

**Written Statement of Hugh B. Haskell, Ph.D.,
Regarding the approval of new nuclear and coal-fired power plants in NC
North Carolina Utilities Commission, June 30, 2008**

I currently reside at 244 Beachers Brook Lane in Cary. I am a Senior Science Fellow at the Institute for Energy and Environmental Research in Takoma Park, MD.

The findings of the latest studies on world climate, IPCC and GEO-4, among others, show conclusively that human actions, primarily the burning of fossil fuels leading to the release of massive amounts of carbon dioxide into the atmosphere, have contributed to the currently observed warming of the planet, the effects of which are being felt most critically in polar regions, with rapid melting of polar ice caps. Absorption of CO₂ from the atmosphere into the oceans is increasing the acidity of the oceans which is having observable ecological effects, notably, a significant degradation of the world's coral reefs, which provide food and spawning grounds for many of the world's food fish, and also by killing vast quantities of plankton which provides food for many species of fish. This, combined with population-driven overfishing, has led some marine scientists to predict that the world's fisheries will be effectively depleted by 2050 unless action is taken now to correct the situation. The ecological climate zones are migrating toward the poles at the rate of several kilometers per decade; plant and animal species that once were confined to the tropics are now appearing in sub-tropical regions, and the sea-level tree line is encroaching into the polar regions. It is becoming increasingly obvious that the climate models that are being used to forecast the rates and degree of change are too conservative, and observed changes are happening sooner and with more severity than recent forecasts have predicted. Clearly, the time to take effective action is now.

Dr. James Hansen, Director of the NASA Goddard Institute for Space Studies in New York City has been arguing forcefully for twenty years that the earth is in peril unless we take immediate action to stop the emissions of carbon dioxide into the atmosphere. We have now run out of time for delay in taking decisive action to stop the emissions. Unless we start dramatic programs to stop carbon dioxide emission within the next two to three years, there is a high risk of the atmosphere becoming unstable and entering into a "runaway" phase in which human action will be ineffective in preventing catastrophic climate change. He argues that the scientific data is very compelling, indicating the extreme danger we face, and he asserts that we must take the first step now by stopping all new coal-fired power plant construction.

We are already seeing the severe economic effects of the recent increase in oil prices. While this is not entirely due to a shortage of oil to be extracted, it is clear that we are nearing, if not at, the point of peak oil production, and it is, or soon will be, starting to trend downward, irrespective of what actions we take. We are not at that point yet with respect to coal, but its price is also increasing due to the increasing world-wide demand and its effect on our economy is already starting to be felt. It is therefore imperative that we take action immediately to reduce, and then eliminate our dependence on coal as a source of energy. Since the earth is finite, we will face the end of these fossil resources sometime. We face the end of oil now, and of coal in the foreseeable future. In the words of Dr. Hansen, "We will have to learn how to get along without fossil fuels eventually, so why not now?"

We must not make the problem so clearly delineated in Dr. Hansen's work worse by increasing carbon emissions to the atmosphere from adding more coal-fired power plants to our inventory, and we need to replace the existing ones with renewable sources of power as they reach the end of their useful lives.

Dr. Arjun Makhijani, the President of the Institute for Energy and Environmental Research, has published a book, *Carbon-Free and Nuclear-Free: A Roadmap for U. S. Energy Policy*, in which he shows that renewable energy technologies are being improved rapidly, in both effectiveness and cost, so that now wind generated power costs no more, and usually somewhat less, than nuclear power, and that

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the cost of various solar power techniques have been cut in half over the past three years, with further cuts in the offing. He has shown that it is quite possible for the United States to achieve a zero carbon emission status by the year 2050, which would allow us to avoid most of the possible damage we face from global warming if we do nothing. To aim for less than the will likely be little better than doing nothing. Stopping the increase in carbon dioxide emissions now and bringing the total emissions to zero by 2050 is crucial

Several economic studies, led by the Stern Report from the United Kingdom, show that the cost of a significant reduction in carbon dioxide emissions will be substantially less than the cost of not doing it. More recently, a widely acclaimed study commissioned by the Environmental Defense Fund, *What Will it Cost to Protect Ourselves from Global Warming? The Impacts on the U.S. Economy of a Cap-and-Trade Policy for Greenhouse Gas Emissions*, came to similar conclusions. Summarizing their conclusion, the authors of the study state

The United States can enjoy robust economic growth over the next several decades while making ambitious reductions in greenhouse gas emissions. If we put a cap-and-trade policy in place soon, we can achieve substantial cuts in greenhouse gas emissions without significant adverse consequences to the economy. And in the long run, the coming low-carbon economy can provide the foundation for sustained American economic growth and prosperity.

