

The Vodafone Commitment on Energy

Miguel Arranz, Head of 2G Product

December 2008

Nokia World Event



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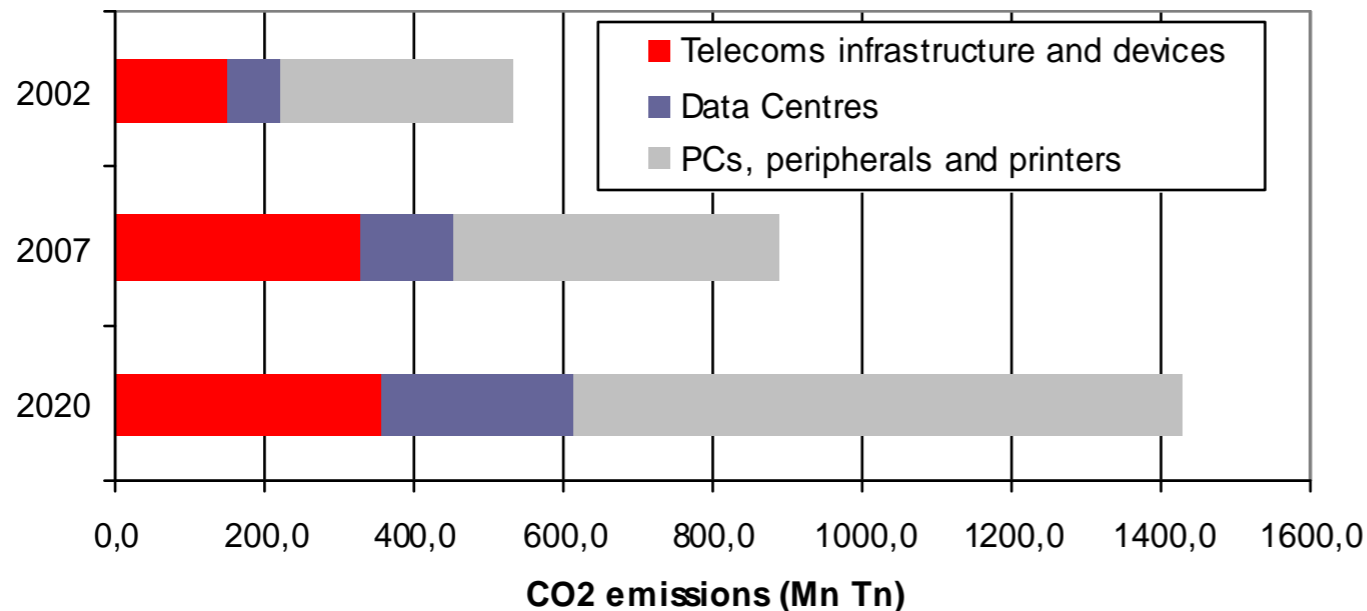
- the CO2 contribution
 - ✓ The mobile industry
 - ✓ Vodafone
- the industry response
- the VF CO2 challenge
- influence others
- helping our customers
- our 50% challenge
 - ✓ radio equipment
 - ✓ infrastructure
 - ✓ green energy sources
 - ✓ sharing
 - ✓ our green competition awards
- and creating culture

the CO₂ challenge – this is serious



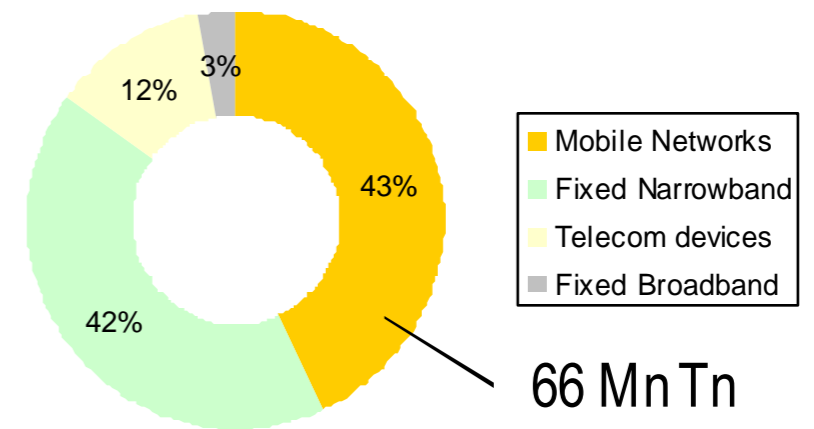
the CO₂ contribution of the ICT & the mobile industry

The ICT carbon bill: our 2% contribution...

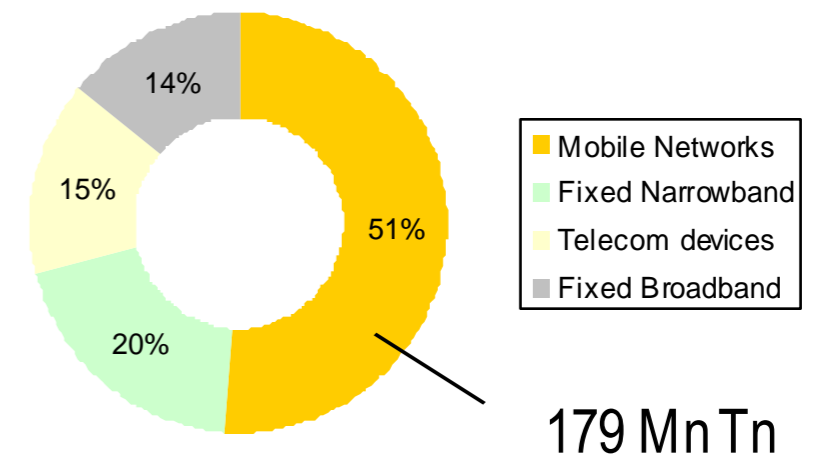


Source: McKinsey and the Climate Group, sponsored by Vodafone, T-Mobile, Nokia Siemens and others through GeSI

Telecoms Infrastructure and devices 2002
(100% = 151 Mn Tn of CO₂)



