Key Drivers & Strategies to "Green" Telecom

www.huawei.com







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Outline

1 Commitment & Vision for “carbon-lean” Economy

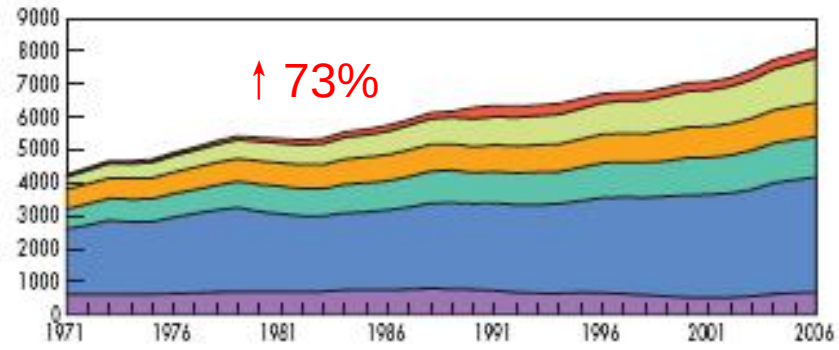
2 Key Enablers for Green Telecom Operation

- Wireless
- Central Office
- Broadband
- Transportation & Packaging

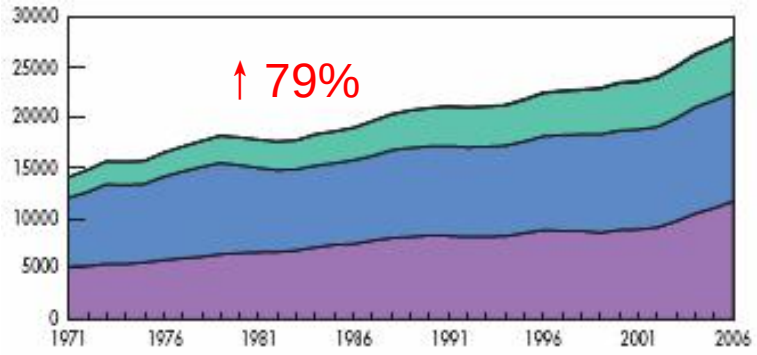
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Effects of excessive energy consumption

