



NAVIGATING THE MOBILE DATA GROWTH – RESEARCH CHALLENGES

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VTC Spring – May 16, 2011



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ERICSSON RESEARCH

› Technology leadership

- the main driver of GSM, HSPA, LTE and LTE-A

› Innovation

- 50 % of Ericsson patent filings
- a major creator of conference papers, journal articles and books

› Cooperation

- leading universities, research organizations and operators

› Strength

- a global organization in 3 continents
- 600 employees, 40 % Ph.D.



Wireless Access Networks

Radio Access Technologies

Broadband Technologies

Packet Technologies

Multimedia Technologies

Services and Software

Security

EMF Safety and Sustainability

Global Services

MARKET FACTS

5.7 billion
mobile subscriptions

x3
mobile data traffic
in one year

785,000
apps in app stores

LTE
commercial reality

15 billion
downloaded apps

> 3,000
HSPA devices

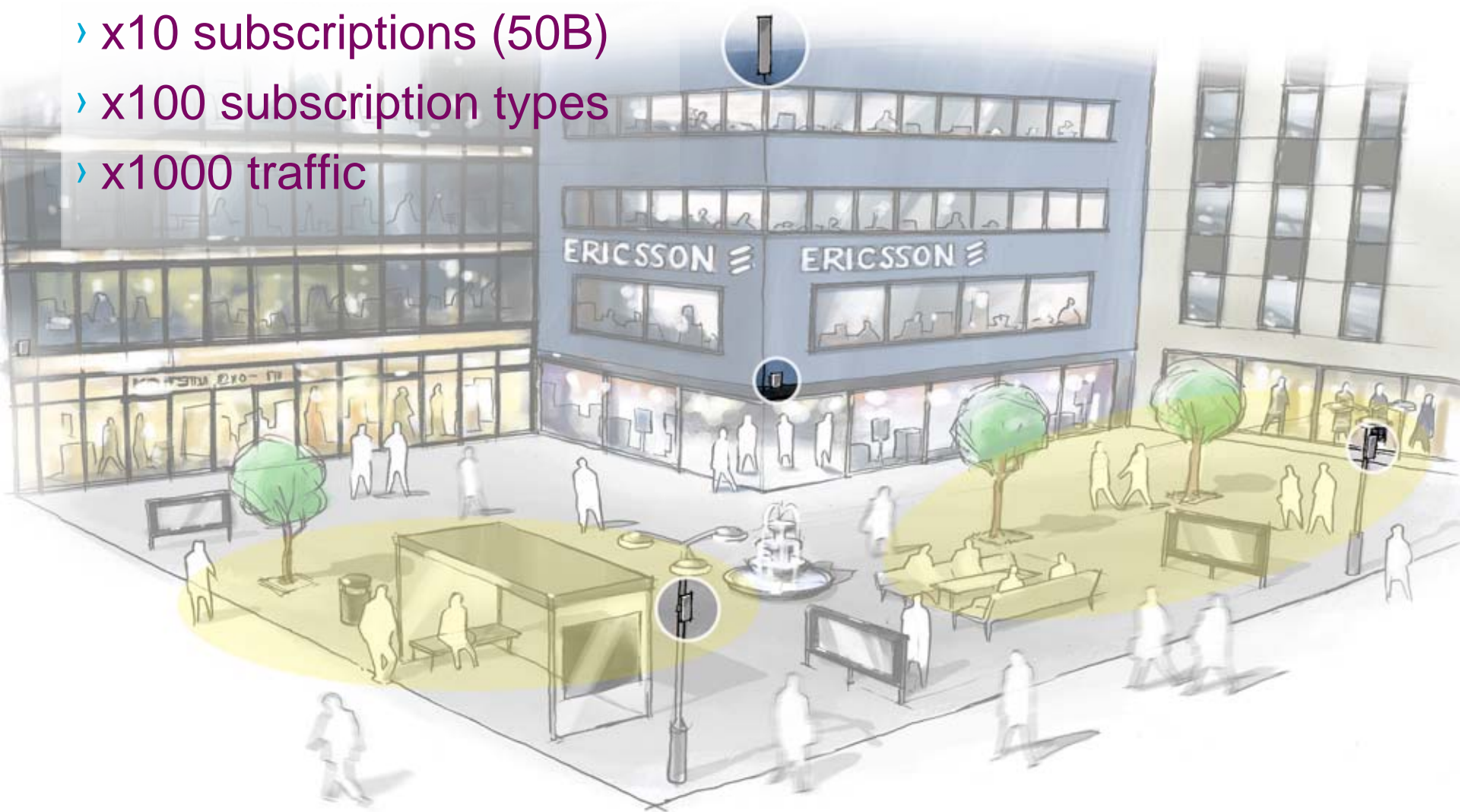
200 million
smartphones* shipped 2010

> 100 tablets

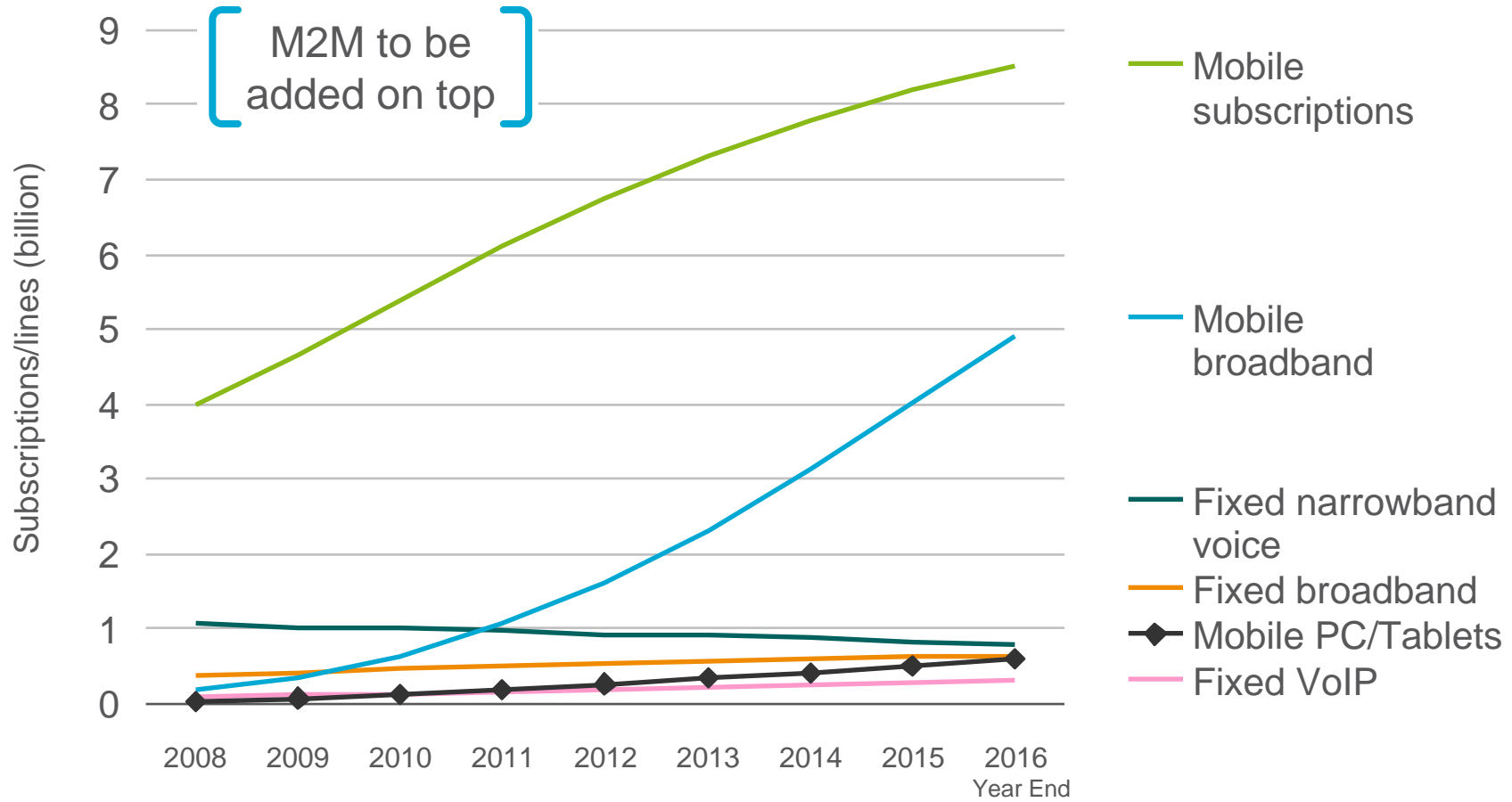


THE FUTURE

- › x10 subscriptions (50B)
- › x100 subscription types
- › x1000 traffic



FIXED & MOBILE SUBSCRIPTIONS



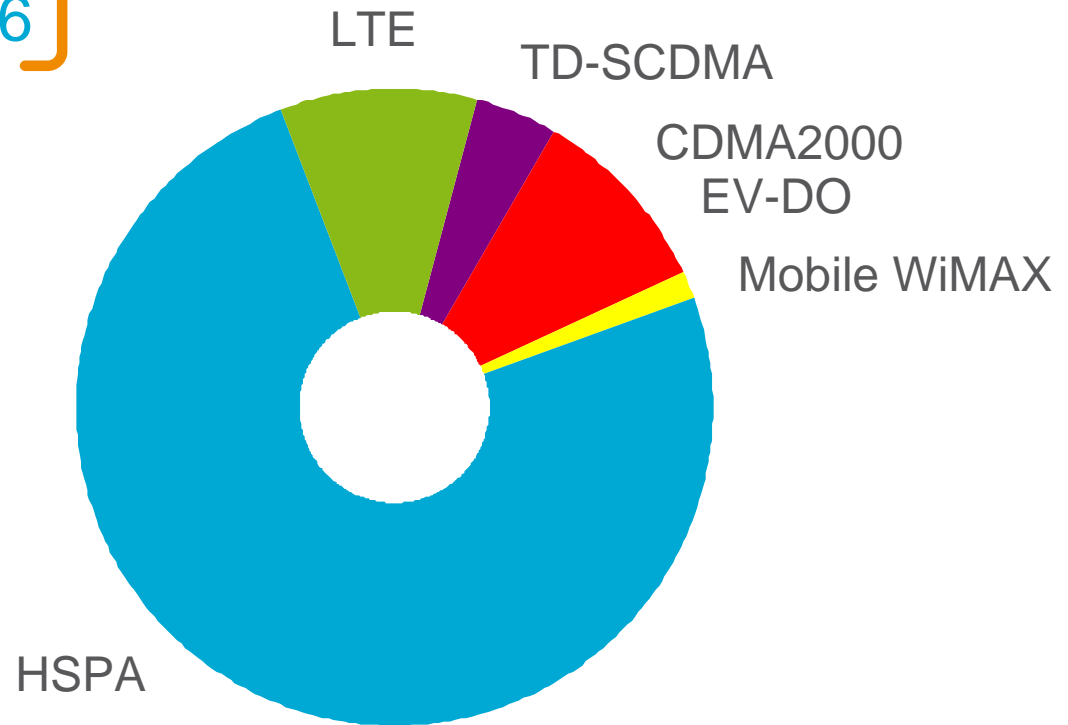
Source: Internal Ericsson
 Mobile Broadband: CDMA2000 EV-DO, HSPA, LTE, Mobile WiMAX, TDSCDMA. Both mobile PC, Tablets and handheld devices.

Mobile Broadband and Mobile PC are subsets of total mobile subscriptions
 Fixed Broadband: Cable, xDSL, Fiber, PC-to-PC VoIP e.g. Skype not included in VoIP

