

Panel Discussion¹

Opportunities and Necessities of Research and Education

Introduction

In the animated and strong panel discussion the different subjects of the conference day were summed up and different points of view were outlined.

In particular, the requirements for international education, training, and future research programs were thoroughly discussed. In this context, the contribution of research institutes should be considered carefully, because they are of vital importance for an advanced development.

Another topic of the debate was the issue, in what manner cooperations should be organized, what topics should be treated in networks, and what financing instruments can be provided to arrange such vital structures of cooperation.

The issue of cooperation, i. e. to operate in a global perspective with regard to research and education, represented the focus of the discussion. In order to achieve a sustainable development, to promote renewable energy technologies and to create capacities in developing countries successfully, the OECD countries need to contribute their share both in training of researchers and practitioners as well as in the basic research and the development of applications. In both fields, developed and developing countries must collaborate closely.

The question of how to organise this kind of cooperation basically means how to promote research and education. Necessary networks and urgent needs for public support were vividly discussed as a possible answer. Today, there are already tendencies to establish far reaching networks in order to generate and distribute knowledge for the promotion of a sustainable development; for the organisational form of

network structures allows to combine cooperation and competition in order to enhance the top efficiency of research and development. The discussion culminated in the promising outlook that these networks may be an innovative and more effective type of international institution – a conclusion that matches with the announcement of the political declaration of the governmental delegates of the Renewables2004 to work together within a global policy network in the near future, that will include all different sectors of stakeholders.

Consequently, the lively panel discussion offered far-reaching results and clearly provided, on the basis of a thorough discussion, opportunities heading for the further development of renewable energies, thus fulfilling the expectations raised in the forefield of the event.

Therefore the participants of the panel discussion deserve my very special thanks for their committed contributions to the current debate.



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¹ The statements of the speakers are adapted for the print by the editors. The messages are those of the speakers, the wording is revised editorially.



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Discussion

Lux-Steiner:

I want to start with the introduction of the participants of the panel: On my right side is Dr. Hermann Schunck, representing the Federal Ministry for Education and Research. He holds the position of the director general of the department for basic research, transport, and aerospace research. Next to him is Dr. John M. Christensen, head of the UNEP Research Centre. Dr. Christensen performs a special task in the field of renewables. He is head of the Secretariat of the Global Network on Energy for Sustainable Development. Next is Hans-Josef Fell, member of the German Bundestag and spokesperson on research and technology of the Alliance '90/ The Greens parliamentary group. The next person is Prof. Didier Mayer. He is acting as the president of the EUREC Agency. And last but not least Dr. Osman Benchikh, responsible for the energy and renewable energies at the UNESCO, he is head of the research activities.

Necessary Future Actions

Lux-Steiner:

I think you have heard a lot of general statements and I would like to start the discussion with the question if we will be able to realize all those activities and action plans. What do you think are the achievements by 2010? What is the most important achievement for you, your organization, or your country? I suggest everybody gives a short statement. Starting on your side, Osman Benchikh. The most important but only one.

Benchikh:

Research and development must accelerate the cost-cutting process. Costs going down for the end users may be the most important development to provide more people with an affordable access to modern energy. This is something that can be feasible, it is not impossible. Realistically this can happen, if market development will be connected to research and development.

As representative of UNESCO I would like to add to that R&D goal the aspiration to have improved partnership and cooperation by 2010 not only in R&D. The North has developed research and centers of excellence which can help to improve the situation of the people in the South. UNESCO is aiming to use R&D as a tool for sharing the natural resources on a global scale. In this context we should understand sustainability as solidarity between the North and the South.

Mayer:

I will only complement what Osman Benchikh said. As a representative of the European research, at least our members in EUREC, I will start with a remark on research budgets for renewable energies. In the last 30 years we have had a decrease by a factor of at least three to ten in the research budgets of the renewable energies, as Prof. Luther has shown earlier this day. It is really important to recover this level. Those budgets must be applied to renewable energies and not distributed all over what we call new energies, like for instance CO₂ sequestration, which is an important technology. We have to keep our budgets. It is now and not in 50 years that we have to build the future for the next 50 years, we have to start now.