Global Energy Consumption



Global CO2 emission



Floods



Drought



↑ 2℃ = Sea Level ↑ 7 meters

↑ 6℃ = Humans vanish

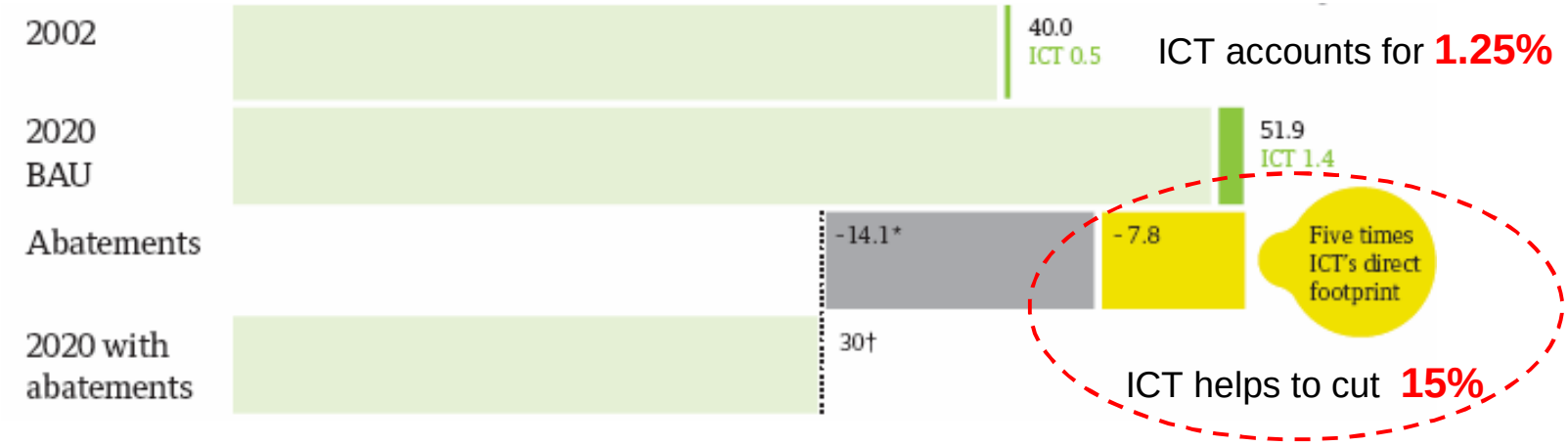
Need to be green

Source: Six Degrees by MARK LYNAS and publications

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GeSI : Green Enabler for the world

Carbon emission & ICT effort, *SMART 2020



*figures in Gt of CO2 emissions

GeSI and some of its members

GeSI
GLOBAL e-SUSTAINABILITY INITIATIVE

Deutsche Telekom

TELECOM ITALIA

HUAWEI

verizon

Telefónica

*SMART 2020, released by GeSI in 2008

SMART 2020 research to expand focus on individual countries like India in 2009 & 2010.

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Key Drivers to implement Green Strategies

Power consumption distribution of *telecom operators



*Source：Operators CSR report / Huawei cases
Huawei analysis

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2 Enabling Energy Efficiency

Wireless



Central Office

Broadband

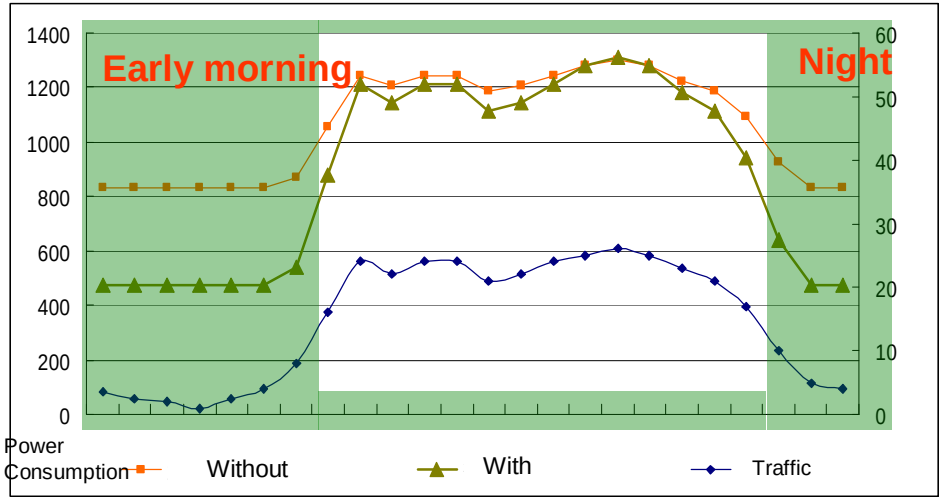
Transportation & Packaging

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"Green software" as an enabler

flexible shutdown feature, Single RAN & Radio Resource Management

Software shut-down to save power

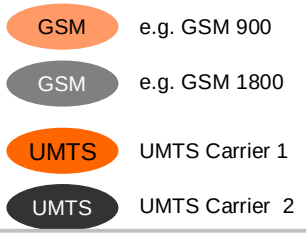


Site Shut-down & **Co-RRM



Co-RRM tech. allows network handover from GSM to UMTS, and shutdown more sites during idle hours, saving power

§ Software shut-down feature allows shutting down of idle carriers in TRX, saves power ~35%