This slide contains forward looking statements

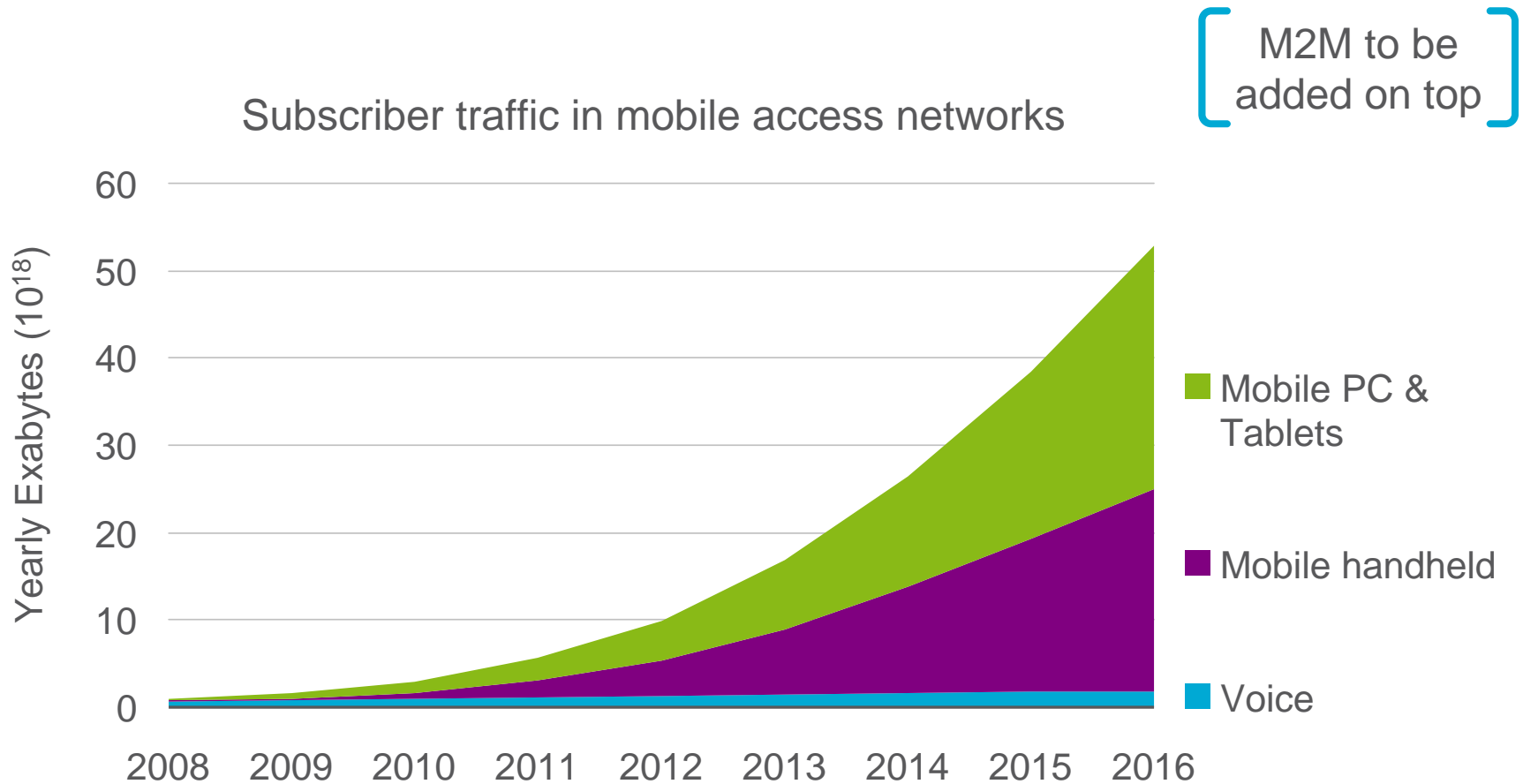
MOBILE BROADBAND – MBB

MOBILE BROADBAND SUBSCRIPTIONS 2016



Source: Internal Ericsson
 Mobile broadband defined as: CDMA2000 EV-DO, HSPA, LTE, Mobile WiMAX and TD-SCDMA.
 Note that mobile broadband here refers to handsets, USD dongles, embedded modules etc. The vast majority is handsets. Tablets/M2M are not included.
 This slide contains forward looking statements

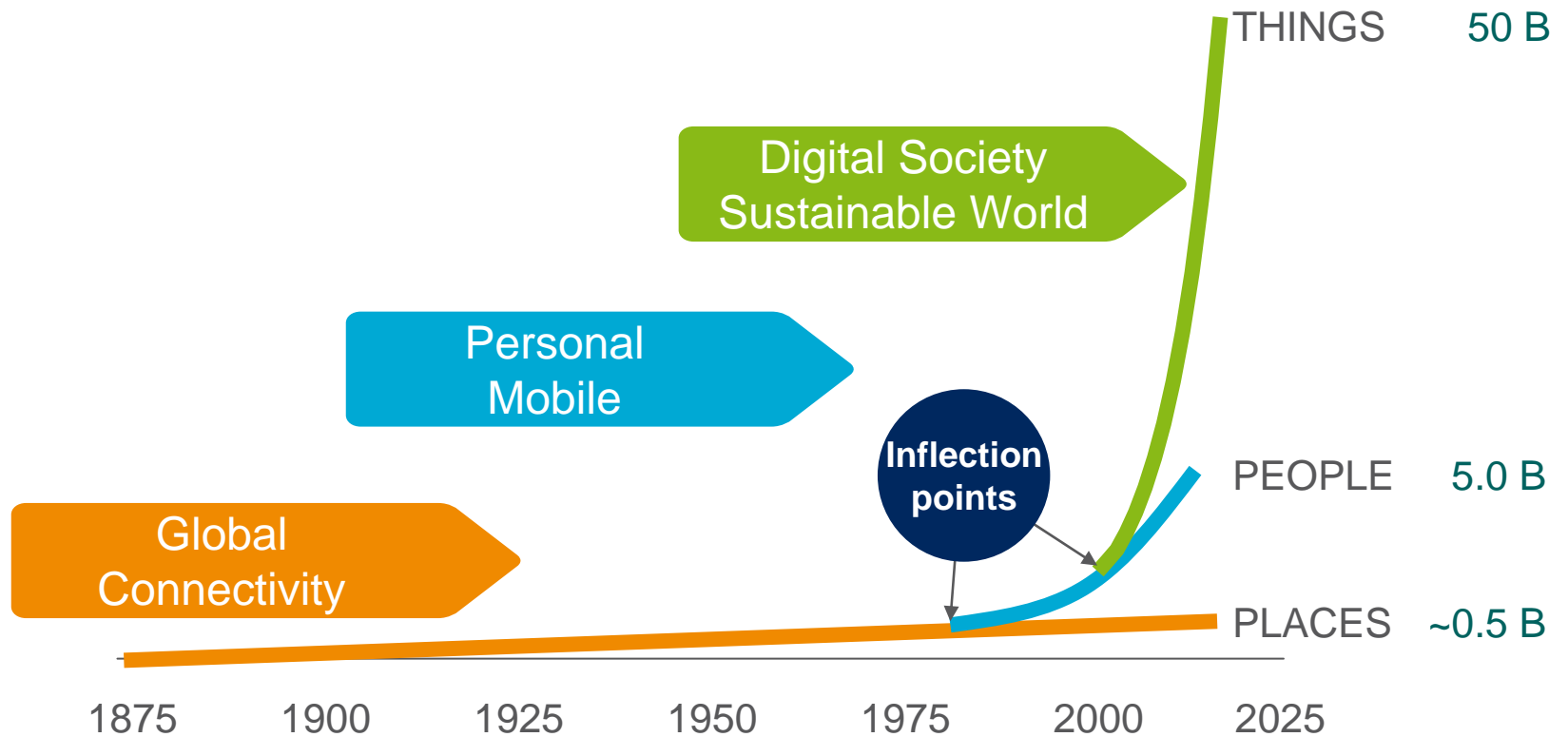
MOBILE TRAFFIC – VOICE AND DATA



Source: Internal Ericsson
 DVB-H, Mobile WiMax, M2M and WiFi traffic not included
 This slide contains forward looking statements

