Nokia Siemens Networks Sustainable Energy Solutions
by
Peter H. Hellmonds
Corporate Affairs, Nokia Siemens Networks

The views presented here are the participants’ and do not necessarily reflect the views and the position of the United Nations or the United Nations Conference on Trade and Development
Nokia Siemens Networks
Sustainable Energy Solutions

Peter H. Hellmonds
Corporate Affairs, Nokia Siemens Networks
United Nations Commission on Science and Technology for Development (CSTD)
Geneva, 10 November 2009
Agenda

A  Business Environment
B  How we help CSPs
C  Customer cases
D  Summary
Business Environment
Environmental issues are center stage

- Investment community increased interest
- Leaders capitalize the value
- Customer expectations
- Demands of rural connectivity
- Companies
- Increasingly tight laws and regulations
- Increasing pressure from NGOs
- Climate change resource scarcity
Operators (CSPs) energy use is in the network...

~ 86% of a CSP’s energy is used by the Network

- Mast sites: 65%
- Switch sites: 21%
- Corporate sites: 12%
- Retail: 1%
- Maintenance vehicles: 1%

Source: ABI Research
…So CSPs are announcing environmental targets

- **Bell**
  Reduce intensity of GHG emissions by 15%, by 2012

- **BT**
  By 2020, reduce worldwide CO₂ emissions per unit of BT’s contribution to GDP by 80% from 1996 levels

- **Deutsche Telekom**
  Reduce CO₂ emissions for Deutsche Telekom Group by 20% below 2006 levels by 2020

- **France Telecom**
  Reduce CO₂ emissions for FT Group by 20% below 2006 levels by 2020

- **Telecom Italia**
  30% increase (vs 2007) of the eco-efficiency indicator for 2008: the objective for 2008 is 1,130 Bit/Joule (the value for 2007 is 873 B/J)

- **Vodafone**
  Reduce absolute CO₂ emissions by 50% against the 2006/07 footprint baseline, by 2020

Source: GeSI report SMART2020
4 key drivers in the market

**Accessible Market**
Estimate (multi B€)

- **Reduction of CO₂ emissions to preserve environment**
- **Increased need to reduce the OPEX of telecom sites**
- **Major thrust to cover new potential markets in rural and remote areas**
- **Grid connectivity in existing and new areas**

- **Infrastructure** (Installed base)
- **Infrastructure** (New deployments)
- **OPEX** (Energy relevant)
3 reasons why energy efficiency matters

| Energy efficiency = OPEX efficiency | • In mature markets, up to 10% of network OPEX is used on energy  
|                                 | • In developing markets, it can be from approx. 15% up to even 30% of networks OPEX for energy  
<table>
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<th>• Fossil fuel prices remain volatile with high dependency</th>
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| Lack of electricity supply        | • Networks are expanding into rural and suburban areas – grid availability and/or quality is challenging  
|                                 | • 1.6bn people lack access to grid electricity ("off-grid")  
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<th>• An additional 1bn people have unreliable access (&quot;bad-grid&quot;)</th>
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| Climate change                    | • Average temperature is increasing annually  
|                                 | • Carbon emissions remain the second largest contributor to green house gas emissions after methane  
|                                 | • Ethical purchasing behavior among consumers becoming mainstream |
Nokia Siemens Networks
Energy Solutions
How we are helping CSPs achieve their business & environmental targets
Nokia Siemens Networks Energy Solutions: an innovative combination of services and systems

**Analyze and consult**
Current energy system analysis and efficiency improvement proposal

**Operate and maintain**
OPEX reduction via continuous improvement of network energy efficiency

**Build and Deliver**
Complete reliable energy solution by combining efficient services and energy systems

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Energy OPEX Management

Nokia Siemens Networks
Energy Efficiency Consulting

Nokia Siemens Networks
Green Energy Control

Nokia Siemens Networks
Off-Grid Site Solution

Nokia Siemens Networks
Bad-Grid Site Solution

Nokia Siemens Networks
Energy Modernization
Off-Grid Site Solution

CSPs’ opportunities:
cover new potential markets in rural and remote areas

• Reduces generator runtime up to 9/10th (solar hybrid)
• Saves up to 20,000 liters per year on a typical off-grid site
• Provides connectivity to rural/remote areas

Renewable energy sources and green energy control to manage the site
Bad-Grid Site Solution

CSPs’ opportunities:
improve network availability and
carbon footprint reduction

- Reduces or eliminates the need for generator (fuel consumption reduction from 10,000 liters/year to zero)
- Dramatically reduces power-related network outages
- Improves power stability at site