Green BTS (<800W), Makes It Possible To Use Green Energy

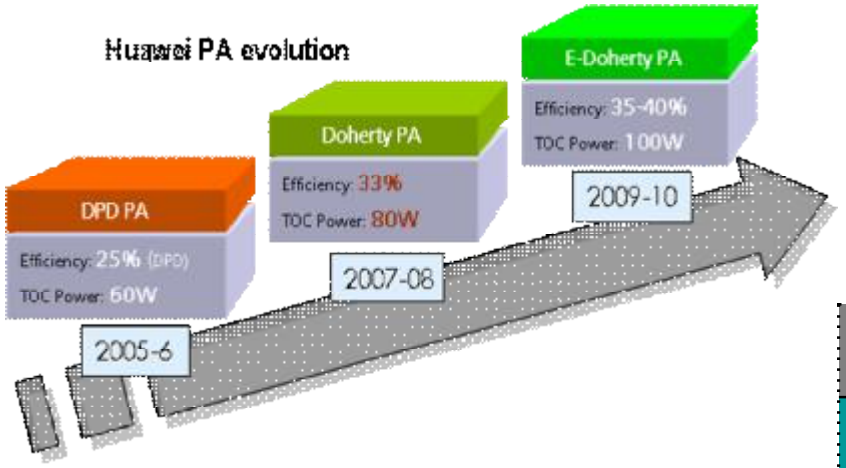
*Huawei site experiences & internal lab data
**RRM =Radio Resource Management

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“Green Power Amplifier” as an Enabler

higher efficiency : Enhanced Doherty PA

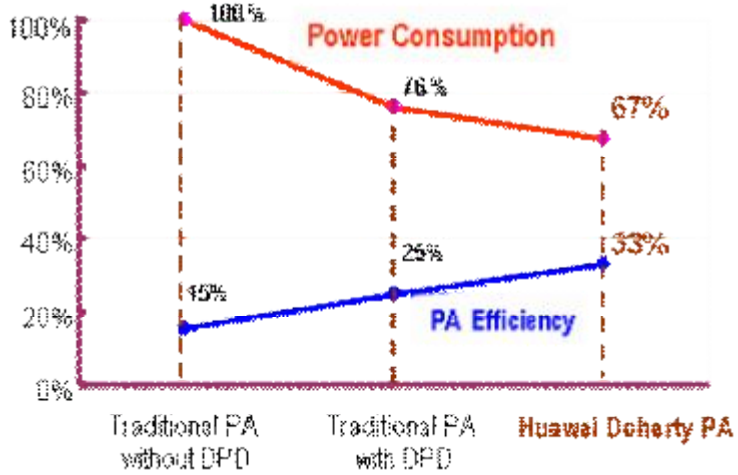
Latest PA Technology





BTS	3C3S
DHT	**850W***
Traditional solution	**1800W**

Note: *BTS3606CE @ 800MHz



- **Benefits:**
  - **Saving cost of power consumption, air conditioner & batteries**
  - **Enhanced coverage yielding to a lesser number of sites**

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“Green” Shelter, dramatically reduces power

Shelter embedded with Direct Cooling

Benefits

- Power saving cooling system
- Saving 60% space
- All-in-one design
- Assembled in 1 day on site

Without Direct Cooling

- A.C 16h per day, 5840h per year
- Fan 8h per day, 2920h per year
- Total power consumption: 6015 kWh/Y

With Direct Cooling

- A.C 500h per year
- Direct cooling system 8260h per year
- Total power consumption:1739 kWh/Y

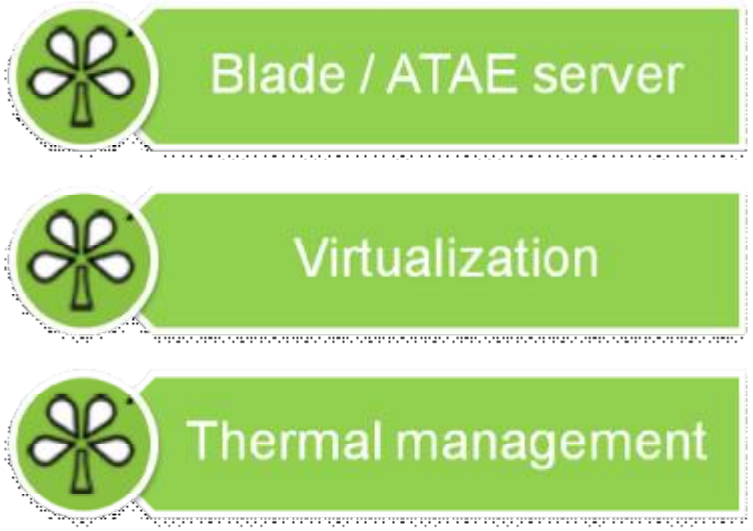
70% power saving

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2 Enabling Energy Efficiency

