

5th ANNUAL

# NUCLEARPOWER

ASIA 2014



*“Nuclear energy needs trust in its safety. These are not words only it must be justified by facts. This is why a holistic safety approach of the nuclear power must be the basis for every development.”*

**Interview with Dr. Jens-Uwe Schmollack, Head of Competence Centre for Nuclear Safety and Radiation Protection at TÜV Rheinland Industrie Service GmbH and speaker at Nuclear Power Asia 2014**

## **What are the unique challenges for emerging countries while developing their nuclear power programmes?**

Establishment of a nuclear power industry from scratch requires long-term planning and comprehensive approach. This is a complex industry with many interconnections and dependencies between elements, it is demanding thoughtful and sophisticated management and control. We are not even talking about years but rather about decades: at least one decade for planning and construction, four to six decades for operation and at least another decade for decommissioning. And not to forget, it assumes also huge investment necessary not only for the power plants as such but also for nuclear regulatory and surveillance authorities, research institutes, educational facilities, radioactive waste storage facilities etc. Such programme needs broad public acceptance in order to integrate into multiple functions in society as e.g. education, research and public authority frameworks. Even on the planning phase, the basic task of selection and implementation strategy requires holistic view. Which type of nuclear power plant is the best for you? It's not only between PWR and BWR – the HTR is not fully market ripe until now - it is also about which vendors to select and what are the implications, how to develop and integrate domestic industrial and human resources and so on. In the end it becomes a major national project.

## **In your opinion, what are the key lessons learned from the mature markets that have developed nuclear power projects for decades?**

The basic lesson learned from mature markets as well as from very successful national programmes, e.g. in South Korea and less successful programmes in other countries is to be realistic. This means to rely on proved technology and systems at least in the beginning, to be not too ambitious in terms of schedule and power to be installed. Furthermore, calculate realistically the full cost including

decommissioning and waste storage. We see in almost all countries with long traditions in nuclear power that diverse cost was not included and not seriously considered initially. Such cost finally ends up as a burden on the tax payer, which results in negative perceptions from society and could have been avoided. In addition, it is necessary to develop in parallel the required infrastructure including all necessary regulations on national level based on experiences and successful implementation schemes available internationally. In Vietnam we can see strong efforts in this direction, although we have not finally arrived up to now.

### **How is TUV Rheinland prepared to help customers tackling these challenges?**

What emerging countries in the complex process of a nuclear programme really need is expert support independent from vendors and preference for specific technologies. TUV Rheinland has five decades of German and international experiences in independent assessment of all kind of nuclear applications over the full life cycle from the neutral perspective of technical surveillance organization, involved in almost all levels of international and many national technical frameworks and can support in this challenging task.

Or another example, under the basic national nuclear laws and higher level regulations it is necessary that detailed technical requirement documents and guidelines are developed to match and support a nuclear programme. As mentioned, one should utilize existing international and national technical framework, e.g. general framework provided by IAEA. Also the framework of certain mature nuclear countries can be used as basis. However, even very detailed available instruments and frameworks might not necessarily fit to the needs of the emerging country. Here international neutral experience can help to select the relevant content and develop appropriate guidelines. And we have such experience.

### **How did the Fukushima accident in 2011 change the nuclear industry dynamics especially on the safety issues?**

The accident indeed had and still has a major impact on our general understanding of nuclear safety philosophy and safety culture. We are considering now event combinations which were excluded in the past, we are focusing on very low probability extreme natural events etc. which were not considered in the past and we have a much better understanding what cliff edge effects can be. And by the way the old discussion about the balance between deterministic and probabilistic methodologies, which flamed up once more recently, is reflected in the stress test approaches which made it clear with the higher weight on the deterministic design requirements to be developed in consideration of probabilistic arguments.

Of course, in the first place many nuclear projects are currently delayed or even cancelled as a consequence of the accident. But in the long term the safety improvements for existing nuclear power plants and new builds will open the possibility for further dynamical installation which would be necessary to at least maintain the existing share of nuclear power in electric power generation. But in fact the question about the share of nuclear power generation in the total electric power generation depends on many more other factors. One of them – maybe the most relevant - is the high investment needed for a nuclear power plant project combined with extremely late ROI compared with the competitive energies. The nuclear industry must meet these challenges too. This can be successfully done only if all stakeholders effectively work together.

### **How has the recent contaminated water leakage impacting the industry especially in Japan?**

Although the radiological impact of those leakages is expected to be local, the impact in terms of loss of trust in TEPCO and in the nuclear industry in general is much beyond the local effects. Nuclear energy needs trust in its safety. These are not words only it must be justified by facts. This is why a holistic safety approach of the nuclear power must be the basis for every development.

### **Why Germany decided to fade-out the nuclear power also it has high safety reputation?**

In fact Germany decided to fade out long before Fukushima. The process started in the 1990<sup>th</sup> with decreasing investments in the nuclear industry and research on one side and increasing investments in the alternative energies. In 2000 fade out was already confirmed between German government and nuclear industry and bound in atomic law in 2002. Fukushima concluded this development finally. Germany as a high-tech country decided to invest in alternative energy technology development and installation on national level.

We must face the reality: The power market today is totally different from the high time of nuclear power installation in the 1970<sup>th</sup> and 80<sup>th</sup>. We have now less capital intensive high efficient alternatives of smaller power plants with combined cycle, process heat usage, with wind and solar etc. This implies relevant competition for the nuclear power industry. But of course there is enough space and need for all the different energies worldwide. And if the safety discussion is not dominating the discussion anymore, the arguments for long term reliable and continuous nuclear power supply will be more visible.

### **In terms of safety, what do you think are the key measurements to be put in place to ensure the highest standard for safety for new build power plants?**

In terms of safety it will not be enough to have off-site emergency plans for severe accidents in place. Those severe accidents have to be practically excluded by appropriate design and construction of the power plants which means their occurrence must have significantly lower probability in comparison with the operating power plant generation. All efforts which we can see are directed by this target. But how it is practically solved and to which extent it is realised for a certain project – this needs in every single case a very detailed and sophisticated safety assessment from the general safety principles down to every single system and component and its qualification. That is what TÜV Rheinland experience in nuclear safety showed us in the last five decades. Without such independent safety assessments all efforts can come quick to pure theory as we could see from Fukushima. We see good examples worldwide for recent independent safety assessments and upgrades which will enhance the nuclear power long term safety.

### **Despite of the safety concerns, what are your visions for the nuclear power industry looking forward?**

For me personally the development of smaller reactors and of high temperature reactors (HTR) is very interesting. If we can tackle the challenge of competitive costs together with enhanced safety, these technologies will have a promising future market. Meanwhile we will have to bring the promising nuclear new build projects e.g. in Vietnam to success stories. That will boost the further development.

**Which area would TUV be highlighting in your speech during this year's Nuclear Power Asia in Hanoi?**

With respect to the very practical issues of the design and construction of nuclear power plants in a global industry we will focus on the challenges of world-wide supply chain and quality management to ensure not only safety but also project schedules and costs. An appropriate supply chain management will also allow successful integration of local resources. This is an important success factors for nuclear new build projects in emerging countries.