THE 50B CONNECTIONS

ANYTHING THAT BENEFITS FROM NETWORK CONNECTION WILL BE CONNECTED



Source: Ericsson

TECHNOLOGY DRIVERS

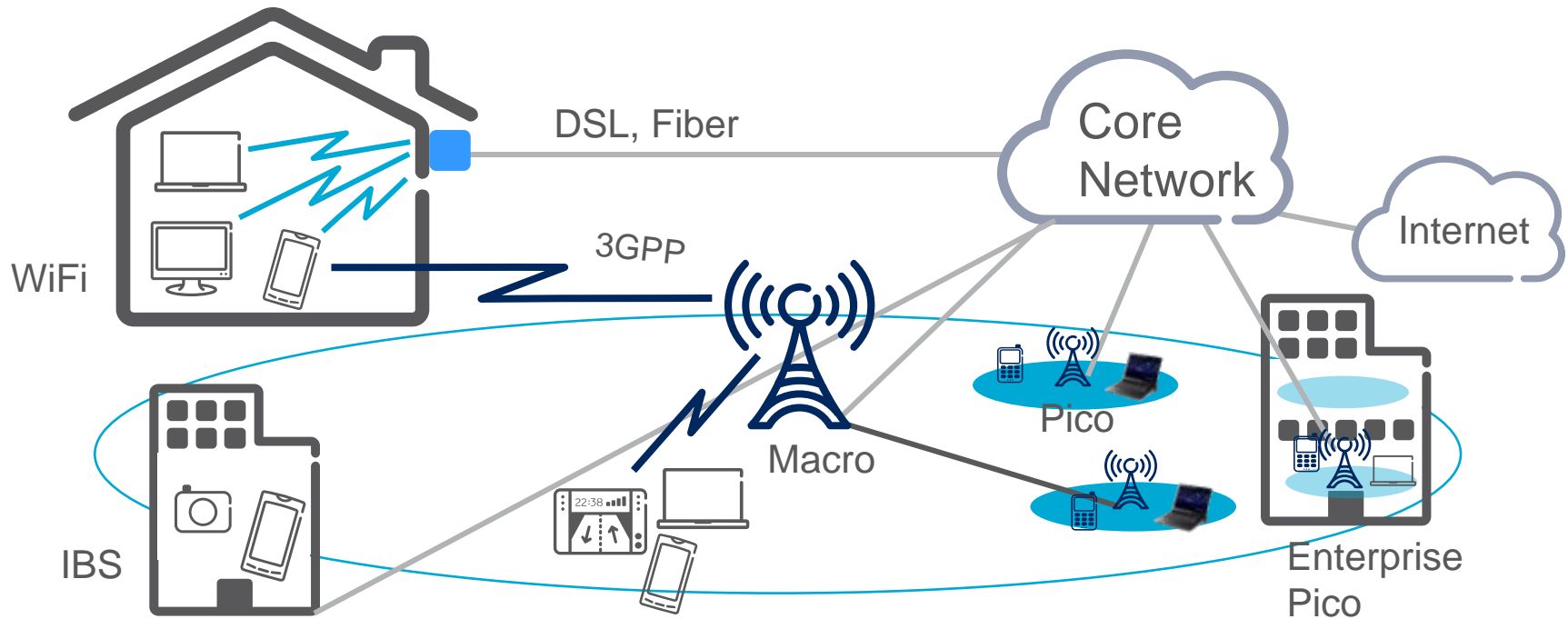
User expectations

Coverage for high data rates
Higher capacity
Quality of Experience

Technology innovation

Energy efficiency
Self-organizing networks
Machine to machine
New architectures
Future radio access