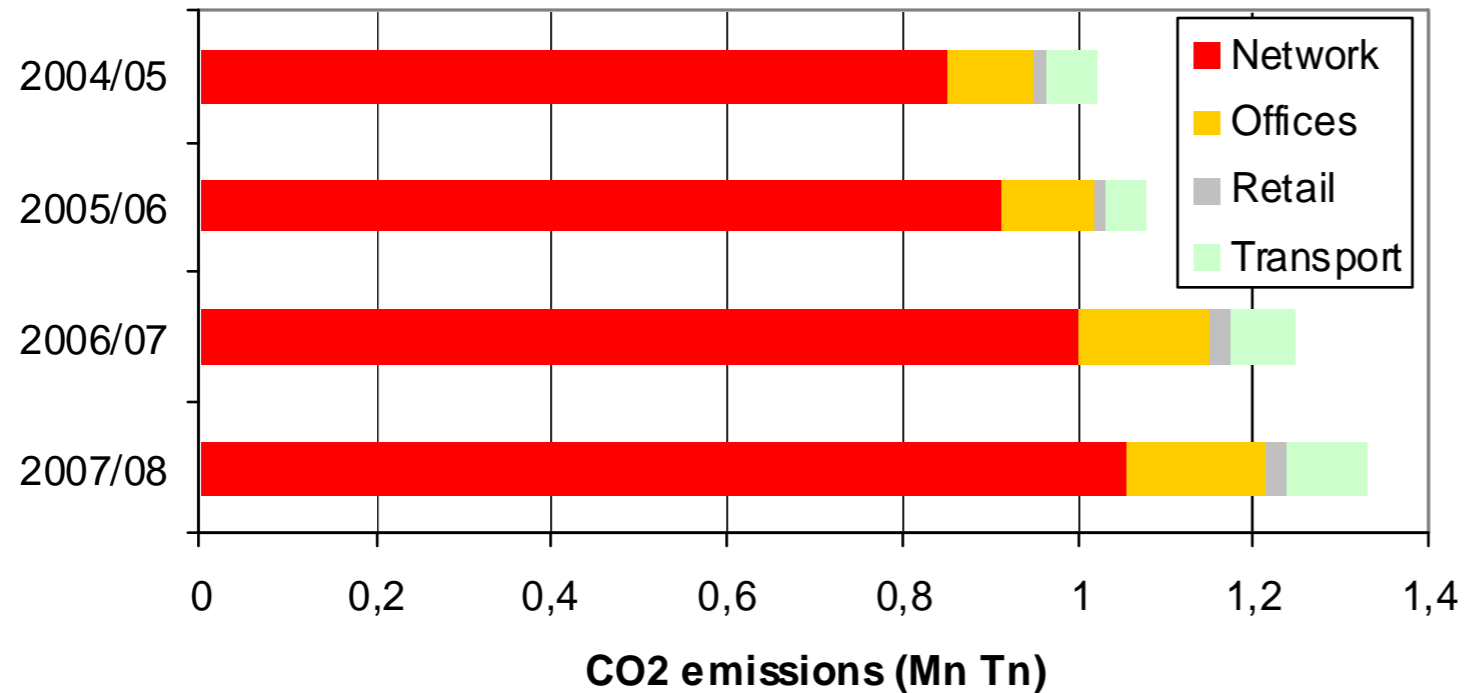
Telecoms Infrastructure and devices 2020
(100% = 349 Mn Tn of CO₂)



Mobile Operators produce 0.2% of Global CO₂ emissions. And growing...

the CO2 contribution in Vodafone

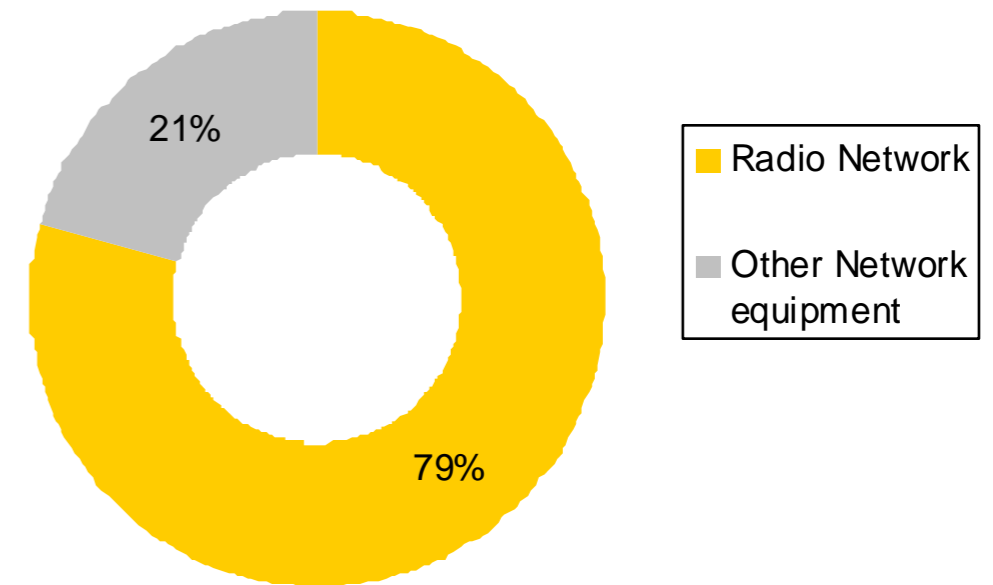
The Vodafone carbon bill



Source: Vodafone Group Corporate Social Responsibility Report August 2008

VF Turkey and VF India not included

Network CO2 emissions



Source: Internal Analysis

Our main carbon footprint contributor is our Radio Network

the industry response: public commitments



- 30% increase (with respect to 2007) of the eco-efficiency indicator for 2008: the objective for 2008 is 1.130 bits / Joule (the value for 2007 is 873 B/J)
- In 2008, 3 million Kwh reduction through use of low consumption lightening systems
- In 2008, 200 tonnes CO₂ reduction by substituting new methane generators by oil boilers
- In 2008, 2700 tonnes CO₂ reduction by replacing ECO3 vehicles with ECO4 vehicles

- Collect & standardise carbon emissions data in all of Telefonica's operating markets and companies
- Identify risks associated with future emissions limits as well as the opportunities to cut them & improve the company's environmental record
- Draw up an energy efficiency plan
- Calculate to what extent the products and services marketed by Telefonica reduce carbon emissions
- Raise awareness of the need to fight climate change among social & economic agents
- Establish a company – wide culture of awareness around climate change & energy savings.

