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Speech by
State Secretary Dr Georg Schütte,
Federal Ministry of Education and Research,
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"Climate Engineering – Critical Global Discussions"
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Professor Lawrence,
Professor Töpfer,
Ladies and Gentlemen,

It is a great pleasure for me to welcome you to the 2014 Climate Engineering Conference on behalf of the Federal Ministry of Education and Research.

The title of the conference – Critical Global Discussions – is well chosen.

It highlights what climate engineering is about:

First of all, it is about becoming involved in discussions whose outcome we cannot yet predict. These discussions must be global – after all we are trying to address the challenge of global warming by means of climate engineering. A global perspective is also needed in view of the potential impact of climate engineering measures. The various nations assembled here today symbolize this need.

And finally, these global discussions must be critical. "Critical" in a philosophical sense, which means assessing climate engineering using binding criteria.

The relevant criteria have yet to be defined for climate engineering. The proposals that have been made still give rise to numerous questions.

Ladies and Gentlemen,

Let me start by referring to the Fifth Assessment Report of the IPCC, which in a way opens the next chapter in climate engineering. The IPCC report makes it clear that the international community does not have much time left to take action to reduce emissions quickly and limit global warming to a maximum of two degrees.

If efforts fail, so-called "negative emissions" will be the only way to achieve the two-degree target according to the IPCC. This technical term implies using climate engineering technologies – that is, technologies which involve great risks and whose effectiveness and consequences cannot be reliably predicted with regard to nature, human life or the economy.

The current climate debate is focusing in particular on massive afforestation and on bio-energy with carbon capture and storage – or BECCS for short. However, should the international climate negotiations not produce the desired success, there will certainly be a call for the use of other climate engineering technologies.

The German Government is confident that this will not happen and that we will in the end achieve the required level of climate protection. This is where we are concentrating all our efforts. But the example of Australia shows that we have still a long way to go. Australia recently abolished the carbon tax which it had introduced only two years before and which many economists consider to be the most effective climate protection measure.

We believe that common sense will ultimately prevail and that the need for climate protection will be recognized. But we also believe that it would be political negligence to fully rely on a "Plan A" without allowing for a critical assessment of a "Plan B".

This is why my Ministry, the BMBF, has been following the climate engineering debate for quite some time now. We consider it part of our responsibility for research policy to actively concern ourselves with the various aspects of this topic.

Our 2011 scoping report on "Large-Scale Intentional Interventions into the Climate System" covers the full range of the topic. The report provides orientation and impetus for the international debate on climate engineering.

Numerous important findings have been made since the report was published and have enhanced our level of understanding. I am very pleased to see researchers in Germany working on this topic – either in the DFG priority programme or at the Institute for Advanced Sustainability Studies in Potsdam, which organized this conference. The survey recently presented by the German Parliament's Office of Technology Assessment is another important element in ensuring an objective climate engineering debate based on facts.

Let me make one thing clear: The aim of research and research policy in Germany is primarily to enhance our assessment expertise.

What does "assessment expertise" mean?

Whether it be bioenergy with carbon capture and storage or the manipulation of the radiation budget: There is no ideal solution which is ecologically sound, socially and politically compatible and economically justifiable. Most of the pathways proposed hold considerable potential for conflict.

The precautionary principle in politics means that we review individual proposals on the basis of scientific findings in order to identify the potential, risks and costs involved and consider feasibility and acceptance.

The results must not be reserved for the scientific community. They must be made available for a public debate and support political opinion-forming. Climate engineering concerns us all.

But this also means that the scientific community must communicate climate engineering to the public in an understandable way and be willing to engage in public discussions. This is the only way to achieve a broad and competent appraisal of climate engineering in society.

Climate engineering presents a number of special dilemmas for research and research policy.

The first is the ethical dilemma:

It is obvious that climate engineering by no means constitutes a solution from today's viewpoint. Nevertheless, a sober review of the progress of climate policy reveals that we need to consider this option carefully at an early stage.

How far may or must research go?

Does climate engineering research encourage a repair policy which only entails ever new, unaccountable risks? After all, none of the proposed technologies is ready for application or has been tested in practice. It may even prove impossible to test many of these technologies sufficiently.

It is also clear that the political focus must be on climate protection and adaptation. The BMBF's 2011 report underpins this view. Could climate engineering research have a bias-

ing, self-reinforcing effect making alternative pathways in climate policy appear realistic at too early a stage?

But can research simply ignore the "Plan B" for climate protection? Is it not a must for research policy to have it critically assessed by the scientific community or even actively developed?

