

Chancellor Merkel,
Minister Baranov,
Senator Zöllner,
Minister Kunst,
State Minister von Schorlemer,
State Minister Heubisch,
Mr Wolf,
Ladies and Gentlemen,

We are witness to exciting times here in the Federal capital - times of forward-looking decisions. A principle expressed so simply and succinctly by the former Federal President Walter Scheel once again rings true:

"Nothing happens without risk, but without risk nothing happens".

We Germans, though, make a great issue of this. This can be seen particularly after the reactor catastrophe at Fukushima. As in other countries, we empathise with the victims in Japan. We have used the accident as an opportunity to review our safety standards for nuclear power stations, but at the same time – and this is what sets us apart from the rest of the world – according to media reports, Germans have stockpiled iodine tablets and bought Geiger counters. Foreign countries diagnose a well-known complaint in the face of such reactions: "German angst".

We apparently react particularly sensitively to potential threats, such as bird flu or EHEC, terrorist attacks or even a tragic reactor accident – even if it happens on the other side of the world. And what elsewhere is thought of as chance is viewed by German citizens with great scepticism - new types of petrol or modern railway stations - and unfortunately this also applies to whole sectors of technology and areas of research. What are the causes of "German angst"? Why do we quickly fall into doom and gloom? Is it mistrust of anything new? Do we lack the self-confidence that we can solve problems?

Actually, there is plenty of evidence of Germany's efficiency – a country that is well known for its writers and thinkers. A country where pioneering inventions - from printing to the automobile through to the computer - have been made. A country where brilliant minds, such as Max Planck, Werner Heisenberg and Lise Meitner, carried out their research. A country where even today a large number of internationally-renowned scientists work at universities and research facilities. Seventeen Nobel Prize winners have worked and are working at the Max Planck Society alone.

Products made by German companies are in demand on the world market. The German economy has recovered very quickly from the financial crisis, and at present we are even talking about an economic boom. But it is not just economic strength and scientific expertise that make our country stand out; there are also political success stories.

The German reunification was regarded by many as impossible; but here in Berlin, two decades on, the cohesion has been successful. An achievement of which we can be proud!

On the basis of this success, we could therefore gain the self-confidence that we will also overcome future challenges. Why isn't this the case? Helmut Schmidt explained it as follows: "The Germans have a tendency to worry. This has become lodged in their consciousness since the end of the Nazi era and the War. They worried about mad cow disease and deforestation; now they are worrying about a conceivable nuclear accident", explained the former German Chancellor in the magazine Focus. Does the reason therefore lie in the traumas that our parents and grandparents suffered over 60 years ago and have not been able to work through? Traumas caused by the misfortune they experienced, but also by the collective blame for Nazi Germany? The latest scientific research shows that not only does the behaviour of those traumatised change, so does their genetic information.

The new research field of epigenetics looks at environmental influences on the function of the genome. In fact, factors such as stress, nutrition or even trauma can affect the properties of a cell, and thus the organism, by chemical modification of the genetic material. The changes can also affect descendants. Florian Holsboer from the Max Planck Institute of Psychiatry has evidence that our grandparents and parents have actually passed on to us their trauma-induced character alterations. Scientists at this Institute were recently able to prove in animal experiments that post-birth stress leads to the false regulation of some genes, and this can trigger pathological anxiety.

But there are also positive epigenetic effects. For example, a study in northern Sweden demonstrates that hunger phases during puberty in boys significantly prolongs the age of their children. The effect of nutrition was also evident in animal experiments. If pregnant obese mice with yellow fur are fed a special dietary mix, they give birth to predominantly brown, slim and long-lived young. Without this mix, the progeny are yellow-coloured, fat and short-lived. Scientists are therefore conducting research on substances that can reverse the negative epigenetic changes – possibly a new opportunity for combating cancer.