Wireless

Central Office



Broadband

Transportation & Packaging

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“Green” CO for Efficiency Improvement

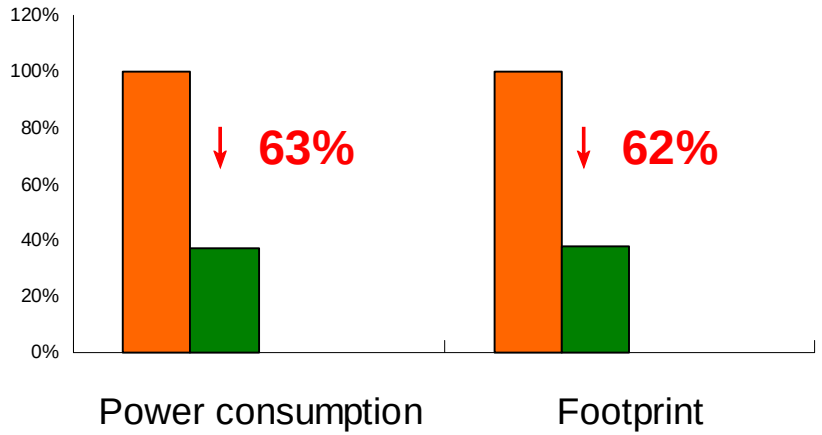
hardware / software efficiency using ATCA

Traditional Server Solution

ATAE server / Solution







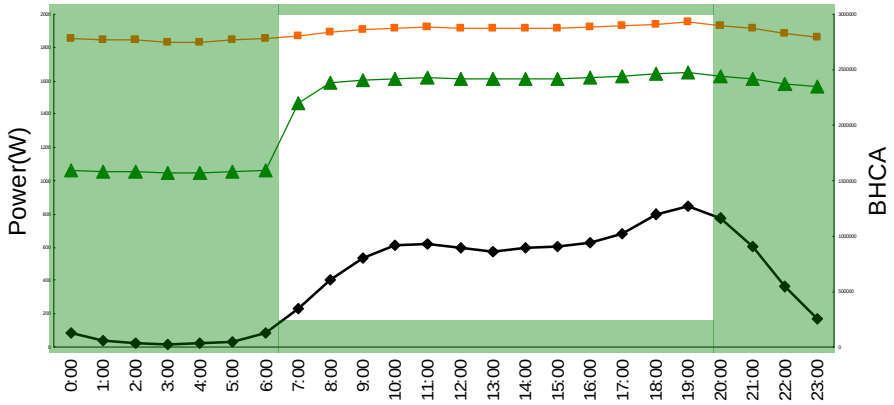
ATAE: Advanced Telecom Application Environment, a hardware platform based on ATCA

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Server: intelligent software + virtualization

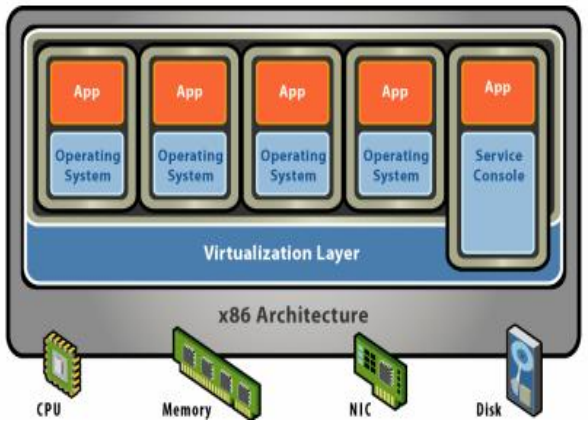
“Green software” improves efficiency

Cluster & Intelligent software



Example: MSC cluster & intelligent software mode could save ~ 20% power.