Our survey produced a clear answer to this question: It is imperative that research be conducted for ethical reasons. However, this initially means research to enable the assessment of climate engineering rather than to prepare its use.

The required knowledge base must be available if, all risks considered, climate engineering proves to be the most socially viable or even the sole option to combat climate change. And we must be able to fully assess the consequences of applying the relevant technologies. This means considering whether we need to accept the consequences of climate engineering in order to avoid the even more serious consequences of climate change.

There will certainly be no obvious solutions in this case. Research and research policy in particular bear special responsibility in view of the risks involved and the controversial nature of the topic:

We must ensure a transparent public debate to justify research. Research, in turn, must provide a solid knowledge base in different areas.

It is important to consider, for example, the possible effects of the large-scale cultivation of plants for bioenergy generation from a scientific, ecological and economic perspective. But it is equally important to consider the aspects of equity and fair burden-sharing. Who is responsible when the use of BECCS jeopardizes traditional forms of agriculture and food supply? This raises highly complex issues of governance and political management which can often only be solved through international cooperation. This leads us to the basic principles of ethics and international law – and to

the second dilemma, the political dilemma:

The use of climate engineering technologies needs to be controlled because these technologies involve incalculable risks and cross-border effects. Such control can only be achieved through international cooperation.

The same goes for research related to climate engineering, which must equally be subject to international regulation. The aim is not to limit research on climate engineering but to enable legitimate research to be performed.

There is much to suggest that decisions on the possible application of any climate engineering measure and on related research must be taken in the context of relevant international conventions. But what is the appropriate regulatory framework for climate engineering? Is it the Convention on Biological Diversity, which bans climate engineering activities – and only allows research under specific conditions? Or would the Framework Convention on Climate Change be more suitable?

At the moment it is hard to imagine an intensive debate to ensure the required level of intergovernmental cooperation under the UNFCCC. Anyone supporting this goal would immediately be suspected of diverting attention from the purpose of an effective climate protection agreement and of giving the wrong signals.

Climate policy's careful approach to the topic of climate engineering must therefore not be misunderstood as political inactivity. Not regulating and not debating an issue in a given context can in fact be based on a particular political stance.

As regards research as such, there are already provisions governing individual fields of research related to climate engineering. The most important example is research on ocean fertilization under the London Convention and Protocol. This Convention could serve as a model for research policy. It provides for freedom of research while defining limits and requiring special justification for research related to climate engineering.

Such regulation can provide research with a reliable framework. But it cannot serve as a blueprint for the broad use of climate engineering as an instrument of climate policy.

Ladies and Gentlemen,

The German Government takes the view that a broad regulatory debate to include the use of climate engineering in whatever convention – particularly the Framework Con-

vention on Climate Change – would be the wrong signal at this point in time. Our main goal must now be to achieve an ambitious, comprehensive and binding agreement on climate protection. What we need are fair arrangements to ensure compensation for climate damage and enable adaptation. This will be the focus of our efforts in the period up to the Climate Conference in Paris in 2015.

If, at the present moment, the use of BECCS were discussed in the context of the UNFCCC and included in the research agenda, this could be seen as preparation of the introduction of this technology. The formal inclusion of BECCS in the negotiations would in fact give priority to this technological option. Our understanding of its risks and acceptance would, however, be just as vague as in the case of other climate engineering technologies.

On the other hand, we cannot ignore the fact that specific considerations regarding the role of BECCS are being introduced in climate policy following the publication of the IPCC report. Could it be that technologies for carbon dioxide removal (CDR) are being gradually elevated to the status of a solution to be applied when climate protection has failed? Even if only to gain time for more ambitious climate protection plans?

Is this an expression of blind trust in technological development or plain realism?

The political question is obvious: Would it not be wise to choose a proactive approach and establish comprehensive international rules for research on and the use of climate engineering at an early stage before individual states make uncoordinated efforts in this regard or the international community comes under pressure to take immediate action? We must admit: We have not yet found a solution to this dilemma. The Federal Government gives primacy to climate protection and adaptation in climate policy. But, observing the precautionary principle, we will be open to a constructive debate about guard rails for climate engineering when the time comes.

And finally, the third dilemma is the scientific dilemma:

The large-scale use of climate engineering technologies is not an option at present because these technologies involve incalculable risks and cross-border effects. However, an assessment of the impact of climate engineering requires experiments that are not limited to models and labs but are conducted under near-application conditions.

The situation is basically the same for all climate engineering measures: They have not been sufficiently studied so far with regard to their effectiveness and possible side-effects or their acceptance and ethical and legal conditions. This also applies to the impact of individual carbon dioxide removal technologies, which are discussed in the IPCC Report in the context of "negative emissions".

