

EPFL – Working Group on the impact of ICT on the Environment

WHY AND HOW THE ENVIRONMENT HAS TO BE TAKEN INTO ACCOUNT AT THE WORLD SUMMIT ON THE INFORMATION SOCIETY, GENEVA 2003 – TUNIS 2005

Introduction/Context

The rapid progress and spreading of Information and Communication technology (ICT) in society creates opportunities as well as risks for the environment and for general strategies pursuing the goal of sustainable development.

The most important opportunity is the dematerialization potential created by the fact that ICT can help to:

- optimise processes and products as regards their material and energy efficiency
- organize innovative services, especially information services, that can replace material products in many cases
- avoid traffic by using telecommunication services instead.

However, progress in the direction of dematerialization is only a necessary, but not a sufficient, condition for approaching the goal of sustainability. There is a high risk that efficiency gains will be compensated for by rebound effects, and that the material and energy demand as well as pollution caused by ICT production, use and disposal will grow to serious problems.

The three actions proposed in this document aim to make a significant reduction in the predictable negative effects of ICT by taking preemptive measures. These measures are necessary if the historic opportunity to use ICT for the goal of sustainable development is not to be forfeited.

The World Summit on the Information Society

During the first meeting of the summit preparatory committee, PrepCom 1, our working group developed a declaration on principles to be followed during the rest of the preparatory process of the World Summit on the Information Society.

- An action plan on the development and dissemination of ICT should involve the environmental component in an attempt to reduce risks and maximize positive impacts;
- We are carrying on a multi stakeholder dialogue among the private & public sectors, NGOs & scientists and invite further participants and links with related initiatives;

The PrepCom1 group on impacts of ICT on the environment **strongly recommends that this topic will be dealt with at WSIS 2003 after further development at PrepCom 2. The group recommends that the environmental impact of ICT is recognised and that information and telecommunication policies, in all countries and at an international level, implements an environmental perspective that maximises the positive impacts and decreases the negative impacts.**

Proposed key actions to reduce negative impacts and to foster sustainable development and dissemination of ICT

We propose to focus on three directions of action:

1. Eliminate unnecessary standby losses of ICT equipment and ICT-systems
2. Increase the useful life of ICT equipment, in particular by prolonging the period between updates and new versions of operating systems and applications
3. Build-up a system of local collecting points and central disposal/recycling facilities for used batteries and electronic components and foster the re-use of electronic components

Why these three directions?

- They are relevant from the point of view of environmental impacts of ICT;
- They cover three distinct areas: direct electricity demand, embodied (or grey) energy and local pollution of soil, water and air (local ecosystems);
- It's possible to rely on current initiatives supported by powerful organisations/institutions and on case studies;

Potential benefits for the different actors (stakeholders)

- Eliminates unnecessary standby losses
 - Consumers have reduced electricity bills, reduced heating loads, reduced cooling demand; an increase in reliability and security (if switched off);
 - Governments/utilities will reduce demand for power capacity and therefore reduce air pollution and CO₂ emissions from power plants;
 - ICT industries that use these technologies will have at low cost a more environmentally friendly image and a market advantage as innovative industries.
- Increases useful life
 - Consumers save money
 - Governments reduce the risk of a digital divide, and the risk of "stranded investments"
 - Develops new jobs and provides better development opportunities for countries in the Global South.
- Builds-up a disposal/recycling system
 - Governments either get support in the disposal/ recycling problem from industry or can delegate it to industry
 - ICT industry has a more environmentally friendly image;

1. Standby losses

1.1. Relevance

In industrialised countries between 5% and 10% of total electricity demand is consumed by ICT and contributes with 1%-3% to worldwide CO₂ emissions. This fraction of total electricity consumed by ICT is steadily increasing, despite tremendous efficiency improvements on the level of electronic components. The electricity demand of new services and the more intensive use and the diffusion of existing services exceed by far the energy conserved by efficiency improvements.

An important fraction of the electricity used by ICT is consumed when equipment is switched off or is not performing its main function. Today, these standby losses are of the order of 50% of the electricity used by ICT. In the future standby losses may increase dramatically due to the general trend of interconnecting different types of equipment and services. Equipment used in a network can often not be fully disconnected and if no low-power mode is provided and actually applied by the end-user, then full electric power is used 24 hours a day and 7 days a week independently of the service needed.

1.2. Current initiatives

Low-power technology and energy saving power management are important features of mobile ICT in order to reach reasonable discharging periods of (storage) batteries. The most important barriers to use of these features in all devices are their higher cost, problems of compatibility between different technical solutions, lack of support by some hardware and software developers and acceptance by the end-user. Current initiatives are summarised thus in a recent paper (Bertoldi et al., 2002): "A number of OECD countries and regions already have policies to address standby power use; other regions have launched policy initiatives in response to IEA's recent international workshops on standby power. Global policy efforts are needed to influence manufacturers, who generally produce and market products worldwide, to reduce the standby power consumption of their products. Some leading manufacturers are already responding to global calls to reduce standby power consumption by developing new technologies and products".