- **Reduce absolute CO₂ emissions by 50% against the 2006/07 footprint baseline, by 2020.**
- Develop a separate climate change strategy for India and set a target by March 09
- Research and reduce the environmental impact of Vodafone's products and services
- Design and deploy products & services that will help our customers mitigate climate change.

Source: McKinsey and the Climate Group, sponsored by Vodafone, T-Mobile, Nokia Siemens and others through GeSI

Vodafone fully committed

the CO₂ Vodafone challenge



vodafone

21 April 2008

Vodafone Group today announces that **by 2020 it will reduce its CO₂ emissions by 50% against its 2006/7 baseline of 1.23 million tonnes.** This target will be achieved principally by improvements in energy efficiency and increased use of renewable energy.

"This is the right decision for a responsible business to take. It is good for the environment but also makes sense for the business...We hope that making this public commitment now will encourage others to take similar action."



**Cut our own
emissions by
50%**



**Provide services to
customers to help them
reduce their emissions**



**Influence others
in our industry**



**Informing our
employees**

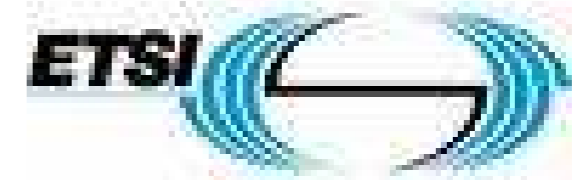
influencing others



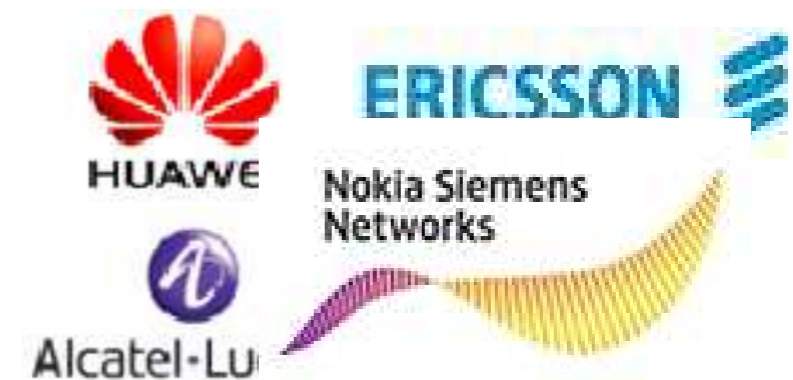
Our Radio Competence Centre works very closely with China Mobile on two workstreams with focus on energy efficiency:

- Common 2G Roadmap functionality, including energy efficiency mechanisms and capabilities.
- Joint specifications for infrastructure use and renewable energy solutions.

Vodafone contributes to the Environmental Engineering group of the European Telecommunications Standards Institute (ETSI).



and of course... **radio vendors:**



enviromental partnership

helping our customers to reduce their emissions

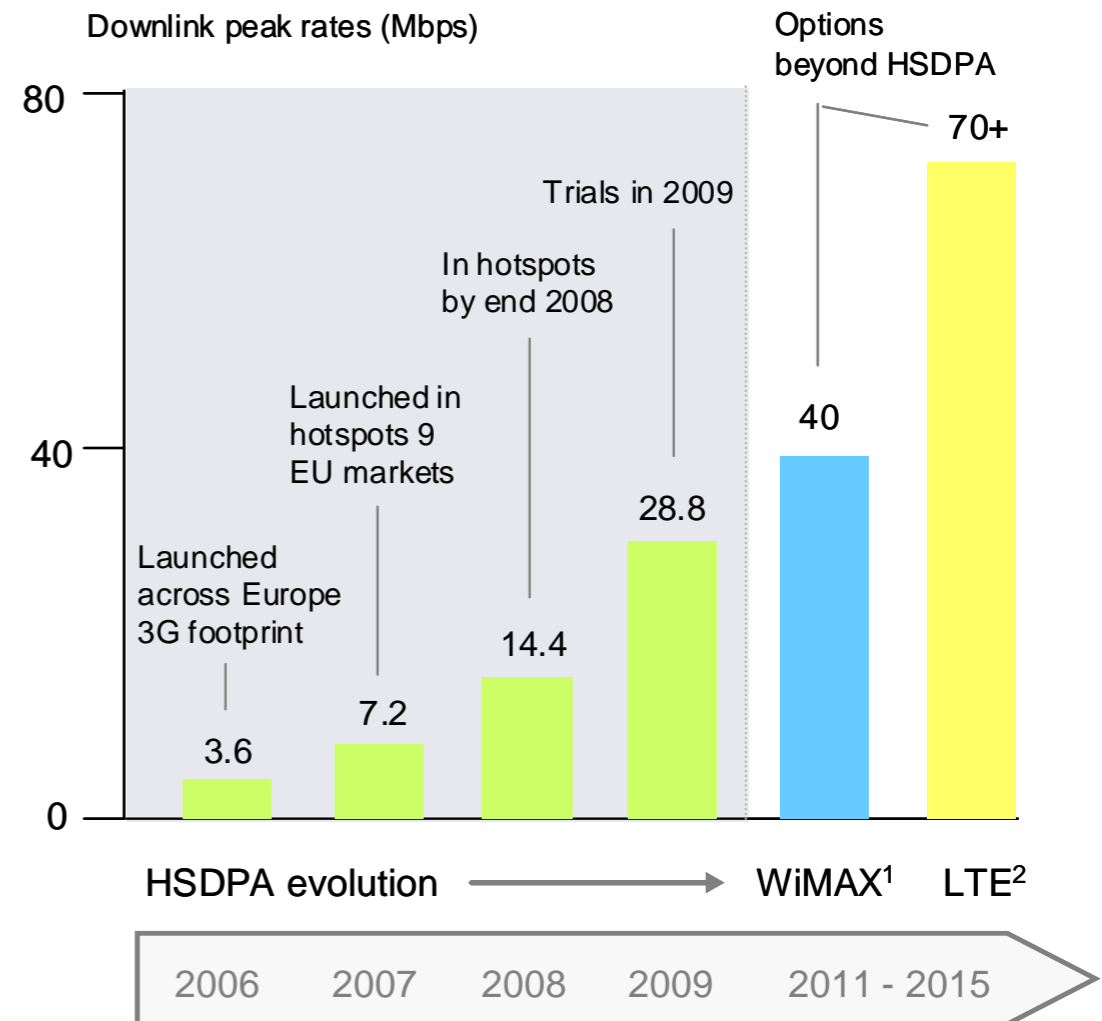
If 20% of European business travel was replaced by teleconferencing, around 25 Mn tonnes of CO₂ could be saved each year

