High Temperature Gas cooled Reactors
Small and Safe Nuclear Reactors

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There is now in the world a renewed interest for gas cooled reactors after a blank period of about 10 years, following the concomitant decision in 1989 to put out of operation Fort St-Vrain in USA and THTR-300 in Germany.

More recently, two small demonstrators have been built in Japan and in China. Besides, two industrial projects are under development, one in South Africa, with the support of foreign companies (BNFL in UK and EXELON in USA), and the other one in Russia, with the foreign support of DOE and General Atomics of USA, Framatome ANP of France and Fuji Electric of Japan.

Will these industrial projects have a potential market within the next 10 years ?

To answer this question, it must first be considered that HTGR reactors in the range of 100 to 300 MWe have potential capabilities fitting with Western Countries market needs :

- Shorter construction time than larger nuclear plants
- Inherent safety for loss of cooling accident due to a large thermal inertia combined with a robust fuel concept
- Potentiality for co-generation

But two major difficulties will have to be overcome.

The first one, before entering effectively the market, is to successfully license and prove a new kind of nuclear reactor. And this will take time, at least 5 years to solve all design problems and license the design, and in addition 3 years to manufacture and build the first of the kind. It must be kept in mind that, if the nuclear part of HTGR has been operated in the past, it was nor with the inherent safety features neither with direct cycle ; the power conversion part of the reactor is rather innovative, and presents significant features departing from current gas turbine technology.

The second one is the cost. Compared to bigger plant, HTGR of new generation allows significant series effects. The inherently safe design simplifies et reduces the safety systems. But, there is a price to be paid which is the size of the nuclear part coming from the low power density. In the past, one of the reasons for which HTGR was not in a position to be competitive against LWR was the cost. This reason is still valid, and it

has to be proven that the advantages of the new designs are sufficient to overcome this difficulty.

In conclusion, the potentialities of these new reactors are sufficiently attractive to be the object of a strong interest, and to justify the significant worldwide efforts currently done. But we have to be realistic if we want to be credible, and express very clearly the challenge that we have to face.

So, HTGR small and safe ? The answer is yes. But competitive ? We have to wait for a few years of more before getting it.