information for ...?	5. How is success in the world of ... measured?	6. What are the challenges and needs for ...?
<ul style="list-style-type: none"> - New business models aligned with local scenarios - Specific media - Relevant business and government sources 	<ul style="list-style-type: none"> - Brand value - Action - \$\$\$ - Values 	<ul style="list-style-type: none"> - Costs: proving the business case - Finding the gold - Understanding the complexity - Hiring the people - Lack of specificity of scenarios - Up to data – new data - Amount of data

Co-production of visualization and communication tools for climate change scenarios

To make climate change scenarios more tangible, visualization plays a big role in the SENSES Toolkit. All co-production workshops also had extensive units for co-production of visualisation, an approach with iterative elements derived from design thinking (Boris Mueller, University of Applied Sciences Potsdam and team). The stakeholders were given an opportunity to address issues that are directly related to their everyday work - and they should express these issues in a visual way.

The workshop was structured into four sections:

- Introduction on data and data visualisation.
- Concept brainstorm.
- Visualisation workshop.
- Presentation.

In the introduction, we looked at the available scenario data and at various visualisation techniques. After the introduction, we split the stakeholders in two teams - a policy & business team and a finance team.

The aim of the concept brainstorm was to identify relevant questions and issues than can be answered by the scenario data. Stakeholders from the policy and business panel developed a broad set of questions they wanted to answer by using scenarios. Some questions were highly specific to the needs of the stakeholders who proposed them. But there were also more general questions mostly regarding the relation between scenarios and goals like the SDGs and the Paris Agreement.

In the visualisation workshop, the task was to create a visualisation (static or interactive) of climate scenario data that is a visual representation of the issue discussed in the brainstorming. The participants in the workshop were asked to design the visualisations by just using pens and paper.

Results of policy & business panel

In the policy & business team, two questions were selected for the visualisation part of the session. The first one on trade-offs between mitigation options and SDGs, resulted in a heat table, which showed the relation between different types of pathways and SDGs (Figure 14).

	SDG1	SDG2	SDG3	SDG4	...	
Pathway A	◇	◇	◇	◇		
Pathway B	◇	◇	◇	◇		
Pathway C	◇	◇	◇	◇		
...						

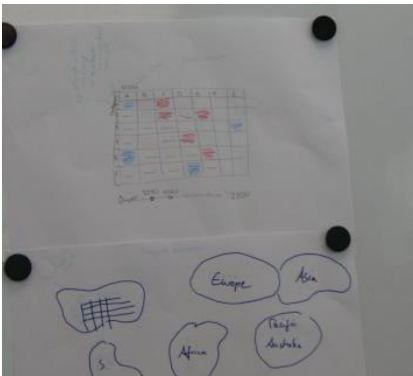
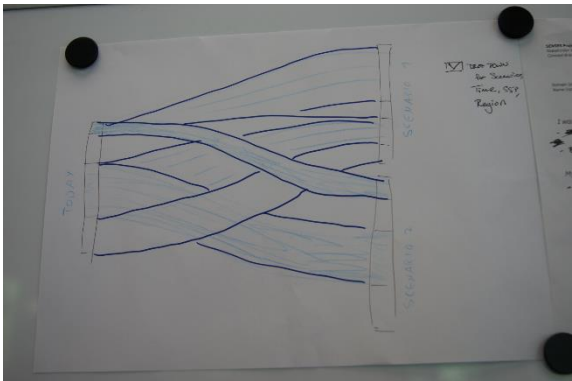


Figure 14: Connection pathways and SDGs.

The matrix would be a tool for assessing which SDGs are fulfilled (green) and which SDGs are not fulfilled (red) by a range of pathways. This is an extremely oversimplified and overarching picture of the relationship between Agenda 2030 and mitigation/adaptation pathways. In reality the SDGs need to be interpreted locally and/or for a sector. The group discussed whether it would be possible still to have a global picture like this, indicating for instance regional differences with bars (longer bars = greater regional differences etc.). Another

concern were temporal scales: the scenarios usually focus on 2050 and beyond, while the SDGs are explicitly about 2030. Several participants were for instance sceptical to use SDG indicators beyond 2050 (uncertainties are too severe).



The second question we tackled was about the bio energy potential in Africa. This led to a sankey diagram (Figure 15) which visualised changes in land use allocation for multiple scenarios.

Figure 15: Sankey diagram bioenergy.

Results of finance panel

Financial stakeholders brainstormed on relevant topics/ questions for visualization:

- Long term and global mitigation scenarios.
- Data on credit risks, impact on different sectors of the economy.
- Technology on regional scale.
- Costs and risks of the 2°C target, investment flows, financial stability, risk of concentration.
- 2°C investment pathways in OECD countries; e.g. show how total investment and different investment streams change under a 2°C boundary (which shows how electrification will change including the difference between coal and green electricity).
- Climate effects on the financial system (problem of confidentiality of data that can only be shown in an aggregated form).

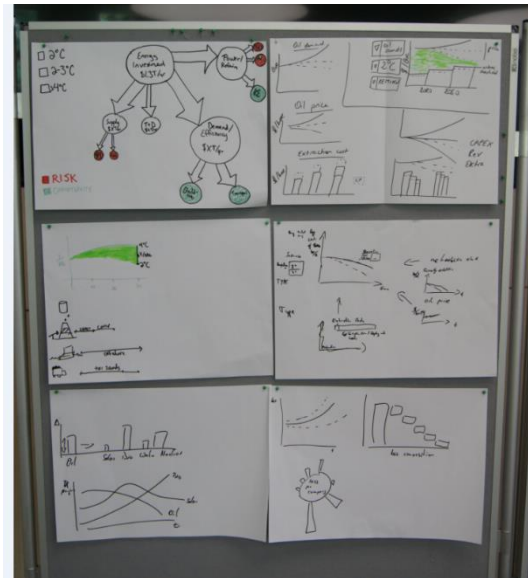


Figure 16: Impact of climate change policies on oil sector.

Financial stakeholders agreed to produce first visualizations on the question: **What is the impact of climate change mitigation policies on the oil sector?** (Figure 17)

The drawing exercise was accompanied by a discussion on the role of models and the potential of visualization. The REMIND-Magpie models can represent prices, quantities, losses per technology (e.g. oil). Visualization can help showing both risks and opportunities. For instance, if extraction costs rise, prices also rise (risk), however, if the price of a technology rises, another technology may get cheaper (opportunity).

