Q&A Ericsson Energy Solutions

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1.1 Q: Why is Ericsson engaged in sustainable energy use?

A: Protecting the environment and combating climate change are two of the most pressing challenges facing humankind. As energy prices soar, network operators are increasingly scrutinizing their environmental and social responsibilities … and, of course, their energy bills.

Optimizing the energy efficiency of mobile networks not only reduces their environmental impact, it also cuts network costs – by as much as 50% in operating expenditure – and helps to make communication more affordable for everyone. Finding new efficient-energy solutions helps spread access to communications by opening up more options for the siting of radio sites in a sustainable, low-impact way.

1.2 Q: Why is Ericsson promoting sustainable energy solutions so heavily?

A: Ericsson itself has conducted lifecycle assessments of mobile networks for more than a decade, which has given us unrivaled knowledge and expertise in how to make energy savings without sacrificing performance and quality.

Our studies show that energy consumption in the ‘use phase’ of radio access networks has the most significant impact on the environment out of all the company’s products (radio access products are the company’s highest-volume product and account for 75 per cent of indirect carbon dioxide (CO_2) emissions).

1.3 Q: Is promoting greater mobile phone use environmentally sustainable?

A: Mobile communications – like fixed telecoms – is a relatively low-impact industry when it comes to energy usage and CO_2 emissions, despite its rapid growth.

From our own lifecycle assessment studies, and other published data sources, Ericsson estimates that approximately 0.14 per cent of global CO_2 emissions and approximately 0.12 per cent of primary energy use are attributable to mobile telecom. This compares with 20 per cent of CO_2 emissions and approximately 23 per cent of primary energy use for travel and transport, for example. The annual CO_2 footprint of the average mobile subscriber is around 25kg – which is comparable to driving an average car on the motorway for one hour, or running a 5W lamp for a year.

Many telecom operators have about the same energy consumption today as they did in 1995, but with twice as many total subscribers. Technology improvements have kept energy usage very low, and there are still great opportunities for the ICT industry to reduce CO_2 emissions. For example, smart use of telecom, intelligent homes and offices, and travel substitution could all have a dramatic effect on energy usage and CO_2 footprint.

1.4 Q: How exactly is Ericsson addressing sustainable energy use in mobile networks?

A: Ericsson's advanced total cost of ownership (TCO) modeling, extensive field measurements and practical experience of advanced technology solutions have all shown how attention to optimized network design, efficient site solutions and use of alternative energy sources such as solar, wind and biofuels can lead to dramatic improvements in the energy efficiency of mobile networks.

Ericsson's energy optimization process for mobile networks is three-stage.

First, mobile networks need to be dimensioned with as few equipment sites as possible, while maintaining the desired coverage, capacity and quality.

Second, the energy-efficiency of individual products – as well as that of entire sites – must be optimized, for example through the deployment of small, efficient sites where large cells are impractical, such as in hilly terrain or to serve small populations in isolated areas.

Third, there is scope for increasing use of renewable energy sources, such as solar, wind and biofuels.

1.5 Q: Which markets are these solutions aimed at?

A: The greatest energy-efficiency gains come from high-quality network design, and so new networks and expansions offer the greatest potential for energy savings. However, Ericsson has developed a number of energy-saving features that can be incorporated into its existing radio equipment – often saving up to 20 per cent of total radio network energy consumption.

Alternative energy sources tend to be most appropriate where mains power is either non-existent or unreliable. However, as radio sites have become less energy-intensive, it has become more economically and technically feasible to use alternative energy sources in other areas.

1.6 Q: Is solar energy really a viable option for mobile communications networks?

A: Thanks to advances in radio network equipment, including new energy-saving features, and the falling price of solar arrays, solar energy is an increasingly viable option from a financial perspective. Despite its higher initial cost, a solar energy solution at a radio base station site can pay for itself in 1–2 years, thanks to greatly reduced operating costs.

However, all solar energy solutions need sufficient sunshine, and it is typically areas of the Earth within 50° north and south of the Equator where they make most sense. For example, a 30 square-meter solar panel array would be enough to meet the energy needs of a 500W base station in Saharan Africa, while an array twice the size would be needed for the same base station in northern Europe.

1.7 Q: What are biofuels and when are they appropriate?

A: Biofuels include fuels such as biodiesel, vegetable oils, ethanol, methanol, biogas and other fuels derived from biomass. Biodiesel can be produced from a number of feedstocks including cold-pressed vegetable oils, waste vegetable oils (used frying oils from restaurants), animal fats and fish oils. The means it not only provides a local source of energy – obviating the need for fuel to be transported great distances – it also provides local employment opportunities and encourages local ‘ownership’ of the mobile network, cutting down on theft and the need for security.

A few important factors to bear in mind when considering the production of biofuel crops include: the requirement for fertilizers and pesticides; the potential displacement of food crops; the use of the biofuel crop as a ‘break crop’ for later food production; and the need for machinery-intensive production.

Biodiesel production can be controversial if, for example, rain forests are cleared for wide-scale biodiesel plantations or if food crops are taken out of the food chain. However, in the case of telecoms, this can be avoided through the use of small, localized production close to the site and at the local community level, and through the use of non-food crops such as Jatropha. It is important to consider environmental guidelines, such as the sustainability criteria developed by UNEP, as well as the total energy gain, or saving, against the environmental impact of each potential energy source.

1.8 Q: When can wind power be used?

A: Ericsson is conducting a number of trials into the use of wind energy at base station sites. As with solar power, wind power can provide virtually free energy. The challenge, however, is to find cost-effective wind turbine solutions that can be scaled down to the needs of an individual radio base station site.

The erratic nature of wind means that a small diesel generator or other power source is likely to be needed for fill-in power during periods of low, or no, wind. Currently, wind power also demands extra site space, because of the need for an extra mast or tower to house the wind turbine.

FOR FURTHER INFORMATION, PLEASE SEE:

White paper:

Sustainable energy use in mobile communications (August 2007)

Communications Expander:

http://www.ericsson.com/winningpropositions/expander/index.shtml