

**Statement of the
Prime Minister of Lower Saxony Christian Wulff
on the subject “Technology to Help Meet Germany’s Cleaner Energy
Future”
at the Energy Forum of the James A. Baker Institute
for Public Policy, Rice University**

Houston, October 1st, 2009

Address,

I would like to thank you very much for the invitation to participate in this energy forum. Right at the beginning, I would like to remind you of the namesake of the institute, Mr. James A. Baker. He was not just one of the most active and reliable Foreign Secretaries in the recent past of the United States, he has also done a lot, in particular for my fatherland by being instrumental for German reunification. Today I am in his place of birth and in the institute that carries his name. I am full of gratitude for Mr. Baker!

We are in a global city of the energy business and at a University that was given the honor of visits from well-known personalities from the countries all over the world that are big in energy, such as Saudi Arabia, the United Arab Emirates, Qatar, Algeria and Russia. The Heads of State of these countries and the heads of the globally active energy companies have been aware of the significance of energy raw material for the existence of humankind for a long time. Large parts of the population have only in the last 20 years started to find out about the finite nature of resources and the potential consequences of the use of energy for the world climate, thus realizing their own involvement.

The OECD “World Energy Outlook 2008” states the following: “Preventing catastrophic and irreversible damage to the global climate ultimately requires a major decarbonisation of the world energy sources. On current trends, energy-related emissions of carbon dioxide CO₂ and other greenhouse gases will rise inexorably, pushing up average global temperature by as much as 6 degree C in the long term.”

The dramatic effect of the current development is described here in a rather matter-of-factly way. To translate this in images would mean: In the month of July of this year alone, 106,000 square kilometers melted from the Arctic ice cap day after day after day. In July, every third day an ice cover the size of Germany had disappeared in the Arctic. Four weeks ago, the “World Wide Fund For Nature” (WWF) stated in a report that the changes in the Arctic increase the climate change in a much more dramatic manner than previously assumed in existing forecasts, including the results of the Intergovernmental Panel on Climate Change IPCC as of 2007. For the people living near a coast and for Niedersachsen which has a

coastline of 1,143 kilometres protected by dams, this means: When the Arctic gets warmer, a quarter of the world's population might be threatened by flooding.

Therefore, the question arises as to how we have to set up our energy generation in general in order to take precautions as best as we can for this kind of a situation. At the World Economic Forum in Davos in February this year, Al Gore presented the model of "green capitalism" calling saving our planet a "planetary task". The Copenhagen Conference in December 2009 offers the unique opportunity to negotiate a new global political framework for climate protection for the time beyond 2012. Here, it will be decided how and at which level the world wants to achieve long term reductions of emissions. The energy industry will be instrumental in this endeavour.

The Federal Republic of Germany and the European Union have set themselves very ambitious targets for climate protection. By the year 2020, energy consumption is to be reduced by 20%, the share of renewable energies in total consumption is to rise to 20%, and an EU average of 20% savings in CO₂ emissions is to be achieved. In case of an internationally binding climate protection agreement, the EU wants to do even more and come up with savings of 30% CO₂ emissions. These are exemplary and ambitious benchmarks if compared to some other countries with similarly high CO₂ emissions.

Climate-protection policy of Niedersachsen's Government

My Government has also stated its position in this field. From our point of view, energy and climate-protection policies always have to be considered together. The main targets of a responsible and sustainable energy policy are still security of supply, reasonable pricing and environmental compatibility of energy supply. From our point of view, these targets can best be reached by an open technology mix of all available energy sources, such as renewable energies and fossil energy carriers like coal and gas as well as nuclear power. For climate protection, Niedersachsen came up with some especially ambitious targets. By the year 2020 we want to cover 25 % of the total energy consumption through renewable energies.

Wind power

Due to its geographic location the use of wind energy is particularly important for energy and regional policy reasons. It can increase security of supply, is a plus in environmental and climate protection and in the wind-intensive coastal regions it contributes towards strengthening the economic structures. Even today, Niedersachsen has a share of 25% of installed wind power in Germany and thus is the leading wind energy state in our country.

Further growth in onshore wind energy is limited due to the utilization degree achieved already. All the more important is the development and utilization of wind energy in the German Bight. With the establishment of the first wind turbines in the German North Sea the chapter of offshore wind energy utilization has recently been opened. We are about to see the start of construction of the first completely commercial offshore wind farm which in 2010 is to be finished with a planned output of 400 MW.