Regarding education we have already started. It is no simple task to organise a collaboration of European universities, but EUREC has made the first steps in the field of renewable energy research and training and has built something that works. After having developed a strong basis, the next steps will be to use our experience and to expand our collaboration in other continents.

Fell:

The worldwide demand for energy is increasing rapidly, and it cannot be met by fossil or atomic energy sources. Renewable energy systems are badly needed.

Two years ago, the German Bundestag received an independent and scientific report telling that the oil reserves are decreasing. At the moment, we can observe the high oil price as result of scarce resources in relation to the extraordinary high demand particularly of the Southeast Asian countries, picking up in their development. In the next decades, more developing countries will increase their demand for energy. As a politician, I have to react to those global developments, otherwise we will end in a crash of world economy. And the industrialised countries will be hit hardest.

There are no other energy sources in question which could possibly cover the rising demand, at least nuclear energy could do that. And therefore we have to change to a renewable energy system. We have to introduce the existing technologies like windmills, like biogas, and others like geothermal energy.

And we need also a big research offensive to create new technologies. There is a huge range of possibilities, but we have nearly no research money for this. In the past 50 years, 80% of public funds for energy research went into nuclear research on fission and fusion. Nuclear energy covers today 5% of world energy demand. The investments in nuclear power are the biggest flop in research history. Only 2 or 3% were given to renewable energies in the last 50 years worldwide, resulting in covering 12% of the world energy demand.

If politics increase continuously our budgets for renewable energy research, we will soon reach a 100% renewable energy system. And this is the most important target because of climate change and the world running out of oil.

Christensen:

It is very difficult to come after this kind of political statement. I agree with all the previous speakers on what I would call the big picture. But I may be urged because my world is mainly on issues in developing countries. It is important to emphasize that the growth in consumption will mainly come from the developing countries. Right now, there is a very big political push with a G7-report and a number of other initiatives that say: "Renewables are very good for the developing countries". And I agree they are. But renewables need to be implemented in OECD countries to realize extent initially. The political push for renewable energies has to come from the OECD countries.

You have to introduce those technologies in developing countries very carefully. For, you get a very negative reaction from countries which are basically interested in energy, not necessarily renewable energies, but energy for development, if new technologies are introduced and do not work properly or cannot meet the rising expectations. So, it is important that the OECD countries take the lead also in actually doing what they preach.

And then it is important to make the link. It needs to come in a realistic manner otherwise we risk to hand over several things too early and to have a backlash. We have seen a lot of success stories on role expectations using Photovoltaics, but there is a lot of failure also. They can deliver a little power, maybe lighting or something on a very small scale. So, if you overrate it once it is very difficult to convince people and come back later. Renewable energies can contribute to resolve energy access problems in developing countries, but they need the push from the OECD countries and they are not the sole solution. So, you need to do it in the right way. That is the main message that I would like to come up with.



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But I agree on the principles and targets and so on, but to be realistic, what can be done: If I just take my own little angle from the position why I am here, from the Global Network on Energy for Sustainable Development which is trying what was proposed in the closing session: We can and we should link together regional centers of excellence in developing countries with European and Northamerican centers and try to work on common themes and developing this kind of sharing of experience, mainly on policies so far. I think there is a lot of room for technologies and a lot of other areas to do the same.

Schunck:

I am trained as a mathematician, not as a physicist. I am an engineer. Prof. Lux-Steiner put a precise question forward, and I am trying to give two answers. As I said, I am trained as a mathematician, so I am giving an answer as mathematician.

I hope that in two or ten years or shortly after that some of those exponential learning curves, giving the correlation of costs per unit energy and of installed renewable energy capacities (from which experiences and learning will follow), will reflect the increasing investments in research and development and the improving competitiveness of renewable energies in the market. Now, my second answer I can not refine from politics. I hope that the problems we have ahead of us can resolved in a peaceful environment. And that takes – and now I go back to the first speaker – solidarity.

