

How to achieve 80% reduction of computers climate impact

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The climate has been a central global issue during the last years. People on all continents are seeing, learning about and understanding this alarming state. Al Gore and the UN's IPCC received the Nobel Peace Prize 2007. People now have an increased awareness and with that, an increased concern about what is happening to the climate.

A survey conducted by Accenture consulting company shows that 85 percent of the worlds consumers are "extremely" or "somewhat" concerned by the climate changes. This concern is most pronounced in the so-called growing economies.

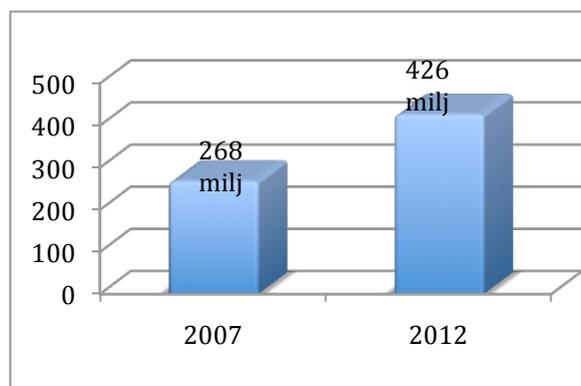
There are many environmental problems regarding IT-industry and IT-products. On the other hand there are also many commercial available solutions. With small means it's possible to achieve 80 percent reduction in climate impact from use of computers. The 80 percent reduction corresponds to IPCC reduction targets.

The solution is divided in two parts:

1. Green procurement
2. Green Usages

Green Procurement

The amount of computers worldwide is constantly increasing and has done so during the latest 20 years. Close to 300 million PCs were sold during 2008 (source IDC).



Estimations from IDC give a worldwide sale in 2012 of 426 million PCs.

This computers can be very green from I climate perspective but can also be very bad for the climate. The power needed to run PCs comes to a large extent from fossil-power plants. Close to 80% of all electricity in the world comes from fossil-power plants (source IEA).

On the market today (spring 2009) there exist a huge variety of PCs, from very energy efficient to PCs with a high-energy demand.

Table 1. Energy consumption of computers spring 2009

	Energy efficient	High energy demand
Desktop	10	94
Flat panel	14 (19")	65 (24")
Total:	24	159

Source: Energy star European database 5 may 2009, idle mode.

There is a factor of nine between the worst and the best from an energy efficient standpoint. All of them has the Energy Star label and is suitable for office work. There is also a strong development towards more and more energy efficient computers. If we takes the most energy efficient laptop in Energy Star database it consume only 5 watts and the most energy demanding workstation consume 315 watts. With the continue development of both the cloud and thin clients there is a possibility that in a short timeframe come down under 10 watts for office work.

In average today installed based of office desktop PC has an estimated consumption between 100 and 200 watts. With a very conservative assumption that the average consumption is 100 watts there is a possibility to achieve 75% reduction if every new desktop computer is the most energy efficient on today's market. With one billion installed computers around the world the change will have dramatically impact on energy demand and climate influence.

Table 2. Possibilities for green procurement

	Effect	One working day one computer	One year one computer (200 working days)	One year one billion computers (200 working days)	CO ₂ emissions one year one billion computers
Average desktop	100 watt	0,8 kWh	160 kWh	160 TWh	66,4 Mtonnes
Most energy efficient desktop	25 watt	0,2 kWh	40 kWh	40 TWh	16,6 Mtonnes

1 working day = 8 hours

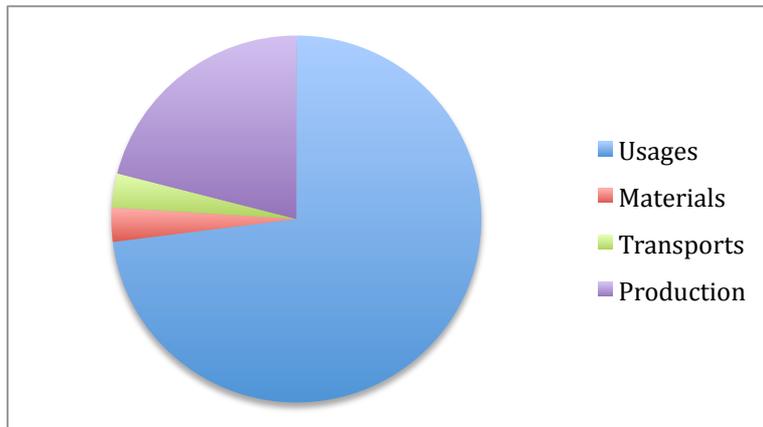
Using EU-25 figures for CO₂ emission from electricity production the emissions from today's installed base of computers can by green

procurement (and based on above table) be reduced by 50 million tones of CO₂.

