

A Visit to Defkalion Green Technologies

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This article does not pretend to be a technical report on a visit to a new energy science laboratory. Instead, it's a personal account intended to share the essence of what I heard there—glimpses of the thinking behind a company that could help change our world for the better.

However, readers who are aware of nanoplasmonics—a new area of science dealing with the interaction of photons with matter including nuclei or sub-nuclear particles—will be interested to read how scientists at the Defkalion Green Technologies (DGT) lab now describe phenomena that they see happening in DGT's excess-heat-producing Hyperion product. Instead of using the term low-energy nuclear reactions (LENR), DGT has been calling the process HENI—heat energy from nuclear interactions. A recent breakthrough resulted in a change; instead of the “N” standing for nuclear, it now stands for nanoplasmonics. I expect that this simpler interpretation of the phenomena could help with the public image of this field and its products. Could it also build alliances with other academic fields?

In April 2013, I met the officers and employees of Defkalion Green Technologies. I approached that meeting with mixed feelings. While driving to their laboratory at the University of British Columbia (UBC) in Vancouver, I knew that afterward I would enter a virtual no-win zone if I wrote publicly about my trip. Unless it could give the world new technical data about the operation of Defkalion's product Hyperion, any report would be a magnet for scorn. And providing that new data was *not* the purpose of this visit. Instead, it was an introductory meeting arranged by a mutual friend, retired industrial chemist Dr. Peter Gluck, at a time when the DGT officers were too busy to allow media interviews.

Adding to my apprehension, I arrived in the company of engineers whose insights I would not be able to quote in my writings, due to sensitivity regarding their employer and their signed non-disclosure agreements.

As a non-scientist who dares to comment on revolutionary energy developments, I rely on independent advisors—qualified scientists and engineers—for technical assessments that I can put into everyday language for general public audiences. But my fellow visitors to Defkalion made it clear that they would not be speaking out publicly about this visit, for the time being.

All that I can tell you about them is that two of the engineers work for a large electrical utility and the third is a physicist employed by a reputable testing laboratory affiliated with the utility. The purpose of their viewing a demonstration of the Hyperion was educational and to explore the conditions for a possible business relationship between their employers and DGT.

One of the three, my friend Vlad, told me that the decision to collaborate would hinge on “whether Defkalion is okay with a totally independent test conducted in our testing laboratory that should put an end to speculation about the reality of their claims.” Critics claim Defkalion have not presented adequate information and data from testing so far. The independence of the test performed by seven scientists on (competing entrepreneur) Andrea Rossi's Energy Catalyzer (E-Cat) heat transfer device—described in a recently published paper on arXiv.org by those scientists—had been already criticized and the results questioned. Vlad said that, since the LENR phenomenon of excess heat is accepted as real by most experimental scientists in the field, “it is only logical to give all the companies that claim such working technologies the benefit of the doubt, and encourage them to prove themselves beyond any reasonable doubt by undertaking proper independent testing.”

Regardless of the constraints on sharing the other visitors' opinions, I came away from Vancouver deciding to write about Defkalion for my next magazine column deadline for *Atlantis Rising*. I am convinced that in the DGT laboratory we had been shown a successful “cutting edge” energy technology demonstration—three times more heat power output than the energy input—while we viewed data points on a computer screen and Defkalion's Chief Technology Officer (CTO) John Hadjichristos patiently answered questions for several hours. A lab assistant who is a chemist also explained the equipment being quietly operated in front of our eyes.

Of course, the technically savvy readers of *Infinite Energy* want specific data from instrument readings—from longer-duration testing conducted according to scientific protocol. At the DGT lab I was told that independent scientists, from respected institutions, who conducted months of third-party testing of DGT's Hyperion have written a paper. So you can expect to receive such data soon.

For readers interested in non-technical aspects of the LENR scene, farther along in this article I will include some of the DGT team's philosophy. First, I have excerpted some pertinent details from the column I wrote for *Atlantis Rising* Issue 100. I have posted a copy of the original column on my blog: <http://changingpower.net/wp-content/uploads/2013/05/Defkalion-2-page-JM-Article-100-3.pdf>

The good news claim is that DGT can *control* their multi-stage dynamic process. We observed their fifth-generation apparatus being ramped up in minutes instead of taking hours or days to reach levels of heat output several times higher than equivalent energy input of electricity. If we had watched a longer demonstration we may have seen even higher levels of more output than input.

