

Alcatel-Lucent Eco-sustainable Wireless Solutions

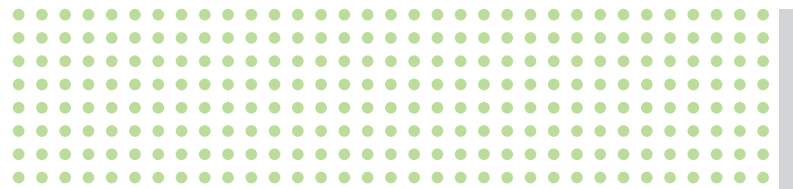
Leveraging the value of green

Alcatel·Lucent 





Wireless network operators now face the challenge of reducing operating costs and carbon footprint, while extending operations to areas beyond the reach of electricity grids. Alcatel-Lucent wireless solutions help you meet these challenges by addressing energy efficiency at all layers of the network, supporting alternative energies at industrial scale and minimizing materials production through converged RAN software-only upgrades. No other wireless solution offers such a broad approach to eco-friendly telecommunications.





Achieving more with less

Wireless operators are facing the challenges of a rapidly changing operating environment worldwide: Over the next few years, you need an infrastructure that can serve millions of new subscribers in remote rural areas. You must be ready to satisfy the demands of consumers and regulators who want to improve the health of the planet. And you need effective new ways to cut costs, so you can support continued growth in data traffic, while maintaining your competitive edge — and your profitability.

Supporting off-the-grid subscribers

By 2015, the great majority of new mobile phone users will come from areas that are beyond the reach of electricity grids. Addressing these subscribers will require autonomous energy solutions that are more reliable and economical than traditional diesel generators.

The GSM Association estimates that 118,000 cell sites powered by alternative energies should be deployed worldwide by 2012, because these solutions have the potential to reduce OPEX and provide more eco-friendly communications. To achieve this goal, mobile operators need alternative energy solutions that can be implemented easily and cost effectively.



One priority when addressing these challenges is to minimize power consumption — and make cost-effective use of alternative energy sources.



THE NEXT BILLION SUBSCRIBERS

- The number of mobile phones users is expected to grow from 3 billion today to over 5 billion by 2015.
- More than 90 percent of new subscribers will come from high-growth markets.
- Between 60 percent to 80 percent of new subscribers will be located in rural areas. (Unstrung Insider, Light Reading, May 2008).

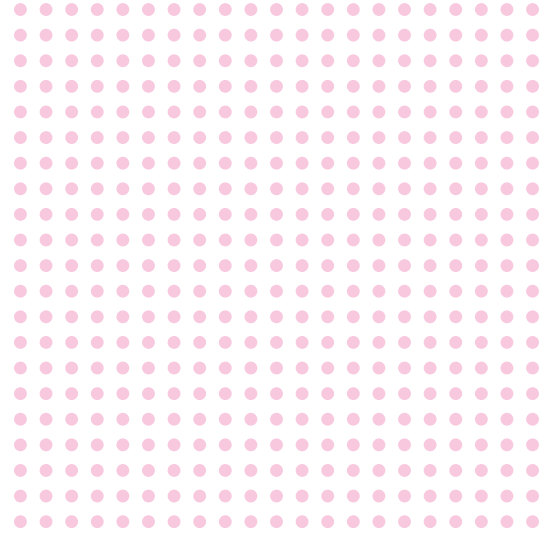




Fighting climate change

You also need to be prepared for consumers who are changing their purchasing habits to help improve the global environment. Today, about two percent of global carbon emissions come from information and communication technologies (ICT), according to recent studies. This figure might seem low, but it is increasing dramatically — in percentage and absolute terms — as telecommunication networks expand.

Therefore, you need to take action now to reduce your carbon footprint. At the same time, you have a valuable opportunity to help other industries minimize carbon emissions, through teleconferencing, telemedicine and other applications that enable smart management of transportation, energy, gas and water distribution.



CHANGING PURCHASING HABITS

- 85 percent of consumers are willing to change brands or consumption habits to make tomorrow's world a better place (Source: *Edelman, good purpose study, 2007*).
- 60 percent of global executives view climate change as important within their companies' overall strategy (Source: *McKinsey & Co, How Companies Think About Climate Change, 2008*).



Reducing operating costs

In mature markets, revenues remain flat, but your networks must support exponential data growth, along with your strategic goals for differentiation. That makes cutting energy bills a priority, because energy consumption can range from 10 percent to 25 percent of network OPEX. In emerging markets, where ARPU is very low, reducing energy costs is vital for profitability.





The Alcatel-Lucent CDMA base station portfolio is rated by Current Analysis as “best-in-class capacity and carrier density” — full spectrum in one cabinet.

Alcatel-Lucent Eco-sustainable Wireless Solutions

Alcatel-Lucent addresses the “more with less” and eco-sustainable challenges throughout the entire lifecycle of its solutions — from design and manufacturing stages (material use, eco-design), through the usage phase (reducing energy consumption — the highest contributor — and reducing floor space to lower the land and civil works impact) to the end-of-life stage (lowering the need to manufacture new hardware due to software upgrades only, ease in dismantling, recyclable materials).