Source: Global Action Plan – An Inefficient Truth, December 2007



Vodafone supports a range of service providers who offer 'Machine to Machine' (M2M) services, improving energy management. We provide in several OpCos in-car technology that helps drivers to avoid traffic jams by providing traffic information, helping both corporate and consumer customers.

Vodafone roadmap

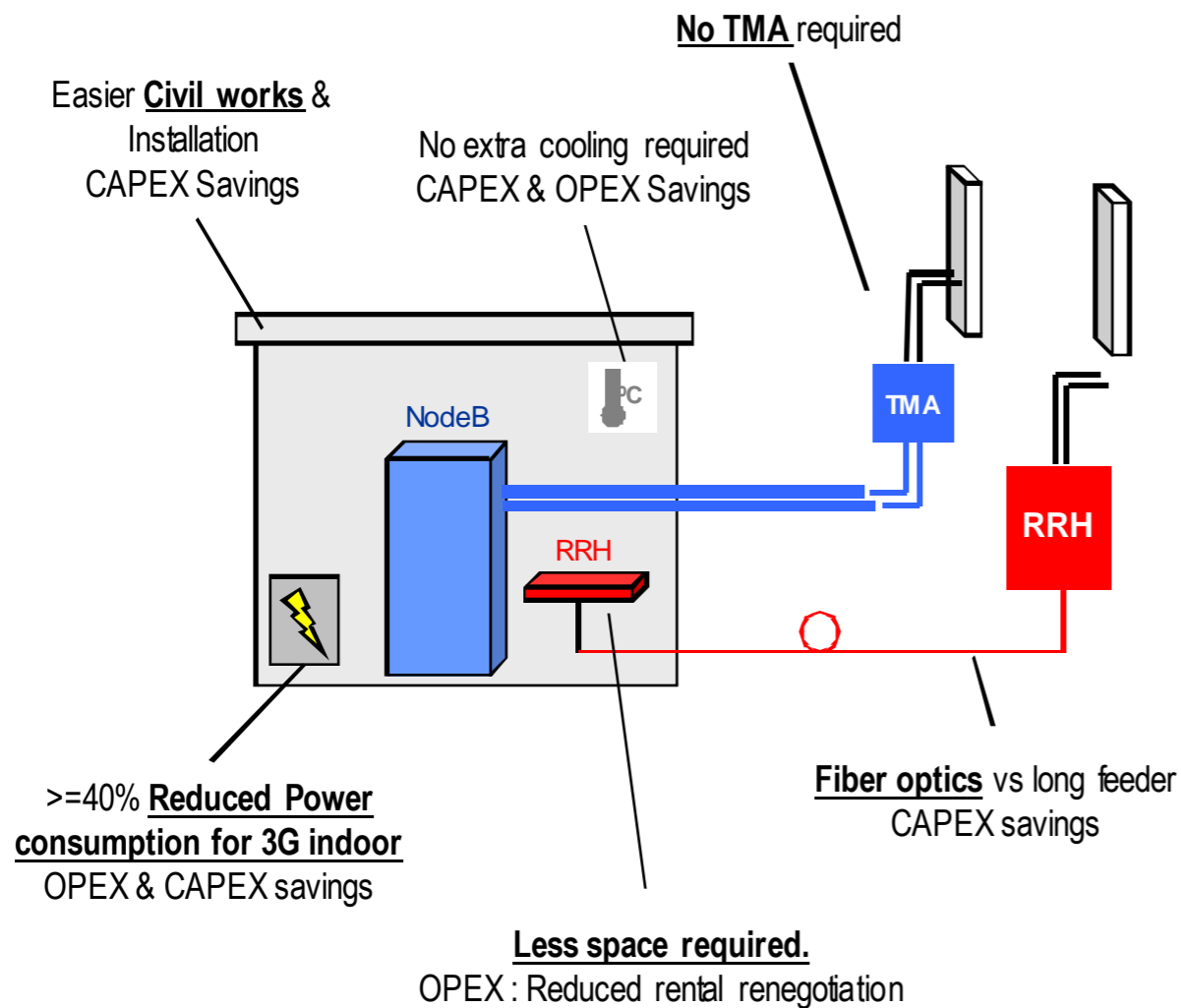


¹ 1*10 MHz (TDD) and 2*2 MIMO. ² 2*10 MHz (FDD) and 2*2 MIMO. ³ Next Generation Mobile Network