We cannot, in all conscience, fail to take action now, if we want to be able to leave a livable world to our children and grandchildren. Since it appears that some form of carbon emission control program is going to happen in the near future, it makes sense that North Carolina start now to reduce its dependence on coal for its electricity supply to minimize the economic impact of the upcoming mandated limits.

There are those who will argue that if we reduce our emissions without demanding that India and China and the other developing countries do the same, that we will merely be subsidizing their irresponsible behavior. While it is true that China has just this month passed the United States as the world's leading emitter of carbon dioxide, our *per capita* emissions are still more than four times those of China, and remain the highest in the world, save for a handful of small countries whose total emissions are a tiny fraction of ours. Furthermore, over the 250 years that coal has been a major source of industrial heat and power, the total *per capita* emissions of the United States is about twenty times that of China, and is exceeded on a *per capita* basis only by the United Kingdom. It is unreasonable to expect the developing countries to take significant action to bring their emissions under control if we do not do so as well. The developing nations are taking actions to the extent that they are able, but their internal rapid growth is, for the moment overpowering those efforts. It is important that the United States take the lead in reducing emissions, not only to provide an example so that the developing nations do not make the same mistakes we made, but also to make up for the carbon dioxide still in the atmosphere from an era when India and China and the other developing nations were using virtually no fossil fuel, and essentially all the carbon dioxide emissions were coming from the industrialized nations. Continuing on our present path puts us for all practical purposes in a mutual suicide pact with the rest of the world.

North Carolina's contribution to the problem comes primarily from two sources: the use of petroleum to fuel our transportation fleet, and the burning of coal to provide electricity for homes, businesses and industry in the state. But North Carolina produces no oil or coal, importing all of these products that we burn from elsewhere. This means that energy production in North Carolina involves a significant outflow of funds from North Carolina to the areas where our energy fuel is produced, both domestically and internationally. It is clear that in the not-too-distant future, some form of federally-mandated control on the emission of CO₂ is going to be implemented. It makes sense that we in North Carolina start now to reduce our dependence on coal for its electricity supply to minimize the economic impact of the impending limits.

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North Carolina has the wind and solar resources which, when combined with a vigorous program to improve the efficiency of energy production and use, can enable the state to become largely energy self-sufficient within a few decades, and thus end our contribution to the destruction of the planet through global warming. We must break out of the last-century mindset that wind and solar power are never going to be able to deliver the energy we need, and that excessive use of those resources will endanger the security of the electric power distribution grid. Dr. Daniel Kammen, the Director of the University of California at Berkeley's Renewal and Appropriate Energy Laboratory, has pointed out that the experience of those nations, notably Germany and Denmark, among others, who have substantially increased the fraction of their national electrical energy supply provided by wind or solar power have had no problems maintaining their distribution grid and furthermore, found that the change could be done rather quickly—over a space of five to ten years in Germany, for example. Due to our much larger energy needs, the transition will take longer in the United States, but we need expect no serious problems in doing it, although our distribution grid is largely obsolete and in need of modernization.

The potential economic benefit to North Carolina from energy independence should be obvious, not least because of the steadily increasing prices of all fossil fuels, a trend likely to continue for the foreseeable future. It won't be enough, of course, for only North Carolina to achieve this goal, but by working toward this end, we can become an example and a leader in the effort to achieve the goal worldwide, which is necessary if we want to leave that livable world to our children and grandchildren and their descendants.

