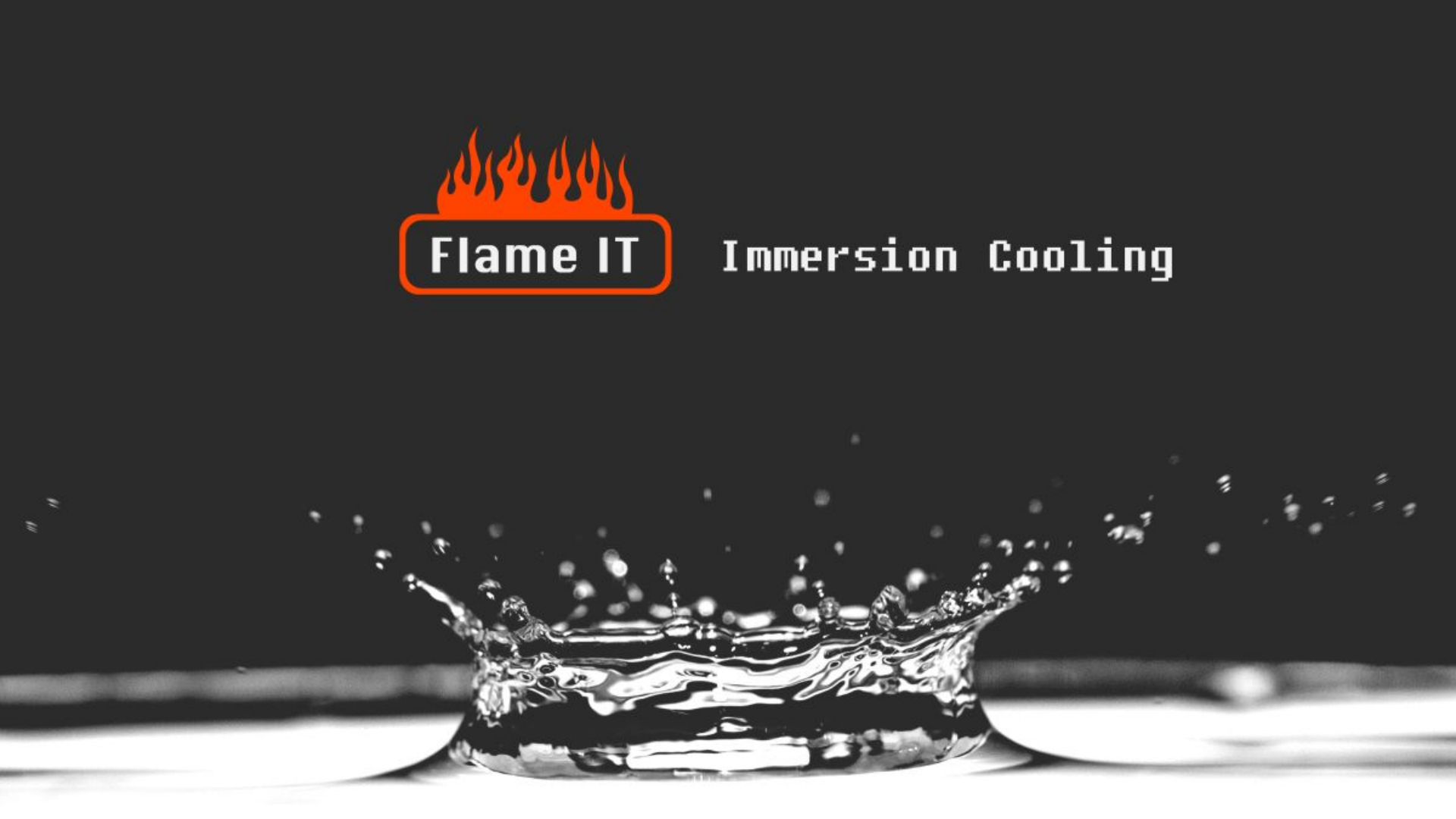
Flame IT
Immersion Cooling

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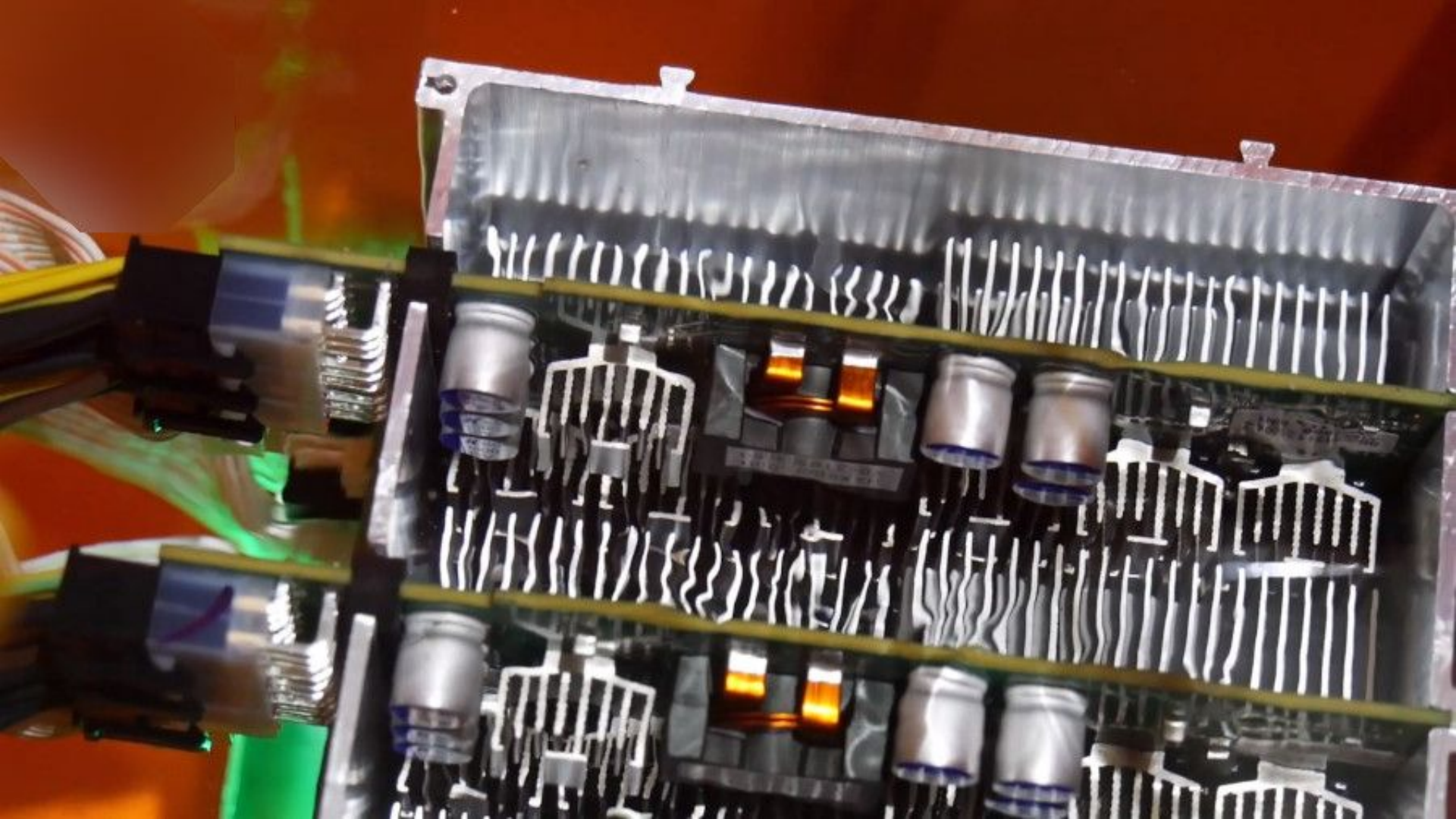
Computers generate heat

The laws of physics require that a certain amount of heat be used in computation. This is a consequence of the Second Law of Thermodynamics, and may not be violated under our current understanding of the laws of physics.

Using these two principles (the Landauer bound and the Margolus–Levitin limit), we can determine quite accurately how much heat would be released by a computer that brute-forced a 128-bit cipher. The results are profoundly silly: **it's enough to boil the oceans and leave the planet as a charred, smoking ruin.**

https://www.gnupg.org/faq/gnupg-faq.html#brute_force



Flame IT

About us

Since 2018 we are developing most advanced and best liquid cooling solution for electronics in the world. We create the most modern, most innovative and efficient solution that enables many times more effective cooling of electronic devices by immersing them in our specially designed, fully synthetic, single-phase liquid.

