

Roundtable 2:

Connections between research and innovation policies, corporate strategies and industrial policies

- ▶ Laurent Michel, Director General for Energy and Climate Change, French Ministry of the Environment, Energy and the Sea, France
- ▶ Olivier Appert, Chair, Conseil Français de l'Énergie, France
- ▶ Louis Schweitzer, General Commissioner for Investment, France

Moderator: Jean-Marie Dauger, Chair of the Communications and Strategy Committee, World Energy Council



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We have three topics for discussion:

- ▶ What are your views on the research or the disruptive technologies in the energy sector?
- ▶ What is most promising or concerning and what is to be tackled with the most focus?
- ▶ What can be most disruptive for our industry?



Laurent Michel, Director General for Energy and Climate Change, French Ministry of the Environment, Energy and the Sea

From the point of view of reducing emissions of greenhouse gases, the situations are different in different countries. In order to have a systemic view, it is necessary to act on many levels and many sectors. It is not only a matter of producing renewables at the lowest price. There are also questions related to the storage and the integration of renewables and the organisation of production. In France, when we look at reaching our targets for greenhouse gas emissions in 2025, we see that 15-25% will come from the circular economy. There are also technologies related to cheaper solutions for the renovation of homes and to recycling as well as financing by means of grants or subsidies. Another issue is transport and the organisation of low carbon, intelligent, autonomous vehicles. We have to look into all the technologies related to global efficiency in the use of resources.



Olivier Appert, Chair, Conseil Français de l'Énergie

As a member of the Academy of Engineering in France, I am struck by two key game changers: the digital transition and the biotechnologies.

With respect to the digital transition, we are at the end of the beginning, not at the beginning of the end. The business model of the energy sector will change dramatically, and digital transition will impact every sector in the energy system. We are not yet able to clearly anticipate what will happen. The digitalisation of the energy sector is already impacting everything related to the

end user of electricity, and new services are already being offered to the final consumer. This is a real game changer.

Biotech is also a key game changer in many different sectors. I believe that the energy companies should think seriously about the possible impacts of biotechnologies both at supply and demand levels.

I also believe that CCS is crucial. In that context, the European situation over the past 10 years has been a disaster. In 2005, we were leaders in CCS technologies, and it was clear that with further research we would be able to reduce costs. At the same time the price of CO₂ was assumed to increase, making for an ideal business model. After that, unfortunately, CO₂ prices dropped and public findings for RDD were not available: so investment stopped in Europe.



Louis Schweitzer, General Commissioner for Investment

I agree with the 2 experts who have just spoken, with only a few slight differences. I believe that the digital transition will have a major impact. However, I am slightly wary of biotechnologies. Biofuels were presented as a significant development but have proved to be totally ineffective to date from a climate change point of view.

I put emphasis on energy storage and batteries. After a long period of no real development, batteries have recently undergone enormous change. That is possibly a game changer or at least a necessary brick in the whole system.

There is no clear signal on the market that would allow us to obtain the funds necessary to develop disruptive technologies. Public investment can only do so much. If large companies do not consider investments in new disruptive technologies as of value, such technologies will simply not emerge.

Jean-Marie Dauger

The second topic is concerned with R&D efforts. We have been complaining for years that the R&D effort in Europe is lagging behind the rest of the world. What are your views on the efficiency of our R&D efforts? How should public spending toward R&D be directed? Should it be centralised or decentralised? How should we select effective projects? How can we avoid the dispersion of means? What is the most efficient way to monitor and to evaluate the use of public funds?

Louis Schweitzer

First, let us recognise that Europe as an energy field does not exist as such and that the European Commission has very little power. When Germany decided to abandon nuclear power, it turned to coal, which was clearly not in line with the European goal of energy efficiency and the reduction of emissions. In contrast, the Danes have been very efficient in renewables on their own. Second, I hope that advanced research is being carried out in universities and research centres in the field of energy that will lead to disruptive technologies. However, those involved in this research do not know if it will lead to development by companies. In industry, demand leads to the production of new technology, but we have too little demand today.

Laurent Michel

It is not possible to always rely on the cheapest solutions, such as petroleum or gas, and they are also the most polluting ones. In order to solve the question of demand for new technologies, we need policy signals and regulations. To be more efficient, we have to streamline and simplify our procedures so that they are more attractive for industry. We also have to be as consistent as possible in choosing a technology or a range of technologies so that R&D efforts can move toward pre-commercial deployment.