Which mechanisms form the basis of epigenetic regulation are being investigated by Thomas Jenuwein and Asifa Akhtar at the Max Planck Institute of Immunobiology and Epigenetics in Freiburg. They are seeking to explain whether, like the genetic code, there is also an epigenetic code. This research will perhaps one day reveal to us the molecular biology principles for the phenomenon of "German angst".

In the meantime, it seems that self-knowledge is the first route to improvement. And we should cure this disease because "anxiety affects thinking". We live in a fundamentally uncertain world in which, as Benjamin Franklin said 200 years ago, "Nothing is certain but death and taxes". It is therefore important to assess and weigh up risks rationally. A gut feeling can be very deceptive. Which risk would you spontaneously consider higher - flying non-stop from Frankfurt to Los Angeles or travelling 20 km on the motorway? Unbelievable, but both carry the same risk! In our risk assessment, we should also consider that we run risks not only by doing certain things, but also by not doing certain things.

By adopting the attitude "innovations yes, but no risks, please!", we members of the affluent society are therefore risking quite a lot. Because with our present standard of living, no one wants to go backwards! Or would you want to get wash yourself at a washbasin with cold water in the morning? Brew malt coffee by hand after heating the stove with wood? Spread butter that is rancid because there is no refrigerator on your bread, and then go to the office after an hour's walk?

Of course, I am exaggerating. But there is this longing for a nature-loving rustic idyll that paradoxically goes hand-in-hand with the self-evident enjoyment of comfort and high-tech living. The Porsche Cayenne parked in front of the organic market satirises this view brilliantly. It is really alarming that this attitude persists even with research. This is the result of an Allensbach study that recently appeared in the Frankfurter Allgemeine newspaper. Two thirds of those interviewed would like to ban research that could produce dangerous results. This finding is most alarming!

Because it shows that a large part of society prefers not knowing to knowing. This is a little like the behaviour of small children who think that if they close their eyes, people cannot see them. However, knowledge cannot simply remain hidden. If Otto Hahn and his colleagues had not discovered nuclear fission, other scientists would. After all, science is a continuous process; the greatest risk is closing your eyes to it!

Interestingly, horror scenarios are in fact also quickly forgotten if a technology proves to be harmless. When the Large Hadron Collider went into operation in Geneva, I received letters from concerned people who thought that it could draw us all into a black hole. The accelerator is in operation, and I personally at least do not feel particularly drawn towards Geneva – except, perhaps, for a holiday...

The paradoxical contact with risk is evident in the current energy debate. After Fukushima, in some debates the proportions also went into meltdown. So for many it is not enough to check and if necessary adapt the safety standards in atomic power stations. To them, it is enough simply for there to be the possibility of an accident to shut down all nuclear power stations immediately. The Ethics Committee appointed by you, Madam Chancellor, has fortunately been instrumental in objectifying the debate. Thanks to the transmission on television, everyone was able to take part in the opinion-forming process. The recommendation by the Committee to shut down all nuclear reactors in Germany in the next 10 years meets broad agreement across the population.

Other institutions, too, have played a part in an objective assessment of the situation, for example the energy experts at the National Academy, among them Ferdi Schüth and Robert Schlögl from the Max Planck Society. They are also working on the basis that we can shut down in ten years. However, they ask us to consider that we then accept a short-term increase in CO₂. Yet that is precisely the thing we wanted to prevent!

Here again, Germany should be an example to other nations – particularly in view of the record levels in global carbon dioxide emissions. In order to limit heating of the earth by the end of the century to a maximum of two degrees, the CO₂ output worldwide in the next 40 years must be cut by half and fall to zero by 2100. These are the most recent calculations by the Max Planck Institute for Meteorology. In the closely interwoven problems of energy and climate, therefore, we are giving the short-term risk of an atomic accident greater priority than the long-term risk of global warming.