Stakeholders came up with one drawing that brings together best visualization ideas (Figure 16).

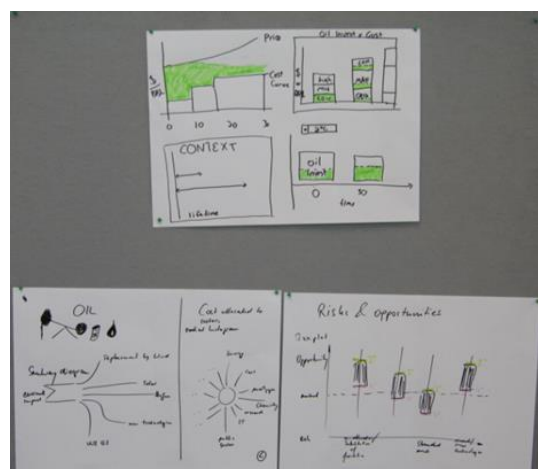


Figure 17: Summarizing visualizations.

1. Lower left: provide context: not all oil investments are created equal: Very different timelines: shale projects anyway have very

fast decrease of production -> only very short pay-back period, whereas offshore or tar sand projects are long-term investments (and conventional in between)

2. Upper left: The world market prices for oil increase more slowly with climate policy than without, or might even decrease under strong policies. Therefore profitability (wedge between price and extraction cost will decrease gradually, and especially for projects with higher-than average extraction costs).
3. Right side: Losses in oil sector due to climate policy are unevenly distributed across segments (shale, tar sands, offshore vs conventional), and thus regionally

Co-production of meta-indicators

Mapping is a key element when it comes to effectively building a bridge between the different worlds of science and users. A mapping of user information requirements to scenario content has to be accomplished. In the simplest case, this can also happen by matrix-like tables in which users have a kind of lookup table to navigate the terminology. Certainly, with respect to better contextualization, more elaborate and mature approaches should be provided, e.g. via a careful choice of indicators^{42,43}. In SENSES we developed meta-indicators that should serve as a bridge to steer users to the sets of scenario pairs answering their questions. Again we used the brainstorming and clustering technique.

The stakeholders were asked to split into their panels to discuss the following questions:

- What questions would you have if you met scenario experts answering YOUR questions?
- What scenario meta-indicators would you like to have available to select scenario sets to answer your question?

Results of policy panel: Questions

The discussion in the policy panel was very lively, central topics were the questions of timing and time horizons of scenarios. Novel aspects like energy-growth in non-G20-countries or security would be also of high interest.

- **Specific question clusters**

1. Timing	2. Physical risk / costs	3. Demand side
- What is the timeframe for implementing/deploying a particular policy/technology? - What happens until 2030 and how does it impact post-2030?	- What are macroeconomic costs (share of GDP) of climate impacts?	- What can demand side measures contribute?

4. Trade-offs and synergies	5. Sectors	6. Adaptation and mitigation dynamics
<ul style="list-style-type: none"> - Trade-offs between different mitigation measures and other factors, e.g. the SDGs - What are trade-offs between ambition, impacts and mitigation side-effects? - What are trade-offs between 1.5 and 2 degrees? And between ruling out/ not ruling out nuclear? Bioenergy? - What policies can reduce trade-offs of mitigation options? - What measures will really count, which ones are desirable but not enough? - Links to SDGs? 	<ul style="list-style-type: none"> - How do others scenarios/pathways compare to ours? Which sectors are they able to cover? - Feasible scale of mitigation in energy sector, co-benefits for society and the environment. - Are the lowering costs of renewables included in scenarios? - Options as results of changing technology or costs? - What are my mitigation options if I don't want to employ technology X/option Y? 	<ul style="list-style-type: none"> - Pricing adaptation needs is a prerequisite for assessing consequences of different mitigation levels. Inability to assess adaptation costs in developing countries will underestimate costs of failed mitigation. - What are the limitations of adaptation? - Role of oceans? Mitigation and adaptation. Loss and damage.

Results of policy panel: Meta-indicators

The stakeholders emphasized that meta-indicators are required at the different levels: by study, scenario, and model.

- **Specific meta-indicator clusters**

1. Scenario	2. Study
<ul style="list-style-type: none"> - Rate of change (tech, GHG, other aspects) - Timeframe - Level of policy decision (global/regional/national/local) - Amount of CO₂ removal and removal method - Level of water withdrawal 	<ul style="list-style-type: none"> - Additional land requirement for mitigation - Food prices, nutrition requirements, water use - Existing SDG indicators - Impacts indicators for different sectors - Hazard indicators
3. Model	4. Transparency
<ul style="list-style-type: none"> - Sector (energy, buildings..) - More granular/grid level information - Transition of carbon intense regions. - Land Use, Land-Use Change and Forestry 	<ul style="list-style-type: none"> - Transparency on input assumptions

Results of business panel: Questions

The stakeholders discussed the central question when are windows of opportunity closing? How quickly do we need to act to achieve a well-below 2 degree target? Evaluation of current policies and their impact against scenarios is highly desirable. Also trust building by revealing deep knowledge was requested.

Specific questions
<ul style="list-style-type: none"> - In what year will it be impossible to achieve 2 degree / 2050 targets? - Impact of policy “switch”? - Review pledge plans against scenarios to identify new options (or shortcomings) - Energy policy learning included? - Asset-related metrics of scenario assumptions? - What studies are these scenarios linked with? Where to get it? - How are the SSPs narratives used? How stylised are the scenarios? - Land afforestation scenarios available? (are they believable and thought-through?)

Results of business panel: Meta-indicators

The meta-indicator discussion identified two clusters: that of required structural information and indicators about scenario output variables.

- **Specific meta-indicators clusters**

1. Structural information	2. Output
<ul style="list-style-type: none"> - Price formation (assumptions) in scenarios - Calibration year - Coverage of sectors producing GHGs - Sectoral, spatially detailed information available? - “Politics of adaptation” - easier to develop integrated policies (infrastructure, water, afforestation, energy) 	<ul style="list-style-type: none"> - Energy mix developments until 2030 - Peak and neutrality year - Scope of emissions - Evolution of energy /of carbon price until 2030 - Any novel technologies included in new scenarios

Results of finance panel: Questions

Generally, financial stakeholders are looking for scenarios that allow a) aligning companies/financial portfolios with different levels of mitigation and b) answering risk questions at the physical asset level, financial system level and portfolio level.

