

Taking the temperature on green telecom

Northstream white paper

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Is the telecommunications industry going green? This white paper analyzes the industry's recent focus on environmental friendliness, examines what lies behind the marketing messages and outlines possible actions that could render financial benefits.

Environmentally related messages are nowadays frequent in equipment vendors' marketing messages. Increasingly, one also meets industry representatives with titles such as "Director Environmental Affaires" and "Head of Climate Change". Additionally, the latest Mobile World Congress in Barcelona reflected this increasing environmental focus where sustainability was one of the keywords. But how much long-term substance can be found in environmental activities and how much is merely trendy marketing?

Several sources¹ estimate that the Information and Communications Technologies sector contributed 2-2.5% of global greenhouse gas (GHG) emissions in 2007 and that it is increasing. By 2020, with expanding telecom networks and increasing PC penetration, this figure is estimated to double² unless actions are taken to change the direction in which the world is moving right now. About half of these emissions are estimated to come from telecom.

Energy efficiency in focus

The main contribution to telecom GHG emissions relates to powering of networks. Based on operator data, Northstream estimates that 80% of a mobile operator's total energy use derives from network operations, see Figure 1. This makes network energy efficiency a key target when addressing telecom GHG emissions. The remaining 20% mainly relates to buildings and transportation.

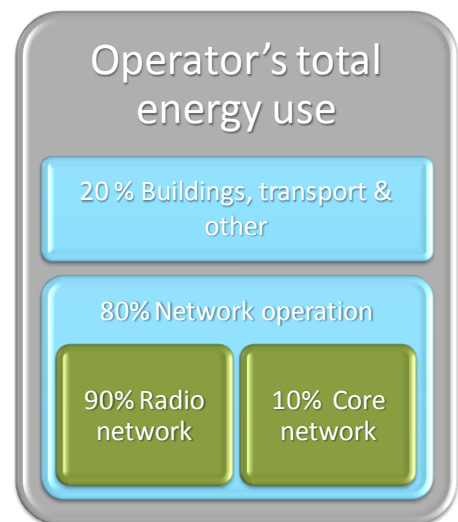


Figure 1 – Schematic view of a mobile operator's total energy use (Northstream 2009)

So what are telecom operators doing to address energy efficiency? Being a responsible citizen is alone not reason enough for most companies to address GHG saving opportunities. There have to

¹ Sources: Gartner 2007; ITU 2007; SMART 2020 2008

² Source: SMART 2020 2008

be financial incentives as well. Fortunately, as for many other industries, these factors often go hand in hand.

One increasingly embraced option to make telecom networks more efficient is “free cooling”. Typically, traditional cooling systems contribute to important parts of an operator’s total network power consumption (Northstream estimates that 20-25% of radio network power consumption relates to cooling/heating of sites). By introducing “free cooling” systems, using fresh air to keep the temperatures within the desired range, substantial savings can be achieved. Vendors are also developing new equipment that can withstand higher temperatures, opening up for better temperature flexibility thus reducing the overall need for cooling.

Another way to improve the energy efficiency of telecom networks is to reduce the amount of power needed to operate the actual network equipment. Mobile operators can use network power saving mechanisms, for example software features like Ericsson’s Base Transceiver Station Power Savings features, introduced in 2007. Depending on the network conditions, this feature can reduce power consumption in mobile networks during low traffic periods by up to 25%³ by putting radio resources not currently used into standby mode. Other vendors have similar or comparable solutions, so when procuring new network equipment, operators can select modern switches and base stations enabling more energy efficient network operations. All major telecom equipment vendors are actively working on reducing power consumption of their products.

Renewable energy sources enter telecom

Reducing energy consumption is all good, but the type of energy consumed also affects the environmental impact. Several operator initiatives are ongoing where renewable energy sources are used to power base stations. At this point it seems to be most prevalent in developing markets and especially in areas with limited access to the power grid (base stations are instead currently powered by diesel generators). As of now, wind-based and solar energy seem to be the most viable energy sources to use. One example is Orange and Celtel that work together with Ericsson to introduce solar energy powered base stations in Africa.⁴ Another example is Ethiopia Telecommunications Corporation that builds solar-powered base station sites together

with Nokia Siemens Networks. However, operators in mature markets are also taking initiatives: in 2007, TeliaSonera announced that it only used renewable energy sources (wind, water, solar and biomass) to power its Swedish and Finnish operations.⁵

Use of renewable energy sources cannot be financially motivated for all sites but as the price comes down, the better opportunity for the business case. There are three factors that determine the technical and financial viability of renewable energy sources for mobile network sites:⁶

- The local cost of distributed diesel
- Solar and wind conditions at the site
- Load requirement of the site, where viability degrades at higher load requirements

Resuable energy alternatives	Usability
Solar technology	Suitable in sunny regions for sites with low energy need (<2kW).
Wind technology	At standard base station loads (>2kW) wind technology is more suitable, provided abundant wind resources (coastal and mountaineous regions). Solar and wind hybrid solutions are becoming more common than wind-only ones.
Pico-hydro	Small hydro power solution (<10kW) that uses the power of streams and rivers. Lowest Capex of all solutions, but location requirements limit mass-deployment.
Biodiesel	Direct replacement for fossil diesel in base station generators. A limitation is local access to supply of biodiesel.
Fuel cells	Provide an alternate battery solution to sites in unreliable grid power locations.

