



Photo: Wiltho Worms

Peter Verhoeff : 'The future gives me energy'

It is Monday 9 March, 9 o'clock in the morning. Throughout the interview in his office at TNO in Delft, Peter Verhoeff's mobile phone is on; the programme director of ITER-NL must be contactable. Noon today is the submission deadline for the new application for assistance from the Fund for Economic Structure Improvement (FES). The government is drawing FES monies from natural gas profits. Sure enough, at around 11 o'clock the phone rings. Niek Lopes Cardozo, head of nuclear fusion research at FOM-Rijnhuizen, one of the partners in ITER-NL, is on the line. It's a short chat.

Are there any problems?

'No, fortunately not. Niek told me that there was just enough time to add the latest input from companies to the application.'

You've been the director here since 2007; what is ITER-NL?

'ITER-NL is a consortium of three knowledge institutions: TNO, the Foundation for Fundamental Research on Matter (FOM) and the Nuclear Research and consultancy Group (NRG). The FOM – and in particular the FOM-Institute for Plasma Physics Rijnhuizen in Nieuwegein – is the traditional home of Dutch nuclear fusion research. NRG in Petten is *the* centre for nuclear expertise: it undertakes both research and commercial activities. And TNO applies scientific knowledge. As an independent organisation, TNO acts as a bridge between the universities and trade and industry, governments and civil society organisations. It's a great trio, don't you agree! Together, as ITER-NL, we want to maximise the Dutch input into the ITER international nuclear fusion project. This project brings together Japan,

China, India, South Korea, Russia, the United States and, of course, Europe.'

And ITER – isn't that the test fusion reactor under construction near the French village of Cadarache?

'Exactly! Cadarache is near Aix-en-Provence in southern France. In Latin ITER means "the way"; this is a major step on the way to fusion energy. Broadly speaking, hydrogen atoms are fused, producing helium. This process releases a huge amount of energy (see also p. 18). According to prognoses, the test reactor will generate ten times as much energy as it takes to keep the fusion reaction going. If we manage that, we'll know the technology works and we'll be ready to start building the first commercial nuclear fusion power stations in around 2040 or 2050. As I said earlier, we are obviously keen to see Dutch

PERSONAL DETAILS

EMPLOYED AS:
ITER-NL programme director, TNO Science and Industry, Delft

BORN ON:
18 July 1958 in Rotterdam

STUDIES:
1976-1980: technical physics, HTS Dordrecht (technical college)

JOINED TNO:
August 1980

MARITAL STATUS:
Married Eefje van den Broek (48) in 1986, lecturer in speech therapy in the Hearing department of Rotterdam University

CHILDREN:
Ruben (18), Renske (17), Hester (14)

HOBBIES:
running, cooking and listening to music (pop, classical)

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'Our conventional energy sources – coal, oil and gas – are running out. Nuclear fusion is one of the very few clean and sustainable energy options we have for the future, for our grandchildren and their children.'



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body that has been set up to organise the European purchase of technology – and everything related to the reactor's immediate construction. We'll see the peak in tendering between 2010 and 2014.'

That's in less than a year! Won't these companies need to be ready by then? So what are those FES monies still needed for?

'The first round of FES assistance of just under 20 million euros was enough to get our companies on the right nuclear fusion track, as it were. According to our analysis, this effort alone is going to result in a series of orders valuing 60 million euro. But that's not all. You learn things along the way and you start seeing new opportunities. For example, the fact that the ITER project is now overrunning its schedule gives us the opportunity to invest new effort. Current expectations are that by continuing with ITER-NL, we can drive up the value of the order portfolio to 180 million euros! And from other "big science" projects we know that the innovative technology that gets developed along such a path as this in turn generates spin-off activities that can be worth as much as half a billion euros. Just think of projects like CERN, the European facility outside Geneva that is doing research into elementary particles, and aerospace projects, including the ISS space station.'

Personally, you've been involved in all sorts of space travel projects at TNO for over 20 years. Do you see similarities between space travel and ITER?

'On a number of points. Both tend to involve projects whose value runs into the millions, and which take a good number of years. In both cases you are working with highly specialist technology, for which you need well-qualified people. Just think of the ITER vacuum vessel and working in space, of extreme temperatures and, don't let's forget, working in an environment with radiation. And then there's the spin-off technology.'

You are hoping that the FES assistance will be granted, aren't you?

'Of course! We are competing with all sorts of other applications, but I hope that it is recognised that nuclear fusion provides the long-term energy solution we need for subsequent generations. With all due respect to wind and solar energy, they do not deliver the quantities of energy that will be required in future. But they have got a contribution to make, certainly in the short term, so there's still every reason to continue developing them. Like them and nuclear

energy, nuclear fusion generates energy without releasing any carbon dioxide. It does produce mild radioactive waste, but that ceases to be radioactive in about 100 years. Moreover, you can't use the waste from nuclear fusion to make nuclear bombs and other weapons. By contrast, this is theoretically possible using the waste from nuclear power stations, which remains radioactive for tens of thousands of years. It really is our duty to work towards good, safe forms of energy. Nuclear fusion is one of them.'

And if the application isn't successful?

'That's not something I think about. I have complete faith in our proposal. And we have a unique formula with ITER-NL; it creates scope for knowledge institutions to cooperate in a new way with trade and industry. The Ministry of Economic Affairs recognises that. And other European countries are adopting our model. Moreover, the ITER-NL formula is a recession-proof model. By encouraging companies to move in ITER's direction and towards more spin-off technology, you can steer them through an economic downturn. Investment like this is now happening in the United States and I expect no less in the Netherlands!'

You wear two hats: that of ITER-NL director and that of TNO employee. How do you separate them?

'It's never been a problem. As programme director I have a neutral position. Within ITER-NL there are strict, fair and transparent rules for deciding whether a company receives support. For the rest, I still find it an appealing challenge to see whether collaboration with TNO can somehow boost a prospective participant-company.'

What is your biggest concern?

'I don't worry! I'm chiefly occupied with the future, that gives me energy. By nature I tend to avoid doing battle with adversaries. Conflicts like that aren't usually helpful. On the contrary, I am always looking to see how we can cooperate to make a success of things, even with an opponent. In the true TNO spirit: by building bridges, strengthening weak points and converting threats into opportunities.'

If this hadn't been your job, what would you have done?

'Exactly what I'm doing now. I wouldn't have missed this for the world. But.... in my youth I thought it would be fun to become a travel guide in Africa and develop custom trips for small groups seeking adventure. Experiences like camping in the wilderness. Wonderful!'

companies and scientists play a considerable role in ITER's construction and installation and in developing its scientific programme.'

Were you able to interest Dutch trade and industry?

'We have now drawn together some 200 companies that are in a position to make a serious contribution to ITER. These are major companies like Philips, Urenco and Stork, construction groups like BAM, engineering consultancies such as Haskoning and DHV and many smaller companies specialising in a particular niche technology. Already we foresee good opportunities for very many of them. You see, ITER imposes incredibly high demands on its supplier companies. It's really driving innovation forward. How could it not when it involves such challenging technology? And that's never a bad thing, certainly in a period of economic crisis. It's ITER-NL's job to help these companies build a strong competitive position compared with foreign companies. For example, we offer access to the financial assistance needed to continue developing a certain technology. And we have valuable contacts, for example with Fusion for Energy. National or international cooperative alliances can be useful to certain projects, to build a stronger position. Fusion for Energy is the