2. Useful life

2.1. Relevance

The production of electronic equipment (for instance, the semiconductor) requires a high amount of electricity and other natural resources. It also uses various types of solvents and hazardous chemicals. One computer is made of more than 1000 different materials, of which a lot are toxic (heavy metals, for instance). It is obvious that longer useful lives would lead to less environmental impact as fewer products would be manufactured and fewer products would have to be recycled or would end up in landfills.

Except for some users who need powerful computers to run updated software or to perform heavy calculations, most people use their computers to surf the Internet and perform secretarial tasks. In those cases, powerful machines are not needed. However, there's the problem of lacking compatibility among different software packages (for example, between files in MS Word and other formats), which requires a new version of the system and then new and more powerful computers, ending in the obligation to buy a new machine even if the old one still works perfectly. In general, the difficulties encountered in repairing this type of equipment and the low price of new components -- however low in quality they may be -- make it difficult to keep repair shop prices competitive with the alternative of buying new replacements.

2.2. Current initiatives

The growing use of free software under the GNU license (<http://www.gnu.org>), is a trend that tries to combat this problem on the software side.

Various NGOs collect used IT equipment in Northern countries and export them to Southern countries. Although that has an effect on the useful life of the components, it leads to different problems. First, these machines are incompatible with new operating systems and software, which lead to the above cited digital divide. Secondly, there's generally no efficient organization for the collection and the end-of-life treatment of this equipment, which could cause severe environmental impacts.

3. Disposal/ recycling

3.1. Relevance

A source of new jobs could be created in developing countries if companies had incentives to take advantage of the potential in new re-use technologies. Civil society could help by lobbying for recognition of this potential in world politics. It is only the chips in computers that are upgraded so fast by technological change. Many of the other components could be re-used.

Hence there could be a change from the current state of the art in dealing with electronic waste, recycling, to partial re-use as a future development.

3.2. Current initiatives

The situation in the European Union and Switzerland is well developed in comparison to that in other countries such as the USA. NGOs such as the Basel Action Network (<http://www.ban.org>) and the Silicon Valley Toxics Coalition (<http://svtc.org>) have called attention to the lack of compliance by the United States with the Basel Convention. Currently there are progressive laws in Switzerland and in the European Union (WEEE) dealing with electronic waste. Procedures involve monitored, environmentally friendly treatment of used electronic components to recoup valuable materials.

However for certain reasons these procedures do not represent an ideal solution. Instead, a combination of the following techniques now appears preferable:

- repair
- re-use
- upgrading of existing equipment
- use of unobjectionable materials, and
- recycling

Implementation of these new procedures within companies motivated by government incentives would require employment of large numbers of people who could be recruited from those in developing countries where wages are low.

Goal/target to be reached at WSIS

A group of researchers, most of them in Switzerland, have set up the Website <http://www.wsis.ethz.ch> and are appealing to the dignitaries who will be assembled at the World Summit on the Information Society, the first part of which will take place in Geneva, Switzerland, in December of 2003. Their appeal focuses on the above-mentioned three key actions to reduce the negative impacts of Information and Communication Technologies ICT and to foster sustainable development and dissemination of ICT mainly in developing

countries. Strategies include partnership building (see next item) and lobbying in person at PrepComs in Geneva.

We want the topic of the environment to be discussed within the World Summit on the Information Society in Geneva 2003. **It has to be recognised that the Information Society has to include the topic of environment if it wants to act in the direction of sustainable development.** In particular, we want the three key points above to be discussed and precise and quantified goals to be adopted.

1. Stand-by losses

Widespread diffusion of ICT will increase substantially electricity demand in developing countries. One strategy to limit this increase – and at the same time to cope with an unreliable power supply – is to use the efficient, but costly laptop technology. Another strategy is to avoid up to 50% of this new demand by eliminating unnecessary standby losses in ICT equipment.

Support by WSIS of the current initiatives of International Energy Agency (IEA) countries and encouragement of developing countries to participate in these initiatives could strengthen the pressure on those manufacturers that have not yet responded to the call of IEA countries. The “leapfrogging” idea would then be applied not only to grandiose strategies like “skipping telephone poles and telephone wires in favor of wireless telephone communication” but also to the energy efficiency of ICT equipment. The establishment of a common list of ergonomic /environmental / energy-relevant criteria for public purchasing/ procurement could be a useful tool to reduce transaction costs as well for the buyer as for manufacturers.

2. Useful life

We recommend that countries implement policy to promote:

- manufacturing for repairing and ease of upgrading.
- leasing of materials
- using free software and making sure that no legal framework will be implemented to stop its spread.

One way of promoting these points is for governments to implement an eco-friendly procedure in public procurement that follows some strong criteria. The development and the use of free software could be an important step if international organizations and entire countries implemented it.

3. Disposal/ recycling

The first and essential point is that countries sign the Basel Convention and stop exporting electronic waste. In addition, countries should implemented implement a recycling system in order to deal with end-of-life electronic waste. Countries’ policies should take into account the following techniques, which are the most profitable:

- repair
 - re-use
 - upgrading of existing equipment
 - use of unobjectionable materials, and recycling
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