- **Specific question clusters**

1. Overarching questions that the finance sector needs answers to	2. Transition risk	3. Cluster physical risk
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<ul style="list-style-type: none"> - Are single investments/portfolios/markets aligned with/contributing to reach climate goals? - Are portfolios/markets taking into account transition risks? - What are the impacts of climate change on portfolios/markets/ assets/ specific loans? - Is the transformation from brown to green possible without damaging the financial stability? - How to integrate physical and transition risks into Stress Tests? 	<ul style="list-style-type: none"> - What do climate models tell about economic change (not portfolio)? - Will fossil fuel assets build today still be competitive to run in 2025/2030? - How does a transition towards a low carbon economy look like (preferably many scenarios and inclusion of a hard and soft landing)? - Is the transformation from brown to green possible without damaging the financial stability? How to address brown assets? Is there an accepted green way forward even for brown assets? - What is the impact of climate change on credits? - What costs are allocated to the single developments? 	<ul style="list-style-type: none"> - What are the impacts of climate change on portfolios/markets/assets ?
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4. Opportunities	5. Technical questions
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<ul style="list-style-type: none"> - What are the impacts of climate change on portfolios/markets/assets? - How much afforestation is cost effective at different long-term targets (e.g. 2°C) and timeframes (e.g. 2050)? - How much new solar, wind, etc. will be built by 2025, 2030/is needed for different temperature targets? 	<ul style="list-style-type: none"> - How do you collect data (point in time or through the cycle)? - How to measure value changes? - How to translate scenarios in relevant metrics? - How can you translate the outcomes of a climate model into economic variables? Which models do you use? - How do you model the transition to a green technology? Which technology is best? Do you consider concentration risks?
---	---

- **General observations**

- Flows are often more relevant than stocks, but get reported less regularly? (e.g. How much new solar, wind, etc. *will be built* by 2025, 2030/ is needed for different temperature targets, instead of total capacity in these years)
- Need of a proxy for technology developments to judge which scenarios are realistic
- Analysis should preferably be based on many scenarios (differentiation along many dimensions (socio-economic, technology, policy,...), including scenarios with a hard and soft landing (abrupt or gradual policy phase-in)

For more systemic questions (overall impact of climate change/mitigation policies on financial stability), scenarios offer in principle a comprehensive and consistent tool, but so far translation into relevant metrics was not yet achieved.

Results of finance panel: Meta-indicators

Generally, financial stakeholders are interested in changes in the economy at a rather detailed level and look among other things for shock type scenarios, breakthrough technologies, flows and stocks and feedback into costs. Useful indicators include negative emissions levels, temperature targets, different levels of transition delay, commodity prices without subsidies, technology capital costs, policy measures beyond the carbon price.

- **Specific meta-indicator clusters**

1. Model	2. Scenario assumptions / useful scenario variations	3. Results
<ul style="list-style-type: none"> - Time-horizon (also short term) - Technology beliefs - Regional granularity - Model version 	<ul style="list-style-type: none"> - Level of ambition/target - Probability of reaching mitigation targets - (Non-CO₂ price) policy variables - SSP underlying assumptions (land requirements, diets, etc.) - Policy year 	<ul style="list-style-type: none"> - Price factors excluding subsidies - Speed of the transition - Investment costs by sector (parameters that drive the technology mix) - Commodity prices; producer prices and purchase prices - Capital cost and learning rate assumptions for new technologies (EVs, Solar PV, CCS, Storage) - Flows and stocks (see above) - Negative emission costs-effectiveness
4. Useful scenario variations		

- Event based scenarios vs. temperature based scenarios
- Discontinuous/ shock scenarios and breakthrough technologies (non-least cost)
- Flows and stocks

Feedback collection

To collect feedback on the SENSES toolkit an evaluation test was conducted. It was based on a questionnaire prepared by the University of Applied Sciences Potsdam team to evaluate the SENSES Toolkit, the portals and modules.

The aim of the questionnaire was primarily to obtain feedback on the general usefulness of the toolkit as well as to get an insight into whether it is easy for the users to become familiar with the interface and to achieve their objective through using the toolkit.

The survey was conducted as follows: Each stakeholder was interviewed individually by a team member of the University of Applied Sciences Potsdam or a substitute student. The survey lasted one hour in total with 15 minutes for free exploration of the toolkit, 30 minutes to go through and answer the prepared questionnaire and 15 minutes for general feedback.

The toolkit was mostly very well received and stakeholders enjoyed exploring the website. The toolkit was perceived as a highly innovative way to present complex information that allows the user to intuitively use and play around with the modules. The presented learn modules were particularly well received, as was the scenario finder. The toolkit was found to be suitable to *“take complex datasets and making them broadly accessible in a visually pleasing way”*. It was said to be very informative and trustworthy by providing sources and authors for each module. One stakeholder stated that *“it makes models come alive”* and stakeholder agreed with the statement that it *“presents the scenarios in a comprehensive way”*.

Furthermore, the evaluation showed that the majority of the questions that tested the usability e.g. calling certain modules, extracting specific information from a graphic or navigating through modules, could be solved without the need of assistance.

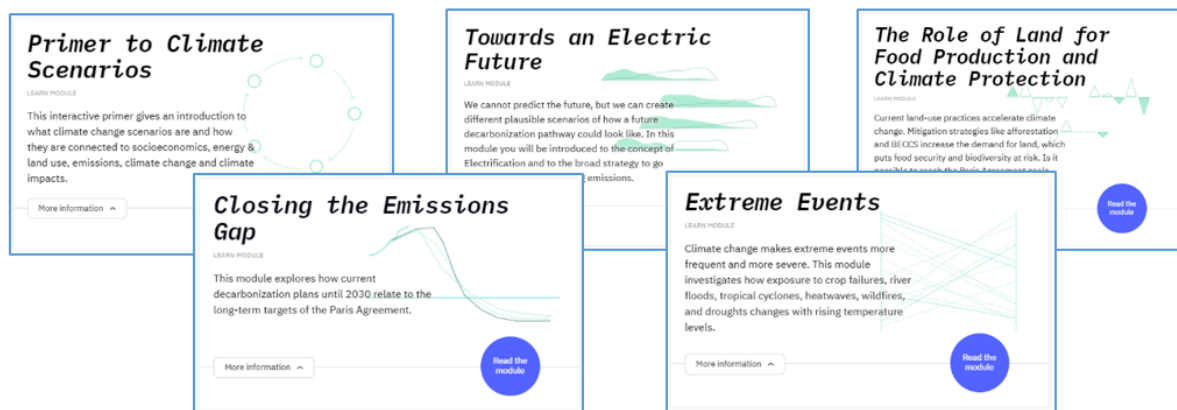
The Survey can be downloaded [here](#) (PW: senses).

