

The Power of ICT in Sustainable Energy & Life Cycle Assessments (LCA)



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An ICT Industry Viewpoint on Green

- Environmental sustainability (e.g., climate change) is dominating the global agenda.
- ICT industry is continually confronted with increased energy costs, governmental targets to reduce carbon dioxide (CO₂) emissions, as well as consumer and investor demands.
- ATIS launched an investigation in 2008 on behalf of its members into how to address environmental sustainability while utilizing the uniqueness of their position to help advance sustainability in other sectors.
- ATIS has issued 3 industry reports on environmental sustainability:
 - ATIS Report on Environmental Sustainability, March 2009
 - ATIS Report on Wireless Energy Efficiency, January 2010
 - ATIS Report Reviewing ICT Life Cycle Assessment (LCA), January 2010
- Technical work ongoing in the ATIS Sustainability in Telecom: Energy & Protection Committee (STEP).
 - Delivering a suite of Telecommunications Equipment Energy Efficiency Ratio (TEER) specifications.

The Power of ICT by the Numbers

- ICT accounts for 2-3% of the world's CO₂ emissions.
- ICT enables other business sectors and consumers to reduce emissions globally by **15% by 2020**.
- ICT enabled solutions have the potential to cut U.S. CO₂ emissions by up to **22% by 2020**.
- Widespread use of broadband applications can achieve net reduction of **1 billion tons of GHG** over 10 years.
- A **7% increase** in U.S. broadband adoption could result in \$6.4B/year in mileage savings from unnecessary driving and 3.2 billion fewer pounds of CO₂ emissions.
- With **over 4 billion mobile users** ICT can influence behavior given its direct involvement in the daily lives of people.

The Value of ICT

- Investment in the ICT sector can help strengthen the U.S. economy and transform the country.
 - ICT promotes energy efficiency that results in reducing emissions.
 - ICT decreases the importance of physical location of decision makers, workers and consumers.
 - ICT plays an important role in helping America reduce its dependence on fossil fuels, protect the environment, and promote innovation and growth.
- ICT Roadmap to Sustainability encompasses:
 - Energy Efficiency & Management
 - Applications and Services
 - Product Development and LCA
 - Renewable/Alternate Energy Sources
 - Corporate Operations

Issues and Considerations for Developing an ICT Sustainability Roadmap

Portfolios

Energy Efficiencies and Management

Applications and Services

Product Development and Life Cycle Assessment

Sustainable/Renewable/Alternate Energy

Corporate

Programs

Central Office

Data Center

BTS

Home Network/CE

Enterprise Network

Outside Plant

Corporate Facilities

Fleet Management

Power Sources/Storage/
Distribution

Energy Reduction

Programs

Home Energy Management

Service Provisioning

Self Configuring Devices

Consumer Product
Dematerialization

Advanced Grid Power
Technology

Smart Appliances

SMART2020

Programs

Waste Management

Reduce, Recycle, Reuse

RoHS

Dematerialization

Supply-Chain

Disassembly

Packaging

Batteries

Programs

Solar

Wind

BioFuels

Fuelcells

Hydro

Clean Coal

Programs

CSRs

Regulatory/Policy

Communications/Education

Facilities Management

Real Estate

Transport (GhG Scope II)

Audits/Targets (Co₂, EE)

Carbon Disclosure

Programs/Certification/
Disclaimers

Research

ICT Enabled Energy Efficiency

Energy Efficiency Strategies at the Service/Application Level

- “Smart Technologies”
 - Smart Grid: Better monitoring and management of electricity grids could globally reduce 2.03 GtCO₂ emissions worth \$124.6B.
 - In the U.S. reduce CO₂ emissions by ~480 million metric tons (MMT) and save ~\$35B in energy and fuel costs.
 - FCC Broadband Plan, Energy and the Environment, Chapter 12
 - Use of Public Safety 700 MHz for Smart Grid
 - FCC & NTIA should consider Smart Grid in their efforts to identify new uses for federal spectrum
 - Energy Independence and Security Act (EISA) of 2007
 - Instructed NIST to coordinate development of interoperable smart grid devices and systems.
- Teleconferencing - If video conferencing were substituted for 10% of business air travel, it would reduce U.S. carbon emissions by some 35 million tons annually.