Global Cooperation in Research

Lux-Steiner:

After having heard these short statements I want to come back to the presentations of today and I would like to ask the panelists: Do we really need a global perspective for research and development in the energy field? We have heard the provocative statement that industrial countries have their task in doing advanced research studies and while developing countries' research needs to be rather application oriented. And they should come together. So I want to ask Osman Benchikh, what do you think about this statement?

Benchikh:

I do not think that we really seriously have to make this distinction. Obviously, the South needs the North and the North needs the South. And there is a need for more solidarity between the North and the South. The term sustainable development is meaningful, but very general. We need to be more specific if it shall have significance for real international development assistance. Therefore I already proposed to understand sustainability as solidarity. We have to promote solidarity among the various actors from the North and the South.

The field of renewable energies offers a true option for a peaceful development. For the South is a region that needs to share know how, while technology and knowledge is now mainly based in the North. Hence, the South presents new opportunities to apply innovations from the North.

Schunck:

It comes down to one question: On a global scale, there is roughly speaking a situation in which the North has high-tech and the South or the developing countries have the adapted technology. It is necessary to transfer as fast as possible technologies and high-technologies to highly qualified Third World developing countries of the South.

However, we should be very careful. I was very much impressed by the lecture of Mongameli Mehlwana who presented the equation Renewables = solar PVs = energy of 2nd choice = rural applications = poor people. That happens if we do not give taxes to high technology as fast as possible and as intensive as possible.

Christensen:

Just adding to the last comment: First of all it is important to have, like Mongameli Mehlwana was saying, a more differentiated understanding of what the North and the South is. Because the South is very many different things. If you go to Brazil, India, China you have quite advanced technologies and policies especially in renewable energies. They are even in front of European countries in some areas.

On the other hand, in many developing countries the situation is a completely different one. Regarding the presentation of Prof Schmid, proposing an open internet-based university to promote training in renewables in developing countries, we really need to understand the local conditions that we talk about. We must not come with a preconceived idea about "This is good for you, because I think this is good for you". We rather need to understand what the local conditions are and what the right technology for that particular need is.

If that match in what we talk about works out, it is a little partnership. That bridge is not very difficult to get across. If, however, you come and think we know what the right technology is, it is very difficult to communicate that kind of information gap on technologies. So, it is the kind of partnership approach which will help to explore which are the right technologies.

Fell:

I agree on that last point. The North or the industrialised countries have the research basis and the industries to develop those technologies, therefore it is their task to develop affordable and cost-effective renewable energy technologies which are competitive in energy markets. However, it has to be checked if, for instance, five mega watt offshore windmills are the right technology for the South. It has to be analysed exactly what the needs of the South are.

Developing countries mostly need low technologies adapted to their capacities to research, develop and produce them on their own. To this end, the education process for capacity building must have two directions in general: first, the North has to learn what the South needs, and second after having funded and developed basic research potentials in the North the education must be application oriented in the South.

This education process can be organised through an open internet-based university as proposed by Prof Schmid. A such university can contribute to knowledge sharing between the North and the South. The North can learn about the South's needs and provide the South with knowledge and technology already available, while the South



can learn about the technological opportunities and adapt them to their needs and capacities in an application oriented manner.

Building Human Capacities

Lux-Steiner:

It was mentioned that we need education of experts on all levels. Especially in Germany, for instance, I can say we have a lot of PhD students who finished their thesis and maybe less than 50% find a job in the field of renewables. On the other hand, we learnt that the South has not enough human resources. So, I want to ask Didier Mayer how we have to deal with this problem.