Virtualization



Example: Service Delivery Platform (SDP, ATCA based, ~12 service enablers, low capacity) reduces 40% energy consumption and saves 50% foot print

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Thermal Management

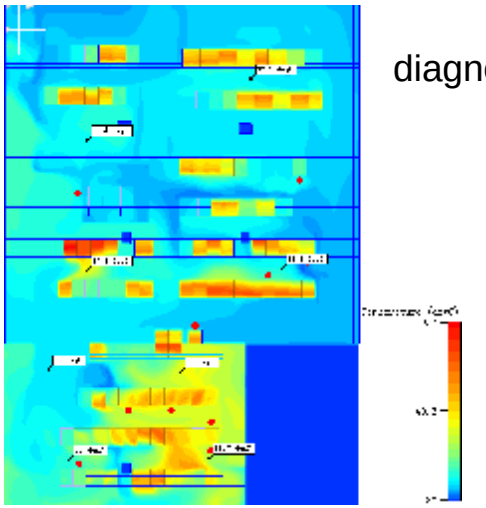
lower demands on cooling & energy consumption

Continuous innovation on CO thermal improvement

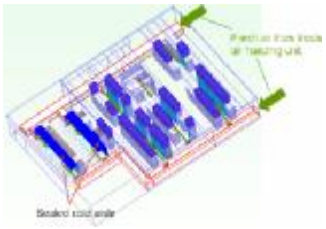
CO Services

- CO thermal diagnosis and planning
- New cooling technologies
- Cooling solution

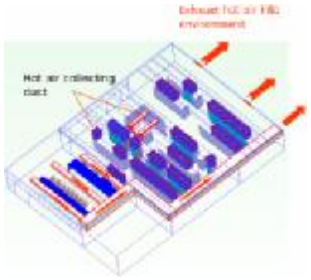
Example: Fresh air solution



diagnosis



Fresh air IN



Exhaust air OUT

Fresh air solution could save **64%** of cooling energy

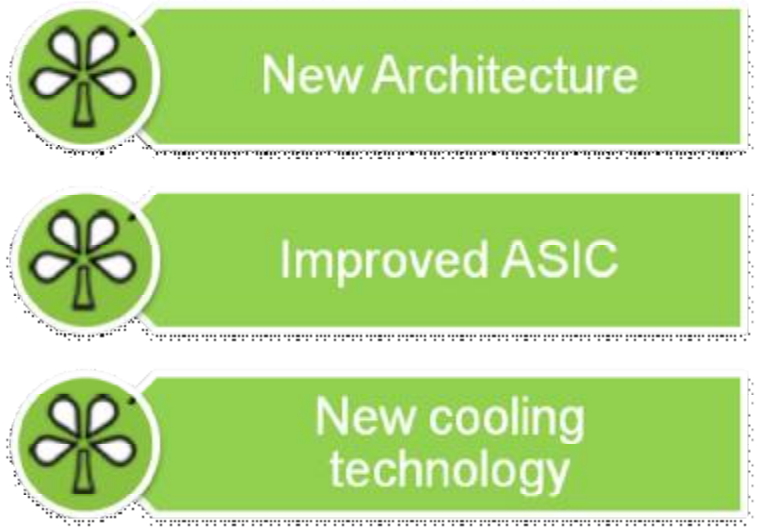
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2 Enabling Energy Efficiency