It is true that the most important part of the effort that must be made to reverse global warming must be taken at the national and international level, but much can be done at the state and local level as well. The Utilities Commission is in a unique position to take a decisive step in the right direction by canceling all existing licenses to build new coal-fired electric power plants and issuing no more in the future. Dr. Hansen asserts—and I think that he is right, at least in principle—that continuing to build coal-fired electric power plants in the face of overwhelming evidence of the damage they will do, is little short of a criminal act, and CEOs who insist on doing so should face severe criminal sanctions. Studies, including some sponsored by the electric power utilities in North Carolina, have shown that the electric power requirements in the state, now and for the next few decades, can be achieved by an increase in the efficiency of our use of electricity, combined with a diversion of investment toward the development of electricity produced from solar and wind resources. This action would eliminate the need for both new coal and nuclear power plants. Furthermore, both coal and nuclear power plants use upwards of 20 million gallons of water per day for cooling purposes—water that is in increasingly short supply and which we can ill-afford to spend on a source of energy that we do not need.

In order to encourage the development of energy efficiency programs it is important for the Utilities Commission to take steps to enable the utilities to decouple their profit margins from the sale of electric power. Mandating such things as stepped and time-of-use rate structures and allowing the utilities to raise rates to partially offset the loss of profits—that is loss of profits, not loss of sales—due to reduced electricity sales. While it is necessary to maintain the health of the utilities by enabling them to maintain a reasonable profit margin, they must be directed to shift the emphasis of their production efforts away from the environmentally destructive and increasingly expensive fossil fuel sources they now use with all due speed. It is also necessary to reward the customers who make the effort to reduce their dependence on electricity by enabling them to enjoy a reduced electric bill each month, so any increase in rates needs to be held to a level such that rate-payers who reduce their electricity usage will see a net reduction in their monthly bills. It is actions like these, among a few others, that have enabled California to keep its per capita energy use nearly constant for the past 30 years without degradation of their citizens' life style, while that of the rest of the nation has risen by about 50%.

Some argue that only nuclear power can take the place of coal as a source of electrical energy in the near term. The rapid growth of wind and solar power in Europe, the dramatic increase in the cost estimates for new proposed nuclear plants, and the estimated 8-10 year time lapse between new proposals and completion of nuclear plants show clearly that this is not true. Nuclear power is one of the more expensive alternatives we have access to, certainly more expensive than wind, and although solar photo-voltaic power is still more expensive it is rapidly decreasing in price as its utilization increases, and wind power is already cheaper than nuclear power. New nuclear power plants are only being proposed by the utilities because of the prospect of large federal subsidies to encourage their construction. Without those subsidies, they would be unable to get the necessary financing to build them.

By the time any new nuclear plants can come on line the expected cost of solar power will be less than that of nuclear power. Both solar and wind power sources can be built incrementally and with a much lower ecological footprint than nuclear power. Wind power can be installed on farmland without significantly disturbing the land on which it is built; it is common for cattle to be grazed on the land below the wind towers or even for crops to be cultivated there. These other sources, when coupled with a vigorous efficiency program, are capable of meeting the state's electricity needs cheaper and sooner than any increase in nuclear power capability can be brought to bear. It is true that nuclear power has a low (but not zero) carbon footprint, but it generates a substantial amount of dangerous waste, and as yet, no government in the world has found a solution to the problem of permanent storage of this radioactive waste material. Some have urged that nuclear fuel be reprocessed and reused as a solution to the waste problem. But this is a very expensive alternative, does not really solve the waste disposal problem and greatly increases the risk of covert nuclear weapons proliferation. For the foreseeable future, it is clear that the owners of the nuclear reactors will be forced to store the waste material on the reactor sites, with all the attendant safety and security concerns that continue to bedevil this particular technology. In the *Bulletin of the Atomic Scientists* issue of May/June 2008 (p. 4) Dr. Makhijani notes:

We have a "peak CO₂" problem—that is, global carbon dioxide emissions must peak before 2015 or 2020 to avoid dangerous climate change. A nuclear path that has no prospect of contributing to a significant reduction in carbon dioxide emissions for 20 years or more *and* contributes to proliferation concerns is costly, risky, and unnecessary.

Given these problems, nuclear energy seems not worthy of serious consideration for a long-term solution to the problem of providing sufficient electric power to run North Carolina. Trading one problematic energy source for another one does not seem like a reasonable course of action to me. Converting our state's energy production to safe and plentiful renewable resources is a worthy and achievable goal.

Let me close by pointing out that the problem of global warming is not without a solution. If we don't find one, nature will find one for us. And I can safely say that we will not like the solution nature devises.

Thank you for your attention.