3.4. Co-production WITH the SENSES Toolkit

The [SENSES toolkit](#) was not only co-produced with stakeholders, but also serves as a basis for **future co-production** workshops. It contains LEARN modules that allow to give stakeholders an introduction about central topics of climate change scenarios. Attached EXPLORE modules pave the way for a deep data dive into scenario information.

- **Learn Modules**

Learn modules are the most user-friendly elements which contain highly processed visualizations and capacity-building material. They address the group of stakeholders with little capacities to get into details but which rather need a comprehensive overview. The presentation of the content is linear and given as compact narrative with interactive infographics.



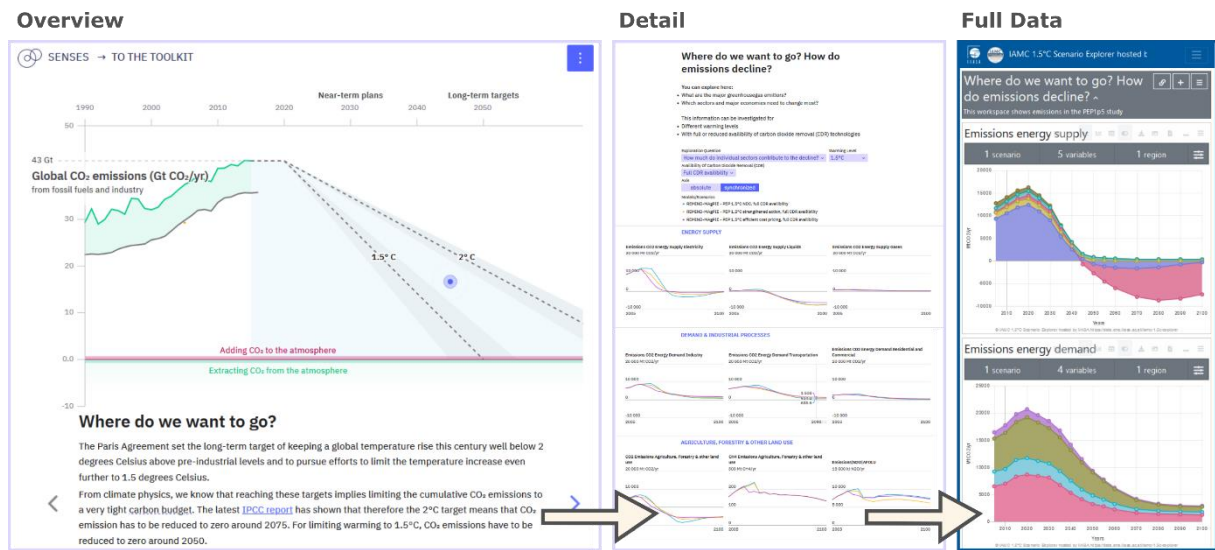
The learn module [“climate change scenario primer”](#) is an apt example, it gives novices basic and comprehensive introduction to climate change scenarios, their interconnection, and how to contextualize them correctly. Further learn modules provide tailor-made information on specific topics about mitigation and impact scenarios, like the emissions gap, the sectoral transition to climate neutrality, or financial risks in fossil fuel exploration. The interaction time with a learn module is approx. 20 minutes. For further information they are complemented by a link to guided explore modules, download material, and literature references. These learn modules can be filtered by user group, i.e. policy makers, finance, and business.

We consider them as ideal to have introductory co-production modules with participants on their basis, especially if these are users with reduced pre-knowledge about climate change scenarios.

- **Guided Exploration Modules**

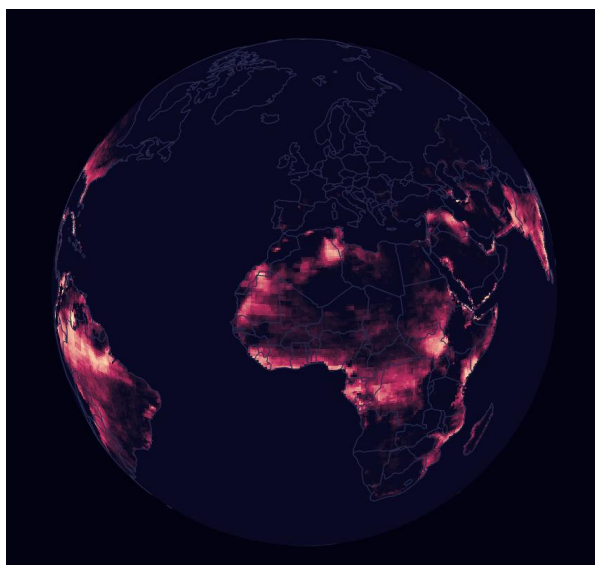
Guided Exploration Modules (GEMs) have a focus on mitigation scenarios. They directly link specific user questions to a compilation of selected sets of scenarios and scenario variables. Most GEMs are connected to learn modules and allow a deep dive into the underlying actionable data. This step is especially of interest for practitioners that want to use climate change scenario data beyond the narratives. If participants want to explore the data further

beyond the provided frame, the GEMs contain a link to an instance of the IAMC 1.5°C Scenario Explorer. There other scenarios, e.g. from the IPCC Special Report on 1.5°C warming, and other variables can be explored, data verified and compared.



We have tested using the GEMs in SENSES co-production workshops and they spark lively discussions. They are suited for in depth understanding of scenario dynamics and a large scale picture of the multiple variables defining individual scenarios. Seeing the concrete expressions of individual scenario narratives in terms of data triggers deeper understanding and questions about input assumptions, turning points in the pathways and alternative courses of action. GEMs follow a low-tech approach, meaning that the production of new GEMs is not very time intense and like they can be updated or new ones added before workshops, which helps that stakeholders can look at recent research examples.

- **Open Exploration of Climate Impacts with SENSES Earth**



The Exploration of climate impacts tends to be especially tangible for participants. Here the Toolkit module [SENSES Earth](#) allows to explore extreme events for 1°, 2°, and 3°C of warming. The land area exposed to hazards like crop failures, droughts, heat-waves, river floods, tropical cyclones, and wildfires can be explored on a virtual globe. The results can be transparently compared across different Earth system and impact models. The chosen mapping on a globe visualization is highly engaging and allows to display a substantial amount of scalar information at the same time.