Afterwards it was explained to me that the tested appara-

tus so far produces 5 kilowatts. The next prototype is expected to be able to operate nine reactors working in parallel, creating a multi-reactor producing up to 45 kilowatts. The power of each reactor can be modulated to put out between 1 and 5 kilowatts by use of the control mechanism—electrical currents creating and maintaining the plasma.

All that's needed to shut down the reactor is to switch off those currents that create plasma.

The Hyperion doesn't burn fuel; it creates a reaction involving atoms' nuclei, but not necessarily the kind of nuclear reaction known or speculated by nuclear physicists on the Fleischmann-Pons effect. Instead it's said to be somewhere between a nuclear and chemical reaction. Bottom line: several different versions of kilowatt Hyperion units tested in Greece ran continuously for six months on less than three grams of powdered nickel and two liters of hydrogen.

Standing in the laboratory that DGT rents at UBC and observing their core technology working smoothly on a nearby table, it felt like I was seeing the bare beginnings of a new era. Defkalion's sixth-generation apparatus, which we didn't see, is a pre-industrial version designed for household use—analogue to the little personal computer which skipped past the huge expensive mainframe computers and reached the public.

The size of a Hyperion 45-kilowatt-of-heat-energy household unit, however, will be similar to a dishwasher. DGT's plan is to make a self-contained 45 cubic centimeter box and have it fully automated, with a heat management system and software inside it.

We were extra lucky to be visiting the Defkalion laboratory, because it was soon to be put into lock-up mode in order to meet development deadlines.

To Vancouver from Greece

Defkalion opened a new R&D facility in Vancouver in late 2012 after exploring the opportunities that were available elsewhere in Canada. Defkalion shareholders continue to fund this project while expanding their ties with international institutions.

Their new location offers advantages, such as being able to rent the use of advanced measuring equipment at UBC's labs. Possible future cooperation could result in new ceramics to support structures inside Defkalion's device, or the university's theoretical experts might further explain the working process.

John Hadjichristos says their core technology is also operating elsewhere. Defkalion is establishing regional R&D centers in countries around the world "to ensure fast growth of multiple applications worldwide." Currently they have R&D centers in Athens and Milan. Defkalion will soon announce its Latin American location.

These regional laboratories will develop various industrial applications in direct partnership with companies whose expertise lies in each application, such as connecting Defkalion's core technology to Sterling or Rankin heat engines, agriculture, marine propulsion and space propulsion, to name a few.

In Vancouver, Hadjichristos and his lab assistants won't try to specifically engineer Hyperion

products for aircraft, steel factories or other industries. "We're not specialists at everything. Our job is to produce safe, green and low cost energy."

DGT Business Development Officer Symeon Tsalikoglou further said, "The responsibility to develop specialized usage of Defkalion's technology will be on those companies that are partnering with Defkalion for common R&D projects."

Team Began Five Years Ago

When they first came together, the Defkalion team didn't plan to develop an energy source technology of their own. Hadjichristos explained that five years ago they began to investigate developing certain industrial products. That effort focused later on Andrea Rossi of Italy's claim that he had a game-changing nickel and hydrogen energy technology that could be turned into industrial products.

Alex Xanthoulis, now Chief Executive Officer of Defkalion, built a team to investigate and see if Rossi's E-Cat claims made sense or not. Xanthoulis and his new team then formed a company dedicated only to these technologies. They found out that Rossi was indeed onto something.

"But unfortunately for him it is not well designed to be controllable," Hadjichristos told us, "so it was impossible to develop a technology around something that cannot be controlled."

While Defkalion was in a business relationship with Rossi's company, the Greek company invested much money on designing around what is called a black box—a technology whose inner secrets are not revealed.

Rossi said as much in his August 4, 2011 press release announcing the end of his agreement with DGT for the production of E-Cats: ". . .no information, nor industrial secret nor any technology whatsoever has been. . .disclosed. . .to Defkalion nor to any Greek company. . .it still remains a well-preserved industrial secret."

In addition to Rossi's secrecy about the technology, there were complications in business dealings such as how Rossi



Defkalion CTO John Hadjichristos with an experimental Hyperion.

dealt with a contract that his company had with Defkalion.

During this visit Hadjichristos didn't want to get into a discussion of the two companies' divorce, and just said to us, "We hope that he will be successful also." He recalled that Defkalion's problem at the time was that they had invested their shareholders' private money into product-design projects and faced a decision—stop and give up on this area of research or try to conquer its challenges by themselves.