Mayer:

I agree with you that this is a very difficult problem, but I would say in France we have not the same as we have not so many PhD-students that are interested in renewable energies. This is a day to day business to welcome them. I already said in my presentation that it was a very important job to find or to create some employment and jobs in the field. Otherwise it is nonsense to educate people in this field. But I was talking about the European level. All kinds of energy are well distributed all over the industrialized countries – the normal energy powerplant and so on, which is not the case for renewable energies, which are not distributed equally. Some different countries are better placed to give employments. So that is why I have talked about the European level which certainly offers enough job opportunities and a fairly high demand for engineers in renewable energy technologies all over Europe.

Regarding the students from developing countries studying in Europe we face another problem than the lack of job opportunities: the brain drain. They stay in Europe – they do not go back. The problem in our case was to educate them to go back and apply their knowledge in the developing countries. So we thought about adding a collaboration to welcome them perhaps for only one year in Europe but to leave them in their universities. So we can educate them and keep them in their home countries at the same time. We try to create a scheme in order to train the trainers for the education process like the Master and even the thesis afterwards. To create education schemes and to create the trainers in their own countries means to build local capacities for education and training. Because otherwise there will be always the possibility for those students to come to Europe and then to organize to stay here and not to contribute to the local development in their own country. This is a problem, obviously, shared by all developing countries. We have to develop solutions for this problem, and one good solution is to go in their places and train the trainees in their own country locally.

Christensen:

I just add a little bit to that, because I agree very much to that. One additional angle, which was the other part of my work for quite a long time, maybe the inner research in development institutions. For, if you look at the political declaration here in the draft which is available now, for instance, research is meant to be on technologies and business models but not on development work. We talked a lot about research and research funding and so on. When you really look at what is done in the development agencies, research is almost a sort of forbidden word in many of them. I think some time ago the Swedes had something called the Swedish agency for research cooperation where they were organizing this kind of partnerships. This was one of the very few development assistance agencies that actually had a specific research focus at the time. It has now been rolled in into SIDA and disappeared, though it is partly there. But there are very few institutions and agencies that have a dedicated focus on research. So, it is an important message that if

they really want to follow up on the declaration. They also need to put research into the kind of development work that they want to fund.

Benchikh:

In fact I raised this issue this morning: the regions where you have the largest potentials of renewable energy resources are the regions where you find the least capacities for research and development and training. In order to reverse that experts from the North have to assist in the South to train the trainers within the bilateral cooperation, as Didier Mayer proposed it. This cooperation with the South is even necessary for Europe to reach the adopted target that 12% of the energy supply shall come from renewables by 2012. Without the South Europe will not manage to have enough renewable resources.

However, not only in the South human resources are lacking. The North lacks experts that have full knowledge on the different forms of renewable energies. Most of the experts are specialised in one area, but we are in need of experts with a broader know how and knowledge on the different forms and technologies and on, for instance, the economic part of the introduction of renewables.

The approach of a European Master degree is contributing to bridge that gap. However, there is no need to multiply the different Master degrees, for in the end that would be less transparent and could be a barrier for renewable energy experts to enter the market.

Global Research and Development Networks

Lux-Steiner:

Actually, I would like to ask how this R&D should be organized and also how do you think can these experts be included. Today I have heard many ideas of networking and I want to insert into the following question: Is networking compatible with intellectual properties? I see that high technology research activities are mostly done in closed groups. So what is the advantage of networking?

**Mayer:**

The advantage of networking has been stressed by Prof. Joachim Luther in his presentation. The mechanisms in question were coordination versus fragmentation. It means, what is the benefit of coordination and what is the benefit of competition? And the answer on it is: We need both, it is very important to have a kind of coordinated competition. Competition is always something really important as new ideas are emerging and competition creates room for new ideas.

But we need also coordination. There are different debates going on all over Europe how the budget of the different member states could be more coordinated in order to increase the efficiency. Because figures tell that Europe as it comes to the European Union's budget plus the member states' budgets reaches the budget of the United States or of Japan. But the efficiency seems to be less because there is research on the same questions supported twice or three times in different member states. So the crucial question is: How can we coordinate this competition between the different member states in order to increase the overall efficiency of R&D. I have no answer. This is another good wish for the ten years coming, I would say. For this is really an important topic. Coordination means to enter the policies of member states, which is very touchy, competition reaches as far as the autonomy of the member states. Optimally, competition shall instigate actors to innovate and give opportunities to launch inventions while coordination shall organise this process more efficient and avoid races that destroy valuable and scarce public resources Both is a question of governance and management.