ONE NETWORK – MANY PIPES

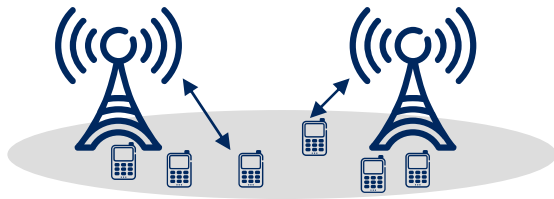


PERSONALIZED SERVICES IN AN ALWAYS BEST CONNECTED ENVIRONMENT – INCLUDING INTEGRATION OF WIFI

THE HETNET TOOLBOX

DENSIFIED MACRO —

Additional macro and micro sites

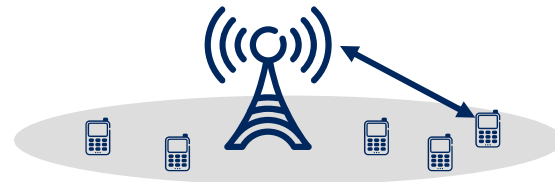


SMALL CELLS —

Very high capacity and data rates

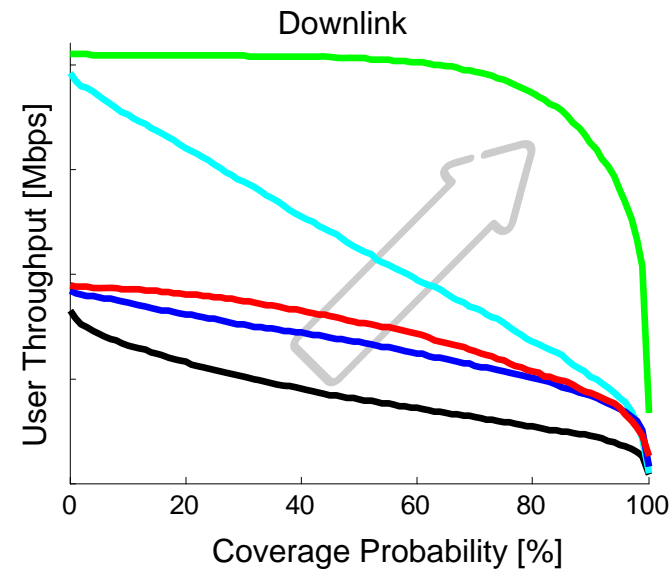


COMBINE TOOLS —
Unparalleled performance



IMPROVED MACRO —

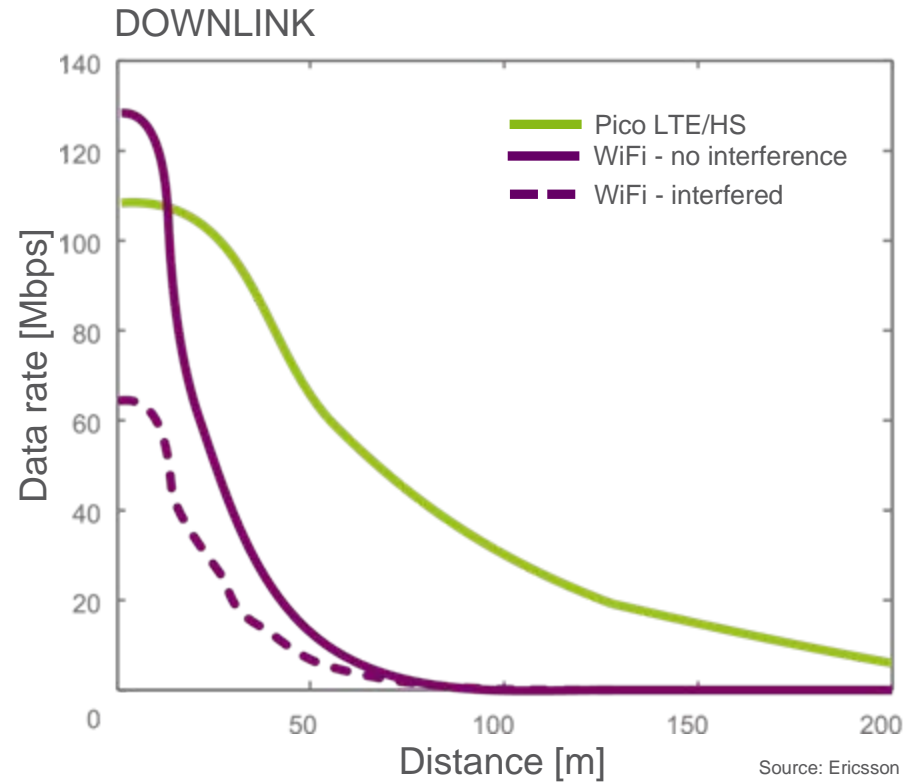
Enhanced macro site functionality



PICO AND WIFI DEPLOYMENT ASPECTS

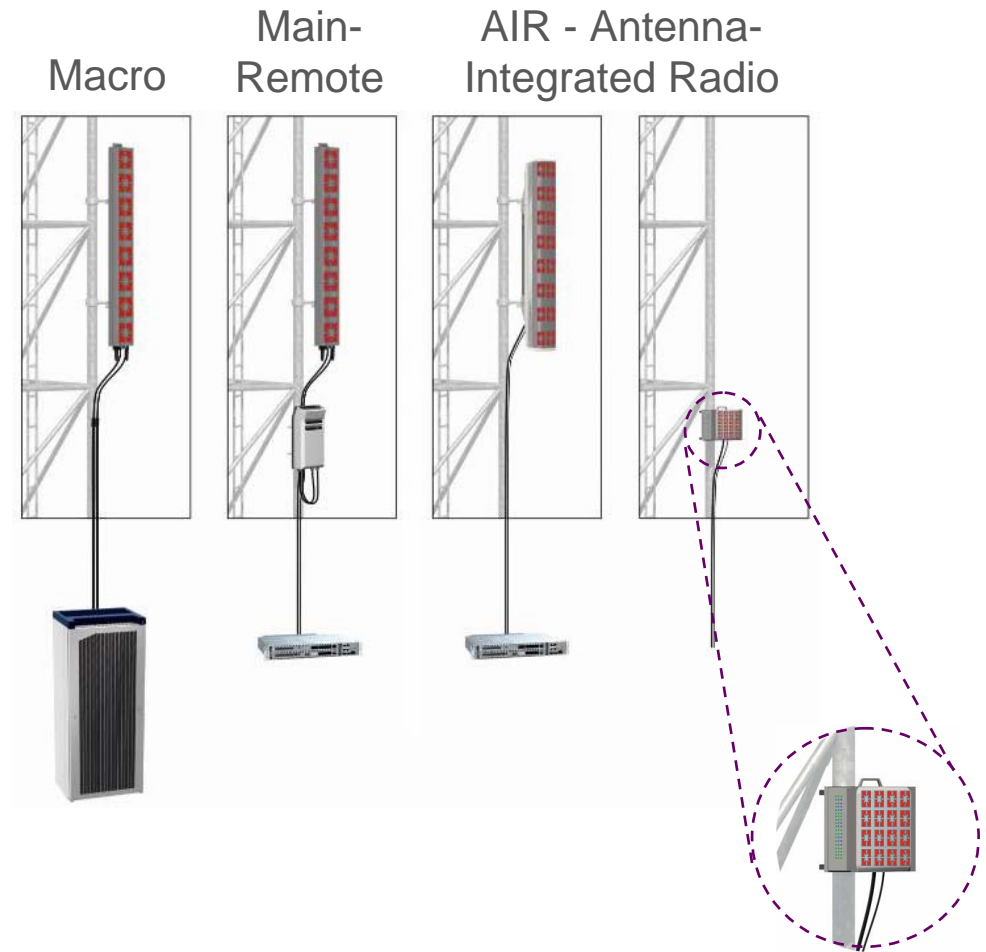
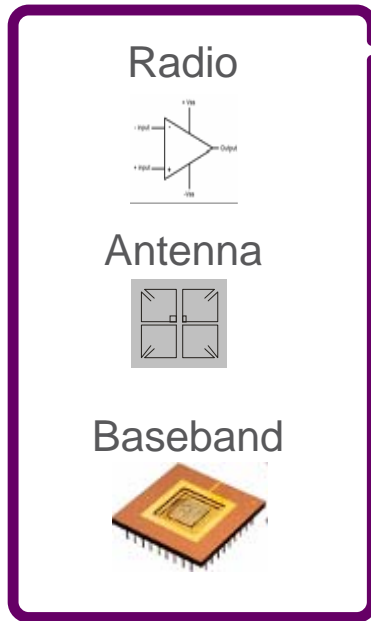


