

# Immersion Cooling

By Next Generation Green Technologies, Ltd



**An innovative DATA-CENTER cooling solution providing savings in Capex and Opex (up to 50% of electrical utility usage), real estate footprint reduction (1:10 and more), initial DATA-CENTER building costs (up to 50%) and equipment life cycle exponential improvement (x3).**

**TRENDS:** Data Center's power consumption has increased dramatically and exponentially in the last few years due to the rise of AI/MACHINE LEARNING which utilize multiple graphical acceleration components (GPU's) from companies such as NVIDIA – which requires dealing with massive HEAT DISSIPATION and energy waste.

Compute needs for IOT/5G/FOG drive requirements for placing the compute/networking gear in environments that are not traditional Data Center facilities.

Furthermore, CARBON-FOOTPRINT is becoming a REGULATORY requirement and most/all enterprise clients will require Data-Center companies to adhere to such regulations in 5-10 years.

## **Opex (Operational Expenses)**

This relatively new cooling technology is based on the principal of “[Immersion](#)” - a.k.a “Submersion Cooling’ in a dielectric liquid. The liquid is non conductive, non toxic and non corrosive.

The immersion method takes all of the compute components (actual hard drives, SSD's, servers/blades = 1U etc.) and submerges them into the thermal conductive liquid discussed above. Furthermore, since fans are removed from the CPU's/Motherboards - it reduces power consumption (~20%), vibrations, static electricity due to dust, noise (DB Levels) and PCB corrosion – hence, extending the life of the equipment.

Since the liquid is in intimate contact with each component of the equipment and its thermal constructiveness and thermodynamics are much better than air – it requires significantly much less chillers cooling (Delta-T is much lower) – hence, enabling to manage and throttle existing chillers or totally eliminate regions where chillers are needed.

Additionally, from a redundancy, resiliency and fault protection point of view – if all cooling components fail, equipment submerged in the liquid would not surpass the 70c degrees which is the first point of alert for most devices these days (critical forced shutdown is at 90c).

## **CAPEX (Capital Expenditures)**

Since currently a single server/blade rack unit can deal with 6-8Kw – one can populate about twenty (20)

servers per rack out of the available forty eight (48) slots and many times even less when GPU (i.e. NVIDIA) or HDC based machines are used. At DC Cooling, we can deal with up to 200KW – hence, reducing Real Estate footprint by a factor of 10x-20x times a smaller size area.

Furthermore, since the liquid racks are set horizontally and not vertically – Data Center building costs can be reduced from a construction point of view (No need for 6 Meter high ceilings and raised floors).

Additionally, initial chiller and blowers expanses are almost eliminated (Minor heat exchangers are used instead – which are a 1/50 of chillers costs), half (½) of generators are needed to be bought – and fuel reserves plus UPS's (Uninterrupted Power Supplies/Batteries) are cut in half as well!



And if that's not enough, if most critical components of the Data Center fail and servers still need to be operational – Data Centers and their clients get DOUBLE the time if not more to remedy the problem.



**About Us:** We at Next Generation Green Technologies are professional group of the highest industry standards. We designed and built data centers, such as Cisco System's \$1 Billion Lab, built and operated Tier-4 Data Centers and beyond. Reach out: [sales@nextgen-green.com](mailto:sales@nextgen-green.com)

- [What is immersion cooling?](#) (3M)
  - <https://www.youtube.com/watch?v=ZJTQX3Htx3g>
- [Best Practice of Alibaba Datacenter-Immersion Cooling Escorts Cloud Computing](#)
  - <https://www.youtube.com/watch?v=-5c-7HGdp00>
- To cool datacenter servers, Microsoft turns to boiling liquid
  - <https://news.microsoft.com/innovation-stories/datacenter-liquid-cooling/>
- Microsoft has a tip for miners
  - <https://www.hardwareheaven.com/microsoft-has-a-tip-for-minors/>