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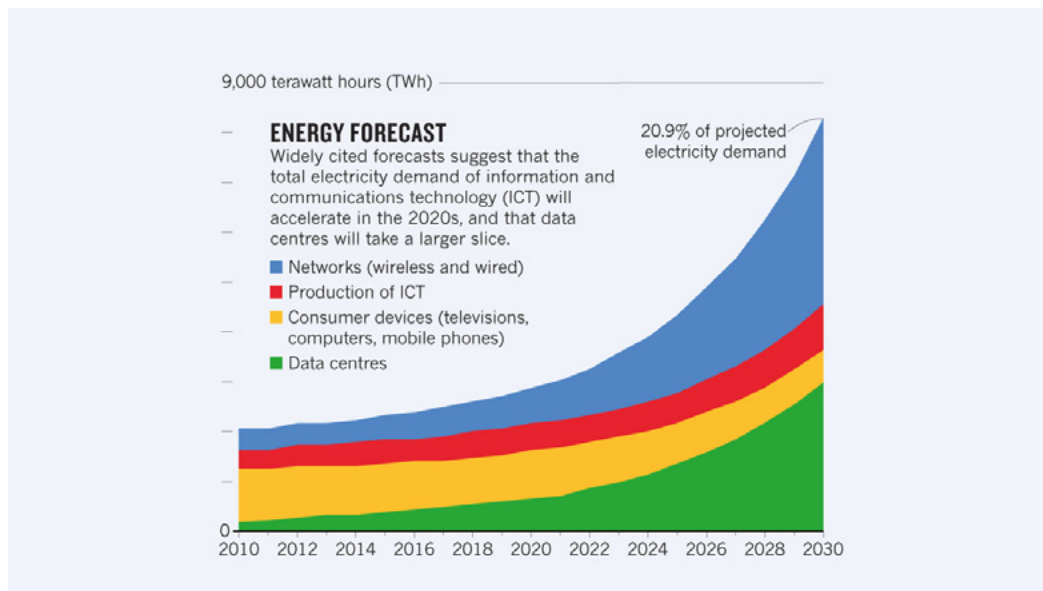
Digital is no more sustainable than print – on the contrary!

Energy consumption and the associated greenhouse gas emissions of information and communication technologies (ICT) are largely ignored by the general public. Digital is generally considered to be „green“ and even a problem solver to get climate change under control. But the internet already accounts for 10 percent of the world's electricity consumption today – and this figure is even set to be 20 percent by 2030. We went on a fact-finding mission.

It is very refreshing to note that young people, especially the Fridays for Future movement, are taking control of the climate change problem and calling on politicians, business and society to finally take action to at least meet the Paris climate goals. That agreement noted that global warming should be limited to less than 1.5 degrees Celsius in order to get climate change at least partly under control.

This is refreshing because the general perception was that younger generations are hiding behind their smartphones and tablets, have no interest in political and social development and are not prepared to take to the streets for it. Far from it – and that's a good thing!





Source: www.nature.com

Unbridled hunger for energy

In the current discussion, the climate change culprits are quickly identified - transport and industry - and rightly so in many cases. One area that is completely ignored, however, is information and communication technology (ICT). What is considered a solution to avoid CO₂ emissions in the public perception has developed an unbridled hunger for energy in recent years. The CO₂ footprint of ICT is currently expected to be twice as high as that of the global aviation industry.

The entire ICT sector, which includes data centers with their huge server landscapes, global networks and stationary and mobile terminals, currently consumes up to 10 percent (around 2,000 terawatt hours/TWh) of global electricity generation, according to statistics. Predictions are making the rounds online that ICT power consumption will double by 2030. With annual growth of 7 percent, this is entirely conceivable. This would mean that 20 percent of the world's total electricity consumption comes from the internet and everything that comes with it.

Massive internet expansion

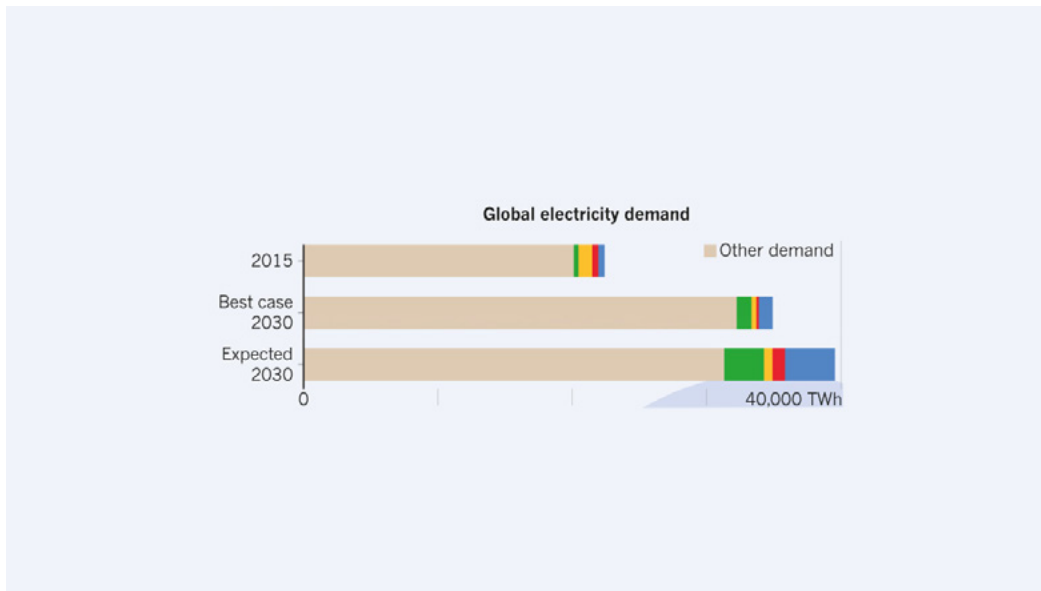
It is also interesting to take a look at the growth of online data transfer. In 1987, this figure stood at 2 terabytes (10^{12} bytes). In 1997, it was already 60 petabytes (10^{15} bytes). In 2007, it rose to 50 exabytes (10^{18} bytes). And in 2017, it exploded to 1.1 zettabyte (10^{21} bytes).