Table 1 – Solar and wind energy are currently the most viable alternative energy sources in telecom⁷

Dematerialization – a means to reduce climate change

Dematerialization, or the reduced use of physical resources, is another way for telecom operators’ to minimize climate impact. In the telecoms industry, dematerialization is often achieved by moving physical transactions to the on-line world, like implementation of on-line billing and advertisement. Further, environmentally

³ Source: Ericsson 2008

⁴ Source: Ericsson, 2009

⁵ Source: TeliaSonera, Annual report 2008

⁶ Source: GSM Association 2009

⁷ Source: GSM Association 2009

ambitious operators are also “dematerializing” business travel both among employees and customers by promoting an increased use of tele-meeting services.

Mobile phone vendors are also supporting dematerialization initiatives. Announced in conjunction with the Mobile World Congress in Barcelona 2009, an initiative by LG, Motorola, Nokia, Samsung and Sony Ericsson is to develop a standardized phone charger equipped with a micro USB interface. The aim is that by 2012, the majority of all mobile phones should be equipped with the micro USB interface, thus substantially reducing the need for different mobile phone chargers. This initiative means reducing not only the energy required for charger manufacturing but also the amount of chargers being shipped and the amount of material to be recycled.⁸ The result leads to a more resource efficient charger life cycle process, both for vendors and operators.

Recycling on the increase

Green telecom initiatives are also driven by increasingly strict regulation. One example is the Waste Electrical and Electronic Equipment Directive (WEEE Directive) of the European Community imposing responsibility for the disposal of waste electrical and electronic equipment on the manufacturers of such equipment which became European law in February 2003. This has substantially changed the way equipment recycling is handled, mainly by equipment vendors but also responsible operators.

Mobile phone recycling is reducing the environmental impact of the telecom industry not only by reducing CO₂ emissions, but also by limiting the release of toxic elements into the environment. With more than 3 billion mobile phone users globally, it is estimated that over 500 million tons of mobile phones have been retired worldwide so far.⁹ These devices contain numerous toxic elements, like arsenic, beryllium and lead, which risk being disposed of in landfills. Typically, there are two ways to recycle mobile phones: reselling of refurbished phones to developing markets and recycling of circuit board metals. The most common mobile phone metal is copper, but also gold, silver and palladium.



Figure 2 – Circuit board of a mobile phone, containing both precious and toxic elements

Recycling of operators’ old telecom network equipment is also coming into focus, driven by increasingly strict regulation.

Not only marketing buzz

Clearly the examples given in this white paper show that there is a lot behind the green marketing buzz of telecom. In the operator community, it is mainly the larger players that are publicly announcing ambitious CO₂ reduction targets¹⁰:

- BT has a goal to reduce worldwide CO₂ emissions per unit of BT’s contribution to GDP by 80% (from 1996 levels) by 2020.
- China Mobile’s goal is to reduce energy use by 40% per unit of telecom traffic (Erlang) by 2010 compared to 2005 levels.
- Orange France has a target of reducing CO₂ emissions by 20 percent by 2020.
- Vodafone aims to reduce CO₂ emissions by 50% by 2020, using 2006/2007 levels as reference.

Typical operator activities to achieve these goals have been exemplified above, where network operations energy saving and use of renewable energy sources are key areas. Other initiatives include reducing energy consumption in buildings, reducing transport emissions, server virtualization, and central sharing of applications to reduce the amount of physical network equipment. Additionally operator network sharing, although there are other stronger basic drivers, can contribute to energy savings and environmental friendlier network operations.

⁸ Source: Dagens Industri, 18 February 2009

⁹ Source: GRC Wireless Recycling 2009

¹⁰ Sources: The Climate Group 2009, Ericsson 2009, Vodafone 2007

There is evidence that these environmentally friendly initiatives have paid off: BT has reduced total CO₂ emissions from 2005 to 2008 by 19% or 0.16 million tons.¹¹ As ~ 100 kilos of CO₂ emissions correspond to a 20 watt light bulb lit for a whole year, the financial impact is important.

Another example is Vodafone that reduced its energy consumption relative to network traffic by 29% in 2006/2007.¹²

In 2008 alone, TeliaSonera reduced CO₂ emissions from its wholly owned operations by 11%, mainly due to an increased use of renewable energy sources and improved energy efficiency. Due to TeliaSonera's continuous focus on reducing its environmental impact, the company has been awarded "Prime" status by oekom research, a leading rating agency for sustainable investments. This rank qualifies TeliaSonera for ecologically and socially based investments.¹³

US operator Verizon Wireless have saved USD 1.3 million on energy spending by introducing a power saving feature on its 63,000 PC company-wide.¹⁴

What can you do?

Early adopters have shown that financial savings can be achieved by addressing environmental issues, while at the same creating a more sustainable approach for our environment. The environmental focus of the telecom industry will continue, driven by sharpened environmental legislation and potential introduction of CO₂ taxes.

Northstream can help operators to find ways of decreasing energy related Opex while at the same time reducing the environmental impact. This is done by reviewing the total energy consumption of operations and identifying ways to improve its environmental friendliness. With this as basis, aggressive environmental targets are identified and required activities are planned and executed.

Specifically focused on telecom strategy and sourcing, Northstream has an in-depth understanding of the various aspects of the operator business. Through our industry experience and our work with different types of players, we are well positioned to support operators on their journey towards a more profitable and environmentally friendly future.

Contact us to learn more about how we can work together in order to understand your energy situation, improve your environmental strategy and implement it in order to maximize the financial benefits.

Strategy and Sourcing
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¹¹ Source: The Climate Group 2009

¹² Source: Vodafone 2007

¹³ Source: TeliaSonera, Annual report 2008

¹⁴ Source: Telecoms.com, 2009