

Thermoelectric Generation Systems – TGS device FAQ

Q. What does TEG stand for?

A. TEG stands for Thermoelectric Generator. We define a TEG as a module or TEG module that can be integrated into a computing system. We can use multiple TEGs within a system.

Q. What kind of IT systems are candidates for Thermoelectric Integration?

A. Any kind of IT system that has components that produce enough waste heat for Thermoelectrics to harvest. All server, router, switch, appliance and even UPS platforms with their associated CPUs, ASICs and chip sets plus power supply components that produce the byproduct heat from their normal use. This heat can be put to use before it is cooled.

Q. What about low voltage or low wattage components we are always hearing about from vendors?

A. Those components will still generate waste heat, maybe not as much as other components in the past but with the advent of more powerful VLSI in smaller platforms and the efficiency gains with Thin Film Thermoelectrics the low voltage components in a system are still harvesting candidates. Also, all the other components in a system (such as hot PSU sinks, voltage regulators, network ASICs, etc..) are not low wattage byproduct producers and thus are also candidates for harvesting as well. There will always be waste heat in the system unless we go to all optical or Quantum computer system which is something that won't be available for general consumption at the enterprise level for a long time.

Q. Are TGS Servers dependent upon any specific type of CPU?

A. No, TGS Servers can be built from any platform model. Our system is CPU, BUS, Fabric, power supply platform and even chassis/case independent?

Q. Will the cost of integrating Thermoelectrics into a system outweigh the value of the energy it produces?

A. No, for two reasons:

1). Due to economies of scale, bulk purchasing of TEGs that a major OEM can conduct will keep costs inline as opposed to a small systems builder building only one or two. Advances in TEGs and Thin film are also reducing the production costs of TEGs.

2). Usage factor, the longer the new TGS system is in production and the energy generated is used the value of that energy, in any form, from offset savings or other use, will surpass the initial cost associated just for the TEGs to be integrated. This delta time can be weeks or months or a year depending on the system or amount employed. See our whitepaper **The Case for Thermoelectrics in the Data Center** on our website for details about the economics and ROI of our system.

Q. How do you scale the energy from the TGS device?

A. By connecting other TGS devices in various power source circuit combinations such as in series, parallel or series parallel. This can be done with a Power Distribution System, which we are working on or our systems can be incorporated into an already employed DC based system in a data center if one is present.

Many telecommunication companies built their data centers using DC at 48v and higher. Our systems can integrate into those as well as newer data centers utilizing just DC based distribution systems from other vendors at the rack/cabinet level.

Q. What is your recursive work all about?

A. Our recursive work is taking the energy from a single TGS system and re-applying it to the same system so it can reduce its power draw from the grid in the first place. For example a 1u server may draw 300 watts, but the work it conducts as a web server creates enough byproduct fuel for our system of TEGs to harvest continually and consistently produce 50 watts of power we can reapply that power to service a component in the same system so the system now only draws 250 watts and thus reduces the electric bill to power this system in the first place.

Q. Does your system integrate or work with other renewable energy systems that an enterprise is utilizing?

A. Yes, our system can work with data centers that are using solar, wind, geothermal, and other systems of renewable energy. The energy our systems produce is DC based so it can be integrated into the power distribution/conditioning or pooling system those renewable system utilize. Our systems just complement any existing alternate energy source system the data center may have already employed.

Q. Where can we see a demonstration of your system?

A. At the moment we have online demonstrations available on our website at:
<http://www.amilabs.com/tgs>

We will have additional demonstration models available for trade shows in the future.