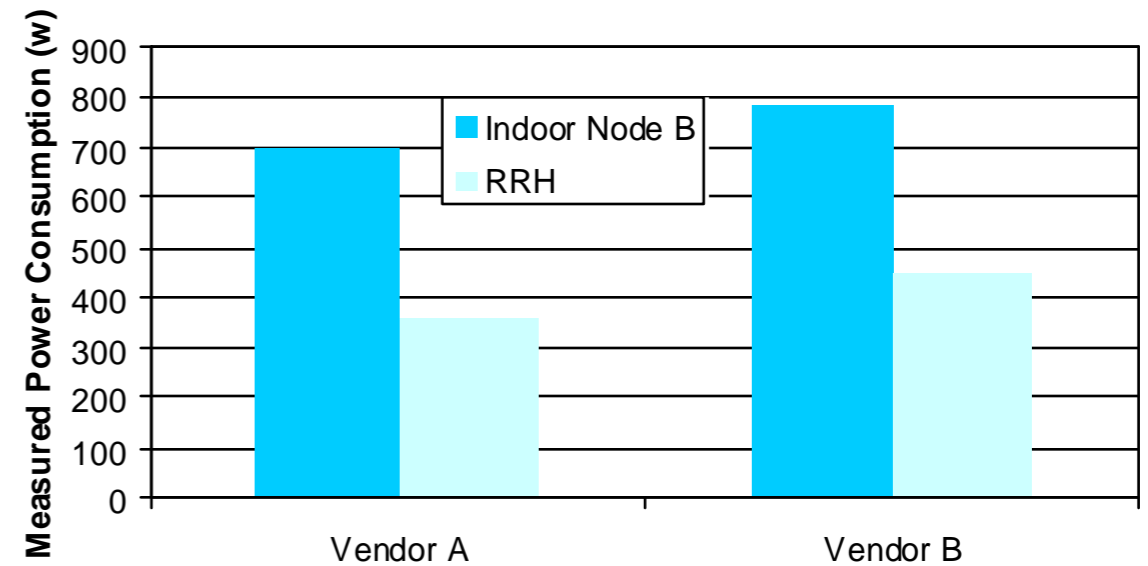
Source: Vodafone Technology Update, March 2008

mobile is a large green enabler

cut our own emissions by 50% : Radio Equipment (1 / 3)



why we like RRH so much?



Measurements conducted in VF Networks, comparison between Indoor node B and RRH for L4L power @ antenna connector

Several Operating Companies have a target to install Remote Radio Head as solution for 90% of the 3G roll out.

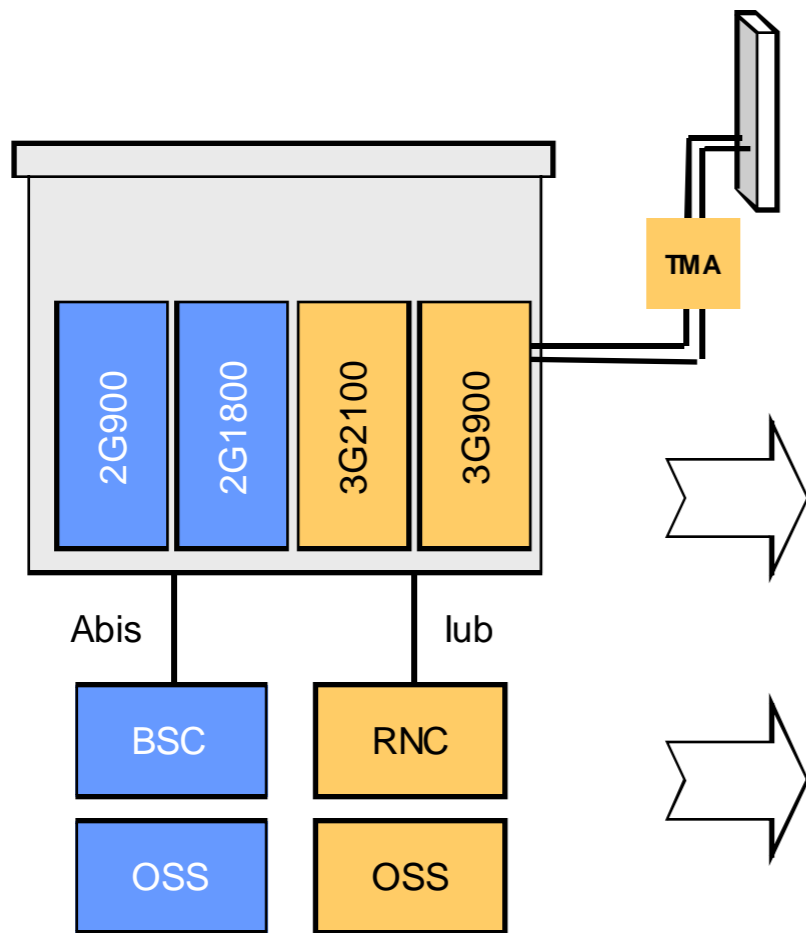
Network upgrade programs in Germany, Greece, Hungary and Spain yielding successful carbon footprint reduction (eg: +20% of reduction on avg CO2 emission / BTS in 2 years in VF Spain^(*)).

