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Nuclear energy

By Norbert HOLTKAMP

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Born in Furstenau, Germany, Norbert Holtkamp studied physics at the University of Berlin and was awarded a doctorate at the Technical University in Darmstadt. In 2001, he was appointed director of the accelerator project ...
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Norbert Holtkamp: "it would be unforgivable not to do ITER"

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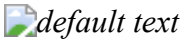
Norbert Holtkamp is the operational director of the ITER project. In an interview with the European Energy Review magazine he believes that the project will demonstrate the economic viability of nuclear fusion, given the foreseeable tensions on the energy market around the middle of the 21st century.



Extracts from the interview published in the European Energy Review , followed by background information

EER - ITER is the first truly global governance experiment (if we exclude CERN from Geneva). It involves developed countries and emerging powers such as China and India. Is it easy to manage, and do you have a philosophy in this kind of management?

N. Holtkamp - Is it easy to direct? I think you can answer this question! ... I would say that we must be able to get there, but of course nothing is certain until we have done so! There is global pressure on energy resources, on us, and on member countries. ITER is a unique experience, the first of its kind; if it fails, it will not only be a failure for the project but also an excuse not to make other international collaborations in strategic sectors. How do I approach this type of management? As an old friend said to me, "You have to distribute the pain fairly!" ". It's not just a joke: if everyone feels equally wronged, then you've come to a good compromise ...

Do you feel pressure from governments, or are you in the position of leading individuals?

There are obviously mentalities, cultures, personalities that are different and collide. The people around a table are all influenced by their cultural background.

But no pressure from governments?

No, I do not think so. It doesn't affect the relationships between them, not that way.

Critics of the project say that scientific success is far from being achieved. They say, for example, that it is very difficult to design a fusion reactor that produces more energy than it consumes. So far, all trials have struggled to strike this simple balance. Why would ITER succeed?

Well, because ITER is a direct extrapolation of JET and JET was able to break even for a few seconds. We can have doubts about Q = 10 (*note: Q is the amount of thermal energy generated by the fusion, divided by the amount of external energy provided. The equilibrium is therefore at Q = 1 and ITER aims to release Q = 10),* on the viability of an operation 24 hours a day, 7 days a week, 12 months a year; we can discuss it, but we cannot question the fact that ITER will go beyond "balance". This is no longer the question.

ITER is supposed to be a link between the scientific program and an industrial power plant, and here we can have questions. I think we can be part of the way, but knowing whether it will be a complete success is more in the debate. But I still think that ITER will demonstrate industrial viability. This is the challenge of ITER and that is why it is built.

Do you confirm that the tests are planned for at least 20 years, and that the next step will be the construction of DEMO, the prototype plant?

Yes, that's it. This 20-year period will be necessary to put everything in order before the green light for the operational phase. Some people talk about launching DEMO before ITER is finished. Sounds a bit crazy to me, but ...

Opponents of the project also claim that the fusion power plant will not be economically viable. What could be the economic cost of the future power plant and the cost of the energy it will produce?

This is a good question. First, let's take a look at the global energy market. I don't know the exact numbers, but I think the last one I heard was $ 3 trillion a year. Compared to this scale, the cost of experiences that open up perspectives like ITER is really nothing at all. It can be done, it must be done, it would be unforgivable not to do it. It is very clear.

Another point: if you look at the oil price curve, you see a doubling. I do not know how it will evolve in the future, but I think everyone agrees: there will be an increase. It is just a matter of time before the cost of nuclear, fusion or fission energy makes it economically viable.

I don't want to scare anyone by saying that the lights will go out in the next 25, 50 or 100 years, but we're *going to* run out of oil.

The construction of ITER represents some 5 billion euros. But again, what can be the cost of a future power plant?

It is difficult to calculate, but to be in a competitive environment, it must be comparable to the investment required for a large fission plant. Look at the cost of today's power plants: it is a few billion euros or dollars. I think ITER has a good chance of driving factories in this price range. But it will be fair to compare the cost of the first fusion power plant to that of the first large fission power plant.

If the cost is not the same, no one will walk. It's the economy, it's very simple.

If the fusion energy is successful, do you think that it will eventually replace the fission energy or that it will be complementary to it?

If I had a crystal ball, I would answer you. By the middle of the 21st century, every source of energy (wind, water, coal, fission from fusion will not be ready) will have to be used. Fusion, I am sure, will then play a large role among all these sources. One of its real advantages is that fuel is available to everyone. This is not absolutely true for nuclear power, unless we manage to breeders. But this fission technology has its own difficulties with making long-life waste.

Elements of context (Newsteam news agency)

The year 2008 will mark the effective start of work for the longest and most ambitious scientific project in the world, since the conquest of space: the ITER project intended to control fusion and therefore to create an inexhaustible source of energy and very low pollution.

It is in the center of Cadarache, near Marseille, that a good part of the research will be conducted by 34 nations, including the United States, Japan, the European Union, Russia, China, Korea and India. An unprecedented example of global governance.

More than 300 people of ten nationalities are already engaged in the preparatory work and settle down with their families. Ultimately, more than 3,000 people, of more than 30 nationalities, will be there. An international class has already been set up and a specific international school will

welcome a thousand students at Manosque at the start of the 2009 school year.

It will be a long project, so long, say his critics, that it will never be successful.

After the signature last November by Valérie Pecresse, Minister of Research, of the "headquarters agreement" which links France to the international organization ITER, work to prepare the site and its access routes will begin at during the year. It was not until 2016 that the first experiments began, with the manufacture of the first high-temperature plasma. Then, it is estimated, it will be twenty years of experience for us to be able to envisage the first prototype of the plant, DEMO, therefore around 2035.

It is that the mastery to acquire is considerable. According to the lyrical expression of Valérie Pecresse, it is a question of "making shine on earth a little of this fire which burns in the stars". Another way of saying it: mastering for civilian purposes what man has been able to unleash in an uncontrolled manner in thermonuclear bombs (H bombs) Therefore considerable scientific and technological challenges (see the text by Gilles Prigent).

Iter, which is far from the term, already has a long history. The project was born in 1985 from an idea of Mikhael Gorbachev, who convinced Mitterrand, Reagan and Tanaka. Then it took long discussions to determine the location of the laboratory location and the choice of Cadarache was stopped in 2005 after a strong rivalry between France and Japan.

Such delays and ambitions inevitably increase uncertainty. And the question, even clear cut, still hangs: should I do Iter?

The first difficulty is, as we have seen, that of scientific and technological feasibility.

The second risk is the question of funding over such a long period. Last January, the Americans announced the suspension of their financial participation - in the amount of $ 160 million - due to the decrease in the overall research budget. As it is not a "cash" contribution but equipment which had to be built by the Americans, this prospect should not entail an additional cost for the other participants but a delay in deliveries.

The cost is already estimated at 5 billion euros (2000 value) for construction, plus 5 billion for the operational phase. In the event of a slippage, what will happen: will we stop research in the name of rigor thus admitting a failure or "will we return to the pot" with the risk of siphoning all the credits of research ?

Finally, will the fusion power plant have economic viability, compared to fourth generation fission breeders? The price of the plant will be exorbitant, say the critics, as will, consequently, the price of the kwh. The debate can hardly be supported by the figures since it will not arise before at best 2035. The exercise therefore still falls under the crystal ball.

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