Without energy no ICT!

ICT is unquestionably a key driver of development – take for example the unique success of the mobile phone around the World. But modern ICT is totally dependent on energy. Particularly for rural areas, there is an urgent need to find solutions for decentralised energy sources.

It can be said, particularly in rural Africa, that ICT needs nothing more than an enthusiastic messenger with a drum or simply a pencil and paper. It works and has done so for hundreds of years. Today however we have access to sophisticated electronic ICT that can change lives at every level of society – and we should be using it to best effect.

Never has this been better demonstrated than in the unprecedented success of the mobile phone in Africa. A ruthlessly commercial industry providing some of the most sophisticated technology in the World has been embraced by most of the least developed countries of the World and it has changed the lives of some of the poorest people in the World. The cellular industry is a success story of epic proportions and, as the technology improves, it is improving people's lives by the day. Here is an ICT killer application that works.

There is however one indispensable condition: modern ICT needs energy, it needs a power source. Without power today's ICT is of no use.

Power technologies have been improved to keep pace with the rapid development of ICT, but the search continues for decentralised, reliable and long-lasting energy sources. This has never been more urgent than it is today – particularly for those regions in the developing world that do not have access to the national grid.

Urban and peri-urban areas usually have access to a national power grid. This has been a significant factor in the success story of the mobile phone industry. However this success of the mobile phone industry so far could not be expanded to rural areas, as in most cases, distances are too great to be connected to the national power grid. What are the alternatives?

The first and most simple solution is lead acid batteries to power up the ICT installation, be it a cell phone, a computer or a TV set.

Apart from the environmental impact of lead acid batteries, they also cause costs for recharging, and transport.

In search of alternative energy sources

Alternative energy options are numerous and vary considerably: From the electricity grid to photovoltaic solar energy, wind energy, hydro energy, wave energy, bio-mass energy, fossil fuel generators, lead acid batteries, fuel cells and wind-up human energy all offer a varied range of solutions for ICT. However, most have various impacts – be it cost, infrastructure or

Case Study: Satellite-linked pay phones in rural Zambia

Connect Africa is running a trial of satellite linked pay-phones (a Public Calling Office – PCO) in deep rural Zambia. Each PCO provides telephone, fax, copy, print, SMS and internet at affordable rates. These PCO's offer local entrepreneurs an opportunity to create a business by running a PCO, or they can improve their own existing businesses by using the facilities provided by the PCO.

The PCO, however, requires an electric power source. It will not work without power. Enter the zinc-air fuel cell provided by the Alternative Energy Development Corporation (AEDC). This is a tested technology that uses oxygen, an anode, a cathode and an electrolyte that combine in an electrochemical process to create electricity. The anode is compacted (by hand) zinc dust which, when depleted, can be used as fertiliser. The cathode is metal that is reused and the electrolyte is de-ionised water that is simply thrown out when used. The whole assembly is lightweight, affordable and totally recyclable. Four LED light clusters powered by a standard 12V fuel cell will provide light for four weeks or more.

This technology also offers an opportunity for people in deep rural areas to establish micro enterprises. Small service centres are needed to sell, service and recharge the fuel cells in their communities. These service centres can also sell the energy provided by the fuel cells to charge cell phones and other battery-operated products and accessories.

The zinc dust and electrolyte will be delivered to local service centres as part of Connect Africa's routine maintenance visit to the PCO, and an ongoing service and monitoring programme will ensure that the local service centres are operating at optimum service levels.

In partnership with the Zambian Communications Authority, the Zambia Wildlife Authority (in who's game management areas we are operating), Iridium Satellite, the Thuraya Satellite Network and the Southern Africa Trust (who are funding the trial), Connect Africa looks forward to testing a comprehensive service that will revolutionise communication in rural areas around the world.

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In close collaboration with the private ICT sector, governments are exploring decentralised solutions for rural communities.

Photo: Jerling

environmental impacts – or are limited to regions where a natural source of energy is available, such as sun, wind, water, or biomass waste.

Human energy is the cheapest and most abundant source, but it is also the weakest one. Solar energy promises to be the most effective alternative, particularly in sun-rich Africa, but it is still expensive and out of reach for the average rural African.

So where does this lead us? If developing regions and emerging markets can make use of the enormous potential of ICT without contributing to already existing global environmental problems affordable, renewable and environmentally friendly power sources are the only solution.

What does this mean? The answer lies in hybrid solutions. Just like ICT needs to be tailored to the specific requirements of the people, so energy sources need to be tailored to available resources and the actual demand. Until we find that killer application for energy, our solutions will come from combining "best for purpose" solutions that are currently available to us.

To give an example, solar energy in a sun-rich environment can be linked to cost-efficient fuel cells rather than lead acid batteries. Thus smaller and cheaper photovoltaic panels can be combined with environmentally friendly and cheaper zinc air fuel cells to provide an environmentally sound solution at a lower cost.

Similarly, a windy coastline should make use of ever-improving wind turbines, or communities living on a flowing perennial river system should install efficient hydro energy plants.

Many governments, whose responsibility is to provide energy to all their citizens, today are exploring decentralised electrification solutions for rural communities. The right decentralised solution is cheaper than extending the national grid, and the added value can be substantial – particularly when remote communities become net exporters of electric power themselves.

Energy is the fuel for ICT which is, in turn, a vital tool for development. Individually they are both limited – combined, they change the world.

More information:
www.iridium.com
www.thuraya.com
www.aedc.co.za
www.southernafricatrust.org

Zusammenfassung

IKT spielen eine wichtige Rolle in der Entwicklung – wie der beispiellose Erfolg von Mobiltelefonen überall in der Welt verdeutlicht. Ohne Energie können moderne IKT jedoch nicht funktionieren. Keine Energie – keine IKT. Um sicherzustellen, dass alle Bevölkerungskreise in Entwicklungsländern von den erheblichen IKT-Vorteilen profitieren können, muss die Energieversorgung ein integraler Bestandteil jeglicher IKT-Lösung sein. Eine Kombination von erneuerbaren Energiequellen, zugeschnitten auf die Bedürfnisse der Bevölkerung und der Region, muss sichergestellt sein. In entlegenen ländlichen Gebieten von Sambia prüft „Connect Africa" zurzeit Versuche mit einem satellitgebundenen Münztelefon. Diese Lösung bietet Zugang zu verschiedenen IKT-Diensten und ist auch eine zusätzliche Einkommensquelle.

Resumen

Si bien las TIC constituyen sin duda alguna un factor clave que impulsa el desarrollo – véase, por ejemplo, el éxito sin precedentes de los teléfonos celulares en todo el mundo – las tecnologías modernas son totalmente dependientes de la energía. Si no hay energía, no puede haber TIC. Para asegurar que todas las comunidades de las naciones en desarrollo gocen de los sustanciales beneficios de las TIC, es necesario que el suministro de energía sea un elemento integral de cualquier solución de este tipo. Particularmente para las áreas rurales, es indispensable desarrollar la combinación correcta de fuentes de energía renovables y adaptarla a las necesidades de las personas y de la región respectiva. "Connect Africa" viene ensayando un sistema de teléfonos públicos de pago (situados en locales denominados PCO – Public Calling Office) con conexión vía satélite en las comarcas rurales apartadas de Zambia. Esta solución podría ofrecer acceso a diversos servicios de TIC y a la vez constituirse en una fuente adicional de ingresos.