Compared to air cooling, our solution allows to reduce the overall operating costs of the equipment by several dozen percent. We are able to reduce the costs of cooling alone by over 95%. Savings come from the fact that no fans and air conditioning are needed to dissipate heat. The liquid reaches every nook and cranny of the submerged equipment, and for the operation of the whole thing you only need a pump forcing the heated liquid to the heat exchanger. Recovered waste heat, in a useful form, can be further used to further increase the profitability of the installation. Flooding with liquid and removing the fans completely eliminate noise, vibrations, extend the life of the equipment and enable us to obtain unprecedented computing power.

Lowering PUE (Power Usage Effectiveness) to unprecedented values ≤ 1.03

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Impact on the surroundings, society and the environment

- **Completely eliminating noise**
- Clean working environment of devices, no dust
- Minimized risk of fire (flash point >150°C, auto-ignition temperature : > 320 °C)
- The liquid is **safe for humans and the environment** (non-toxic and biodegradable)
- **Fewer breakdowns by eliminating vibrations caused by fans**
- Compatibility with 19'' and 21'' Open Rack solutions (R&D)
- **Significant reduction of OPEX costs (up to 40%) and CAPEX**
- **PUE (Power Usage Effectiveness) <= 1.03**
- Thanks to better cooling, the equipment works more stable and more efficiently:
  - **Does not overheat** (optimal operating temperatures translate into better efficiency)
  - That gives ability **to safely overclock systems** (with good heat rejection even up to 30-40% more computational power)
- Higher computing power density per unit area (compared to traditional DC’s)
- Using waste heat You can support other heat sources or completely replace them
- Green DC’s
  - **Reduction of CO2** emissions through reduced electricity consumption and the use of recovered heat
  - Eliminate water in the cooling cycle

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Monetization method

Sale of fully equipped and ready-to-work products in various variants:

- mobile computing containers (several dozen, several hundred devices)
- clusters / computing cabinets (several or a dozen devices)
- workstations (one or several devices)

Sale of complete cooling solutions, without IT equipment. The customer will perform the installation by himself (with little help of hydraulic) or together with support of our team.

Launching own computing centers and selling recovered heat.

The potential use of the heat recovery solution / is seen in the following areas:

- **IT:** cryptocurrencies, computing centers, telecommunications, etc.
- **Industry / Agriculture:** providing waste heat from the IT area to technological processes: drying, heating, cascade heating, etc. (we helped launch a heating solution for 40,000 chicks)
- **Construction**: use of waste heat for heating existing and newly emerging properties.
- **Individual customers:** household heating: water, swimming pools, underfloor heating, etc.
- **SmarCity Heating:** we supply "intelligent heaters" for **Rural Central Heating**

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R&D: Control & Monitoring

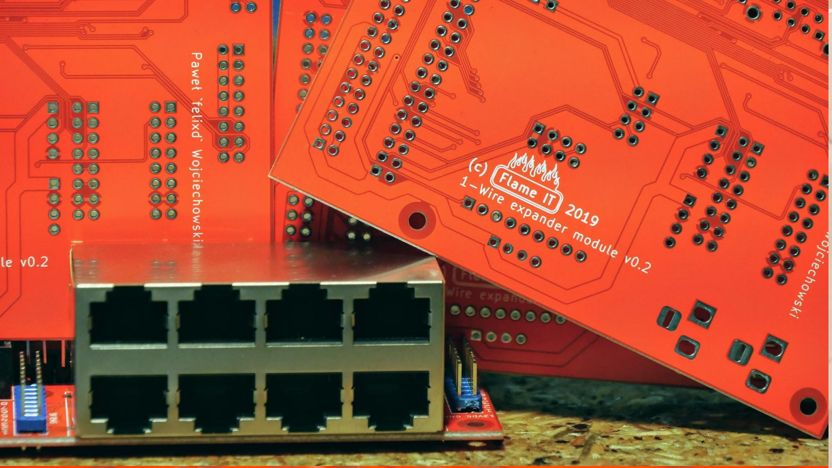
It is our starting point for the module that monitors the operation of our cabinets / containers. The module is connected to the SBC computer (Single Board Computer)