With its design of staged access to the wealth of information in climate change scenarios the SENSES toolkit offers a broad basis for co-production workshops with stakeholders of different levels of pre-knowledge.

3.5. Administration & Logistics

“The devil is in the detail.”

Unknown

Here we provide you with a list of possible arrangements which apply to most events. Based on this list you can create an appropriate timetable. Try to do the schedule like a wedding planner, by determining which tasks should be done 3 months ahead, which – one month, two weeks etc. Use a **flowchart** as an effective method for time management (Figure 18) where you start planning from the end (No. 1). Then you determine what is the penultimate step (No. 2), then – the step before the penultimate step (No. 3) until you arrive in the beginning of planning process. When you are done with the task list, assign deadlines for each task also starting from the top of the list. In the end, determine who is responsible for which task. Try to mention all necessary tasks in detail as if you would explain to a child how to bake a cake (very detailed instructions: who, what and when) – the more accurate you are, the less probable it will be to suffer from time stress later.

	A	B	C
1	When	Who	What
2	03.03.2020		Conference XY
3			↑
4	02.03.2020		put the signs inside and outside of the conference building
5			get the key to the conference room
6			↑
7	30.02.2020	XX	finalize and print the agenda
8		all	check presentation facilities
9		all	final meeting of the organisation team
10		YX	print out name tags
11			↑
12			...
13			

Figure 18: Flowchart method for creating a schedule for the organization process.

- **Who are your internal stakeholders?**

Recruit organising working groups and ensure support within your organisation. Define who can help you at which stage, e.g. with registration of participants before the beginning of the workshop and provide assistants with necessary information. Administration should also be considered as stakeholder (as described in 2.2). The greater the influence, the earlier stakeholders should be involved in the planning process.

- **What is your budget?**

Financial planning is a key issue. It is up to you whether you first think of the budget and then see what can be the theme, target audience and duration or vice a versa, when you adapt

your initial goals to available budget. Probably, the best option is to do both in parallel. Keep available budget in mind from the beginning and check if the goal is realistic. It is also the best option, because you cannot exactly foresee how many people will visit and, thus, what will be exact catering costs etc. If the registration number is much higher than expected and catering expenses increase, the funding agency or partner institutions might provide you with extra funding. If it is not possible, reductions can be made because some target groups will attend online or providing only coffee breaks and letting participants pay for the lunch, dinner etc.

Here it is important to have preliminary numbers by listing all costs and identifying sources of funding. Most expenses occur through hotels, catering, and restaurants. Also check their availability in the certain period of time and for the certain destination you are planning for.

Possible expenses are:

- Hire of venues.
- Catering: meals, lunches, tea and coffee breaks etc.
- Networking dinner(s) at restaurants.
- Travel costs: accommodation, transport, daily rates, taxi.
- Additional transportation, e.g. shuttle bus to/ from venue; transport for site visits.
- Conference stationery.

Possible funding sources are:

- Partner institutions: If the funding is scarce, it is possible to conduct a joint event with partner institutions that can cover some expenses, e.g. travel costs of keynote speakers or catering.
- Funding agency: If you can explain to the funder why extra costs are necessary and how the whole project would benefit from it, then it is worth asking.
- Registration fee: The participation fee creates more commitment. Even if it is a symbolic amount of 20-50 euro, people will register only if they are really interested and going to visit it. Of course, you have to check if is applicable for your event.

This list is by no means exhaustive, it is provided to start the thinking process involved in budgeting for a workshop. In order to arrive at the total cost of the event, think through all elements of the workshop and find out an approximate cost per participant.

- **Promotion of your event**

After setting up a registration form, you can spread the link to your target audience. Remember to update your project homepage and inform all other relevant sources. These could be announcements in social media, on the webpages of the funding agency, partner institutions or related projects, posting of printed announcements, announcements through email distribution lists. Think of your network and possible multipliers.

- **Consider a cultural/ religious background**

Cultural misunderstandings should not be underestimated. Try to inform yourself at least a little bit about cultural and religious norms of the participating countries related with hospitality, expressing gratitude and dietary habits – you will be highly rewarded for it.

At our institute we mostly order vegetarian and vegan catering because of sustainability reasons but during a workshop there was a misunderstanding since absence of meat was interpreted by foreign partners as a lack of hospitality. Here, It is sometimes helpful to “re-define the context” by putting a note saying that we would like to show hospitality by serving regional, seasonal and organic products that are also climate-friendly.

- **Send the final agenda and logistical information to all participants**

An exemplary agenda is provided in 0. Necessary logistical information is given in **Error! eference source not found.** Ask participants who plan to come with a car to send you a notification with their car registration number. Then, you can inform the entrance gate employees and give them a printout with dates and locations of your event (since they might be contacted by participants when passing the entrance gate).

- **Stationary**

Think which stationary materials you need for your event, like writing pads, pens and lanyards. Check if you need a presenter case and mouse presenter, self-adhesive name tags, flipcharts or whiteboards.

- **Photographs**

Mostly it is appreciated if you have nice photographs as a proof that an event took place and was visited by a high number of stakeholders. Also photographs can be used as content for the project webpage. However, make sure you comply with the data protection requirements of your country.

Look through the entire programme and consider when and where it would be useful to have photographs. If a group photograph is planned, reserve 15 min. in the agenda for it.

Think if a team member or a colleague could do photographs but don't underestimate how difficult it is to produce photos suitable for homepage! You can also check if your press department would support you with this task. So you might consider hiring a professional photographer. If the budget allows it, you should have a written contract, including acceptance of offer, conference site, shooting date and time, estimated group size, size and number of photographs required, black and white or coloured format and a delivery date. The involved photographer should visit the conference site in advance to determine the best in- and outdoor shooting sites.

- **Translation service**

Most events in science are held in English. Still sometimes it can be necessary to have simultaneous translation for some talks. Consider that it is an expensive service and additional costs will arise due to borrowing of special equipment such as interpreter booths etc. If you hire an interpreter, make sure you sent her the presentation slides at least a day before – this will very likely improve the quality of the translation and, thus, the reception of the talks.

- **Organization team**

Divide the tasks between the organizing team and make sure everyone is informed. Set up regular meetings to monitor the progress and discuss within the team.