When Defkalion faced that decision, Hadjichristos had studied almost all of the scientific papers available in the LENR online library (<http://lenr-canr.org>) at that time. He had some ideas, and proposed "give me six months and a small team of scientists and I might have a chance to make it happen."

Hadjichristos decided not to take direction from other scientists' previous LENR attempts, except for minor areas of research such as how to handle materials. The team did look for common features of what is called the nuclear active environment (NAE) found in successful LENR methods. Hadjichristos said, "Already we understood that the process could not be controlled in the environments used in all the experiments since Fleischmann and Pons. . ."

Unlike most LENR researchers whose initial goal is getting the highest level of heat output from their prototypes, Defkalion first designed their apparatus for its ability to control the phenomenon. The goal of achieving the best ratio of output to input came afterward.

The Greek team began with small ideas and played with them, and checked out suggestions from even very young scientists on their team instead of rejecting unusual original ideas. For instance, a young scientist who is currently apprenticing at CERN was a student of electrical engineering when he was inspired to make a suggestion that turned into one of the important technical advances for the company. The team also recognized Nature's clues; LENR-type events happen in the sun's corona and possibly in Earth's crust and in volcanic explosions as in many other not well understood phenomena in technical apparatus, such as high voltage transformer breakdowns.

Early in their experimentation, in one incident they suddenly saw unexpected levels of heat energies. Eventually they were confident that they started to understand the reaction.

The DGT team solved a major technical problem by thinking like the strategist in an ancient legend about the Trojan War, the hero Odysseus. "Trojan Horse" has become a metaphor for any trick that causes the target to allow their enemy into a space where the enemy can then defeat the target. This is another interpretation of engineering as signalled in the Greek language.

In the legend, Greece had been fighting a long war and was stopped outside the gates of the walled city Troy. King

Agamemnon had led futile sieges for ten years. Odysseus was inspired to build a huge wooden horse—the horse being Troy's emblem. Under cover of darkness the Greeks hid soldiers inside the horse. While the Greeks pretended to sail away, the Trojans pulled the horse into their city as a trophy. That night the soldiers crept out of the horse and opened the gates for the rest of their army, which had sailed back. They destroyed the city and ended the war.

John Hadjichristos compares fusion researchers' strategies to that war. Troy's castle or a mountain can be a metaphor for the Coulomb barrier, the repulsive energy that two nuclei need to overcome so they can get close enough to fuse.

Agamemnon tried to take down the castle by using his troops' brute force. Hadjichristos said, "The hot fusion guys are doing what Agamemnon was—trying to squeeze and break that energetic mountain. These kinds of strategies. . . cost a lot of money and what you gain is less than what you lost."

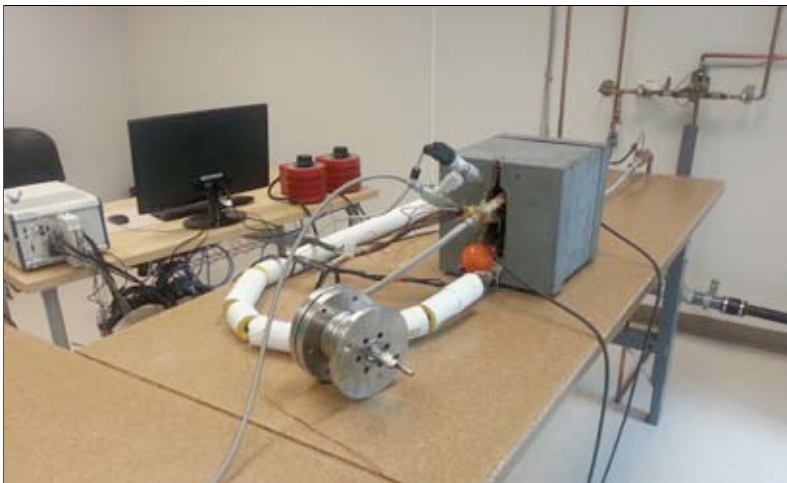
"We did what Odysseus did to get rid of the castle with his warriors." The DGT strategy was to properly "disguise" the proton from the hydrogen nucleus so that other nuclei wouldn't recognize it. It still was a proton, but for a very short time, something like 10^{-13} of a second, it looks like a neutron due to the stretched (elliptical) orbit of the accompanying electron in clusters. For this fleeting period of time they "disappeared" the mountain since the Coulomb barrier was no longer a barrier. "Then it's rather easy to get (particles) in a dance and create the energy."