Alcatel-Lucent delivers the energy efficiency you need for success in today’s changing operating environment. Using a holistic approach to minimizing power consumption and expense, we address all hardware, software and subsystem levels — across access, transport and core networks. As a result, you can dramatically lower your electricity bills, reduce carbon footprint and gain new opportunities to use affordable alternative energies. No other vendor offers an approach this broad.

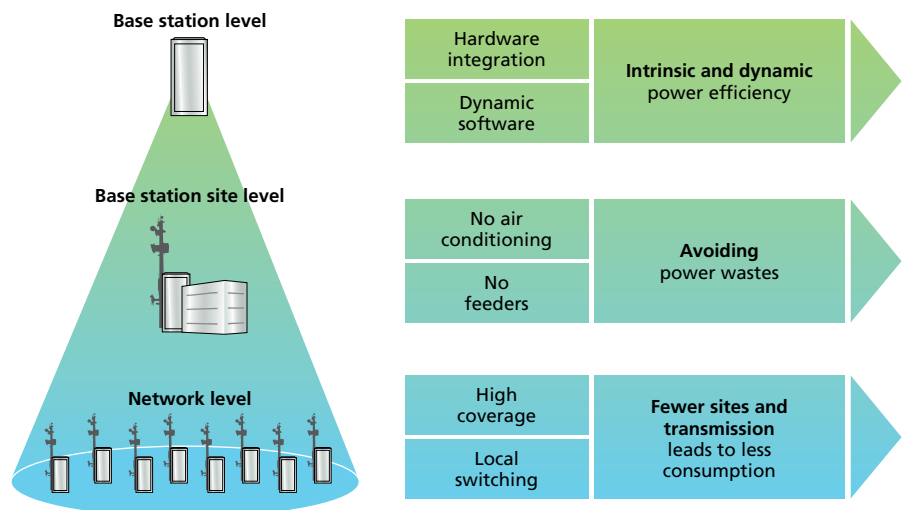


Wireless access: New tactics for saving energy

Because access accounts for about 80 percent of all power consumed by wireless networks, Alcatel-Lucent developed the following methods for increased energy efficiency:

Hardware integration – We offer solutions like the Alcatel-Lucent Twin Transceiver module (Twin TRX) in GSM that can house two logical TRXs in the space formerly required for one. This design reduces power consumption per transceiver by 32 percent. Additional power savings of up to 60 percent can be achieved with the Alcatel-Lucent Multi-carrier Power Amplifier architecture. Providing multistandard support for GSM, W-CDMA and LTE technologies, it can group several transceivers on a single power amplifier. Our W-CDMA and LTE modules offer power amplifiers featuring 40 percent energy efficiency.

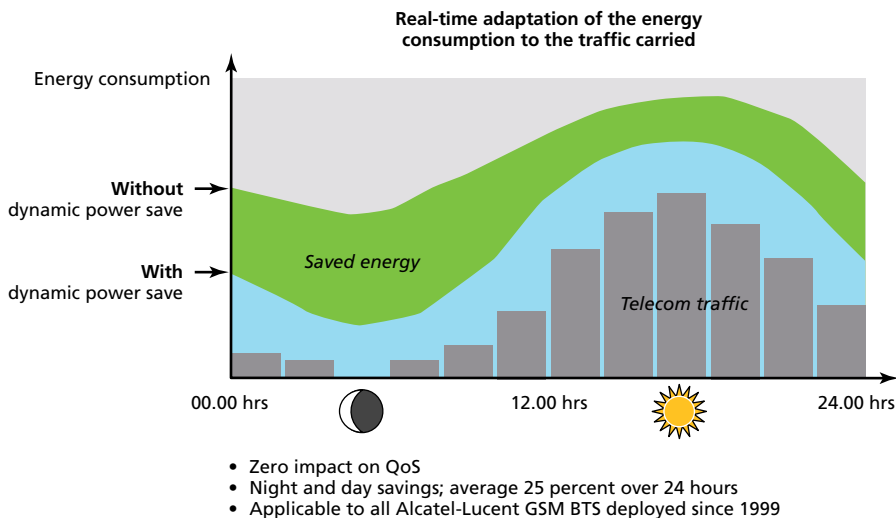
Figure 1. The Alcatel-Lucent holistic approach for increasing energy efficiency





Dynamic software – We dynamically adapt power consumption to actual traffic to lower energy wastes, with features like the Alcatel-Lucent Dynamic Power Save (DPS) for GSM. It can adjust the power amplifiers of each transceiver at the scale of a share of a timeslot (half of a millisecond). So your power savings can occur at any time, with no impact on quality of service. Over a 24-hour period, power savings of 25 percent to 30 percent have been measured with DPS. This feature is available on our latest base stations — and can be activated through a software upgrade on all Alcatel-Lucent GSM BTSs installed since 1999. Another example is the Automatic Carrier Switchoff for W-CDMA.