Wireless

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Broadband



Transportation & Packaging

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Broadband “green” access

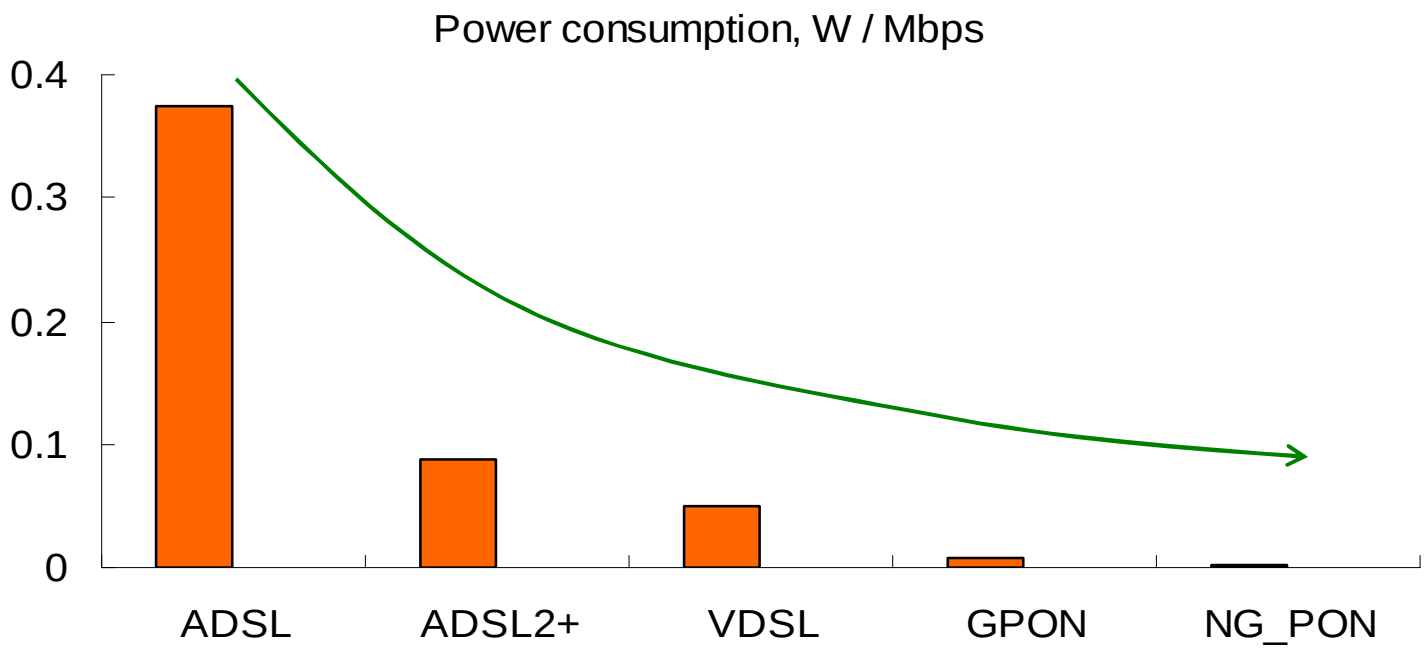
faster access and lower power consumption

1st IP DSLAM in 2001

1st commercial **ADSL2+ in 2003**

1st Commercial VDSL2 & T-bit in 2006

Full-service of Fiber Access In the near future

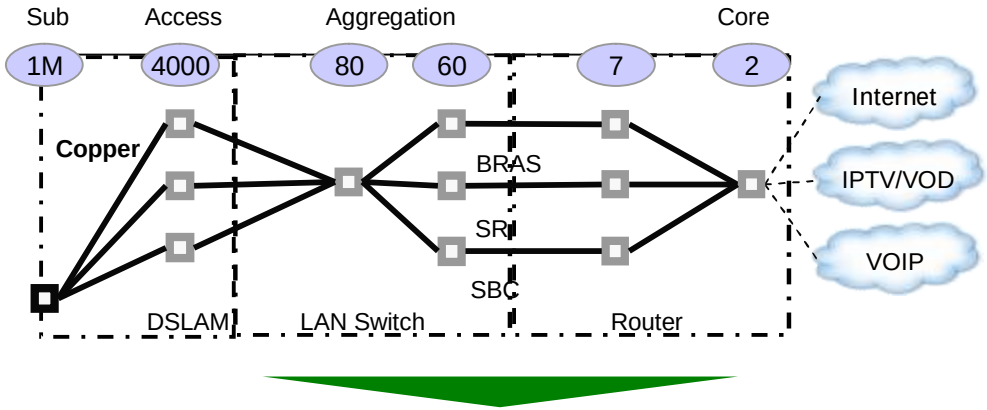


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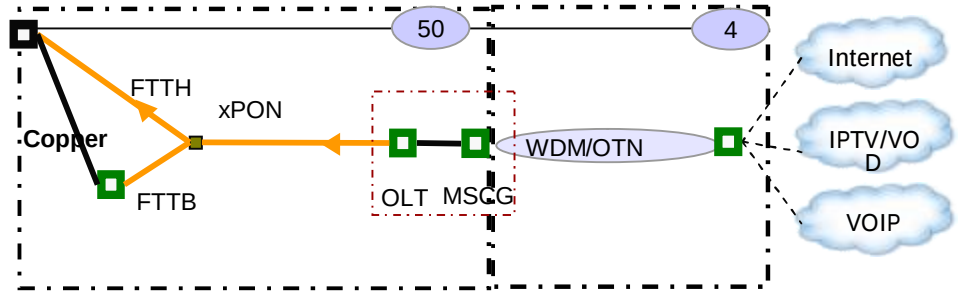
“Green” and simplified Network Architecture

