# DEALING WITH THE VIRTUAL SATURATION OF ELECTRICITY SUPPLY IN FRANCE AND IMPROVING DATACENTER ENERGY EFFICIENCY

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Over the years and as technology has changed, DataCenters have become energy-greedy buildings. It is no longer rare to see projects that consume close to 30 megawatts of electricity, the equivalent of a thirtieth of a nuclear unit or a town of 20,000 people... As soon as they file their construction permit, hosting providers reserve quantities of energy from ERDF that often exceed their requirements. Some of this energy may never be used, but it is necessary to ensure repeat supply to the site and its development over the long-term as the energy reserved from ERDF cannot be sold to other hosting providers, of course. In certain areas of greater Paris, we are in a situation of "virtual" saturation of the electricity network. Energy has become the key element for everyone involved in this market that, let's remember, is growing 25% per year, so we need to react.

The size of DataCenter projects has also evolved. A few years ago, DataCenters would cater for around 1,000m² of computer labs. Today their size has grown to nearly 10,000m² hence the need for greatly increased power. Furthermore, to anticipate future customer requirements hosting providers have got in to the habit (good or bad) of reserving more energy than they need. So despite the exceptional value for money of French electricity, this chain of events is leading to a dearth of "available" energy which needs to be dealt with.
As well as the previously mentioned "booking" of electricity, one of the key levers for solving this lack of energy is the direct improvement of the DataCenters themselves. To achieve this we have identified four developmental directions: project design, technical equipment, use of system resources and involvement of the end-user.

From his very first sketches, the architect defines the shape of the building, its compactness and size and the positioning of the computer labs and technical areas. This design phase has an essential impact on the end result. The choices made at this point will determine the building's bio-climatic aptitude. It is therefore important that, at this early stage, discussions are held between the project manager, the architect and the engineering office with the aim of associating architectural quality, energy performance, economy and respect for the operational programme to create an efficient whole.

The choice of technical equipment also greatly influences the energy efficiency of a computer centre. Reducing direct consumption of IT resources is important for two reasons: it reduces electrical consumption of computer labs and consumption associated with air conditioning. It is essential to invest in latest generation technical equipment. This equipment, which does not necessarily require over-investment, has the advantage of providing top energy performance whilst ensuring the highest operational safety. This involves choosing high performance power inverters or, more directly, using appropriate servers. For example, it is important to impose specifications on DataCenter customers to make them use cold corridors and prohibit the use of a fleet of servers of which over 10% are 5 years old or more.

It is also essential to define customer requirements from the very start of the project, designing the technical equipment in consequence. Over-sizing is one of the main causes of low efficiency in most DataCenters. The definition of customer requirements also covers security and data availability that must be adapted to the type of data stocked. For example, a super-redundant technical architecture (with high energy consumption) is not the right choice for archive storage that could allow one micro-breakdown per year.

The average use ratio of a DataCenter is estimated at 56%. To improve energy efficiency, consolidation and virtualisation solutions must be implemented for servers and storage. These techniques mean several virtual systems can operate on one unique physical system, thereby reducing the users' energy bill by up to 80%.

Finally, it is also essential that hosting providers involve customers in their sustainable development approach. Hosting providers must revise their electricity billing methods and bill customers for their actual electricity consumption. Users must be offered a monitoring system that will help them visualise consumption in real-time and consequently improve energy expenditure. This is directly associated with (and rewarding as part of) the virtuous approach of improving a DataCenter's energy efficiency. Supervision software is also available to optimise the number of servers operating at any one time. We can clearly understand why a bank would turn off some of its Trading servers in the middle of the night, even if this is rarely the case for the moment...

At Etix DataCenter, we are not pretending to have the solution to this lack of energy. However, we are imposing all the principles mentioned above in our attempt to reduce the electricity consumed by our customers, with the objective of optimum energy efficiency for our installations and a reduced electricity bill for everyone.