By the year 2030, it is planned to install 40 wind farms with up to 25,000 megawatt of installed wind power near the German coastline. With this, 25 m homes could be supplied with electricity. Without the use of offshore wind energy, the Federal Republic of Germany will not be able to fulfil its targets of climate protection and the extended use of renewable energies.

Biomass

The use of biomass is turning into a further significant source of renewable energy. In Niedersachsen, about 70% of renewable energy use is made up of biomass. It is not just used for conversion into electricity, more and more processed biogas is supplied to the natural gas networks.

Within Germany, Niedersachsen as an important agricultural land has a lot of potential in the area of energetic biomass use that is already used to a considerable extent. The share of energy crops in arable land use in Niedersachsen was a good 10% in 2008 and for the whole of Germany ca. 15. %.

Niedersachsen is leading in the use of biomass, and with a share of 25% of the total installed electrical power of biogas plants in Germany we are at the top when it comes to electricity production from biogas. Between 2001 and 2008, energy generation was increased almost by the factor of 40. I suppose biogas plants could be an attractive investment for farmers in the Midwest here in the United States.

Conventional Energies and Nuclear Power

Coal power plants

Despite all the efforts to extend the use of renewable energies, a reliable energy supply in the foreseeable future will not be able to do without fossil fuels, and in electricity generation this means coal in particular. Global coal consumption will increase, mainly because of the industrialisation processes in Asia.

The technology of a major share of the global coal power plants is outdated. Worldwide, hard-coal power plants have an average coefficient of performance of about 30 %. The highly efficient coal power plants of the latest generation, however, achieve an electricity COP of 46 %. Just to give you an example, in Germany RWE is on its way to set up low CO₂ electricity generation from coal including CO₂ separation and storage. These projects open up a CO₂ reduction potential of about 30 %. Highly efficient coal power plants could be a field of technical cooperation between Germany and the United States.

Nuclear Power

From the point of view of Niedersachsen's State Government, a sustainable energy supply with a well-balanced mix of goals like security of supply, economic feasibility and environmental compatibility is best achieved through a mixture of all available energy sources, leaving aside all ideologies. This includes the use of fossil and renewable energies but also nuclear power.

Germany as a location for industry has to be able to rely on a trusted and affordable energy supply. The nuclear power phase-out deliberately abandons a technology that provides affordable, reliable and almost CO₂-free electricity. With a view to the high safety standards of German nuclear power plants, Niedersachsen's State Government is in favor of longer lifetimes. The Federal German Government should follow the example of the United States and that of other European countries. Thought control in this context is inappropriate. What would be the counter-argument against a new political consensus to replace the 22 running nuclear power plants by 6 innovative modern and even safer ones? Thus, we could claim to have

phased-out almost 75% without interrupting scientific and technological development which many quite rightly complain about otherwise.

One of the key questions is the disposal of radioactive waste. In Niedersachsen, we are faced with a similar multi-faceted situation as you have it in the United States with Yucca Mountain. Almost four out of 10 adversaries to nuclear energy would change their opinion provided there would be permanent and safe solution for the disposal of radioactive waste. Although a new debate about the future of nuclear energy and the question of terminal storage has been opened, I am in favor of concluding the research into Niedersachsen's site called Gorleben. Should there be negative findings as regards safety we will have to start looking for a new site. We should all know: Everyone needs a terminal storage facility. Those who want to use nuclear power and those who want to phase out nuclear power. The question of finding a terminal storage facility is no question for ideological answers.

Geothermics

Opening up geothermal energy carries a major potential. As an energy source, geothermal energy protects the climate, can be used for base load, is available decentrally and in everyone's own country and has almost no limits. The installed plant base of about 70,000 kilowatt accounts for ca. 150 m kilowatt hours per year, thus covering ca. 0.1 % of Niedersachsen's heating requirements.

In 2005 already, Niedersachsen's State Government initiated the establishment of a "Geothermics" agency in order to live up to the positive trend in the use of geothermal energy. Since the potential energy gain through deep-reaching geothermal probes with a lot of installation requirements is rather low at the moment, a meaningful utilization is only possible in very selected cases nowadays. There is a pilot project in Niedersachsen called GeneSys of the Federal Institute for Geosciences and Natural Resources in Hanover, investigating the potential of geothermal use of deep sedimentary rocks with low permeability. Should the procedure be successful that is used here for the first time in this form, theoretically the construction of various hundreds of such plants would be feasible in Niedersachsen.

Niedersachsen has the headquarters of more companies with excellence in geothermal energy and drilling technology than any other federal states. Therefore, our state will also benefit from the extension of geothermal energy outside of our borders and it will gain through more jobs and more economic growth.