energy efficiency at network level, equipment level, chipset level

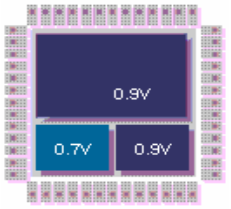
Traditional 3-Layer MAN Architecture



New Architecture: saves 70% power cost



SOC saves 25% power



SOC

- CPU, switch, USB, VoIP, WiFi all in one SOC
- Saves **25%** power

“No-fan” system saves 20% power



- Portable
- Silence
- Saves **20%** power

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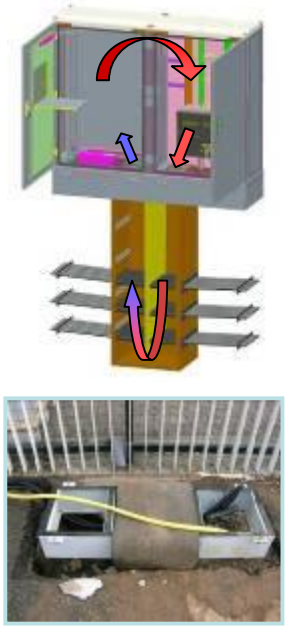
CASE: Geothermal cooling cabinet

Telecom Italia saves 70% of cooling energy in Turin

TI LAB Turin, Italy



Geothermal cooling cabinet



The test results have confirmed:

1. cooling energy cost savings upto 70%
2. coefficient of performance = twice that of the heat exchanged cabinet

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RoHS/WEEE compliant Terminals







Terminals moving towards full compliance for international RoHS & WEEE standards, starting from Pb reduction and accelerated usage of green materials etc..

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Recyclable “green” packaging

improves logistics, reduces wood consumption

Traditional carton



Recyclable green package







- New packaging reduces **90%** of wood consumption, 22% weight, improves operational efficiency by 82%;
- Each year will yield savings of : **57 k** m^3 wood (=forest 670 hectares), 1.37 M litres of diesel… which equals to cutting of **120 k tons** of CO2 emission ..

