IAQ QUALITY SUSTAINABILITY AWARD 2021 - ONE-PAGE SUMMARY

The One-Page Summary should be filled in and submitted as Appendix 1 to your Application. It will also be published on the IAQ Quality Sustainability Award Homepage; http://iaqaward.com. The length of this document must not exceed 1 page.

Project and contact details

The name of the quality sustainability project (max. 100 characters)
The development and application of high reliability CF fuel assembly based on innovative quality managements

Contact Person	Telephone	**Email**
Bin Yu	+86-15114058192	745761844@qq.com

Organisation(s), country, where the project-members are working, including Web-page links
Nuclear Power Institute of China, China, http://www.npic.ac.cn

Project description

With the development of human society, human demand for theenergy is increasing. In recent years, with the environmental problems such as global warming brought by traditional fossil energy, the development of safe, clean and affordable energy has become the key to global sustainable development in the future. Nuclear energy is an important part of clean energy. According to IAEA(International Atomic Energy Agency) estimates, increasing the proportion of nuclear energy in global energy is an important way to achieve the goal of global climate change and sustainable development. As the key component of nuclear reactor, fuel assembly is the heat sourceand Its safety and economy are the key to the sustainable development of nuclear energy.

To improve China's energy structure and achieve the goal of sustainable development. Since 2010, NPIC (Nuclear Power Institute of China) has started the R&D of CF fuel assembly project. Until 2018, the total investment of this project is more than 185 million US dollarsand more than 400 researchersworked in the project team.

From the very beginning, CF fuel assembly has established the research goal of high-quality and sustainable development. The TQM, multiple design verification and other quality tools have been adopted into different R&Dstages of CF fuel assembly, such as mechanical design, out-pile tests and in-pile application, so as to ensure the reliability and safety of the fuel assembly. Meanwhile, in the fuel assembly production stage, PDCA Cycle (Plan-Do-Check-Act Cycle) and other quality methods are used to optimize manufacture process to improve efficient utilization of raw materials and achieve GOAL 12: Responsible Consumption and Production.

At present, many *Hualong 1* nuclear power plants in the domestic and overseas used CF fuel assemblies, each nuclear power plant using CF fuel assemblies can generate nearly 10 billion kwh of clean power every year, which is equivalent to reducing the consumption of standard coal by 3.12 million tons, reducing carbon dioxide emissions by 8.16 million tons, and planting 70 million trees which makes a great achievement of GOAL 13: Climate Action.

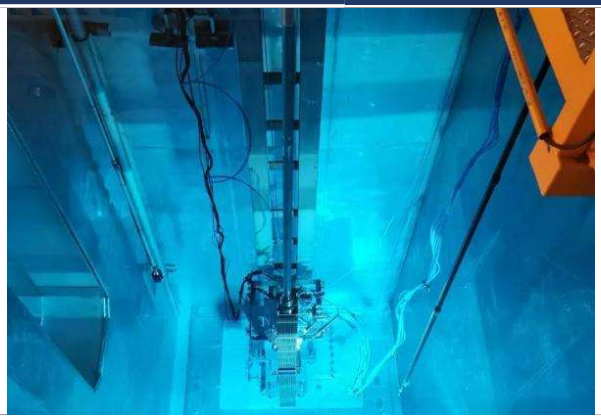
Each CF fuel assembly can generate electricity 1.65×10^8 kWh per year and because of the above steps, the price of electricity generates by nuclear power plant used CF fuel assemblies is around 0.6 US cents per kWh which is correspond to the coal-fired plants and 20% cheaper compared with current nuclear power prices which is affordable clean energy for the developing countries and achieve GOAL 7: Affordable and Clean Energy.

In terms of GOAL 17: Partnerships to achieve the Goal, the long-term cooperation with developing countries based on mutual benefits have been established through the export of CF fuel assembly, and we have created more than 10000 local jobs and trained more than 1000 professional and technical personnel.

Project leverage potential

- The sustainable and robust design concept of CF fuel assembly has been used as references for the next generation fuel assembly R&D and the improvement of current fuel assembly.
- Multiple quality tools such as PDCA greatly improved the utilization rate of raw materials and reduced the use of other harmful chemicals in raw materials productionwhich has been applied to the similar raw materials production.
- CF fuel assembly international cooperation patternhas made great contributions to local economic developmentwhich has been regardedas aniconic in the Belt and Road initiative of China.

Picture/Image describing the project



Note. More information about the award and how to apply can be found on the IAQ Quality Award homepage