

A Nuclear Energy Tale

By Ferdinand E. Banks*

Every year, in conjunction with the awarding of the Nobel prizes, the new laureates participate in a TV program called *Snillen Specularar* (Genius Speculates), where they discuss various topics that are supposedly of interest to a broad audience.

The dominant voice this year was the physics winner, Robert Laughlin, who at one stage of the discussion expressed outrage that in Sweden scientists who receive their paychecks from the government are encouraged to avoid discussing nuclear matters in a serious (i.e., technical) fashion, just as they are prevented by law from participating in organized nuclear research. Of course, if they had conclusive proof in one form or another of the economic shortcomings of nuclear energy, then it is likely that they would be warmly welcomed to the corridors and restaurants of governmental power. However, as many of us know, such proof is difficult to come by; some would say impossible.

The Social Democratic governments in both Sweden and Germany have now announced that they intend to dismantle their nuclear sectors, although they are deliberately vague about the time frame. In both countries this departure is the work of the small but vocally active environmentalist parties; it is a part of the price that must be paid by the Social Democrats for the political cooperation of these parties. Personally, I consider arrangements of this nature a dangerous threat to rational governance, and eventually to democracy itself, but I see no reason to broach that topic at the present time. Instead, I would like to discuss several economic aspects of the nuclear retreat.

Sweden and Norway are generally credited with having the most inexpensive electricity in the world; but Norway's electricity is about 95 percent hydro based, while Sweden's is approximately 46 percent nuclear based. This give the thoughtful observer some idea of what *best practice* nuclear installations are capable of. The simple conclusion that needs to be drawn here is that there is no quantitatively comparable source of electricity in the world that can match—on a cost basis—the electricity that can be produced in the Swedish nuclear sector.

According to an article in *Le Point* (Pour ou contre le nucléaire: un match en huit rounds, 14 November, 1998), the average cost of nuclear power in France is 21 centimes/kWh, while the cost of gas is 19-28 centimes, and 22-26 centimes for coal. (In Sweden the cost of nuclear would be about 17-19 centimes/kWh, while the cost of gas and coal would be about the same as in France). As pointed out in the same article, the cost for nuclear applies to an installation with a power rating of 1400 MW, while gas and coal have the above listed costs for units rated as 650 MW. What this means is that if electricity demand has stagnated, then newly constructed nuclear plants will not be able to produce at or close to the minimum point on their average cost curves for many years, and thus, considered over the lifetimes of these facilities, gas and coal are more economical in new installations.

But this argument does not have universal application. It does not apply to those developing countries where there are already gigantic power shortages. China is a good example. It may not apply to the new Central European *transition*

*Ferdinand E. Banks is a professor at the University of Uppsala, Uppsala, Sweden.

economies; and it would not apply to France and Scandinavia if the Germans are serious about massacring their nuclear sector. As reported in the *Financial Times* (Friday, December 18, 1998), "The French are probably laughing all the way to the bank – literally. They will be able to run their (nuclear) plants a lot harder. In fact this is true for all countries surrounding Germany – they are definitely rubbing their hands with glee."

A comment might be useful at this point. The price of electricity in Germany is almost twice that in Sweden, and much larger than in France. A *liberalised* Europe in which Sweden and France can freely export electricity to Germany would mean that 1400 MW installations in France – if they are comparable in load/capacity factors to nuclear equipment in Sweden and Finland – will be able to out compete with natural gas and coal facilities of any size in Germany.

There is also some hand rubbing taking place in Sweden. Perhaps the main impetus for electricity deregulation in Sweden is the thought of access to the electricity markets of the countries comprising the *Baltic Ring*, to include Northern Germany. In fact, one of the reasons for the Swedish power industry's tame acceptance of the unreasonable arguments for scrapping their nuclear capacity is their belief that electricity generated in any kind of Swedish installation will be competitive in Germany. Similarly, an important reason for the docile acceptance by German households of nuclear disengagement is the present high cost of German electricity. It is a relatively simple matter for the *Greens* in that country (and in Denmark) to sell the myth of inherently inexpensive *green electricity*. Swedish consumers know better, even if their knowledge has not done them any good.

At the present time in Sweden, a glib argument is being forwarded that nuclear energy is just a "parenthesis" in world energy history, although I prefer to believe that the real nuclear age has not begun. Regardless of what we think about the availability of fossil fuels at the present time, in 50 years these resources might be drastically depleted (and that may include high quality coal). On the other hand, world population may have reached 10 million persons. In these circumstances, it would be foolhardy to ignore the energy in uranium.

One final observation. Although a consensus of physicists claims that the storage of nuclear waste is a problem that has been solved, they do not have much good news to give us where the issue of atmospheric deterioration due to the production of carbon dioxide (CO₂) is concerned. When my own thinking is in a neoclassical mode, it tells me that in a textbook world the nuclear sector in countries like Sweden should be expanded rather than contracted – since nuclear installations produce no CO₂ directly – and the cost savings (in relation to gas, coal, and renewables) would be used to support research and development of the alternative energy technology that figures so prominently in the future economic scenarios that the environmentalists have constructed for the industrial world. Scenarios that, if taken verbatim, are largely naive and counterproductive; and which, if realized in detail, represent a clear and perhaps not so remote danger.

References

Banks, Ferdinand E. (1999), *Energy Economics: A Modern Introduction*. Kluwer Academic Publishers, Amsterdam and New York.

Rose, Johanna (1998), "Nya Krafter", *Forskning och Framsteg*, No. 6 (September).