Clarity and commitment can be reached by developing a process protocol for the organization team where the tasks for each module are listed within the agenda and sorted in chronological order, including responsible colleagues. This protocol should also mention who is a moderator, observer, timekeeper, technical host (responsible for technical implementation, slides upload) as well a notetaker for each module (roles were described in 3.2). You will avoid stress and misunderstanding if you have a written list confirmed by everyone ahead. Apart from that, make a list of emergency contacts with phone numbers, including taxi service.

If the organizing team is split between different cities and doesn't know each other in person it is crucial to plan at least one day before the workshop to discuss the process and get to know each other. Then you will act as a team in the workshop. Reserve two hours for going through the entire agenda as well as individual sessions in your team, after everything is set and process protocol is written. This can be done in subgroups - here moderator, notetaker etc. come together and go through details to get a good feeling.

- **Sustainability**

Make sure that the event is as sustainable as possible. Some ideas here are:

- Print out a small amount of materials if it is really necessary.
- Use public transport if possible or walk to the restaurant together, encourage guests to arrive by train.

- **Final steps**

Assume that the last day/ two days before the conference will be stressful because you will get queries or cancellations from participants, have final discussion in your team and something else might happen that will draw your attention. That is why try to perform all important tasks ahead, e.g.:

- Send a final agenda to participants, helpers, caterer, chief secretary and eventually to other employees.
- If necessary, print out the agenda, book of abstracts and other signs (e.g. WLAN code).
- Meet the conference manager and discuss the details, e.g. location of registration table, poster boards, flipcharts, coffee breaks and lunches, which seating you need in which room etc.
- If necessary, get the keys to conference rooms.

4. Appendix

4.1. Outcome exercise

This imagination exercise can be used for overcoming a mental block if your project seem to be a huge mountain and you don't know how to get to the other side. It is normal to feel anxiety or fear in front of a large project. The exercise can be done in front of your team and you need one moderator, one participant and a rope.

A participant stands at one end of the rope and imagines that the other end is the project goal that she wants to reach.

Moderator: Look at your goal at the other end. How do you feel about it? What do you plan to do after you reached your goal?

When a participant answered, moderator invites her to walk all the way to the other end of the rope and imagine that the goal is reached now.

Moderator: What have you achieved? How do you feel now? Describe the atmosphere around you (time, location, sounds, who is next to you?). What are you doing at the moment?

After an answer, the moderator asks a participant to do one further step aside which symbolically stands for the next step after the project end e.g. vacation or next project proposal which a participant mentioned before.

Moderator: Looking back at your first goal – how did you manage to reach it? Describe what helped you on the way? What were the difficulties? How could you overcome them? Which stakeholders supported you on your way? How did you convince them to participate? Etc.

In the end the moderator asks the participant to come to the end of the rope where she was at the beginning.

Moderator: how do you feel now about the project goal? What could be your first step?

After the last question is answered, discuss in a group, e.g. your project team what were the key insights. Repeat the exercise with a different moderator and another participant. Due to this exercise you benefit as a team because you get to the same stand, exchange ideas and open to each other as individuals. An important prerequisite is to engage in the exercise, work with imagination and activate all your senses because this releases your creativity.

4.2. Example of a feedback round

Traffic-Light method³:

In this method, you draw a traffic light on a flip chart or white board. Give a set of sticky notes to each participant (ideally in red, yellow and green for better visualisation).

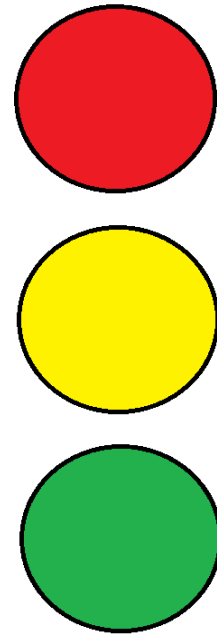
The three traffic light colours mean:

Red = what was good?

Yellow = what should be improved?

Green = overall impression

Give participants ~ 5 minutes to write their feedback. Then, each person can place her sticky notes corresponding to the colours of the traffic lights on the flip chart, reads it out and comments, if necessary. After the statements have been filled in, they are looked at together and discussed.



³ Lebendige Gruppenarbeit durch kreative Methoden
https://www.mittelhof.org/static/media/filer_public/5b/ef/5bef0a48-2cd6-4a8b-afd6-19952a80624a/selbsthilfe_reader_2015.pdf

4.3. Structure of an invitation email

Here we describe the relevant sections of an invitation email and what it should contain. Please find an example in 4.4.

Introduction

Try to create a personal reference. If you know each other, mention where you met last time. You can also refer to somebody you both know if you are not acquainted. Otherwise, make a reference how you found this person and why you think she might be valuable for your project.

Then, briefly introduce your project and its main goal, also highlighting who are you looking for and why it's beneficiary to participate. As your email might be long and decision-makers normally don't have a lot of free time, it is important to put the core message in the first two or three sentences as a teaser that will arise the interest to read further (Figure 2).

Main part

Here you describe your project in detail. Try to stay short and precise and mention the key information such as project goal, who are the target users of the results, what are the main activities and how they are going to be performed (e.g. through conducting five workshops) as well as who are the partners.

Then define the role that you assign to a specific stakeholder and explain how this person can contribute to your project. Next, list potential benefits for this stakeholder if she will participate.

Conclusion

In the end, mention the next necessary steps e.g. deadline for the reply, possible phone call to discuss the details, signing the letter of support etc.

4.4. Invitation email to join the project

Dear ...,

I hope this email finds you well. I am writing to you with an invitation to serve on the Business Panel for co-developing Climate Scenario Services within the **SENSES project** through which we are currently applying for EU funding.

Below is some **background on the project** and **your possible role** if you chose to accept the invitation. I think the project would be of particular interest to you, since the **aim is** to bring business and science better together – and there is not much of an obligation for you as Advisor. It'll be thus fantastic to have you on board, and we were hoping that you could strengthen our application even with a **letter of support** (obviously, we'd be happy to help draft the letter).

The SENSES project

SENSES stands for "Climate Change ScENario SErviceS: Mapping the future". With the development of a new generation of climate change scenarios for informing the 6th Assessment Cycle of the IPCC and the implementation of the Paris Agreement, there is a renewed need to make climate change scenarios better accessible to decision makers and stakeholders. The overarching goal of the SENSES project is to develop tools and approaches to make the new generation of climate change scenarios an integral part of climate services.

