EUCNC / 6G Summit

Design to Impact

3rd of June 2024

JB. Besset

orange™

Under pressure

Multiple and simultaneous crisis

Climate change hazards

Critical Raw Materials

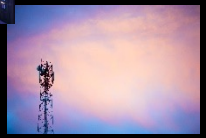
Energy Prices

Democracy

Growing digital

Energy consumption

CO2 emissions



Telco commitment

Net Zero Carbon

SCIENCE BASED TARGETS

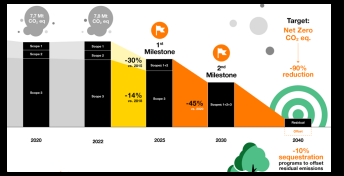
As Telco we have a role to play

Promote digital inclusion	Empowering people
Foster digital trust	For a safe digital world
Manage traffic growth	Answering customer needs
Be profitable	To play our role
Do our part for environment	Protect and regenerate

To do our part to protect environment

Mitigate & Adapt

Net Zero Trajectory



Infrastructure resilience and business continuity

Telco as an enabler for digital services for mitigation of emissions

Help the other to do so

Telco as an enabler for digital services for adaptation and business continuity

Network Design to Impact

An optimization under constraint problem

$$Max\{F(a), \forall i\ Ci(a) < Li\}$$

F(), the impact function

What should a network maximize?
Digital inclusion, digital trust, coverage, latency, resilience, profitability, emergency services, remote management, … ?

a, the parameters of the network

On which parameters can we play?
Infrastructures, sharing, technology roll out, equipment renewal, …

$C_i()$, the constraint functions

Which are the constraints we want to respect?
CO_2 emissions, energy consumption, raw materials, water, ground footprint, …

L_i, the limits we set

What are our commitments on these topics

Re-Think the network design

Value approach

Build the needs (the “impact function“) with the society and verticals

Meaningful performances

“Some new network features may not be deployed if it implies missing Net Zero targets’’

Design networks to fulfil this needs and not for performance itself

5G performances per user are adequate, need to make them accessible to a wider number of concurrent users, and to improve capacity

We should aim at further improving the cost, environmental impact, and energy.

KPI	Possible extreme value	5G reference [12]	Complement, e.g., target scenario
User experienced data rate (at cell edge)	300 Mbit/s 100 Mbit/s	300 Mbit/s 50 Mbit/s	dense urban other outdoor environments Note: 250 Mbit/s required for immersive experiences. The majority of identified future usages would require less than a hundred of Mb/s.
Area capacity	3 Tb/s/km² 450 Gb/s/km²	750 Gb/s/km² 100 Gb/s/km²	dense urban outdoor & wide area Note: 30% activity factor assumed
Connection density	35 000 / km² 15 000 / km² 1.10^6 / km²	25 000 / km² 10 000 / km² 1.10^6 / km²	mobile broadband – dense urban mobile broadband – urban macro massive IoT
Positioning accuracy	< 10cm < 1m	1m 3m	indoor deployment outdoor & wide area
Energy efficiency	x10 vs. 5G	no quantitive requirement	at least as much as capacity increase, so that the network energy consumption remains stable of decreases
Minimum end-to-end latency	5 ms 0.5 ms (URLLC)	0.5 ms 0.5 ms	in generic deployments, for services that require it for specific services & uses cases associated to specific deployments
Reliability	99.9 % 99.999 %	idem idem	for most of services, typically (mobile broadband for specific services & uses cases associated to specific deployments
Mobility	500 km/h	idem	for specific services (very high speed trains, planes)

Eco-design the network

A holistic approach: global impact of new feature on the whole telco ecosystem above network

Slow down infra and hardware deployment

No mobile sites densification

Take benefit of virtualization to limit hardware renewal

Extend equipment lifetime

Fair Tech

Rethink technologies to be compatible with constraints (circularity, resources sobriety, …)

Thank you

Orange white paper
Mobile Network Technology Evolutions Beyond 2030