ICT Enabled Energy Efficiency

Energy Efficiency Strategies at the Service/Application Level (cont)

- Telecommuting
 - Could reduce greenhouse gas emissions by 312 million tons due to energy saved by businesses over 10 years.
- E-Commerce / Dematerialization
 - E-commerce generates 36% less air pollutants, 23% less hazardous waste and 9% fewer greenhouse gases than conventional shopping.
- Emerging Applications
 - Education - Tele-education is an area that could grow rapidly. It could improve the quality of learning especially in more specialized and advanced subjects.
 - Health Care: One important area for the aging population is the use of different kinds of telemedicine and remote assistance services.

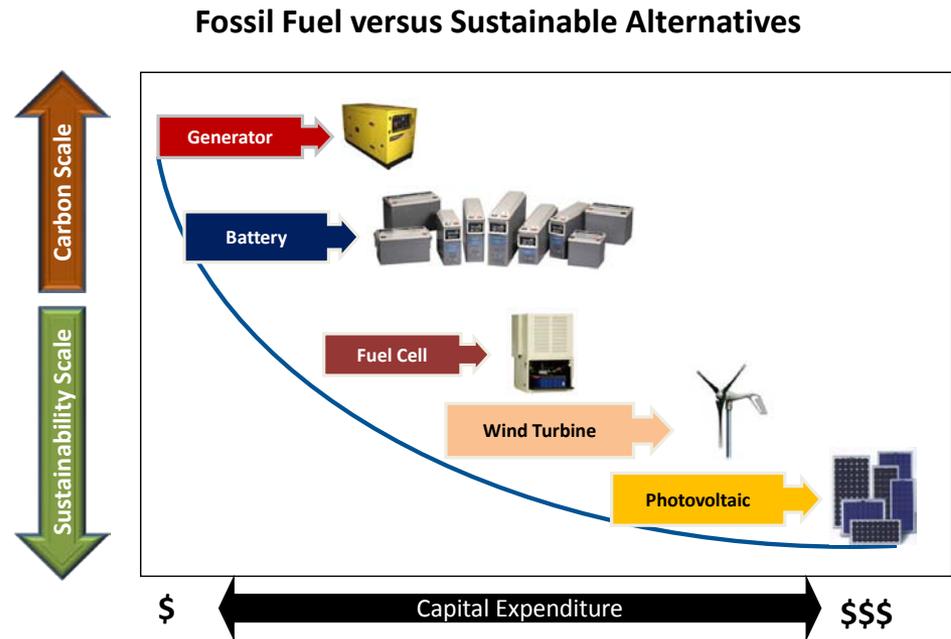
ICT Wireless Energy Efficiency

Energy Efficiency Strategies at Equipment & Radio Base Stations (RBS) Level

- The expanse of the wireless network is driving greater emphasis on wireless energy efficient practices and methods.
- Direct Strategies at Equipment & RBS Level:
 - Dynamic Sleep Mode Software
 - Potential to reduce energy consumption by up to 25% in the RAN.
 - Advanced Power Amplifiers
 - High-efficiency power amplifiers can provide for more than 60% efficiency.
 - ATIS Telecommunication Equipment Energy Efficiency Ratio Metric (TEER)
 - Methods in which energy efficiency should be measured in ICT equipment.
 - Mobile Device Improvements
 - Major initiatives include a universal charging solution; production of “green” handsets; and improved industry recycling.
- Study show that an inefficiently designed network could double the energy consumption of the network.

Use of Renewable Energy in ICT

- Small cell sites (less than 15kW) generally allow for small scale solar, wind, and fuel cells as energy sources.
- Capital expenditures for renewable alternative energy sources can increase as a function of sustainability.
- GSMA Development Fund's Green Power for Mobile advances the use of renewable energy sources to power 118,000 new and existing off-grid base stations in developing countries by 2012.



Items to consider:

