



Ficolo Environmental Policy

About Ficolo

Ficolo Oy (Ficolo) is a Finnish limited liability company providing Cloud Delivery Services including colocation datacenter services. Ficolo operates three colocation datacenters and a connectivity hub point in Finland. Besides the colocation services Ficolo's services include Cloud Connectivity, Managed Cloud and Cloud Assurance service. Ficolo's vision is to become the largest independent colocation datacenter operator in Finland.

Environmental sustainability in datacenter industry

Global ICT sector electricity use is about 10 per cent of global electricity demand of 20,000TWh. Datacenter electric demand is, in turn, 10 per cent of total ICT sector demand. The Finnish datacenter electricity demand is in line with the global demand and is estimated being 0.5-1.5% of total Finnish energy consumption.¹ With global data traffic more than doubling every four years, data centers are potentially a cause of major environmental impact already in the near future.

Ficolo approach to sustainability is to use renewable sources for energy consumption, and bring about a major improvement in the energy efficiency of servers, storage devices and other ICT equipment.

Environmental sustainability at Ficolo

Ficolo assumes responsibility for preserving the nature and minimizing environmental impacts. Ficolo actions are guided by applicable laws and regulations but also from Ficolo's strive to provide environmentally friendly services. In Ficolo's case, ca. 15% of Ficolo's total costs and ca. 20% of variable costs come from energy consumption. The relative low level compared to the industry average is associated with the service mix of which substantial part is value adding services on top of colocation services Ficolo provides. Nevertheless, energy consumption forming the main part of the carbon footprint and operational costs of a datacenter, focuses Ficolo on energy efficiency and selection of energy sources endeavoring to minimize its carbon footprint.

In order to increase the energy efficiency, reduce costs and stand out as an industry leader within environmental sustainability Ficolo has introduced the **Ficolo Environmental Policy** in 2011 based on seven principles:

1. We use 100% green energy in powering the datacenters.
2. We pursue to develop and implement energy efficiency of our processes and the data center e.g. by optimizing the conditions in the data center.
3. We utilize free cooling, and cold and hot aisles are in use in the data center.

¹ Motiva (https://www.motiva.fi/files/4828/Energiatehokas_konesali.pdf)



4. We recycle all our waste. Our target is to keep waste at minimum, especially landfill waste. Extra attention is paid to recycling of electronic waste.
5. We support our customers' environmental awareness by providing them the exact figures of their energy consumption.
6. We value products which help to protect the environment and utilize energy-efficient technology.
7. We reuse our waste heat. We equip all our datacenters with heat recovery facility to utilize the waste heat in the data center facility or local district heating networks.

Ficolo's target is to continue to reduce the energy consumption and increase the eco-efficiency of its solutions.

Seven principles of Ficolo's environmental policy

1. Using 100% green energy in powering the datacenters

Ficolo has powered its datacenters 100% with green energy since 2011. Currently, it uses two models procure green energy:

- Ficolo's The Rock Datacenter (in Ulvila) is powered through an electricity supply agreement with a local energy company for delivery of pure wind energy.
- In other data centers (in Helsinki and Tampere), Ficolo purchases electricity from the market through a local energy company first, and afterwards purchases the Guarantees of Origin corresponding to the amount of consumed electricity. Ficolo submits the copies of purchased Guarantees of Origin to its customers, if requested.

The nominal capacity of Ficolo's operational data centers and those under construction is ca. 11MW, which converts to electricity consumption of ca. 96,000MWh per annum at full utilization. Such a consumption would mean an annual savings of CO₂ emissions of 3,543 tons.²

In addition, Ficolo plans to construct a solar park with a nominal capacity of 0.5MW in proximity of its underground data center in Ulvila in order to offset data center's electricity consumption related to cooling. Ficolo has received energy subsidy from the Finnish government for the construction of the solar park.

² Based on full load assumption compared to Finland's energy mix emissions.

Further, Ficolo is an active participant in the national advancement of energy efficiency and the use of green energy within the data center industry through the national data center association and other networks.

2. We pursue to develop and implement energy efficiency of our processes and the data center e.g. by optimizing the conditions in the data center.