Lux-Steiner:

In Germany there have been some activities within the last five years, especially networking between research centers and universities. And I would like to ask you, Dr. Schunck, what is your opinion about the results?

Schunck:

May I first go back to your former question. I think we all want renewable energies to become competitive in markets. If that is so, we need people that are knowledgeable in using them. Therefore we need to educate people and we need to disseminate knowledge. I think there might be a stress situation between intellectual property and cooperative networking, but it is inevitable. Because in the end we want companies to be successful with products in markets. But these markets have to be created first. And if people in the South are not able to buy something, to apply things and to use things there are no markets. So in a certain way we need that networking towards the other side to come to a better sustainable development. And if we do not do that, I think we might end in applying what a famous British author once said to East and West "Never the train shall meet". We could refer this to North and South if we are not really careful and try to organize technology transfer and to organize knowledge transfer. The setting up of networks is the best what we can do. I was really impressed by the idea of Prof. Jürgen Schmid in his last talk, proposing an open internet-based university. That is a really practical thing, we should talk about.

Christensen:

The network I am representing deals with policy analysis, which includes intellectual property rights in that area. At least the experience we have so far is that the "cross knowledge", based on comparative policy analysis, is really very valuable both in terms of North-South and South-South. It has a rather strategic value than a technological one for which intellectual property rights are applicable. For you can sit and analyse the problem and then you can come up with some kind of theoretical solution. But if we actually see that something has worked in Brazil and understand why it has worked, what elements are transferable to another region, if it is relevant for them, and

then pick it up there, it is much stronger than somebody coming with a mere theoretical argument of how to do it.

Hence, you can come out with a very strong message on policies, if there is a strong network behind it with, for example, ten developing countries and ten industrialized countries. If they come out with a such common message saying "These are the overall results looking at virtually all subregions in terms of how it works", you come up with a very strong political message, also in terms of pushing the policy agenda.

For you really have to insist to reach the policy makers and start cooperative networks. It could be wonderful if you can get people to initiate to have a such look at that kind of technology cooperation as a long term thing where you create the markets by being more open in the beginning, because otherwise you are not going to move anywhere.

Fell:

If we want to have a real change in the promotion of research and education programmes in the world for renewable energies we have to learn from other areas of energy. The International Atomic Energy Agency is some decades old. Nearly every country of the world gives millions of dollars every year to finance it, and they organize education and research for atomic power. It is a huge and powerful institution. Nothing comparable exists in the world for renewable energies. Therefore we need a similar agency. The World Council for Renewable Energy held a big conference in the last three days here in Bonn. They made a call for an International Renewable Energy Agency (IRENA) to organize the know how transfer in the world in education programmes, in research programmes, in programmes to bring the best political instruments to the countries and much more. Therefore we have to organize a process leading to the setting up of IRENA.

Now, I want to ask you Dr. Schunck as representative from the German Federal Ministry for Education and Research, which helped to organise this conference: Would it be possible that Germany takes a leading role in the financing and in the follow up process for a

such organisation like an open internet-based university or anything else comparable?

Schunck:

That is a question put forward to me. I was almost afraid you would ask me whether I could be able to give you an answer regarding the International Organisation – I could not do that. But I tried to listen very carefully to what was put forward today. And it was really very interesting, especially the last lecture – this very precise proposal of Jürgen Schmid was the climax for me. Now, I can do as much as saying I would be very happy to take this back home to our ministry and take a very good look at such a proposal. You know there are questions like that you have to finance techniques and make sure that you do not double something, which perhaps is already there. You have to look at things like that before, but I would be very optimistic that if we meet a year from now we could say we started it here.

Fell:

Thank you very much.

Christensen:

These are very positive news. I have just two points applicable to a couple of things.

