



NUCLEAR RENAISSANCE

Diversity could fuel EU's energy security

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In a talk I gave at the University of Siena, Italy, in 2009, I took the liberty of explaining why a peaking of the world oil supply was certain, and conceivably sooner rather than later. Of course, when the price of oil can reach \$147 a barrel, and bona fide experts claim that a price of \$200 a barrel is possible, it seems appropriate to suggest that a flattening of the global oil output curve is scarcely worth noticing.

The question now becomes “What does this have to do with nuclear energy?” The short answer is “everything,” because when the price of oil escalates, references to nuclear energy multiply in publications and on television screens in every corner of the industrial world. This is perfectly natural, because oil is a benchmark for the world energy economy — a standard of value — and a large increase in price is a sign that bad economic news might be on the way. The dilemma is that an exhaustible resource (i.e., oil), whose exhaustibility becomes increasingly apparent with every passing year, has a tendency to lose its charm. Eventually it brings frowns to the faces and questions to the lips of rational human beings, which is a category that often includes a few decision-makers.

That being the case, instead of passively waiting for another large oil price increase to cut the ground out from under the international macro economy, it might be wise to think in terms of constructing a more satisfactory energy system. Fortunately, a mention of that project can already be found in many newspapers and news magazines. It goes under the name of diversity.

As it happens, diversity is a controversial concept, because it can mean radically different things to different individuals. In a brilliant and easy-to-read article, Richard Rhodes and Denis Beller (2000) said, “Because diversity and redundancy are important for safety and security, renewable energy sources ought to retain a place in the energy economy of the century to come.” By itself, this statement is enough to warm the hearts of every environmentalist between Stockholm and the navy yards at Cape Town, South Africa.

Nuclear power is environmentally safe, practical and affordable. It is not the problem — it is one of the solutions.



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Construction of a third-generation European Pressurized Reactor, like this one in Flamanville, France, is especially costly now. But in a decade or so, such reactors will be standardized and built more cheaply.

But they continue by insisting that “nuclear power should be central. Nuclear power is environmentally safe, practical and affordable. It is not the problem — it is one of the solutions.”

One of the solutions! I wonder what Svante Axelsson, head of the Swedish Society for Nature Conservation, or physicist Tomas Käberger, head of the Swedish Energy Agency, would have to say about that. Axelsson published an article in a Stockholm morning paper that included some mathematics that simply ignored a glaring reality 500 kilometers away. The gentleman was attempting to show the economic advantages of liquidating the Swedish nuclear sector and replacing it with wind turbines. However, he must know that the cost of electricity, which in Sweden is determined by nuclear and hydro, is among the absolute lowest in the world, while the cost (and price) of power in Denmark — perhaps the promised land of wind energy — is among the highest in the world.

As for Käberger, I find him especially shortsighted to the dismal economic consequences that would result from binding the energy hopes and dreams of his country to a non-nuclear future. The issue is straightforward.

The physics is simple, and has been simple during the past 30 or 40 years for the ladies and gentlemen who deal with that subject on a daily basis. But the economics is almost a complete mystery. Here I do not mean just Axelsson and Käberger, but also those people who decide how much we must pay for our electricity in the coming years and to a certain extent where and how we live, what we drive or do not drive and the prospects for our children.

MISCONCEPTIONS ABOUND

For many years I have made a practice of expressing myself to my students as follows: Most of the people who genuinely understand nuclear economics refuse to tell us about it — often for social or financial reasons — while those other persons are unceasingly provided with golden opportunities to present their half-baked offerings. The flood of misinformation about energy matters has almost reached avalanche proportions and can be expected to increase as the expression “nuclear revival” (or nuclear renaissance) gains momentum.

Recently, Britain’s Financial Times newspaper published a long tirade by a certain gentleman

where he stated that we are inexorably moving toward a non-nuclear world in which all carbon dioxide emissions are “sequestered.” Jeffrey Michel, a real energy expert, is no great friend of nuclear, but he has called the sequestering of carbon dioxide a “thermodynamic travesty,” and indicates that if taken to extremes, it could place a considerable economic burden on the countries in which it is practiced.

Another point needs to be made here. Five years ago, Britain’s Royal Academy of Engineering presented some “carbon net” values for electric

by a small amount, if at all. Let me also suggest that if it had not been for the macroeconomic meltdown that began in July 2008, the already high electricity costs to large industries in the eastern part of the United States might have increased by at least 25 percent.