As a market standard, Ficolo uses Power Usage Effectiveness ratio (PUE) to evaluate how efficiently its data centers use energy. PUE is the ratio between the total energy consumption and the energy consumption by the data center's IT equipment.

$$PUE = \frac{\text{Total data center energy consumption}}{\text{IT equipment energy consumption}}$$

Ficolo does not only optimize the energy consumption of the data centers it constructs, but also improves energy efficiency of the data centers it acquires.

Ficolo does not only follow PUE and energy consumption of ancillary functions e.g. cooling but also focuses on IT equipment energy consumption in order to minimize the total energy consumption of its data centers. Ficolo minimizes the energy consumption of its data centers by using data center automation and close monitoring:

- Data centers are built with modular structure which minimizes areas where cooling needs to be applied
- Data centers' electricity usage is monitored and optimized in real time, thus Ficolo is able to react to abnormal peaks in electricity usage on a customer and a server level
- Data center temperature is monitored and optimized on 10-minute interval; Ficolo uses Big Data collected from the data center (space in active use, outside temperature, inside temperature, work load etc.) to optimize temperature (Ficolo keeps the temperature optimally high whereas data centers in general are often cooled too much)
- Lighting is used only where and when personnel working with smart sensor lightning
- Uninterruptible power supply (UPS) equipment and other equipment is selected based on energy efficiency and eco-friendliness (Ficolo uses UPS equipment with efficiency optimization function)

Ficolo's data centers' PUE are on the lowest industry levels³:

- The Rock (Ulvila): 1.15
 - As the data center is located in tunnels in bedrock, it needs to be cooled only a few days in a year when the outside temperature rises to above 25C
- The Deck (Tampere): 1.3; can be further improved
 - PUE was 1.6 at the time of acquisition and before Ficolo's optimization
- The Air (Helsinki, acquired from Fujitsu): expected 1.1-1.2 after optimization
 - PUE was 1.5 at the time of acquisition and before Ficolo's optimization
- The Air (Helsinki, under construction): 1.05
 - The Air will use air cooling only

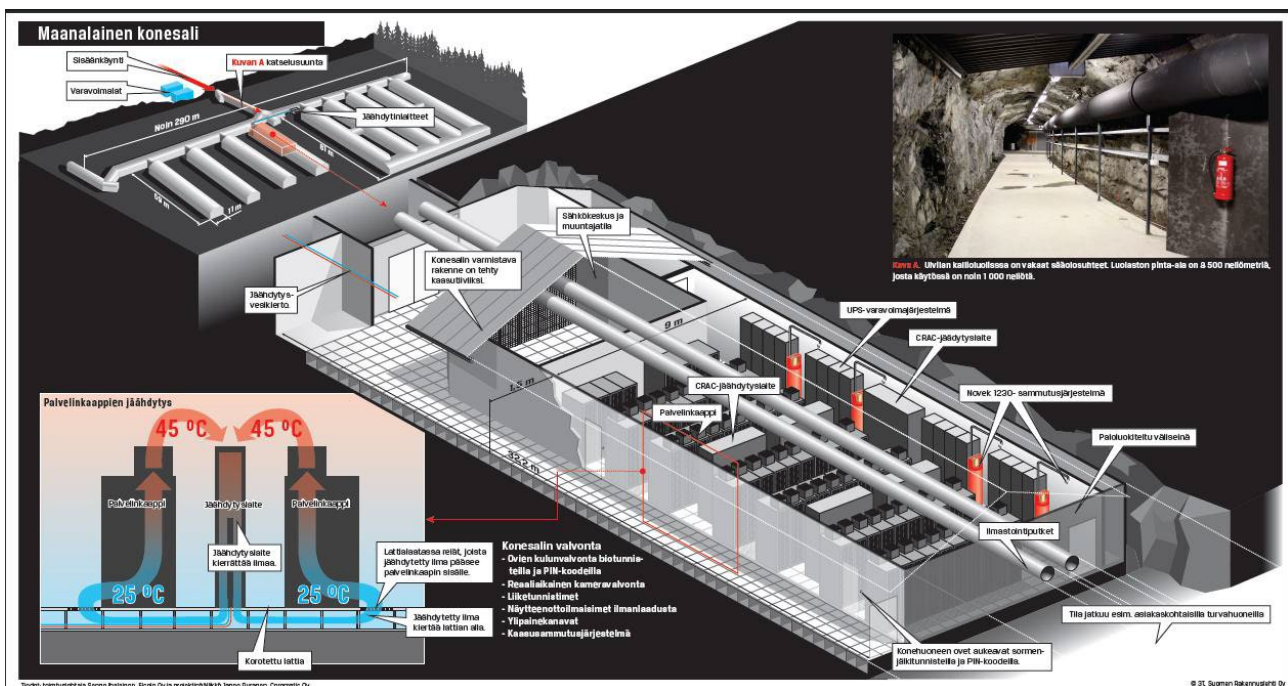
³ Google which is considered to be operating modern and advanced data centers reports combined PUE of 1.12 for all of its data centers.