The first one is, I also liked the presentation that we have heard before. Maybe one caution is, there has been quite a lot of initiatives after the world summit 2002 creating relatively big internet set up portals, but we have already talked about that before. Though they sound very reasonable, this is the same caution as with some technologies. I mean you are talking about target groups where the access to internet is quite weak in many cases. That needs to be done in a way that the people you are targeting can access. So do not make it too fancy. Because when you are sitting on a very slow connection in Guadeloupe, you have absolutely no chance opening even the front page. There has been quite a lot of talk about internet portals for the Least Developed Countries. But it is a contradiction in terms. They have connections so poor, but we do not realize it. Nevertheless, the idea is good, it has nothing to do with that.

My second point concerns the making of IRENA. You make something what I call a logical leap in the argument: Because we had that for nuclear we need to have this for renewables. But things have changed since, and maybe there the decisive question is: With the new communication technologies and networking and all the other things, do we really need an agency? Just building up an agency like a UN-agency takes five to ten years. And if there are other ways of acting – I do not know, I am asking the question – are they more efficient and effective? Is there actually another way to do the same thing, which would be more efficient and gets started quicker and can be built on somebody's initiative that is already there?

I do not know the answer. I would love to see an agency, but I am just worried that to keep talking about only one solution, we may limit the span of options. For we have talked about IRENA for about ten years. I was before Rio together with Hermann Scheer in the Solar Group for Rio and it has not moved since then. If it were happening, it would be a great idea. But I am not so optimistic on that. Maybe talking too much about it prevents other things from happening. That is why I am worried, although I am not against IRENA.

Fell:

To discuss the foundation of IRENA one has to understand it in historical terms. In comparison the International Atomic Energy Agency was founded in a process starting with only ten nations. They did not ask the United Nations for allowance. It is not the realistic way to bring all nations of the world together. That foundation process will probably take some 20 years. For the time being we just need to start the process with, for instance, ten leading nations, provide that agency with funds, and five years later there will be hundred nations to join in the process.

Then we will have a law for this agency, a law particularly for renewable energies instead of fossil or atomic. For those are the basics when the International Energy Agency comes up with a statement. Therefore we need to organise a standing alone process for renewable energies.

Lux-Steiner:

I would like to come to another issue. Actually it is now the period of writing road maps, there are road maps for almost all nations as well as on the European level. In this context there has come the time for advisory boards. So, I wanted to ask you: Do we need international advisory boards? How many do we need and how should they be organized? This is a question for you, John Christensen – I think you have some experience?

Christensen:

I think that is a bigger scale than what I am working on. Mine is more modest. It would be nice if there were some of the recommendations here for some kind of stakeholder work or forum. I do not disagree that to have an organisation in a somehow institutionalised form would be of great benefit. I am just wanting to move it on. And if we can move it on in a pragmatic way it will be very important.

Because it is important that something comes out of these big meetings and summits, what I have called "care the ball", whatever the ball is. It is important that we have some kind of set up, that we have a message to take from here and keep working on it. If it is possible to set up this kind of agency with a limited number of countries that could be one option, a sort of multistakeholder forum, for instance, that was also discussed at the ninth session of the Commission for Sustainable Development (CSD-9), which was focussed on energy. The proposed International Science Panel on Renewable Energy could be another option. I think it is important for the message coming out, that there is some kind of specified follow-up, and then you can discuss the details, terms of reference and so on, when you move on. But if we leave here at the end of the week without any kind of follow up apart from that we meet for the CSD in 2006 and 2007, it will be like any other major meeting that recommended an action plan but in fact had no action.

Benchikh:

One of the major problems to launch renewable energies is what the policy changes require from the decision makers. These people are in need of information and advice. An international

advisory council, or what form it may ever take, can provide advice and promote a change in mentalities. This change of thinking is only possible through education. Education with an international background is today the only education to promote that change in awareness and understanding. An additional argument is that the switch to renewable energies makes necessary an adaptation of the people, of ourselves, to the new form of energy. To conclude, I believe a such body is absolutely needed, and the proposal that has been made this morning is clever and will work out.