Louis Schweitzer

To answer your question about avoiding dispersion, I would reply that dispersion is not to be avoided. Instead, we should try all avenues and stop those that do not work. Failure in itself is not an issue. The issue is not trying or not following up on interesting leads.

Olivier Appert

However, it is important to remember that it can be difficult to stop projects once they are underway.

Regarding the claim that Europe's R&D efforts are less important than elsewhere, we first need to consider that R&D statistics may not present the full picture. Moreover, we need to consider the quality of the research rather than the quantity.

Regarding the so-called mismatch between R&D funding and the huge subsidies to large companies for mature technologies, I would be interested to know the efficiency of the huge subsidies paid to wind and solar in Germany in terms of job creation and the reduction of CO₂ emissions.

The criteria used for project selection appear to play a very important role. One important criteria is the maturity of the project. Another element is its economic impact. We need to bear in mind that job creation is an important element of the Energy Trilemma.

Finally, to ensure that public R&D funding is used efficiently, it is necessary to mobilize private R&D. However it is very difficult to invite private industry to respond to calls for tenders because the costs of the transactions are higher than the amounts received as subsidies for the project.

Jean-Marie Dauger

Are there any questions or comments from the floor?

Philippe Baptiste, TOTAL

One of the objectives of the French *Programme de l'Investissement de l'Avenir* was to improve cooperation in R&D between the public and private sectors. Several institutions were created to that end. At the same time, the existing institutions have maintained their objectives. All of this creates a very complex landscape in France and makes cooperation quite a challenge.

Louis Schweitzer

It is an established fact that there is some complexity in the French institutional landscape! That is why we decided not to create any new institutions in the third Programme except in the medical field. It is also why we evaluate new institutions after 4 years: if their complexity is greater than their productivity, we may decide to stop them. If we had a tradition of cooperation in France between universities, public research organisations, and industry, the specialised institutions we have created would naturally disappear. They were after all created to bring people together.

Jean-Marie Dauger

How can you evaluate an R&D project 4 years after its launch? What are the measures you intend to use to evaluate the financing of R&D projects? Would the proper evaluation of public profitability on R&D programmes include externalities and the value created in sectors other than the one for which financing was awarded?

Louis Schweitzer

One can clearly measure the level of commitment. When it comes to evaluation, we need to rely on independent experts.

Olivier Appert

It is important for evaluation to have external views. In France, the president of an evaluation committee is always non-French, and 50% of the committee members are non-French. A key success factor is to ensure that we will not continue to work only among ourselves.

Laurent Michel

An evaluation committee needs to be flexible and adapted to each project.

Olivier Appert

In my experience, problems arise when a research programme is not well-structured due to the fact that the interests of the stakeholders are not aligned. In that case, it is difficult to evaluate the quality of the work that has been carried out.

Jean-Marie Dauger

Our third topic for discussion is the fact that the energy sector has big actors, and they can have a huge impact on market design, on the political environment, and on technology. Those companies are being forced to innovate very rapidly. What are your views on how organisations should be structured in order to bring about innovation in sectors that were not formerly innovative?

Laurent Michel

On the one hand we are speaking about a huge need for innovation. On the other, we are speaking about fewer funds available in the traditional energy sector and in the major utilities. These companies need an openness of view and a willingness to select projects and to work with other companies including digital specialists and start-ups. They need a commitment to start new projects.

Olivier Appert

First, I believe that there is significant difference from one sector to another within the energy scene. Second, I think that disruptive technologies will not emerge from the inside of these big organisations but can only emerge outside of their structures. The big actors have a complex called NIH: “not invented here”. It is also important for big companies to liaise with start-ups and other external entities: the concept of “open innovation” may be very efficient

Louis Schweitzer

I am not sure that one can force anybody to innovate. In times of difficulty, large companies tend to focus on their essentials. They can sometimes change their minds if they see a strong trend emerging: that they believe will last over time. We have to convince companies that something will consistently be important for a long period of time. When it comes to world health, everyone realises that climate change is a major issue. However, that is not yet the case in energy today from an economic point of view.