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Summary: Scenario analysis

Huawei solutions cut carbon emissions and operating expenses

Existing solution

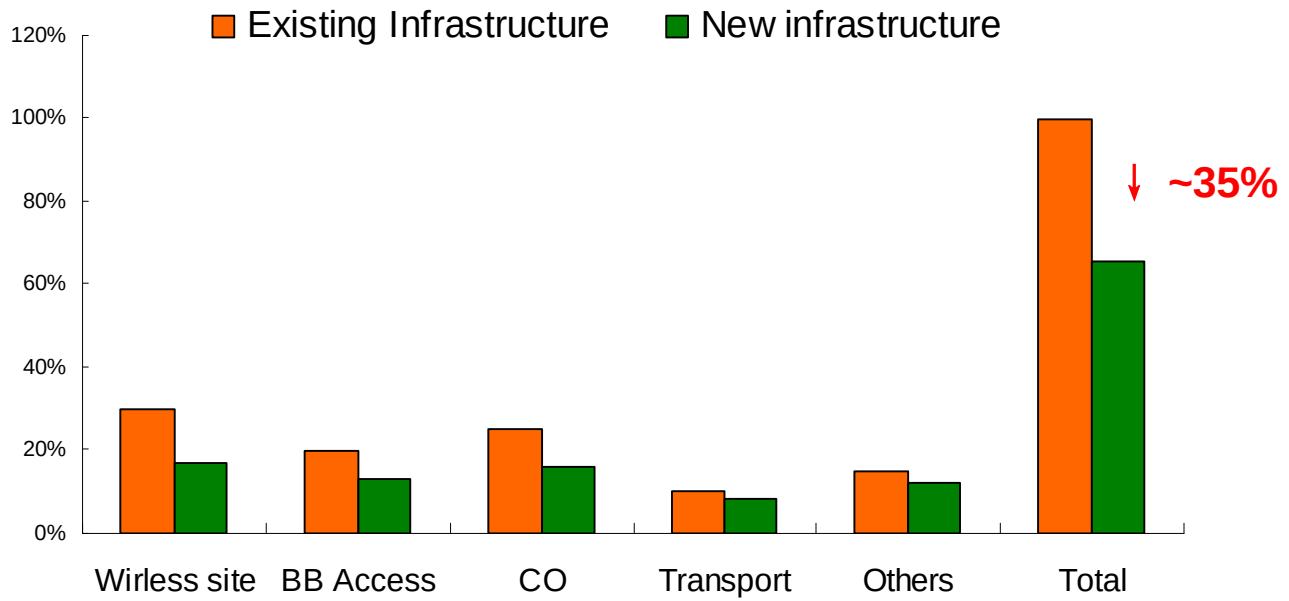
Description

- Traditional infrastructure (TDM)
- Equipments deployed for 4-8 yrs
- Air conditioning

Green solution

Description

- New infrastructure (ALL IP based)
- Green equipments (e.g. 4th generation BTS)
- Air Con / direct cooling / alternative energy



Source: Huawei cases (summary) for EU / China operators, 2005~2008

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Recommendations to industry : Go Green

§ Policy Framework

* Licensing to set KPI's for energy efficient operation

§ Technology

* Green considerations should be a must while implementing technology

(as telecom emissions represent 25% share of ICT)

* "Flat IP" Network architecture for network and energy efficiency

§Measurement & Certification

* Green Certification & Standardization (e.g. "energy star"..)

§ Regulation

* "Green Regulation" (e.g. max. power consumption per BTS, recyclable package..)
* Correlation of traffic situation to energy source solution

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Solar Power Solution for Egypt



TRX configuration	S2/2/2
BTS consumption	800W
PV module	165W× 36pcs
Battery capacity	1600 AH/48V/3days

Customer challenge

Remote desert with off-grid

Tourist district (environment protection required)

Solution feature

Stable power supply for site

Environment protection & energy savings

TCO Savings

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Solar-Wind Hybrid Power Solution for China



TRX configuration	S4/2/2
BTS average consumption	600W
Average solar insolation	4.47 H/day
Average wind speed	5.44 m/s
PV module	160 WP× 22 PCS=3520 WP
Wind turbine	1 KW× 2 PCS=2 KW
Battery bank	1200AH/48V

Customer challenge

- Remote telecom site with off-grid power
- High OPEX with traditional energy solution
- PV module & wind turbine anti-theft protection

Solution feature

- Wind turbine and PV module special design for anti-theft
- PV module on shelter & wind turbine on tower **reduces 15% CAPEX**
- Green energy solution **reduces diesel fuel ~17,000L/year**

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Green telecom Actions by Top Operators

Operator	Viewpoint	Action
Deutsche Telekom	“A sustainable company in a sustainable society”	Reduce energy consumption by regeneration power
BT	“ Climate change is costing us”	21CN project saves electricity 14 million KWH
orange / france telecom	“ The FT group is resolute in our commitment to "Responsible Growth." For us, this is not just a duty – it’s an opportunity”	Self-design solar power 2% higher efficiency than normal PV system
kpn	“KPN is pressing ahead on saving energy in the Netherlands and also internationally with other operators in Europe”	10,000 m2 direct ventilation equipment room, save annually Electricity, 84 million KWH CO2 emission, 51,200 tons Cost, 8.4 million Euros

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Huawei Corporate Vision :

"**Green communications, Green Huawei, Green world**" …



"**HUAWEI is committed** to social responsibility and environmental protection…, Ultimately we aim to achieve the goal to reduce operators' power consumption, our own power consumption and the entire …"

Sun Yafang, Chairperson of HUAWEI

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