Now I am coming to the question of founding an agency. The intention of an eventual international agency for renewable energy is to create an institutionalised body promoting renewable energy for the reduction of poverty. However, if such an agency is to be founded it has to be tied in some organisational form to the UN-system, otherwise it will just be another bilateral initiative not acting on a global scale. I am not saying I am for or against a such agency, but indeed it is necessary to change something in



order to reach out to the people, raise their awareness, and provide the infrastructure or other preconditional resources needed for development.

Fell:

The crucial question of creating an international agency is not to build it with or against the UN. The question is how to exceed the pace of normal UN-processes. The agency should be created in an open process, always consulting with the UN. Although to speed up the process a combined effort by some nations willing to take the lead and the UN – the UNESCO might be the most appropriate UN organisation –

should be made. They should found something like a network of universities, a network of research centres, or an internet university, or something comparable. This process will instigate a process with the UN-system. So the process will neither include nor exclude the UN but the UN will be part of the process. That is what counts.

Financing for Research and Development

Lux-Steiner:

Ok, let us move to the next topic: money, or the financial resources. The trend in research and development expenditure is going down. Industrialised and developing countries are mainly differing in their financial capacities. My question is based on the statement Sigurd Wagner made today, that by the year 2013 we do not need any subsidies anymore, for instance in photovoltaics. What would you suggest to do? Wait and see how the learning curve is going down, maybe not so fast if we do not have research and development? Should we wait or can we find private investors? Or should we push the market launch of renewable energies, following the German model of feed in tariffs, which is a very costly alternative? How are we supposed to manage this?

Schunck:

It is very easy to say we need more research. Of course we do. But we do not decide ourselves how much money we get. I am a bureaucrat – Hans-Josef Fell is the member of parliament – we are organising processes to get money, but budgets are scarce today.

Some speakers have made a very important remark today. The steady support is important, the continuity of funding instead of something going up and down. Sigurd Wagner did not say that in ten years from now all by itself there will be no more subsidies necessary. There is a shortage of money that has to be paid in between. We have to organise a stable support system, we have to organise markets, perhaps in the way of the much debated renewable energy law in Germany. It creates a market, which would not have been developed by itself, and we know we need to introduce that technology. The much we have to develop new

technologies or try to be careful that our scope of technologies that we pursue is broad enough, we might miss something that – only in years from now we will understand – is interesting and important.

Creating markets, in the end, is most important. There are some examples how that can be done in this country with – and I pass that to Hans-Josef Fell if he wants to explain it – the renewables energy law.

Fell:

To explore the question how to promote the introduction of a sustainable energy system based mainly on renewable energies, we have to look at the whole chain from mostly public funded basic research to private industrial application-oriented research to market launch. And the whole chain has to be supported. For to set incentives for private investments in research there has to be a market. If, however, more actors enter the competition for the best technology in the market the overall effects of the research process will improve.

Apart from that we have to explore the market as well. Photovoltaics are already today competitive without subsidies, not only in 2013. On a global scale the half of the regional markets for photovoltaics work without subsidies. Photovoltaics generate the cheapest electricity in African regions where no grid is accessible.

In fact, the research process and the incentives in markets to invest in research and renewable energies are interlinked in feed back loops. If we achieve to speed up the cost cutting process, renewable energies will be more competitive in markets without subsidies and attract more investments, which will speed up the whole process of research and market launch of new technologies and hence the switch to renewable energies.

Benchikh:

I want to add to what Mr. Fell has said, that taking the point of view of developing countries I would not even call it a subsidy. I will call it social solidarity, equality among the population in the same country. The example of Spain and the Spanish islands may illustrate that.