**LTE AND HS
PICO CELLS
MAXIMIZE THE
VALUE OF SITE**



RBS ARCHITECTURE

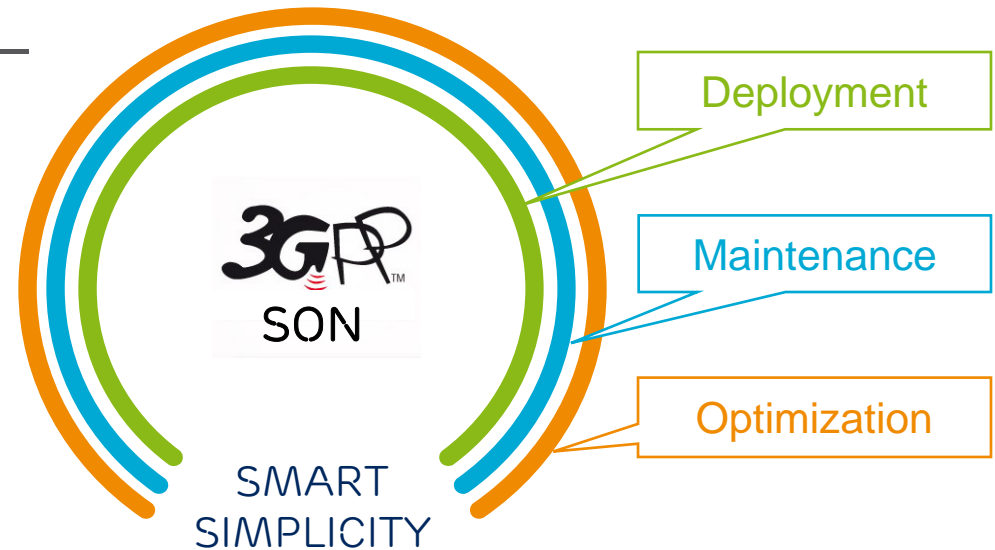
Modularity



SELF-ORGANIZING NETWORKS

Self-Organizing Networks – smart simplicity

- › out of the box operation
- › continuous optimization
- › multi-standard operation



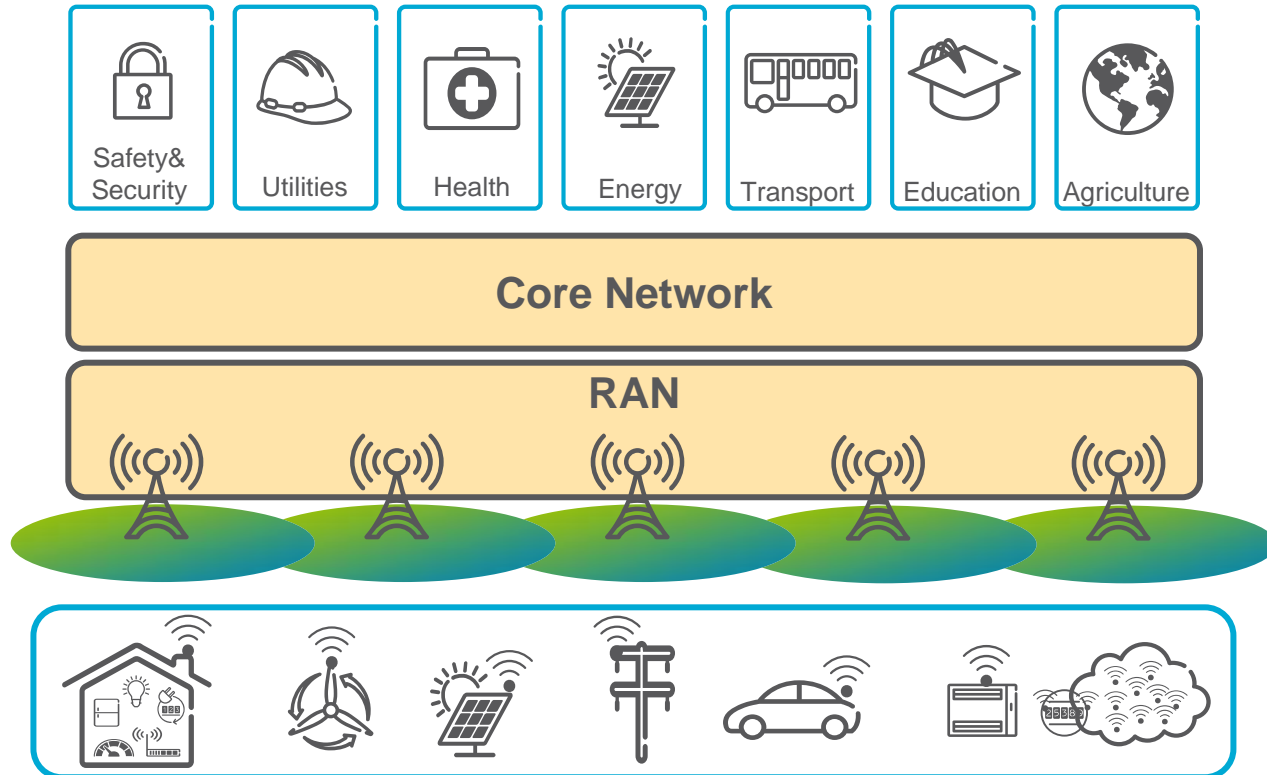
**TIME FOR ADDING NEW CELLS –
FROM WEEKS TO MINUTES**

EXPECTATIONS ON SON

- › Reduced operator OPEX
- › Improved network performance
- › An enabler for large network deployment
- › Making networks – and services – affordable