Renewable energy sources and green energy control to manage the site
Energy Modernization

**CSPs’ opportunities:**
energy OPEX reduction with minimum CAPEX investment

- Doubles battery life from 2.5 to more than 5 years
- Reduces toxic waste (e.g. lead, other chemicals)
- Optimizes energy consumption in cooling and air-conditioning

Northstar Blue Battery

SiteStar Cabinet

0.9m and 1.8m high cabinets for optimal battery cooling at very low power consumption

**Improved battery back up solution**
Green Energy Control

**CSPs’ opportunities:**
reduce OPEX by remotely managing energy sources

- Allows remote monitoring and controlling of energy consumption at site
- Up to 70% of OPEX savings
- Up to 50% reduction in carbon footprint

Interfaces all power sources and smartly manages performance remotely
Energy OPEX Management

**CSPs’ opportunities:** increase profitability while reducing energy bills and carbon footprint

- Reduces sites visits
- Improves site security
- Reduces network outages due to power source
- Improves infrastructure lifetime
- Enables preventive maintenance

Network Infrastructure Management for efficiency improvement and growth

- Basic
  - Site infrastructure management and Energy modernization
- Advanced
  - Network management for efficiency improvement and growth
  - Business models with varying degree of TCO
Nokia Siemens Energy Solutions help CSP’s to increase profitability

Sustainable OPEX savings with pay back within 1-2 years

- Off-Grid Traditional
- Off-Grid Nokia Siemens Networks site solution: -73%

- Bad-Grid Traditional
- Bad-Grid Nokia Siemens Networks site solution: -68%

- Good In-Grid Traditional
- Good In-Grid Nokia Siemens Networks site solution: -62%

Emerging market typical site assumed
Ethiopia Telecommunications Corporation (ETC) network powered by renewable energy solutions

**Challenges**
- Expand into rural areas, no or bad grid
- Use of renewables (wind or solar)
- Total cost of ownership (TCO)

**Solution**
- 300 sites – 50% in rural areas with no grid
- Bad-Grid Site Solution
- Complete turnkey solution + consulting, planning & project management

**Benefits**
- Payback in 2 – 4 years
- Low TCO
- Minimal maintenance costs
- Mature technology - Relatively easy and inexpensive to install
- Long lifetime

"The project’s key challenges were electrical power and road access. There are places in Ethiopia where neither road access nor commercial electric power exists."

Ato Amare Amsalu, CEO of ETC
Softbank achieves 40% savings in site rentals and 60% less power consumption with Flexi BTS

Challenges
• Rapid expansion of subscriber base
• World’s most demanding high-speed data services market
• High CAPEX & rental costs for sites
• Stay green & reduce OPEX

Solution
• Increase network capacity with Flexi BTS
• Optimize BTS through unique software features
• Ready for new multimedia with HSDPA & LTE

Benefits
• Softbank met rapid growth in subscriber numbers
• Optimized energy efficiency - reduces CAPEX by up to 15%
• 40% savings in site rental costs = Flexi
• 60% less power consumption, CO2 down

“We have built up this relationship of trust with Nokia Siemens Networks, and it is our goal to offer good services that are competitively priced.

Softbank Mobile wishes to continue to work further with Nokia Siemens Networks.”

Mr. Junichi Miyakawa
EVP, Director & CTO, Softbank Mobile Corp.
A European operator to cut carbon emissions and reach more rural areas with Off-Grid Site Solution

Challenges

- No access to grid (difficulties to reach rural areas)
- High CO2 footprint (24/7 operation of site with diesel generator-DG)
- Limited traffic to serve, high OPEX

Solution

- Nokia Siemens Networks Off-Grid Site solution to replace diesel generator with hybrid (solar + wind) solution
- Nokia Siemens Networks Green Energy Control

Benefits

- Carbon emission reduction up to -50 tons
- Pay-back time for hybrid solution vs. diesel generator < 2 yrs
- Reaching rural areas in a more environmental friendly way, while cutting operational costs at the same time

“In our search for improving network efficiency we also kept thinking about the need to protect the environment. We are pleased to have a partner who shares our values and our concerns.

Nokia Siemens Networks has a clear vision of the future and turn it into solutions in which efficiency and ecology go hand in hand.”
Summary

- Nokia Siemens Networks is committed to help CSPs reduce OPEX in networks while strengthening CSPs image as environmentally responsible corporations.
- Nokia Siemens Networks offers full end to end energy efficiency solutions with most competitive TCO.
- Nokia Siemens Networks Green Energy Control is key differentiator in the market place.
- Renewable energy shall be NSN first choice for all remote base station sites by 2011.