Negligible clicks...

For example, if you start a search query on Google, then you consume about 0.0003 kilowatt hours. This seems to be negligible, but if we add up all the searches, we arrive at an immense power consumption for the operation of gigantic data centers. This is why Amazon and Co. are trying to operate their data centers at least partially with renewable energy.

The main driver of the rising energy demand is the continuing rise in the number of internet users. Currently, 4.4 billion people have access to the internet. While writing this blog, Google received 77,000 requests per second. The total data traffic on the internet in one second amounts to almost 80,000 GB. Under internetlivestats.com, you can find some interesting live statistics.





Source: www.nature.com

...and overflowing data streams

Streaming services and, in particular, applications such as videos and games, now account for the majority of energy consumption. In one second, 80,000 YouTube videos are watched, and every minute, 400 hours of additional video footage is uploaded to [YouTube](https://www.youtube.com). The hours spent watching Netflix have also risen sharply – from 266,000 to 694,000 hours per minute. It is estimated that streaming services account for 80 percent of the volume of data on the internet, of which one third is adult content.

With the Internet of Things (IoT), all manner of devices, from refrigerators to printing presses are being connected that will constantly exchange information – and this is also reflected in the energy balance. According to a study conducted by Gartner, the number of globally interconnected devices will quadruple from almost 5 billion (as at 2015) to 20 billion in 2020. Cisco, global market leader in IT and networking, is even speaking of a tenfold increase. They all form the pillars for Industry 4.0, whose implementation is also on the agenda in the printing industry.

The treasure diggers of the internet

The trend towards accessing IT resources from the cloud naturally also entails increased energy consumption. Today, data is no longer stored and processed on one's own computer, but in central data centers. As a result, the volume of data transported online has increased enormously. Online shopping, of course, also has its impact and the energy-intensive mining for cryptocurrencies further increases demand for electricity.

The [Shift Project](#) predicts that CO₂ emissions from ICT will rise to 8 percent by 2025, which will correspond to the current CO₂ emissions of all vehicles. An interesting [video](#) about it. It shows that a single click is negligible, but in total, it nevertheless has an impact.

Printing and paper industry: Putting figures in perspective

And what do all these figures have to do with the printing industry? A comparison with the printing and paper industry shows that ICT has become one of the largest consumers of electricity and that, despite all the ICT industry's efforts toward sustainability, the CO₂ footprint is not diminishing. The speculation that digital communication is per se more environmentally friendly than printed communication is untenable. Here, we as the paper and printing industry are called upon to put the figures into perspective.



In North America and Europe, for example, more than 60 percent of the energy used in paper production comes from renewable energy sources. The ICT sector is still a long way from achieving this goal. It goes without saying that paper must also be printed on and transported to the recipient. The rule of thumb here is that 80 percent of the CO2 footprint of printed matter is accounted for by paper production, the rest by manufacturing and shipping.

As a result of progressive process optimization and declining paper consumption, the industry will sooner or later consume less electricity. In its International Energy Outlook for 2016, the US Energy Agency predicts that the share of energy consumption in the paper industry in OECD countries will fall from 6 to around 4 percent in the industrial sector by 2040 – this corresponds to an industry-related drop of 30 percent.

What happens to 65 million tons of electronic waste?

And then there is also the recycling rate. Here, paper, cardboard and corrugated board are in pole position with over 70 percent – digital waste, in particular, is far behind. According to Eurostat, the collection rate for e-waste in 2016 was just over 40 percent. More recent figures are unfortunately not yet available. It is not always clear what happens with such waste. E-waste is partly exported as hazardous waste and ends up in landfill in developing countries.

It is estimated that less than 16 percent of the 65 million tons of electric waste produced worldwide is recycled. But it is not entirely clear why, because it contains true treasures in the form of precious metals and rare earths that are just waiting to be recycled. Paper, on the other hand, has been going through a well-established recycling system for many years.

The myth is not tenable

When it comes to sustainability, there is no need for paper and printing industry to hide, even though there is still a lot to do in our sector. The fact that paper is made from renewable raw materials also plays into the hands of the industry, especially in the current discussion about the use of plastics. This is precisely why it is so important to inform customers, but also end consumers, about the climate-relevant effects of the various channels.

The figures published by the environmental protection organization [Greenpeace](#) do not give a particularly positive picture of sustainability in the ICT sector. The paper and printing industry currently accounts for 1 percent of global CO2 emissions (World Resources Institute), ICT for 10 percent. The myth that digital is by definition more sustainable than print is not tenable.

Your
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