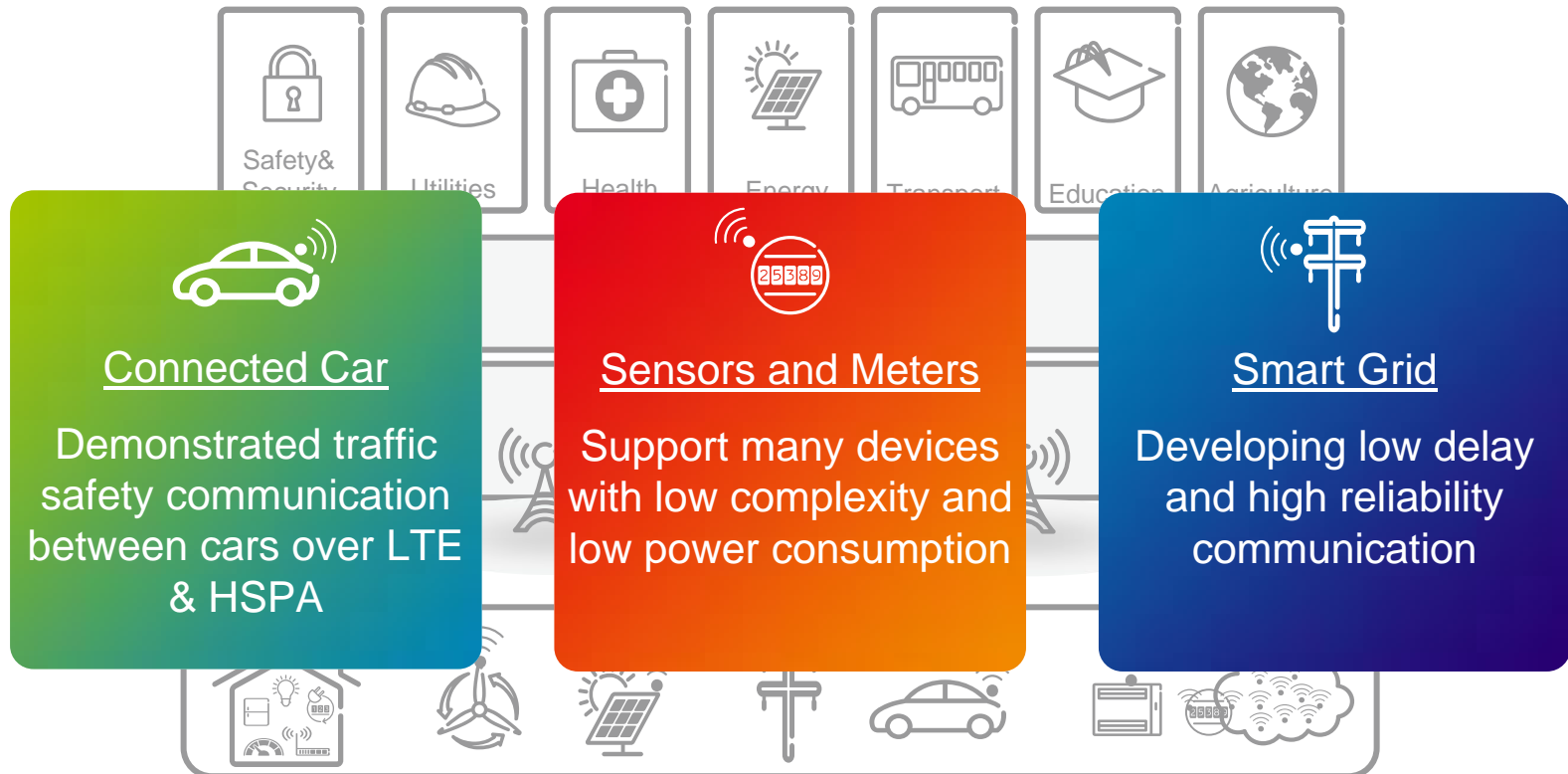


MACHINE TO MACHINE



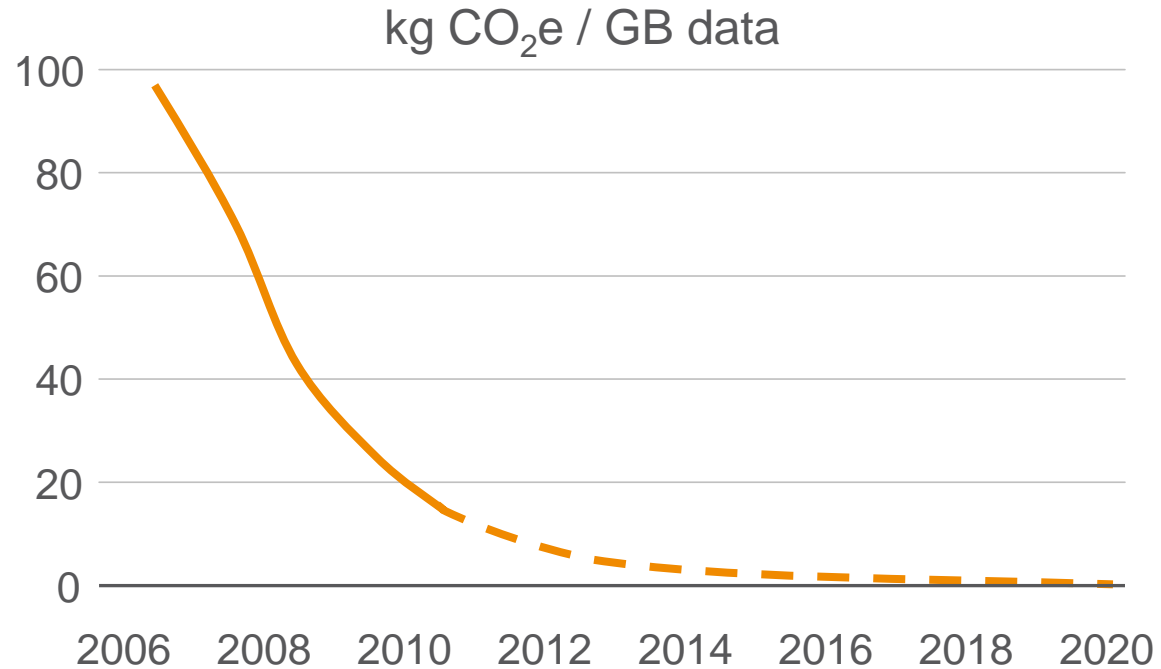
**A WIDE RANGE OF NEW APPLICATION AREAS
WITH DIVERSE REQUIREMENTS**

M2M APPLICATION EXAMPLES



ENERGY EFFICIENCY

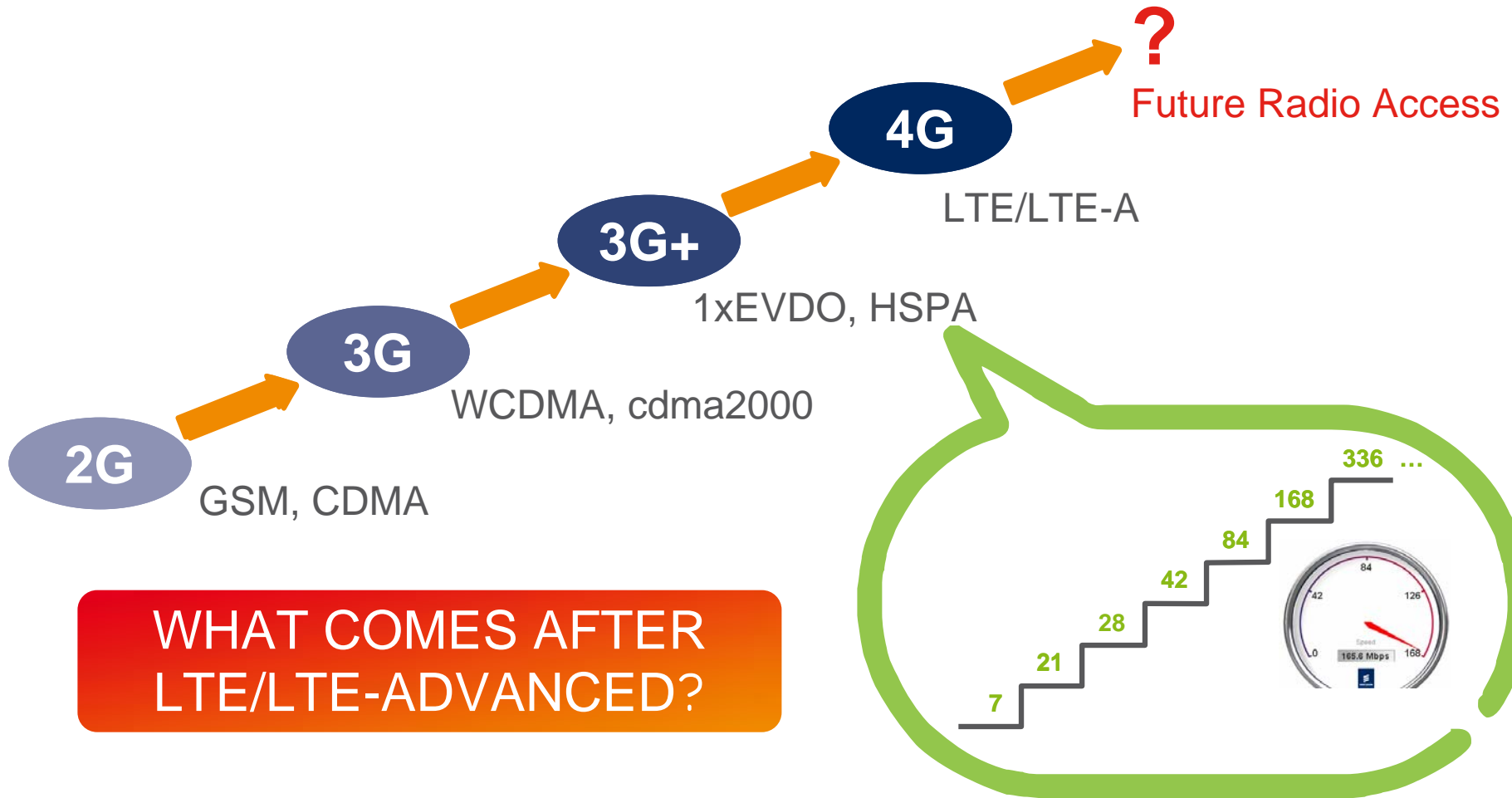