These CDR technologies differ fundamentally from solar radiation management or SRM technologies, which manipulate the radiation budget using aerosol particles, for example. But the impact of CDR technologies on food production or ecosystems, or the acceptance of carbon storage sites for use on the required scale are also largely unsettled issues.

Questions also remain with regard to the scaling of local CDR solutions. Viewed in isolation, these solutions may be unproblematic. A locally limited ocean fertilization experiment, an individual device for chemical CO_2 filtering or the afforestation of a specific area may not seem critical. But a solid assessment of the large-scale effects requires comprehensive experiments.

This leads us to the following question – particularly with regard to SRM but also CDR: How can we develop sound expertise for assessment and decision-making when the required research involves the illicit and undesired use of climate engineering technologies?

We still have no master plan for further action. Climate engineering is confronting us with completely new issues owing to its far-reaching consequences. Therefore we need an approach which ensures that social assessment and political regulation can keep pace with the increase in scientific knowledge and develop side by side.

An open social and research policy debate – also including field experiments – must therefore differentiate and avoid generalization. There is certainly a difference between assessing bioenergy with carbon capture and storage and considering the insertion of aerosols in the stratosphere. First of all, these technologies involve completely different risks and cross-border effects. Second, those technologies are gaining significance which the current debate considers to be of prior regulatory importance in the context of the IPCC, the Framework Convention on Climate Change or the Convention on Biological

Diversity. And third, CDR technologies are generally closer to the climate protection debate than the sometimes curious ideas regarding solar radiation management.

Now, what criteria could guide future research on climate engineering?

- Research should in particular serve the clear and comprehensive assessment of risks. This means giving consideration not only to scientific and economic aspects but also to acceptance, equity, governance and ethical justification.
- Research should focus on technologies which involve special risks or require regulation in a specific political context. Issues addressed in UN Conventions or discussed by other international bodies must be at the top of the agenda.
- Certainly, there will be measures with a favourable balance between feasibility and expected benefit on the one hand and potential risks on the other. These measures could provide genuine solutions. Examples include large-scale afforestation and the use of carbon dioxide in the synthesis of industrial products or fuels.

Research should also be aware of shifting baselines. Changes may occur in the way specific technological options are perceived. The context of political and social assessment may change. And new research always refers to what may be possible and feasible in the future.

It helps if research stakeholders work hand-in-hand to place trends in a political and social context and enable policy-makers to form their own opinion.

That is why I would like to encourage you to continue your work across disciplinary borders. The BMBF's scoping report involved climate researchers, legal scholars, economists, philosophers, political scientists and risk researchers, who worked together very productively. They all struggled to find a common language and a common view and the result is far more than a mere survey of individual scientific perspectives.

And when researchers working in the DFG priority programme engage in close exchange with the IASS Cluster on Sustainable Interactions with the Atmosphere, this can provide an added value for all the parties involved. You can all contribute jointly to creating and providing the basis and conditions for the assessment of climate engineering.

Ladies and Gentlemen,

Let me conclude by summarizing some points which are characteristic for climate engineering from the research policy viewpoint:

As the competent Federal Government department, the BMBF pursues a proactive and responsible policy in the field of climate engineering. Our goal is not to pave the way for the application of these technologies. One cannot approach this topic in terms of such simple categories. The BMBF is assuming responsibility for and actively engaging in a far-sighted debate about climate engineering, taking into account the research and social policy perspective. We are doing so to solve the dilemmas I have described – and also because Germany perhaps plays a leading international role due to its scientific and political awareness of climate engineering. The BMBF will therefore keep up its research policy efforts.

Of course, the BMBF supports the responsible and fair international regulation of research on climate engineering. International law with its relevant conventions is the benchmark for all kinds of research commitment. At the same time, we want to observe the freedom of research because researchers whose hands are tied cannot produce useful results. Combining both principles is not a contradiction for us but rather a challenge in our efforts to address the provision of general public services.

The aim must be to create a framework for interdisciplinary research which supports a differentiated debate and enables a precautionary policy. The BMBF will continue to pool relevant knowledge as we did with the scoping report.

The decision about the future of climate engineering will ultimately be taken at political level. Isolated findings produced by researchers cannot meet the special requirements of social dialogue and involvement which are typical of climate engineering. Bringing this knowledge together will therefore remain an important goal for the BMBF so that politics and the general public can become more strongly involved in the debate.

This conference is providing a forum for shaping debates and conducting a dialogue about key issues and current trends. I hope and expect that it will contribute substantially to the promotion of scientific dialogue and to building bridges between science, politics and society. - I wish you every success and inspiring days here in Berlin.