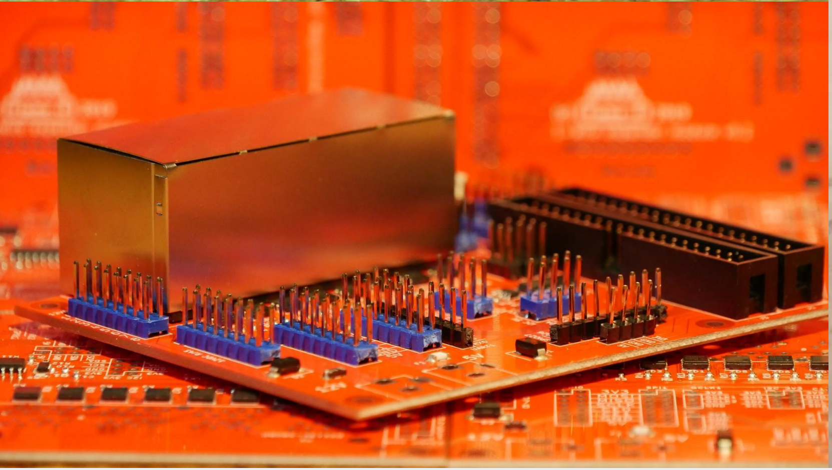
At the moment, it allows us to monitor up to 160 1-Wire sensors: temperature, pressure, humidity, etc.

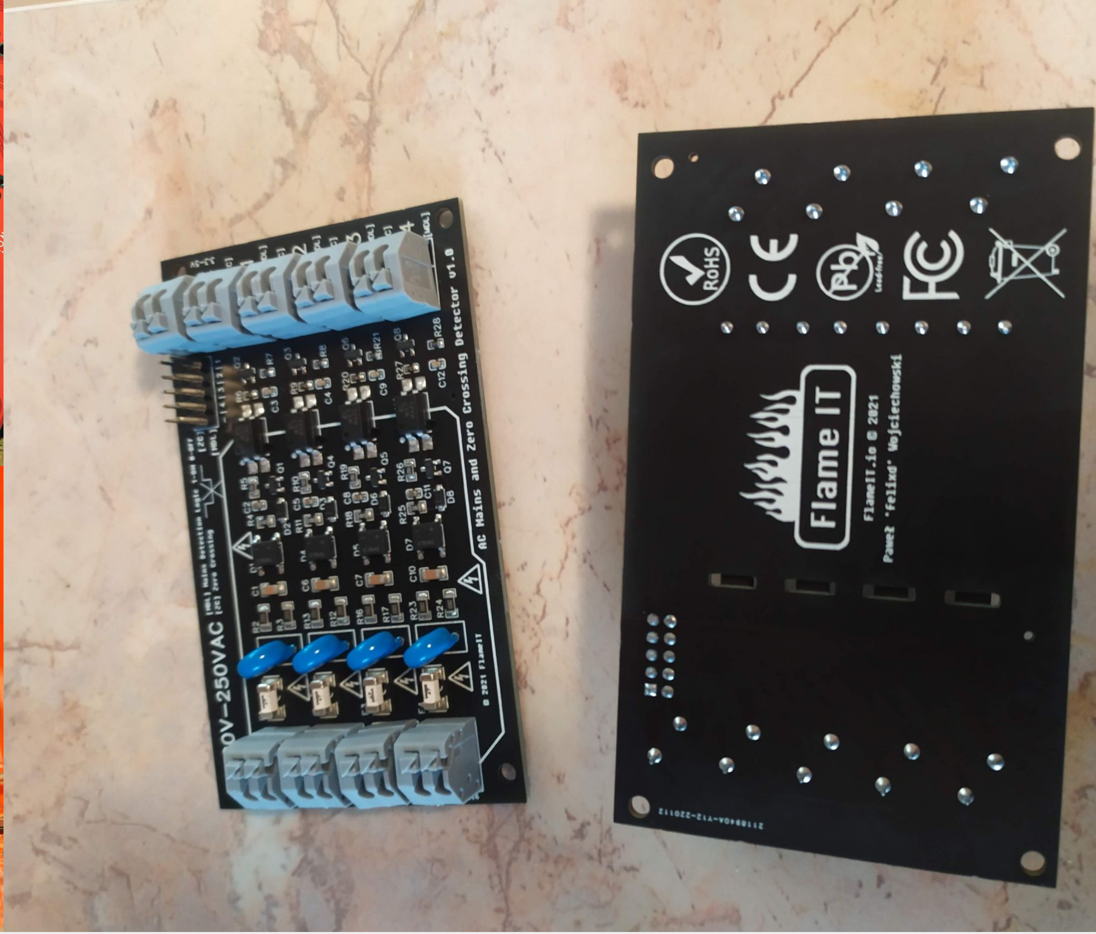
The platform gives us flexibility of operation and development. Ultimately, it will be responsible for monitoring and controlling the operation of our all solutions.