3. We utilize free cooling and cold and hot aisles are in use in the data center.

In order to minimize the cooling needs of its data centers Ficolo uses modular structure, which means that only the area in active use need to be cooled compared to the conventional way is to cool the entire data center at once.

In addition, Ficolo uses free cooling, which is a most efficient cooling method.

- Since the Rock (Ulvila) data center is located in cool underground bedrock, the data center needs additional cooling only for a few days when outside temperature rises to above 25C. When needed, indirect free cooling is used to cool the data center.
- Liquid free cooling is used in both the Deck data center (Tampere) and the acquired part of the Air data center (Helsinki)
- The new part of the Air data center which is under construction will use indirect free cooling



The cooling is organized with cold and hot aisles, which prevents the cold air flow led to the servers from mixing with the heat produced by the servers. In addition, server racks are isolated from each other and placed in solid rows with no empty spaces between the racks, which further decreases the need of cold air flow. The cooling is optimized on 10-minute interval using Big Data it collects from the data center.

4. We recycle all our waste. Our target is to keep waste at minimum, especially landfill waste. Extra attention is paid to recycling of electronic waste.

Ficolo pays careful attention to the amount of waste its operations produce as a byproduct. By far the largest source of waste is packing materials of IT equipment Ficolo purchases into its data centers. Ficolo procures its IT equipment only from reputable suppliers with strict environmental policies in place, comprising both packing materials and the equipment itself, including manufacturing, logistics and energy efficiency.

Further, Ficolo recycles all waste it produces to minimize landfill waste. Ficolo requires ISO 14 000 certificate from its waste disposal partners. In addition, electronic waste is recycled through specialized partner with highest information security and environmental standards.

5. We support our customers' environmental awareness by providing them exact figures of their energy consumption.

Data centers' electricity usage is monitored and optimized in real time. Ficolo's customers have access to the customer portal where they can monitor among other things the work load and the electricity usage of their servers and the associated cost. This effectively increases customers' awareness of their electricity consumption associated with data storage and processing.

Real time monitoring of electricity usage enables Ficolo to react to abnormal peaks in electricity usage on a customer and a server level. Ficolo may alert a customer due to a sudden or a steady increase in electricity consumption. In addition, if so agreed with the customer, Ficolo may set a limit on electricity consumption.

In situations where the customer wants to bring its own equipment and not to procure it through Ficolo, Ficolo encourage its customers to use environmentally friendly IT equipment. In addition, IT equipment which does not fulfill European standards is not allowed into Ficolo's data centers.

6. We value products which help to protect the environment and utilize energy-efficient technology.

Ficolo procures its IT equipment only from reputable suppliers with strict environmental policies in place comprehending both packing materials and the equipment itself including, manufacturing, logistics and energy efficiency. In addition, situations where the customer wants to bring its own equipment and not to procure it through Ficolo, Ficolo encourage its customers to use environmentally friendly IT equipment.

7. We reuse our waste heat.

In line with its pursuit of minimal environmental impact Ficolo actively promotes waste heat reuse in all of its data centers.

- Waste heat reused from the Rock data center (Ulvila) is currently used to heat the data center facility. Ficolo has also agreed with the Ulvila municipality to provide heat to a new eco-friendly housing area to be built in the near future.
- The Air data center (Helsinki), which is currently under renovation and construction will be equipped with waste heat reuse. Ficolo is planning to sell the heat to the local energy company for district heating, which will further improve energy efficiency of the data center.
- While the Deck data center has an option for waste heat reuse, however, due to the current size of the data center, the amount of heat potentially to be reused is not sufficient for utilization. As data center expands, waste heat reuse will become more feasible.