^(*) VF Spain CSR Report 07 / 08

RRH for 3G now - 2G & LTE soon, bringing 40% efficiency in 3G

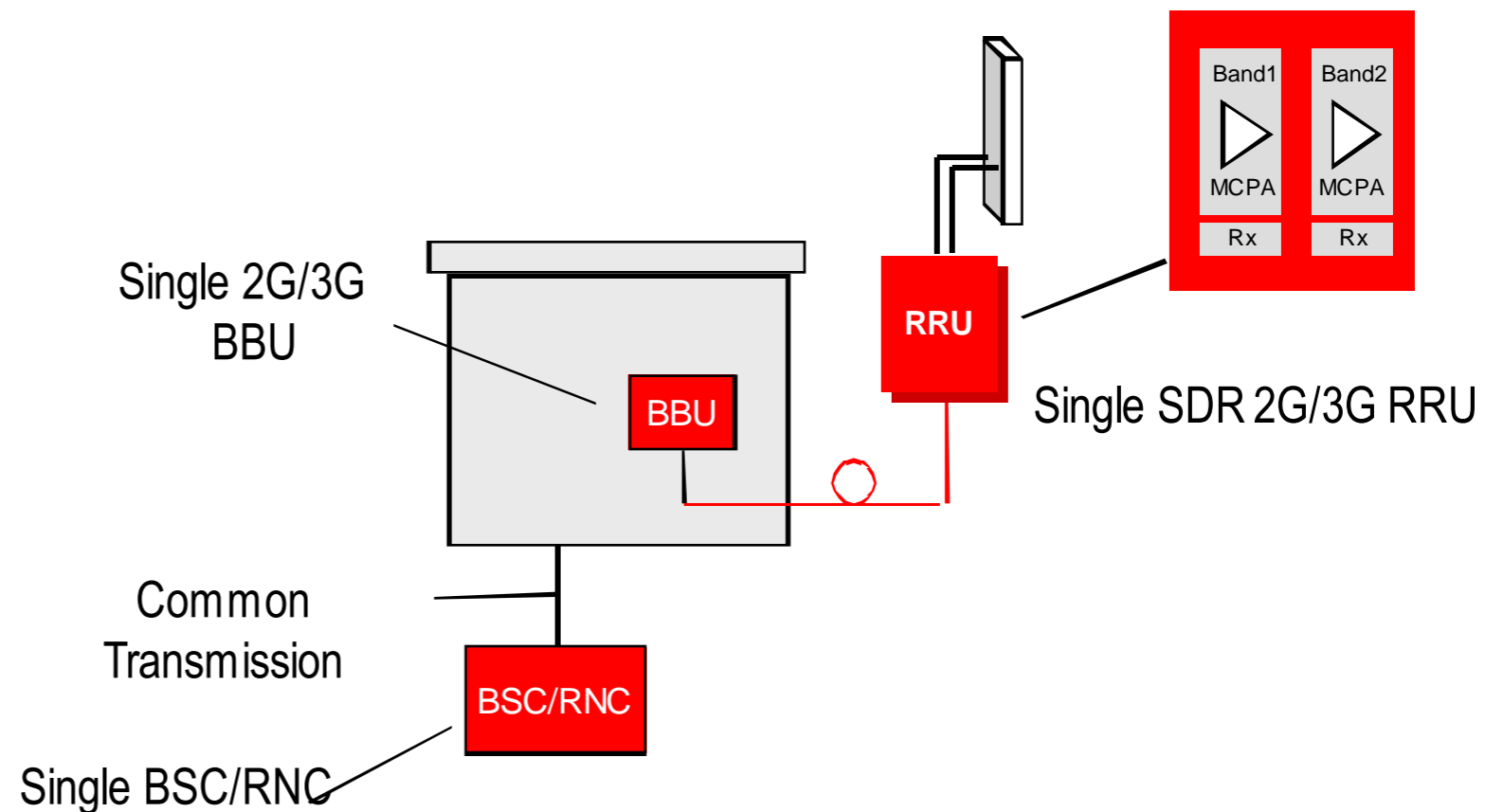
cut our own emissions by 50%: Radio Equipment (2 / 3)

Conventional RAN design



Single RAN design

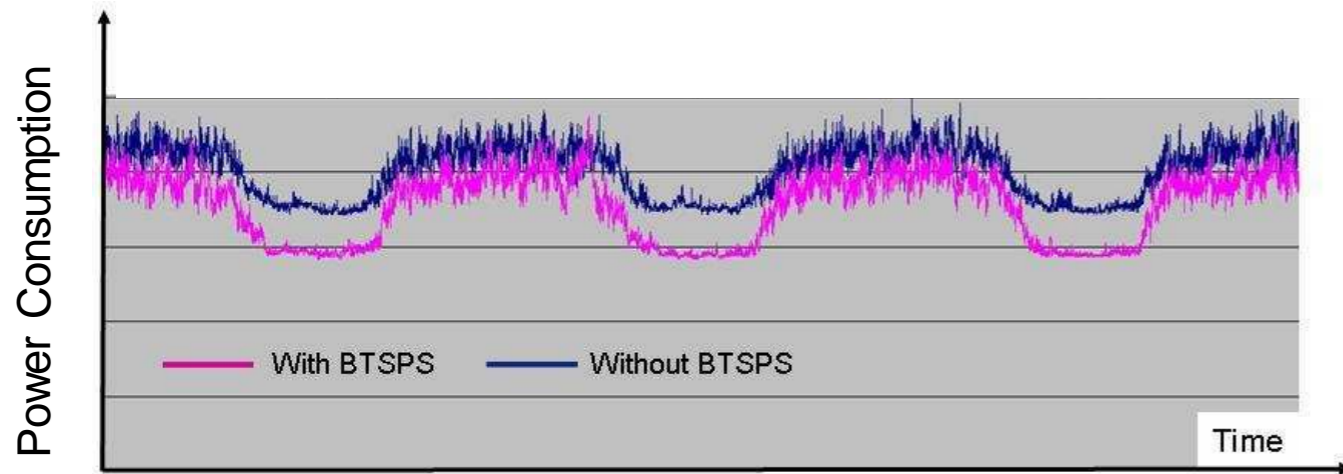
2G, 3G and eventually LTE simultaneous deployment & operation in a single box



Single RAN SDR Technology has been developed by VF Group Radio Competence Centre in Madrid, in close co operation with RAN vendors. Promising results already in place.

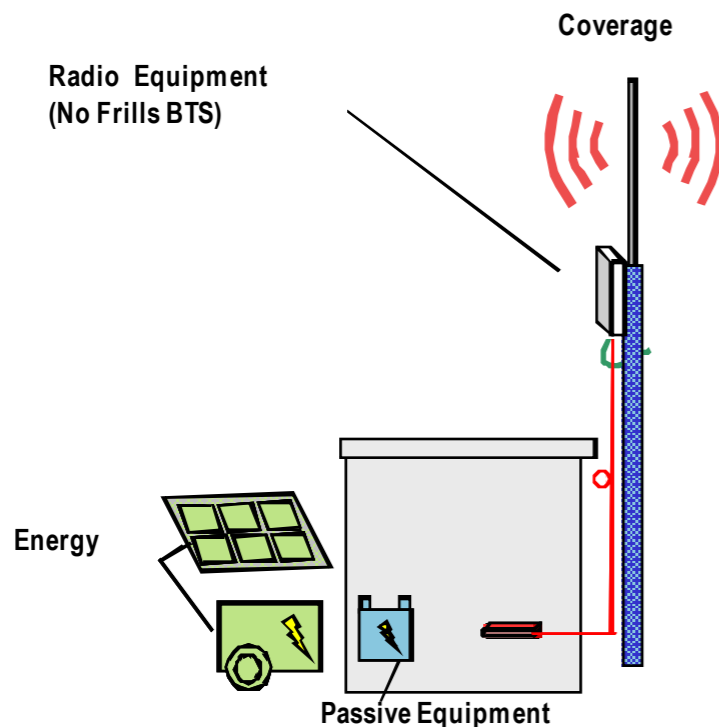
Single RAN for real very soon, energy improvement up to 80%

cut our own emissions by 50%: Radio Equipment (3 / 3)