We are also designing our own state in the art, mains sensors for monitoring and controlling electricity.

What has already been done and what’s under development


Paweł 'felixd' Wojciechowski
(c) Flame IT 2019
1-wire expander module v0.2




AC Mains and Zero Crossing Detector v1.0
Flame IT
FlameIT.io © 2021
Paweł 'felixd' Wojciechowski

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Proof of Concept installation

- In 2018, the first prototype is created that is still working!
- In the years 2018-2021, we built our own 22 kWp PV installation from scratch to support our project.
- Water tanks with a total capacity of 600 liters have been installed. 400 + 200 liters.
- We don’t have cold water in the morning. All water goes through the 200 l water buffer.
- Water temperature: 45-55 oC
- IT equipment power: 1.5kW
- Thanks to the entire installation, during summer, there is no gas consumption at all. All hot water is provided by our prototype.

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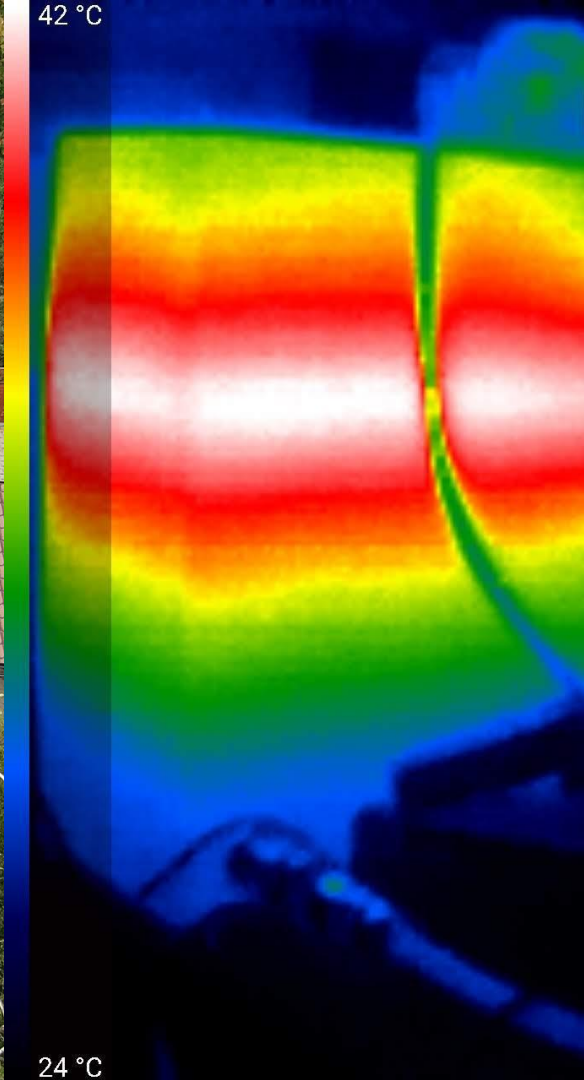