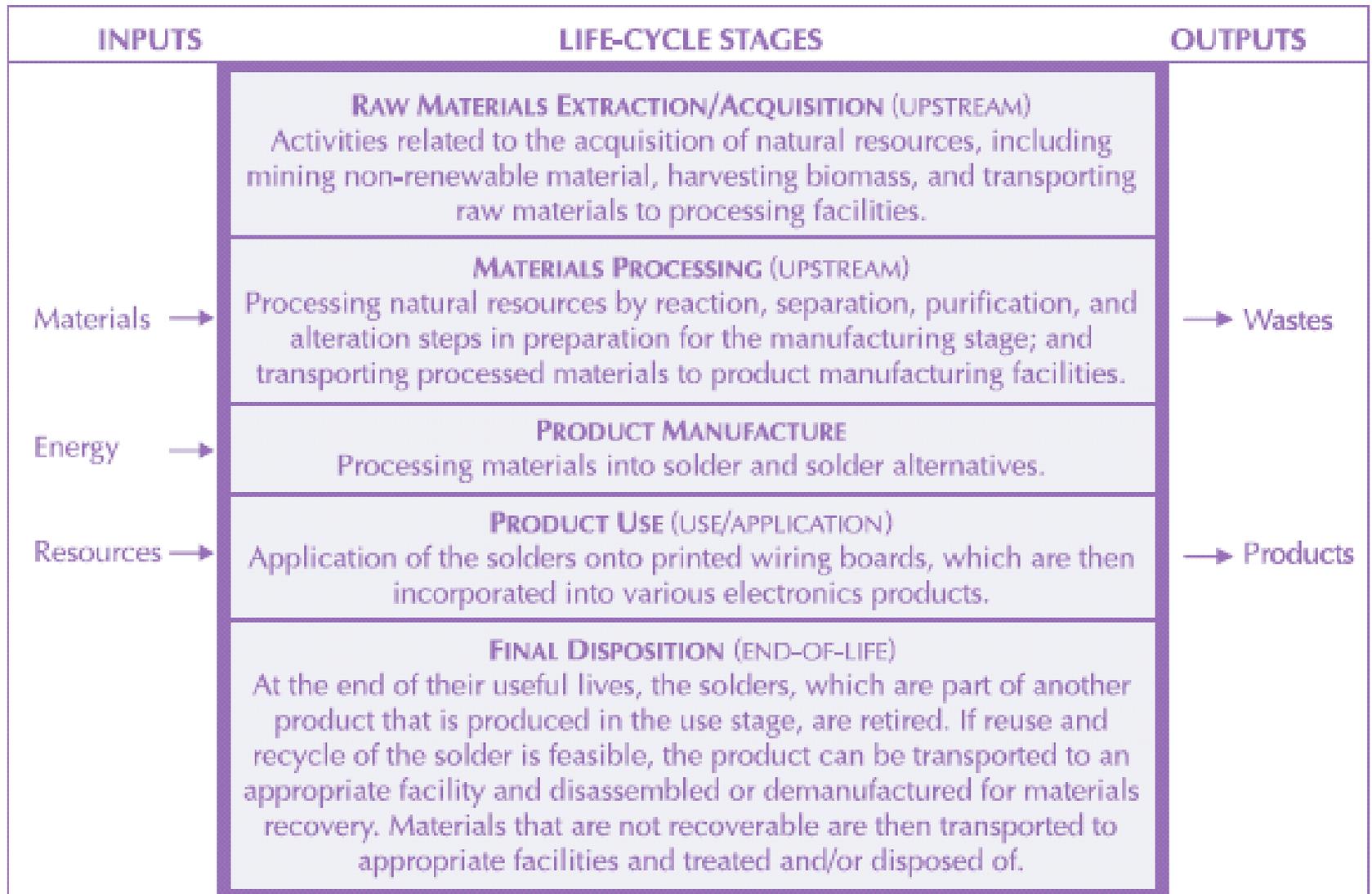
- Economics
- Fuel availability
- Reliability
- Sizing
- Indoor Application
- Life Expectancy & Warranty
- Footprint
- Maintenance

ATIS Study on ICT Life Cycle Assessment (LCA)

What is a LCA?

- “Life Cycle Assessment” is a concept and a methodology to evaluate the environmental effects of a product or activity holistically, by analyzing the entire life cycle of a particular product, process, or activity. (U.S. EPA)
- Since the late 1980’s companies have used LCA as a tool to quantify environmental impact.
 - Provides a quantification of environmental impact that might influence the end users’ perceptions of a product.
 - Is often used to support marketing claims about the environmental benefits of a product.
- ICT is applying LCA principles and greening its supply-chain.
- ICT Enabled LCA: More companies will start to look to ICT to help reduce their environmental impact; e.g., dematerialization and tele-services.

LCA Stages and Boundaries



Key Takeaways

- ICT is well-positioned to help develop and advance solutions.
- Business opportunities exist to identify more efficient operations, conserve energy and reduce cost (direct impact).
- The greater opportunity is in leveraging ICT to reduce the 97% of emissions coming from other industries.
- ICT is a powerful enabler of solutions to deliver energy-efficient substitutes for manual, mechanical, or physical processes.
- Tremendous opportunities exist to demonstrate environmental leadership and raise awareness.



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