Figure 2. Decreased power costs with the Alcatel-Lucent Dynamic Power Save feature





“No air conditioning” solutions – Power-hungry air conditioning systems are traditionally the biggest energy drain on a wireless site. But Alcatel-Lucent outdoor base stations use our Direct Air Cooling System (DACS) and Fresh Air Cooling System (FACS) which provides smooth operation, even in the most extreme conditions.

No feeders – By locating power amplifiers closer to antennas, Alcatel-Lucent remote radio head (RRH) solutions eliminate feeder losses and reduce base station power consumption typically by 25 percent.

Fewer sites – Alcatel-Lucent also provides high-coverage features to minimize the number of sites you need — and your overall network power consumption. For example, our WiMAX beamforming feature dynamically focuses radio power in the direction of active users — decreasing site requirements by up to 40 percent.



Wireless core network: Mobile NGNs go green

Using the ATCA platform, the Alcatel-Lucent 5060 Wireless Call Server (WCS) delivers improved performance with a smaller footprint. Low-voltage processors and built-in features that reduce power usage during low activity make this platform 70 percent more energy efficient to operate and cool than previous hardware platforms.

The circuit boards of the Alcatel-Lucent 5060 WCS also reduce waste by providing longer-lasting processors. And they enable economical upgrades that increase capacity and support new technologies, while using the same chassis.

Transmission: Leveraging innovative infrastructure

The Alcatel-Lucent transmission portfolio offers high energy efficiency through individual product performance, as well as innovative architecture schemes. For example, Alcatel-Lucent products can dynamically route traffic to the most energy-efficient layer of the network. Where optical and electrical equipment are combined, traffic will generally be routed to the optical layer, while using the IP transport layer only when required for specific traffic management functions.



Converged RAN: Reducing the need for new hardware

Alcatel-Lucent began offering software-only upgrades to our products long before other vendors. These capabilities make transitions to new technologies the smoothest in the industry, reducing the need to manufacture new hardware — and minimizing the environmental impact of manufacturing.

Services: Global expertise for your energy transformation

Alcatel-Lucent offers a comprehensive suite of energy consulting services. Alcatel-Lucent experts can provide a complete assessment of your energy systems and consumption and make broad, vendor-agnostic recommendations for ways to increase efficiency. These recommendations not only include investments in telecommunications equipment but also suggestions for software upgrades, process changes and other tools and methods to reduce your overall power usage.

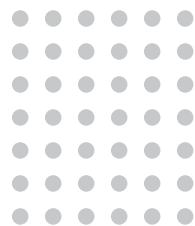


The Alcatel-Lucent advantage

To reduce costs – Alcatel-Lucent eco-sustainable wireless solutions use a holistic approach to energy efficiency. We address all hardware, software and subsystem levels, end to end, throughout access, transport and core networks. As a result, you can dramatically lower electricity bills.

To serve potential customers in high-growth markets – We extend the reach of wireless networks beyond existing power grids, using advanced alternative energy solutions, such as wind and solar power. We are working to provide the first truly industrial wireless base stations powered with alternative energies — offering faster deployment times and a higher return on investment than can be achieved with the solutions currently available on the market.

To help you satisfy regulators and consumers who are fighting climate change – Our product designs embed eco-sustainability throughout the life-cycle, with the following highlights: we minimize power consumption, decrease the need to manufacture new hardware, decrease the land and civil works impact through zero-footprint solutions, and offer new opportunities to use affordable alternative energies, so you can reduce your carbon footprint.





The first truly industrial solution for alternative energy

Leveraging our experience with several hundred solar-powered wireless sites, Alcatel-Lucent has established a leading Alternative Energy program. Its primary goal is to provide the first truly industrial wireless base stations powered with alternative energies. These solutions offer faster deployment times and a higher return on investment than can be achieved with the fragmented, site-by-site solutions currently available on the market. The program brings together the benefits of Alcatel-Lucent integration and implementation experience, our base stations' power efficiency and our professional services from consulting, design and implementation up to operations and maintenance. The program includes a unique lab and pilot station to foster an ecosystem of internal experts, partner companies and institutions — bringing together the worlds of alternative energies and telecommunications. This project helps operators extend the reach of their mobile services to serve a huge population of potential new subscribers. In addition, it enables renovation of existing sites, using more economical and eco-friendly solutions powered by alternative energies.

Figure 3. The Alcatel-Lucent Alternative Energy Lab and Pilot Station – a key tool in our alternative energy program



- Lab (incubator) plus live pilot
- Test, validation, integration
- Ecosystem consolidation

In Alcatel-Lucent site of Villarceaux, near Paris.

Leveraging Bell Labs R&D center

Lab

Pilot

Unique R&D program in live environment

Profitably deploying autonomous sites at 45° latitude

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