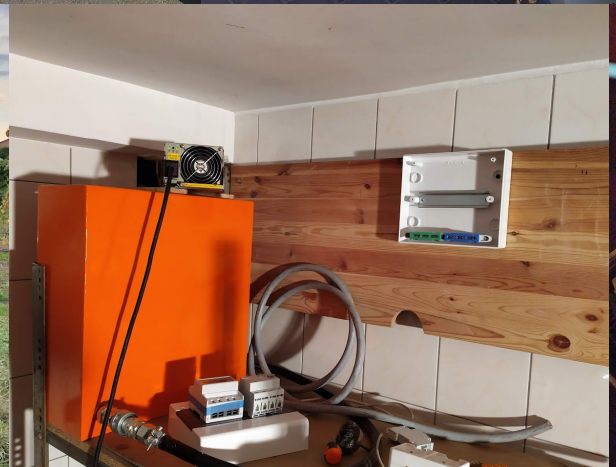
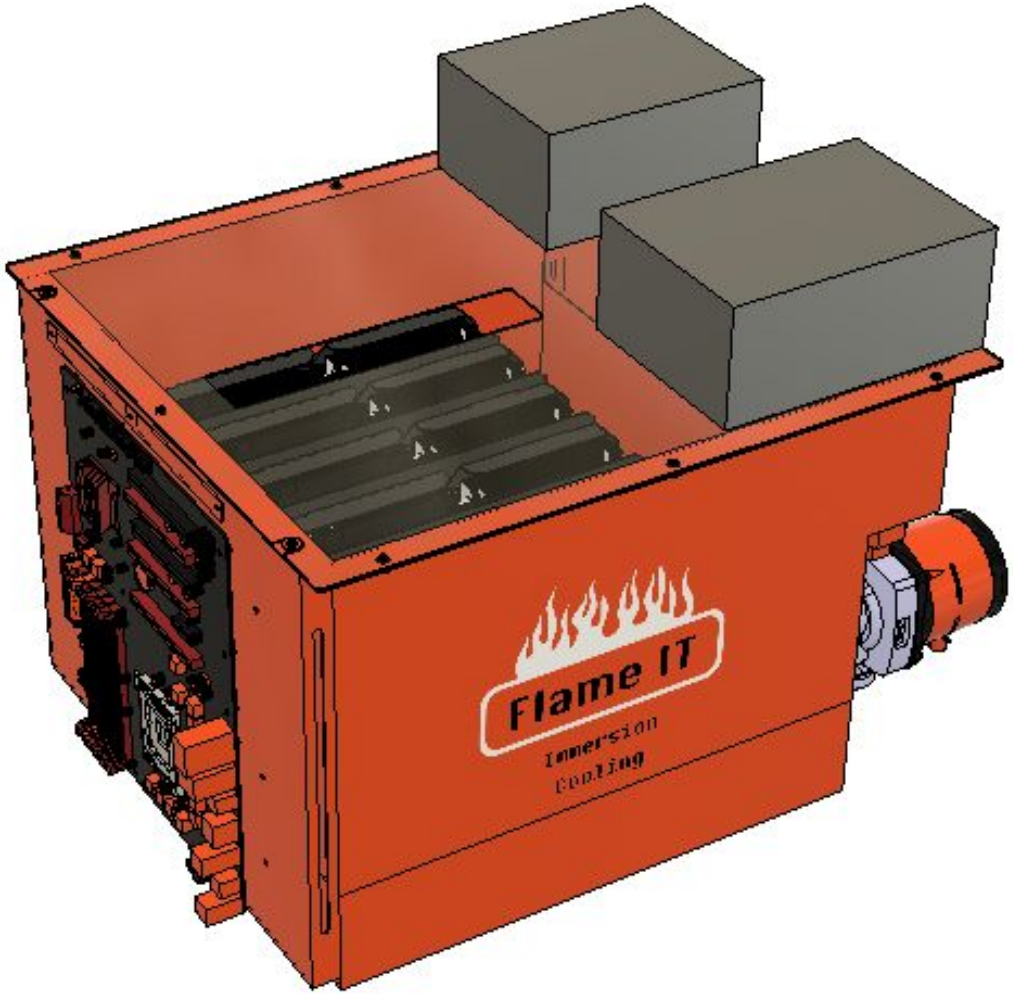
Proof of Concept / Working installations

- Several house/industry heating installations have already been created:
  - 2 * ASIC tank
  - 4 * ASIC tank
  - 6 * GPU tank
  - 12 * GPU tank
- We are keeping 40 000 chickens warm
  - https://www.youtube.com/watch?v=xhOoKwJALz0
- Hotel swimming pool heating installation is supported by our solution. The project, in the future will evolve to supply all heat needed by hotel

We are waiting for Your project to be on that list!


42 °C
24 °C




Flame IT
Immersion
Cooling

Immersion Cooling ready pumps

Probably, as first company in the world, we have immersion cooling ready pumps.

We have managed to find a partner that produces our fully immersion cooling ready pumps.

All the materials in the pump have been carefully selected to meet our requirements and to face material compatibility issues. We have, out of the factory, pumps that work.

