

THE ENERGY EFFICIENCY OF COMPUTER NETWORKS

1.6% of Switzerland's electrical energy is used by networks. This amounts to about 772 GWh annually equivalent to the electricity consumption of a Swiss town the size of Lausanne with its 150,000 inhabitants. An appropriate choice of equipment and specific measures for energy optimization could reduce this consumption by more than 50%. Energy-optimized devices in computer networks could result in a saving of more than 210 GWh of electrical energy per year. A further savings potential of more than 220 GWh lies in the use of a network energy management system. This is shown by a recent study of the Swiss Federal Office of Energy.

The study investigates the energy consumption and the possibilities for power savings of computer networks in Switzerland. In addition to the analysis of existing statistical material, the study is primarily founded on a series of expert discussions with network specialists and users. It was conducted by the company Meyer & Schaltegger AG at the request of the Swiss Federal Office of Energy.

More and more working places are being integrated into computer networks nowadays, for more and more information has become available in electronic form. Computer networks consist of distributed systems of computers and peripheral equipment interconnected by data lines, thus allowing the sharing of informations and resources. Already today, two thirds of Swiss establishments with 20 or more employees use networks today.

All devices connected to networks are included in the energy calculations. These are mainframe computers and special network components as well as personal computers, monitors and printers. The mainframe computers consume approximately two thirds of the energy, about one fourth of the consumption goes to working-place devices, the rest can be attributed to network components.

We have also assessed the potential savings made possible by consistent use of the energy-optimized devices available today; this could reduce the energy consumption by 212 GWh or 27%. These savings would be achieved if in future acquisitions energy-optimized devices are chosen.

In addition, we investigated the effects of a network energy management system, that is, a selective shutdown of devices outside their normal utilization periods. The use of such an energy management system for all networks would further reduce the energy consumption by 222 GWh or 29%. In order to be effective, such an energy management system must be able to function automatically.

Various factors influence the achievable savings. Relevant criteria include the size of the enterprise and network and the network type. Medium-sized and large establishments with their numerous connected working places have the greatest savings potential. Mostly, these are networks into which larger computer systems, minicomputer and mainframe computers have been integrated. Even though 25,000 networks are installed in small businesses, their share in energy consumption accounts for merely 43 GWh or hardly 6%.

Another factor is the operating time of the network. One may assume that most networks operate only during the office hours. This is the case mainly with small and medium-sized businesses, while larger establishments use worldwide networks that remain in operation around the clock.

In the future is to be expected a further increase in the number of networks. New worldwide communication facilities may dramatically increase the number of installations, even with small businesses. The use of all available options to optimise energy consumption thus appears to be of utmost importance.