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Utilization of renewable energies for sustainable accelerator operation at KIT

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The Karlsruhe Institute of Technology operates the accelerator test facility Karlsruhe Research Accelerator, which also provides synchrotron radiation at 2.5 GeV. Roughly one third of the wall-plug power is used for cooling. Optimizing the infrastructure for cooling has a huge impact on the overall sustainability. To reduce the environmental impact a thermal well system was installed. It reduces the base heat load by eliminating one of three 500 kW cooling units. This paper describes the challenges, such as iron-manganese rich groundwater, and their solution for our 1 MW passive cooling system. The average energy consumption of 28 kW for the thermal well infrastructure is compensated by a new 540 kWp solar power plant. This paper elaborates on the commissioning of the wells and shows the first results of this overall sustainable cooling concept.

Footnotes

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Author: GETHMANN, Julian (Karlsruhe Institute of Technology)

Co-authors: MUELLER, Anke-Susanne (Karlsruhe Institute of Technology); SHEN, Bingbin (Karlsruhe Institute of Technology); BRÜNDERMANN, Erik (Karlsruhe Institute of Technology); RUPRECHT, Robert (Karlsruhe Institute of Technology); MEXNER, Wolfgang (Karlsruhe Institute of Technology)

Presenter: GETHMANN, Julian (Karlsruhe Institute of Technology)

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