Switching off BTS items when idle

Vodafone Germany championed the development of automatic TRX shutdown features, already deployed in selected markets and under implementation in emerging like India. Achieved efficiency depending on vendor implementation.



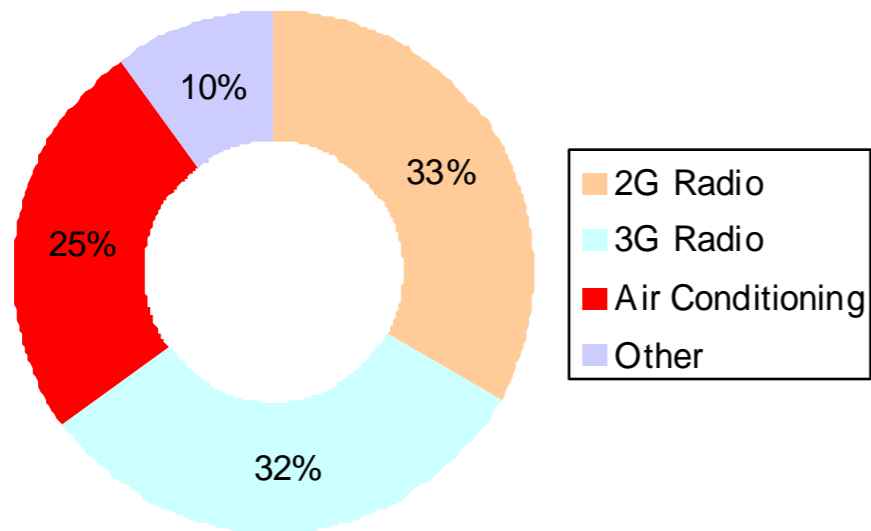
No Frills BTS

Tailored 2G BTS for rural deployments in emerging markets, with target consumption of 150 w, without compromise in coverage or functionality. This efficiency target will enable deployments in off grid environments (and low ARPU communities) Renewable energy sources largely facilitated.

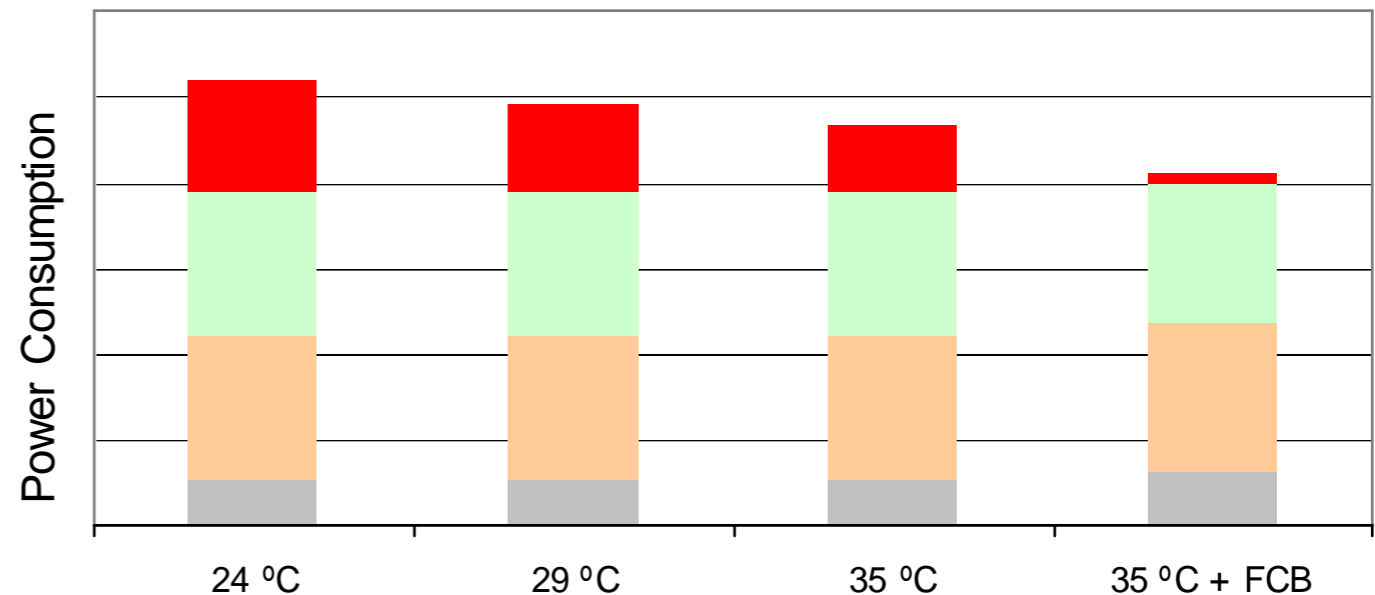
also facing legacy radio base & rural deployments in emerging

cut our own emissions by 50%: infrastructure

Typical Shelter Site consumption



Optimising Shelter Consumption



When Radio Equipment located in shelters the combination of Free Cooling Boxes and Increased Max Operating Temperature can bring more than 10% of energy savings / site.

Vodafone Portugal increased the temperature to 35 degrees in all its 1,100 base stations in 2007/08. Free cooling at 35 degrees planned be rolled out across the Group in 2008/09.