Defkalion's terminology for describing the entire field of research is intended to deflect

potential problems with bureaucrats. Instead of LENR, the company would prefer to say that their process is heat energy from nanoplasmonics interactions (HENI). The words "nuclear reactions" in LENR have raised red flags in many countries' nuclear regulatory agencies while not describing the real nature of the observed phenomena in the Defkalion reaction. Representatives of industries in more than 80 countries have contacted Defkalion about potential licenses to manufacture Hyperion products in their home country or to gain access to their technology for applications.

New Paradigm Philosophy

Alex Xanthoulis explained why the company turned down lucrative offers from large corporations that wanted exclusive rights to the DGT technology. It was not an easy decision, but DGT officers decided to keep the rights to the household-sized unit because they want people in all economic circumstances to benefit from affordable power technology. Xanthoulis' personal experience with helping an elderly acquaintance who could not afford to pay both rent and heat for her apartment serves as a metaphor to his team;



The Hyperion device.

their touchstone is a “Mrs. Maria” motto—a reminder to design a product that will be priced such that simple and vulnerable low-income people can have access to cheap energy.

They also take seriously the possibility of too much heat energy escaping into the environment when large numbers of their units are built, tested and sold to consumers. This concern led to embedding technologies and design architectures into the Hyperion that will avoid as much irresponsible consumer or producer behavior as possible. “In Europe you cannot throw energy into the environment. It is a very bad habit,” Xanthoulis explained.

My power engineer friend vehemently expressed his own worries—that in worrying about waste heat escaping from customers’ windows, DGT officers are taking responsibility for society’s problems and that concern could deflect them from getting a product out into the world.

Hadjichristos replied that DGT’s responsibility is only to provide—inside the Hyperion’s enclosure—the tools that help a customer be more environmentally friendly. Software and other mechanisms for responsible use of the technology will be built into the design of their first commercial product. “Full stop. That finishes our job.”

There is much more to the DGT vision than can be covered in a short article, such as using waste heat to warm neighboring homes or businesses and provide hot water; cogeneration and other ways to turn waste heat into electricity; how small decentralized energy generators such as Hyperion can make an “intelligent grid” possible; teamwork in the larger world of planners, researchers and scientists.

“Talk To and Hear Each Other”

Before my visit I read a blog discussion in which John Hadjichristos told Peter Gluck—regarding the need to keep academic dogma and egos out of a definition of the new phenomena—that more open-minded attitudes and unity among specialists are required. “Science is one, and we have to keep it that way if we want to keep on talking with Mother Nature,” Hadjichristos wrote. “We can not see or listen and understand her stories if we stop talking to and hearing each other.”

Dr. Gluck, who had actively researched the cold fusion/

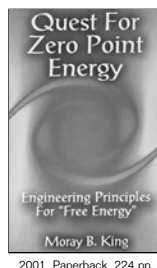
LENR field even before retiring from the chemical industry, writes on his blog (egooutpeters.blogpost.ro), “Cold fusion came before its time. It is too complex, too new, too unexpected, too messy, too multifaceted, too dynamic, too non-linear and too weird to be really understood and controlled at the time of its discovery.”

As he sees it, over the years some LENR scientists retreated into the safer position of “we’re making discoveries in basic science,” instead of resolving to make practical heating devices that ordinary people could use soon. Fleischmann and Pons’ original vision lost its momentum. The two had wanted to bring a new source of clean energy to the world and develop useful products, but instead they were punished for announcing their discovery prematurely.

LENR hasn’t solved the world’s energy problems, so in Dr. Gluck’s view it makes sense to move on to a new category of research and development—“LENR+.” The difference is that LENR+ aims more directly at making commercial products. He looks to Defkalion Green Technologies and sees that focus and cause for optimism.

About the Author

Jeane Manning is an award-winning author whose books are published internationally. Her co-authored book *Breakthrough Power: How Quantum-leap New Energy Inventions Can Transform Our World* can be ordered from *Infinite Energy*. The e-book of *Breakthrough Power* is available from <http://BreakthroughPower.net>. Follow Jeane’s blog at: <http://ChangingPower.net>



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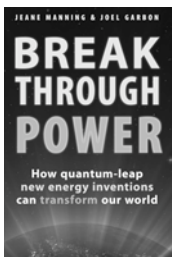
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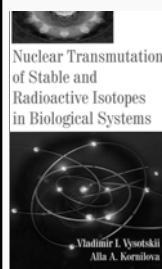


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