For risk researcher Gerd Gigerenzer at the Max Planck Institute for Human Development, this is not unusual, because: "We quickly become fearful if many people could die suddenly. If, however, many more people are in mortal danger over a longer period, that seems less threatening to us".

In our global village, we need other thought patterns. This includes not just planning for the next few years, but also considering the needs of our children and grandchildren. And we must – particularly in the energy question – look at the global picture. People in the emerging and developing countries are entitled to an acceptable standard of living. However, to achieve this, energy production in the coming decades must increase considerably. The demand for electricity is in fact growing out of all proportion. According to calculations by the international Energy Modeling Forum, demand for power will increase six-fold by the end of this century. If we wanted to meet this increase with sun or wind energy, in the next 90 years we would have to build 25 large solar power stations every day, or a wind engine every 10 minutes. Our previous possibilities therefore fall too short.

In order to, in any way, create the conditions for a sustainable energy supply by the year 2100, we need a research offensive. Above all in basic research, as it paves the way for completely new technologies. If nuclear power stations are no longer accepted, we must do everything we can to produce energy from the sun on earth, thus harnessing fusion energy. In this way, large amounts of power can be produced in a climate-neutral, resource-efficient and safe way. At the Max Planck Institute for Plasma Physics, researchers are working on overcoming the scientific and technical hurdles for fusion power stations. This is basic research par excellence combined with the most demanding engineering work. This goal could be achieved by 2050 - but only if Germany and the world community invest intensively in fusion research. Many thanks to you, Madam Chancellor, and to Minister Schavan for supporting this branch of research!

Key factors for the energy supply of the future include new energy reservoirs and the binding of carbon dioxide. The underlying chemical reactions have up to now been difficult to control on an industrial scale. The Max Planck Society is therefore expanding its work in this area at a Max Planck Institute for Chemical Energy Conversion. The researchers there will investigate primarily how electrical power or sunlight can be converted into storable energy carriers such as methane and methanol. If this is

successful, we would need far fewer new pipeline networks and could utilise logistics already in place, such as gas pipelines and filling stations. Economically a major benefit! And furthermore, food does not belong in the petrol tank!

A resource that so far has not been used, however, is lignocellulose, the basic building block from straw, wood and many types of plant waste, and thus the most common biopolymer on earth. With new knowledge in biotechnology, we could generate microorganisms to convert the sugar stored in the lignocellulose into ethanol. That would really be sustainable green fuel!

For all that, basic research is to a vast extent and at the highest level what is required! The Max Planck Society is prepared to play a key role in this. Using the new Institute for Chemical Energy Conversion, which is being planned, we will establish a research network focussing on this subject. This will also include other scientific facilities and universities, as well as industry. We also have our sights on the new generation of scientists for this vital area of research. It is important that the basics for a real energy turnaround do not fail because of financing!

Ladies and Gentlemen,

Since 2002, expenditure on research and development worldwide has risen by 45 percent, according to a recent report by the Royal Society. As a nation that leads the field in many areas of technology, we should not only follow this trend, we should be heading it. Because a highly-industrialised country such as ours will live tomorrow on the knowledge and the innovations that we generate today. It is therefore an important switch that, for several years, the federal government and the Länder have increasingly turned their attention to development and research.

Madam Chancellor, you had the courage, even in the year of the financial crisis, to secure additional investment in German research for the coming years. In good times, it is easy to make such a decision. At a difficult time when no one knew how quickly the crisis could be resolved, it was a remarkable decision. Thank you!

The planned Freedom of Science Act can also reinforce Germany's position in global competition with the best researchers. **Research, research, research** is therefore our task for the future.

Because the problem of a sustainable energy supply is certainly just one of several mega-issues. Just as pressing are the questions of feeding the world, combating epidemics and disease, and demographic change, to name but a few.

New knowledge is our only chance of finding answers to these questions. Together with our partners worldwide, we at the Max Planck Society can meet these challenges

- because what is at stake is nothing less than the future of the human race in a world worth living in.