Usages

Lifecycle studies show that a significant part of the climate impact from computers comes from the use-phase. How much differ from system boundaries and in data in such a studies. In the below diagram the use phase is estimated to 73 % of the climate impact for a notebook computer. The figures originate from EuP-studies.

Figure 1. CO₂ emissions over the lifecycle for a Notebook



Source: EuP Ecodesign Preparatory study

Different user habits have a large influence on the total climatic effect. Our computer usage patterns have been estimated in preparatory studies to EU's EuP(Energy Using Products) directives. Taking an average of the various user surveys conducted throughout the world has resulted in relevant values.

A desktop computer in normal usage patterns is estimated to be in active mode approximately 2279 hours annually, according to EuP. A normal work year in Sweden is approximately 210 workdays translating into 1696 work hours. Already here, we see that our computers at work are thus in active mode 583 hours beyond our work hours. We participate in meetings, are at home with sick leave for our children or ourselves, on business trips, busy with other issues, etc. It is plausible to estimate that our computers are used efficiently about four hours on an average per workday. This all mounts up to the fact that every computer is in active mode 1430 hours to no use per person and computer. That amounts to each computer needlessly being in active mode a half year out of every year.

The improvement potential in regard to our user habits is vast. This means that there are large savings to be made regarding both emissions and money. Decreasing the active computer time to an average of 4 hours daily leads to a potential savings of approximately 65 percent.

Table 3. Possible savings within office usage

	Today's habits, active mode (Hours)	Possible decrease active mode* (Hours)	Decrease In percent
Desktop	2279	1439	63
Laptop	2613	1773	68
Monitor	2586	1746	68

Source: Your computer and the climate, TCO Development

* Estimating that active usage is at most 4 hours daily and 210 workdays yearly.

In December 2008 the number of unique Internet user was 1 billion (source: Comscore). One billion users that put their computer in energy saving mode when not in will get a huge energy saving potential.

These savings do not call for economical investments. What is called for is a blend of knowledge, motivation and leadership.

80 percent reduction now!

There are many opportunities for solutions while maintaining or even increasing working quality and on the same time saving money.

When investing in new equipment getting the best case IT products means cutting energy consumption with in average 75 percent.

Examples of existing energy efficient solutions spring 2009

Today's standard office PC:	60 - 120 watts
Best desktop:	10 watts
Best notebook:	5 watts
Best display (19"):	14 watts

Source: EU-energystar.org, May 2009

However there are many different needs in a workplace and some need a more powerful solution then the 10 watt desktop. A course but cautious estimate would be that if everyone had installed the most energy optimal solutions for the need, energy consumption could be cut in half without changing user habits.

There are significant and immediate saving to made regarding out user habits. Studies have shown (se above) that only a fraction of all computers are used in an energy efficient way. Many computers are never turned off and many haven't activated (or have deactivated) their energy saver functions. An estimation based on the EuP studies shows that, on an average, only 35 percent of the total energy consumption is used in productivity. 65 percent of the electricity consumption and therefore 65 percent of IT's carbon dioxide emissions have no corporal or social value.

The combination of changing usage patterns and buying the best next time will give us the 80 percent reduction that the IPCC points out as a global target. If every part of the society contributes in the same way as this example regarding IT we will reach a global solution to the climate threat.

The solution:

Green procurement: 50 %
Green usage: 65%
A combination: 80-90 %

When the green procurement and the change of user patterns is made there is a possibility to make a carbon offset for the rest which will even further contribute to fight climate change.

Room for expansion

By combining today's best technologies, where each PC has an average consumption of 40 watts and activating optimal energy saver functions, the yearly energy consumption per PC could be as low as 30 KWh. This would mean that many more people worldwide could use computers and yet, at the same time, the total climate influence would decrease.

If today's one billion computers reduce its climate impact with 80 percent there will be room for 2 billion computers and still have a halving of computers global CO₂ emissions. In academic or political terms its means that there has been a decoupling between growth and climate impact.

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