It is well known that to get the electricity on an island it costs more than in the mainland. Nevertheless the price on the islands is the same as in the continent. The price of electricity on Teneriffa is the same as in Madrid. For a single reason: it is social equity and equality. This shall be done and applied for renewable energies, too. Why do we have to call it a subsidy when it comes to renewable energies? No one calls it a subsidy if the costs for production in other energy areas like nuclear energy are compared, though full-cost accounting of all external effects shows something else.

Mayer:

In order to link the research and education process to the private sector and the needs of the market EUREC Agency is in connection to all European industrial associations. We are starting a discussion and preparing a position paper on the short, medium, and long term needs, looking at the demands of end users as well as market opportunities. This coordination of research and industry is necessary, for the private sector is much more focussed on the short and medium term while basic research has a long term perspective. It is particularly the task of research centres to make out opportunities for renewable energies today and to analyse long term perspectives. So the research has to bring in what is not yet in the market, but only the consultation between research and industry can produce strong positions, that can be communicated and introduced to policy makers.

Actions and Commitments

Lux-Steiner:

Unfortunately, we are running out of time now. So, before we finish the discussion I would like to have a short statement of each panelists: What will be their own contribution in the next few years?

Schunck:

I gave my answer already. Thank you.

Christensen:

Maybe I did so, too. But since I have my thing up I will just point out one thing, I hope to do. Regarding the statements on photovoltaics in

Africa, I hope that I can help get rid of some of these myths, because it is basically not what is happening. There are very isolated projects where you can do this, where photovoltaics are the cheapest and most competitive technology for energy access. But as a general statement: It is one of the things that create misconceptions about what the renewables can do. If you look at South Africa, ESKOM has to pay the whole investment just to make it run as a programme. Photovoltaics have high upfront investment costs, hardly affordable for the poor. For the time being the use of renewable energies must increase in industrialised countries, thus bringing down the costs and making them more affordable for developing countries.

I hope really that we can get rid of some of these myths and overrated expectations because it has got to be the way forward for renewables in order to provide energy for sustainable development and to provide the poor in developing countries with access to modern energy in the long run.

Fell:

Instead of announcing what I will do to promote renewable energies, I would like to raise what I need to be proactive. I need the scientific support of the research community. You do not imagine how much weight your word has in the political arena. Policy makers perceive scientists as most highly qualified. The research community has to demand the funds for research in renewable energies. For there has been research in fusion technology for fifty years now, and they continue to receive their public funding, however, there are nearly no programmes worldwide for renewables research. And there will not be any if the research community do not demand public funds for renewables research. Furthermore, the scientific community has to demand from policy makers to change. It is not sufficient to spend money for research without putting in place the research results. To generate new knowledge does not change the world, we have to act on what we know. To phrase it with Erich Kästner: 'There is nothing Good except You do it'. Only then we might succeed one day and create a sustainable energy system.

Mayer:

As I already mentioned earlier the work plan of EUREC Agency includes a discussion between research and industry leading to a position paper that shall help to increase budgets for renewable energies. On the other hand my particular responsibility is in the field of education. We will continue on our path and will extend our activities, for instance by contributing as much as possible to the internet academy proposed by Prof. Schmid. The internet is one way to reach out to a greater number of people, however, this action has to be paralleled by existing initiatives. For the physical meetings and the availability of test facilities are still important. Either those facilities will be used in Europe or, as already pointed out before, those facilities have to be built up elsewhere. This brings me to the question of financial resources for funding. Just very briefly: Since financial resources are very scarce nowadays, actions have to be as efficient as possible, so we have to design the education capacities to be built up very carefully before.

Benchikh:

First of all I would like to thank the organisers of this excellent meeting which gave opportunity for an exchange of ideas and concepts that were missing in the field so far.

UNESCO welcomes the different ideas that have been brought forward in the discussion and will consider cooperation with the proposed agency or network that will deal with science, technology, and education.

To conclude, I would like to express my hopes that we will see within this decade more knowledge sharing and thus more solidarity in the field of renewable energy.

Lux-Steiner:

I would like to thank all the panelists and give the floor to Prof Jürgen Schmid, who held the scientific responsibility for the organisation of the Science Forum.