The research institutes located in Niedersachsen play a leading role and will be able to do so in the future as well. The relevant research institutes in Niedersachsen are led by the Clausthal University of Technology in a newly established research group "Geothermal and High-Performance Drilling Technology" and they cooperate with Baker Hughes. In the first period of funding from 2009 to 2011, the project was supported by Niedersachsen with a financial volume of about €6 m.

Energy Research in Niedersachsen

For each and every one of us and for decision-makers alike, climate change means new challenges. In order to develop regional concepts and strategies to adapt to climate change we need more basic know-how about future climate changes and the effects at a regional and local level.

The State Government funds the “Research Group Climate Impact Research” and with it, projects to give answers to these urgent questions for the future. The research group has an interdisciplinary approach and focuses on areas such as agriculture, forestry and water management including coastal protection. A further strategic field in Niedersachsen’s research policy is energy research with the focus on “renewable energies”. These we extended over the last few years in a targeted manner. There are new research projects on energy sources (sun, wind, biomass as well as geothermal energy) and on questions of network integration and the future network structure.

Niedersachsen has covered the future-oriented subject of “deep geothermal” for a potential use of our Lower Saxony geothermal potential as well as in view of an export of know how and technology. The State Government is about to create the parameters for moving forward in this area:

- Through linking up research activities, research and economic competences in deep geothermal are to be brought together in Niedersachsen,
- Networking with the industry should be improved,
- Innovative technologies are to be developed with a focus on practical implementation and
- Engineers and geoscientists are to receive training and further training.

All of it is supposed to happen in national and international cooperation.

I am very pleased that there will be a signal of cooperation in the area of energy research and an exchange of scientists and students after the discussion forum today. Clausthal Technical University and Rice University will sign an agreement about it.

We want to have as many institutions in society as possible contributing in the search for answers on the general questions of future energy and climate-protection policies.

The tasks in the areas of energy supply that we are faced with cannot be answered by politics alone. In climate-protection policy, it is of particular importance to go for cooperation and dialogue. This is why we established a Government Commission on Climate Protection last year. In this Commission we want to talk to the important groups in society, such as the industry, unions, municipalities, the science community and environmental associations, and we want to develop strategies to act towards a more efficient energy use and to adapt our state to the consequences of climate change. We hope that the Government Commission will create innovative concepts for energy and climate protection which will then result in a comprehensive climate-protection programme for Niedersachsen.

As regards the energy industry, we are witnessing a turning point without the final structure of the future energy supply and energy consumption being clear today.

- 1) The end of fossil fuels was forecasted 20 years ago already, and neither has it happened nor is it happening in the near or midterm future.
- 2) A sustainable industrial policy, a modern climate and energy policy stimulates investment and modernises the economy. Innovations are the breeding ground on which a competitive edge is created in global competition. In particular, this is true for the area of energy

efficiency. Here, investment needs to be extended on a massive scale. This is not just true for facility upgrading but also for the market of small electrical appliances. The global market volume of €540 bn in this sector alone will almost double till 2020 to €1 trillion. Energy efficiency is the market with the highest market volume.

- 3) The potentials for wind and solar energy that were smile at 20 years ago have proven to be implementable and available for large-scale industrial use. Thus, they have become attractive for global energy companies and for internationally active banks. “Desertec” gives a concrete example for this. The target is to generate electricity from the blazing sun over the Sahara and to supply Europe with it. A consortium from the areas of technology, energy and financing uses €400 bn and wants to cater for 15% of Europe’s energy requirements. This is a challenge not just on a technological, logistic and financial scale, it would also be an answer to the problems of climate change, migration and in this specific case, to the economic development of Africa.
- 4) When cars are no longer propelled in an audible manner through internal combustion engines but use quietly purring electrical engines for movement it is not just the debates about noise emissions that will be different in towns and in the country. Here, major things have changed with far-reaching consequences for automotive production, the oil industry as well as all the supply and delivery structures relying on it. Unexpected opportunities are opening up for the Western world with its market-economy based approach
 - as regards an extension for processing and use of fossil fuels,
 - as regards the industrial use of renewable energies such as solar and wind and the substantial financial investment that goes with it, and
 - as regards the scientific and technical solution of the electricity storage issue, in particular in modern battery technology for the mobility sector.

I would like to state that the Western world has all the prerequisites in order to be the first to provide useful and gainful answers to the key questions about the future of energy policy.