Getting rid of cooling, in shelters as well

cut our own emissions by 50%: green energy sources

For base stations in remote locations not served by an electricity grid, we are testing the viability of replacing or supplementing diesel generators with on-site renewable energy systems. These include solar panels, wind turbines and fuel cells. Eg: we have installed solar panels at 140 sites in Egypt and we have started trials in other OpCos

cellular-news

1st Oct 2008

Vodafone has begun generating electricity for its mobile communications network with the installation of a wind micro-generating system in the Serra do Socorro near Mafra....The system is being implemented at 32 of Vodafone's telecommunications base stations around Portugal.

The central element of the system is a 3.5KW wind turbine installed on the telecommunications mast which...



making the most of renewables

cut our own emissions by 50%: sharing

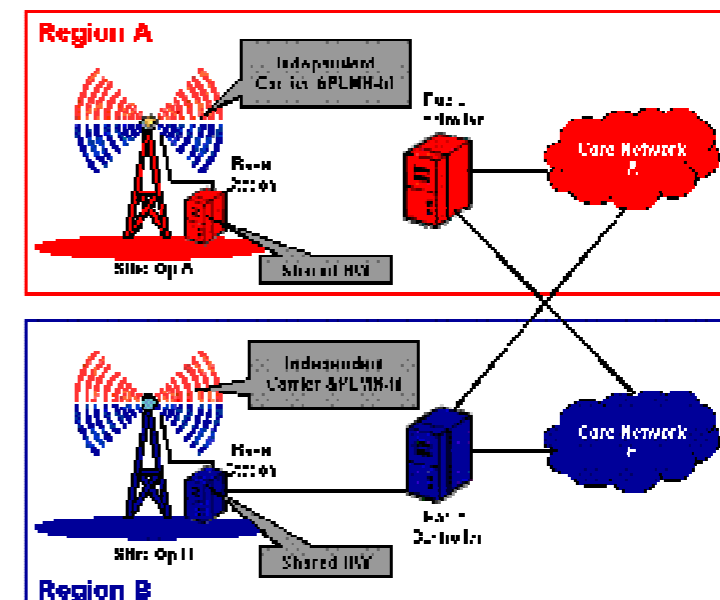
passive sharing and...

We have passive network sharing agreements in 17 of our markets, including those agreed in Italy and the UK in 2007/08. Shared elements include electrical and cooling units.



...one step forward

Vodafone Spain has developed in 07/08 the UTRAN sharing agreement with Orange for the 3G roll out in locations below 25 000 pop. This enables a 40% reduction in the number of required Node Bs for these areas.



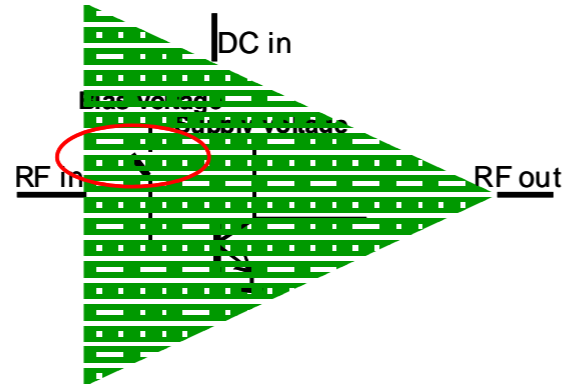
Sources: Vodafone Group CSR Report August 2008 and VF Spain CSR Report 07/08

as simple as...the more sharing, the less consumption

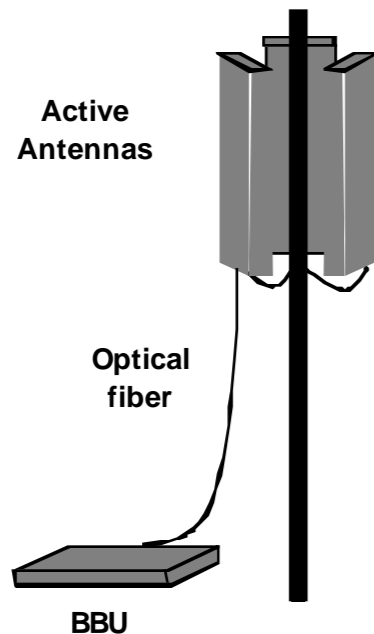
cut our own emissions by 50%: rallying the industry

our green competition awards: four challenges for the wireless industry

1 PA efficiencies beyond 60%



2 Rural BTS for emerging markets, below 100 w without coverage compromise



3

Wideband Single RAN – not only multitechnology SDR, also multiband in one box!

4

“Invisible” Radio Units to expand the applicability of RRH concept

and the winner will get its prize...

and making a cultural shift

We have a goal to be a responsible business and in our Corporate Responsibility plan we promise to be more energy efficient

Are you energy efficient?



Switch to renewable
 Vodafone UK has bought renewable electricity since October 2005. Energy Manager Simon Martin says: 'We have a contract with British Gas to buy energy such as electricity, gas, heating oil and other services. That means it's not 100% renewable. Our plan is to get 100% renewable power that includes wind, solar, hydro, geothermal and landfill gas.'
Remote Energy Control
 What do you do if you have power at home but your power goes out? Vodafone Energy you switch between renewable energy 24/7. Vodafone Energy you switch between renewable energy 24/7. Vodafone Energy you switch between renewable energy 24/7.
From a...
 From a...
 From a...
 From a...



Step up to the Vodafone climate challenge

Home About Climate change Get involved Our commitment Feedback FAQs

The Vodafone climate challenge

Vodafone announces a new climate commitment
 Click here to find out more

Our climate strategy
 Watch the video
 More on Arun's announcement
 Our commitment Transcript FAQs

I want to register!
 Register to add your comments to the forum and see how you can improve your own carbon world.
 Click here to register
 Click here to login

Become a climate change champion

Welcome...
 to the new look Vodafone climate challenge site!
 We've made a few changes since we first launched the site, to coincide with our latest climate commitment, so please take some time to look around and get involved - you could even become a climate change champion!
 We always welcome feedback, and suggestions, so please let us know what you think.

the change starts through our employees