These tools and approaches will be combined to a tailor-made, user-determined Climate Scenario Toolkit including a unique collection of user-centered scenario visualization tools and co-creation techniques for **three user groups**: 1. National and international climate policy makers, 2. Regional climate scenario users, and 3. Businesses, particularly those with long term planning horizons.

We believe that the Climate Scenario Toolkit can provide substantial climate services to these user groups. For example, it can help to inform climate policy makers about the global implications of national contributions under the Paris Agreement and business leaders about long-term investment opportunities and risks related to climate change and climate policies. On a regional level, scenarios can be used to explore inter-linkages with other sustainable development goals, e.g. relating to food, water and energy availability and poverty.

The project is structured around **three main activities**: (i) establishing user panels, identifying user needs and community building, (ii) developing techniques for the co-creation of climate change scenario knowledge that properly addresses user needs, (iii) design of user-centered scenario visualization tools.

Over the project lifetime **five meetings** will be organized: the kick-off meeting, three intermediate workshops, and a final dissemination event. The intermediate meetings will aim at the development of co-creation techniques for scenario knowledge as well as the co-design of visualization tools. They will most likely be organized in Stockholm, Berlin and Brussels.

The project is a collaboration of **five research institutes** that bundle expertise in climate change scenario research as well as design and visualization techniques:

(1) XXX

- (2) YYY
- (3) ZZZ
- (4) ..
- (5) ..

The SENSES project has been invited to submit a 2nd round funding application to the ERA-NET Call “European Research Area for Climate Services” (so-called ERA4CS) under the European Union’s Horizon 2020 Framework Program. If funded it is expected to start in spring 2017 and run until spring 2020.

Your role:

To reach its goal the project will work in close cooperation with three user panels representing the interests of **(i) national and international climate policy makers, (ii) regional climate scenario users, and (iii) businesses**. These panels shall ensure that the new CC scenario generation can provide substantial climate services to their communities.

More specifically, as a member of the Business Panel for Climate Services you will be consulted throughout the project lifetime with the **aim** to:

- identify the needs of core climate scenario users in the business sector,
- engage in community building among users of climate scenarios in the business sector,
- advise the development of co-creation techniques for scenario knowledge,
- advise the user-centered design of visualization tools.

To fill **your role** you would participate in the majority of planned project meetings, i.e. kick-off meeting, three intermediate meetings, and final dissemination event. We will use innovative and highly interactive workshop formats at these meetings to enable an effective co-production of knowledge between users and scientists.

We will reimburse your travel expenses for your participation. Any further interaction may occur via electronic means.

Your benefits:

- participation in the creation of scenario knowledge ensuring it fits your needs and answers your questions,
- first hand access to the latest scenario data and continuous exchange with internationally leading research institutes in the field of climate scenario development and analysis,
- visibility of your contribution to the further development of climate services and thus ultimately visibility of your engagement to support sustainable development and a climate–resilient and climate-friendly society.

I hope you will find the information in this letter useful for making your decision. I can speak for the entire SENSES team when saying that we would be delighted if you were to accept our invitation.

If you have any questions about the project, your participation and the obligations and benefits, I or one of my colleagues in the steering committee would be happy to follow-up this written invitation with a phone call within the next weeks to explore the venture further with you. **Please let me know if you wish to discuss this and when might be a good time to contact you.**

Yours sincerely,

...

Example agenda for a co-production workshop



4th SENSES Co-Production workshop

[FH Potsdam](#), Germany

March 04-05, 2020

Background & Aims

Limiting global warming to avert the worst effects of climate change will require rapid, far-reaching and unprecedented changes in all aspects of society. The new generation of climate change scenarios allows to take an integrative look on climate change, climate impacts, potential adaptation and mitigation. Thus, decision makers can benefit substantially from exploring and using this data, investigating potential futures - understanding risks and opportunities.

The SENSES project aims to develop tools and approaches to make the new generation of climate change scenarios more accessible and comprehensible. Central needs for this step are identified in a co-creation process between scientists and decision makers. Addressed users are experienced stakeholders with policy focus but SENSES also aims at providing access for new user groups from business and finance.

In this workshop, scenario users will be involved in the co-creation of scenario tools together with scenario experts. We will present results in terms of visualization tools tailored to the user needs. We jointly want to progress on methodologies and tools to empower stakeholders to extract valuable information contained in scenario results and to answer their questions.

As novelty we will also take the step to provide a link between the global and regional scenarios, with a focus of linking impact and mitigation.

Three user panels are addressed: (i) national and international climate policy makers, (ii) businesses, particularly those with long term planning horizons, and (iii) financial institutions, with a focus on climate-related risk assessment.

Our consortium is set up as follows:

- (1) Potsdam-Institute for Climate Impact Research (PIK) – project coordinator
- (2) International Institute for Applied Systems Analysis (IIASA)
- (3) University of Applied Sciences Potsdam (FHP)
- (4) Wageningen University (WUR)
- (5) Stockholm Environment Institute (SEI)

Agenda

DAY 1 – March 04	
11:00-12:15	Welcome Session Welcome [Boris Müller, FH Potsdam] Stakeholder introduction [Cornelia Auer, PIK Potsdam]
12:15-13:00	Goal of meeting, status SENSES [Elmar Kriegler, PIK Potsdam] Discussion
13:00-14:00	<i>Lunch break</i>
14:00-15:20	Presentation & evaluation of SENSES toolkit, portals and learn modules [FH Potsdam] Presentation of modules to gain access to climate change scenario content Split up into individual expert evaluation by stakeholders
15:20-16:00	<i>Coffee break</i>
16:00-17:30	Plenary round on results [FH Potsdam] - Discussion based on evaluation and feedback - Outlook / development of further modules - Discussion of package
17:30-18:00	Feedback on first day [Elmar Kriegler, PIK Potsdam]
20:00h	<i>Joint Dinner</i>

DAY 2 – March 05	
9:00-11:00	Presentation & evaluation of guided explore modules [PIK Potsdam] Presentation of modules to learn using climate change scenario data Evaluation and feedback of modules in breakout groups
11:00-11:30	<i>Coffee break</i>
11:30-13:00	Linking global scenarios to regional scenarios [WUR Wageningen, SEI Stockholm] Introduction of visualisation techniques and data developed in co-production Developing scenario narrative sketches
13:00-14:00	<i>Lunch</i>
14:00-16:00	Scenario visualization techniques and impact quantifications [WUR, SEI] <ul style="list-style-type: none"> • To understand transboundary climate impact effects (TCI) and • To develop adaptation-mitigation pathways
16:00-16:15	Wrap-up and feedback

4.5. Process description

A process description helps to organize the workshop that you don't get into time trouble and still leave enough space for improvisation. You do not only specify the activity in this document but also very clearly the goal of the individual workshop elements. This supports goal oriented co-production that is well structured and still flexible. Below you see a snippet of such a process description capturing the first two units of the coproduction. For an entire workshop all units would be described in this way. See also [Process description.docx](#) (PWD: SENSES) in the cloud folder.

