



PRESS RELEASE

Green Revolution Cooling's Oil Immersion Cooling Technology Helps Vienna Scientific Cluster Achieve a mPUE of 1.02 with Zero Water Use



AUSTIN, TX, JULY 2, 2015 - VSC-3, the third iteration of the Vienna Scientific Cluster, is reporting a mechanical Power Utilization Effectiveness (mPUE) of 1.02 as of the end of Q1 2015, making it one of the most efficient data center facilities in the world.

To put the 1.02 mPUE into perspective, the VSC-2, which used a highly optimized rear door solution, achieved a mPUE of 1.18 during the same period. "We are very impressed by the efficiency achieved with this installation. It is particularly impressive given that it uses zero water. We believe this is a first in the industry," said Christiaan Best, CEO and founder of Green Revolution Cooling (GRC), the company that manufactures the immersion cooling system used by the VSC-3.

VSC-3 uses a closed loop dry cooler as the final method of heat rejection, meaning the system does not require any water input. And while the lack of evaporative cooling may lead to a slight increase in cooling energy during the summer, GRC does not expect the cooling overhead to increase beyond 6% of the IT load.

The ultra-efficient supercomputing cluster, the VSC-3, was installed in 2014, after a unique tender process that accounted for the total cost of ownership of various technologies rather than the usual lowest upfront cost alone. Green Revolution Cooling, together with Intel, ClusterVision, and Supermicro came up with a custom solution that was well ahead of the competition.

The winning solution, pictured above, is made up of 2,020 nodes, each with 16 processor cores housed in the CarnotJet System. The more than 600 teraflops of computing power takes up a mere 540 kilowatts of power and is packed into a little over 1000 square feet of white space.

Green Revolution Cooling's oil immersion cooling technology gave the bid a number of significant advantages over the competing solutions. Apart from being extremely efficient at cooling the cluster, the GRC system also helped reduce the energy consumed by the servers as well as the upfront build-out cost of the data center, including the cost of the very servers the system cools. "The value proposition [of the GRC system] was extremely impressive. The whole data center and cluster was far less expensive than it would have been with any other cooling solution on the market. We are certain we will be using the GRC solution on more projects in the future." said Christopher Huggins, Commercial Director at ClusterVision.

The key to GRC's technology lies in its unique approach of immersing complete servers in a mineral oil based coolant called ElectroSafe, which is a clear, non-toxic, liquid that is an electrical insulator but a good conductor of heat. In fact, it has 1,200 times the heat capacity of air by volume, making it ideal for cooling IT equipment. The superior thermal conductivity and heat capacity of the coolant, as compared to air, helps reduce the energy required to extract heat from nodes in order to maintain optimum core temperatures. The system also completely eliminates the need for capital intensive air conditioning equipment such as chillers, air handlers, humidity control, and even raised floors.

Further, the technology enables hardware optimization such as the removal of fans and intricate chassis, which are no longer required. The removal of fans and reduction in leakage current also allows for the downsizing of power supplies. These hardware optimizations alone saved an estimated \$300 per server as compared to an off the shelf solution of similar configuration.

About Green Revolution Cooling

Green Revolution Cooling creates the most powerful, efficient, cost effective solution for data center cooling in the world. GRC offers the CarnotJet System, a liquid submersion cooling system for any rack-based OEM server. It uses a non-toxic mineral oil with 1,200x more heat capacity by volume than air with end results that allow for 95% less cooling power used, 8-20% less server power used, dramatically reduced infrastructure costs and increased server reliability. Visit www.grcooling.com for more information.

Connect with GRC on Twitter (@GRCooling), Youtube (youtube.com/GRCooling), and LinkedIn (linkedin.com/company/green-revolution-cooling).

About The Vienna Scientific Cluster

The Vienna Scientific Cluster (VSC) consists of several cluster systems that have been designed to satisfy the demand for High Performance Computing (HPC) of a consortium of Austrian universities. At this time there are five VSC partner universities: Vienna University of Technology (TU Wien), University of Vienna (Universität Wien), University of Natural Resources and Applied Life Sciences Vienna (BOKU Wien), Graz University of Technology (TU Graz) together with the universities within 'Universitäts-Cluster-Süd', and University of Innsbruck (Universität Innsbruck).

Currently two of VSC's systems are in use: VSC-2 and VSC-3, their oldest system VSC-1 was decommissioned by the end of March 2015. <http://vsc.ac.at/>