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Tanks

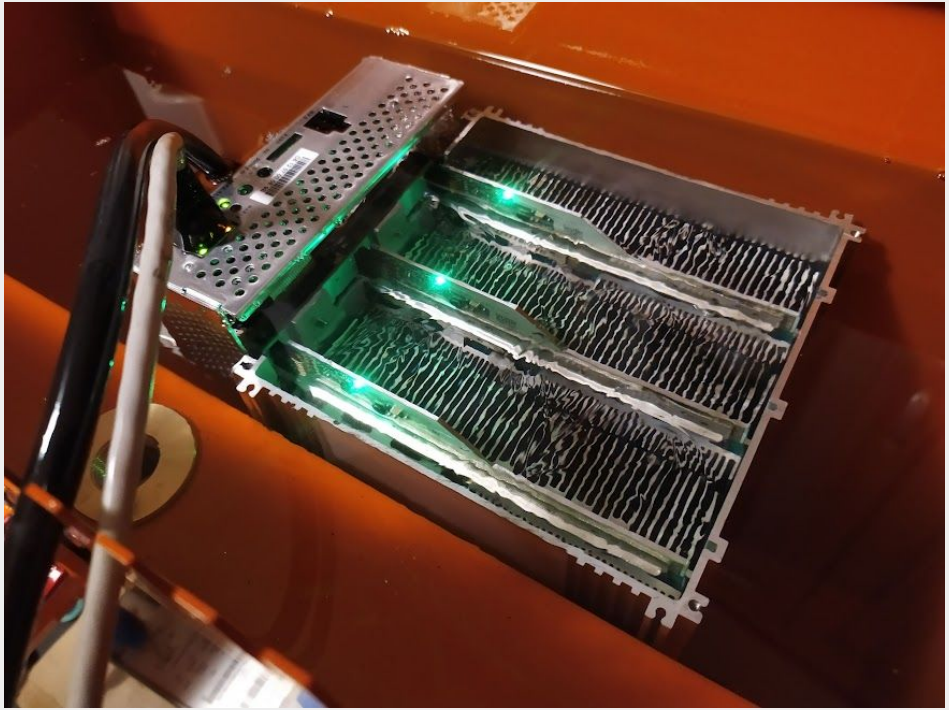
We have designed and manufactured wide range of different tanks designs.

From really small tanks for 2 ASIC miners to bigger containers for 4 / 8 ASIC miners (Antminer S19 as reference size)

We also have designed and manufactured tanks for GPU cards.

By the end of December 2022 we will introduce 19/21’’ server solution.

FlameIT is capable of doing any size project. 200MW installation? We are here to help.



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Cooling Liquid (FITCool6)

After years of searching, we established cooperation with a chemical plant that produces the best synthetic cooling liquid for us. Our product, a single-phase liquid, offers the best thermal conductivity available. It is completely safe for humans and the environment, and above all for submerged electronics.

We have full access to the R&D department and chemists with whom we cooperate. We are able to perform full material compatibility tests using industry standards.

We deliver the best cooling liquid solution in the world.

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Our team

- **Paweł Wojciechowski (Poland) - CEO**
  He studied Automation and Management at the Poznań University of Technology in Poland. For 7 years he developed the start-up Azimo as Software Programmer.
  https://www.linkedin.com/in/pawelwfelixd
- **Marek ‘Senior’ Wojciechowski (Poland) -** 40 years of software development experience
- **Marek ‘Junior’ Wojciechowski (United Kingdom) -** sales, UK
- **Vivek Singh (New Delhi, India)** - sales in India/ASIA. IT development. 10 years of professional experience as a software tester. It is currently developing in the field of pentests.

and growing... :)

We also work closely together with professionalists from below fields:

- Companies in the field of plastic processing of metals
- HVAC designer, BIM (Building Information Modeling)
- Automation specialist, producers of professional prefabricated low voltage cabinets

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Media about us

GNIEZNO24.COM

https://gniezno24.com/wywiady/item/23909-pradi-i-cieplo-prawie-bez-kosztow-gnieznianin-udowodnil-to-dzieki-kopaniu-bitcoinow [PL]

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https://www.onet.pl/styl-zycia/noizz/polak-ma-koparke-bitcoinow-na-panele-solarne-zarabia-i-nie-placi/07mnf0c,3796b4dc [PL]

Thank You for Your attention.

https://flameit.io