Process- draft

Time	Activity	GOAL	Responsible	Equipment
10:30	<p><i>Welcome</i> Introduce the team and introduce the participants. Short.</p> <p>The wider picture of SENSES and why we are here today.</p> <p><i>Introducing SENSES and the case studies</i> The background and the rationale behind the case study. Overall methodological approach. Process overview. This presentation should end with the identification of today's workshop as a key element of the process. Modelling and CE should be mentioned.</p>	<p>Team and participants know each other Scope of the project and topics are clear</p>	EK	<p>Post-its, projector Skype for remote stakeholders</p>
11:00	<p><i>Introducing scenario planning and today's work</i> This session needs to i) tell the stakeholders what it is all about, ii) convince them about the advantages for using scenarios and iii) give them an overview of the scenario process in the workshop and after the workshop. And what it is not. Stress Chatham house rules and that people only represent themselves. This session ends with a presentation of the focus question: [How can scenarios be relevant to you? What are the factors of importance to you (stakeholder)?]</p>	...		

4.6. Introduction game

Prepare several questions and let people move in a room, forming groups and getting to know each other. Participants have to interact to implement the tasks. These questions should be asked in intervals of 5-10 minutes so that participants can have a smalltalk before forming the next group.

The questions might be:

- **How long did it take you to come to Potsdam (in hours)?**

Place yourself in a line depending on your travel time... (Explain where the beginning should be).

- **In which city or country were you born?**

Place yourself on imaginary map... (Explain where in a room is e.g. Germany and let everyone distribute in a room relative to it).

- **At what time of the day are you working most effectively:**
 - in the morning
 - in the afternoon
 - at night
 - something else

Form 4 groups for each option... (tell participants which spot stands for which answer)

- **Which Software do you prefer:**
 - R
 - Python
 - Matlab
 - none

Form 4 groups for each option... (tell participants which spot stands for which answer)

- **I check my emails a day on average**

Place yourself in a line depending on how often you check your emails (for example 1-10x, 20-50x, 50-100x, >100x)

4.7. Persona introduction

This persona exercise introduces stakeholders from different sectors and identifies their needs. Persona is a fictitious, generalized character that represents a particular user type of climate scenarios that has diverse requirements and behavioural patterns. Personas can be a stereotype, an extreme. Creating personas helps to understand expectations, experiences and goals in relation to climate scenarios.



Name:
Age:
Position:

Typical Statement:
”
“



1. What are the interests and motivation of ... ?	4. What is the main source of information for ... ?
2. With whom does ... interact?	5. How is success in the world of ... measured?
3. Which information does ... need to deliver to this people?	6. What are the challenges and needs of ... ?

Figure 19: Persona canvas: guiding questions that help define the persona (Credits [Marzavan](#) & Auer)

Moderator:

You are going to work with your stakeholder group and each group is going to create one persona. So Business creates a business persona, Policy - policy and finance - finance. We know that you come from different backgrounds, so the persona is going to be fictive and a stereotype! We invite you to imagine that your persona is sitting at her office desk and receives an invitation to a scenario workshop...What does your persona look like? Who is she/he? Why is she attending?

Show Persona canvas (Figure 19) and explain it. Participants can draw a picture of their persona if they want to. Tell them that they are supposed to use the chart (loose properties of a persona) to gather the information. If they want to, they can paint a stakeholder map or just place the stakeholder on a post it. Make it visible! One stakeholder/ information/ source/

need per post-it! You can have fun here and freely decide how you want to edit it. Remember: it is a fictive person and you build a fictive story around the persona.

1. Add a Question/ Dimension when you feel that one is missing.
2. Find somebody in your group who is doing the writing.
3. You have 15 min. for the creation of your persona.
4. Gather up in your stakeholder group and take a persona canvas, paper, pens and material.
5. Set the clock: Go, be visual!

Then, stakeholders should present their persona and answer questions, discuss together. Here it is a good idea to go with the participants to the respective wall where the persona being presented is located.

Loose properties of a persona (supplementary material)

Scope of duties:

- What position do you hold? What is your job title?
- What is your performance measured against?
- What skills are required?
- What knowledge and tools do you draw on?
- Who do you report to? Who reports to you?

Objectives:

- What are you responsible for?
- What does it mean to be successful in your position?

Challenges:

- What are your biggest challenges?
- How do you overcome these challenges?

Company:

- In what industry(s) does your company operate?
- What is the size of your company (revenue, employees)?
- Acquisition of know-how and competence:
- How do you access new information for your business?
- Which publications or blogs do you read?
- Which associations and social networks do you belong to?

5. Recommended reading

Besides the literature referenced in the next section we specially recommend the two books to those that want to dive deeper to understand the spirit of co-production, typical patterns of co-production, or get an idea about potentially required conflict management. Both originally do not target science as audience, but more industry, government, and social change networks.

1) **The Art of Leading Collectively** by Petra Künkel

Petra Künkel gives a rather feminist perspective on how co-production can be put in practice in a success- and meaningful way. She has a focus on sustainability transformation and is especially helpful for those that want to pursue deep change and long-term partnerships.

Kuenkel, P. (n.d.). The Art of Leading Collectively by Petra Kuenkel. Chelsea Green Publishing. Retrieved 24 September 2020, from January 20, 2016

2) **The Art of Co-creation** by Bryan Rill and Matti Hämäläinen

This book does not aim at specific sustainable transformation processes or endeavors with climate background. But it provides much practical support and helpful insights on how co-production can make a real difference.

Rill, B., & Hämäläinen, M. (2018). The Art of Co-Creation: A Guidebook for Practitioners. Palgrave Macmillan. <https://doi.org/10.1007/978-981-10-8500-0>

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