Germany also plays a very interesting role in the global energy drama, because while about 42 percent of Germans want nuclear to remain, about 52 percent in this highly literate country want it banished as soon as possible. What does not seem to be understood is that

When European consumers feel the pinch of higher fossil fuel prices there is an increase in interest toward alternative energy sources.



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generation sources that took into consideration the intermittency of wind (as reflected in the “capacity factor” for wind installations). The difference between the cost of nuclear and wind was so large (in favor of nuclear) that I decided to avoid controversy by not referring to it in my work.

But then I noticed that when the oil price began to move up, the same happened with the price of coal and natural gas. Many utilities in the United States were forced to introduce some of the largest rate increases in decades for electricity prices. When asked why, they immediately put the blame on the increase in cost of coal and natural gas, which was clearly associated with the price of oil. At the same time, the American nuclear-intensive firms Exelon and Constellation Energy were able to greatly increase their profits, because although they charged the same price for their electricity as non-nuclear competitors, the cost of uranium only increased

if a complete nuclear retreat takes place, and the Kyoto goals are realized, energy prices in Germany could go into orbit. Germany seems to have high hopes where renewables and increased gas imports from Russia are concerned; but I am not certain that this alternative works to their advantage, particularly the latter part. I prefer to believe that politicians should want a large amount of their energy requirements to be accounted for by sources over which they have complete control.

At the same time, I am quite willing to admit that on the basis of what I have seen and/or heard in countries like Sweden and Germany, nuclear antagonists seem to possess only an adversarial interest in the energy future unless the discussion is about “carbon free” items. Something that is missed here, often by nuclear supporters, is that a highly efficient nuclear sector could turn out to be invaluable

Strong opposition to nuclear power is evident in Germany. Activists blocked and delayed a shipment of 123 tons of radioactive nuclear waste from western France to a dump site in Gorleben, Germany.



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as a source of finance for investments in the renewables sector. This should be quite clear on the basis of advertisements sponsored by highly profitable oil companies and seen everywhere.

THE ONLY OPTION

In a long and complicated 2006 article in *The Energy Journal* (of the International Association for Energy Economics), five important energy researchers presented an argument for nuclear power as a hedge against uncertain gas and carbon prices. The article contains helpful information about the cost of nuclear power from 2005 to 2006, or perhaps slightly before. Some unexpected increases may have taken place since that time. I am thinking, in particular, of the costs associated with the European Pressurized Reactor under construction in Finland that, in terms of capacity, is the largest in the world.

The trouble in Finland is really quite simple. It is a “one-of-a-kind” — “custom built” — reactor. In a decade or so, reactors of that size, and larger, will be standardized and constructed for much less money. However, it is useful to note that the Finns are already thinking of another such reactor, although they are in an ideal position with respect to the natural gas of both Russia and Norway.

Something of particular interest to me was a statement at the end of the article: “The Finnish experience shows that if well-informed, electricity intensive end users with long-time horizons are willing to sign long-term contracts, then nuclear new build can be a realistic option in liberalized markets.”

I have had a few words with David Newbery and other experts on this matter and tried my best to explain that “liberalized” markets are quite irrelevant for this sort of discussion. Twelve Swedish reactors were constructed in a completely nonliberalized setting. They gave Sweden the lowest electricity costs in the world and the highest income per head in Europe. Moreover, I can assure you that it was not a question of this “build” being a “realistic option.” It began shortly after the first oil price shock, and given the outlook, it was the only option. □

Banks, Ferdinand E. 2009. “Some Energy Myths for the 21st Century.” Conference paper, University of Siena.

_____. (2007). *The Political Economy of World Energy: An Introductory Textbook*. Singapore and New York: World Scientific

_____. (2001) “A disabliging introduction to electric deregulation.” Conference paper, Hong Kong Energy Research Institute.

_____. (1996) “The future of nuclear energy in Sweden: an introductory economic analysis.” *Energy Sources*.

Rhodes, Richard and Denis Beller. 2000. “The need for nuclear power.” *Foreign Affairs* (January-February).

Roques, Fabien and William J. Nuttall, David Newbery, Richard de Neufville, Stephen Connors. 2006. “Nuclear power: a hedge against uncertain gas and carbon prices.” *The Energy Journal* (No. 4).