- › New solutions for system information broadcast, mobility, paging etc. with an energy focus
- › Base station design improvements



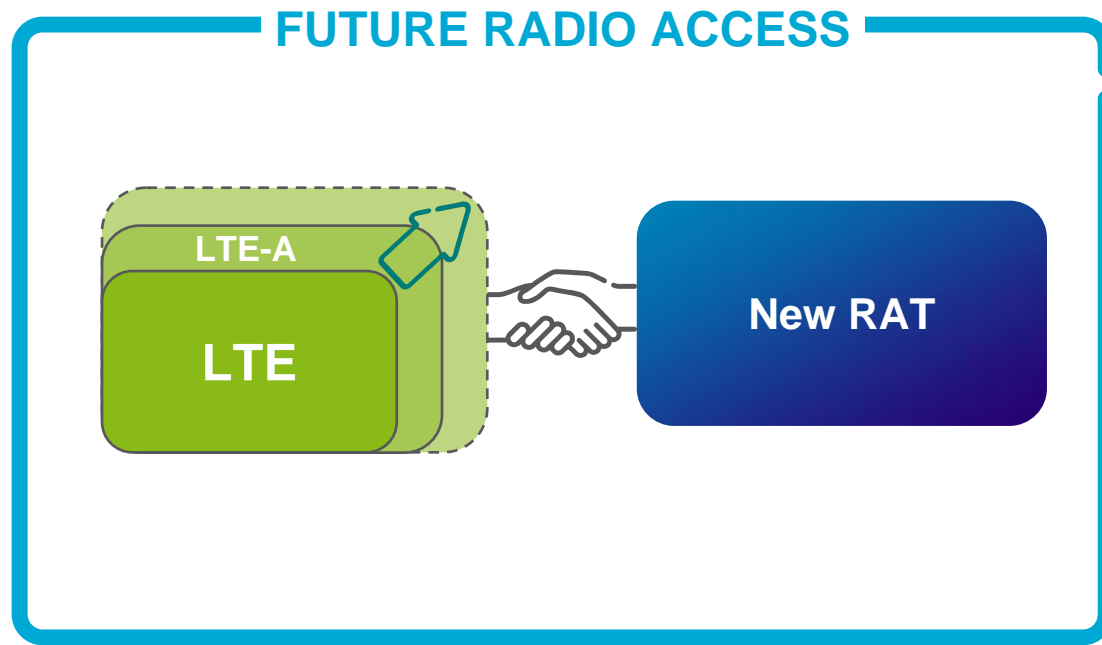
Source: EARTH

COPING WITH TRAFFIC INCREASE WITHOUT INCREASING CO₂ EMISSIONS

RADIO-ACCESS EVOLUTION



FUTURE RADIO ACCESS – WHAT IS IT?

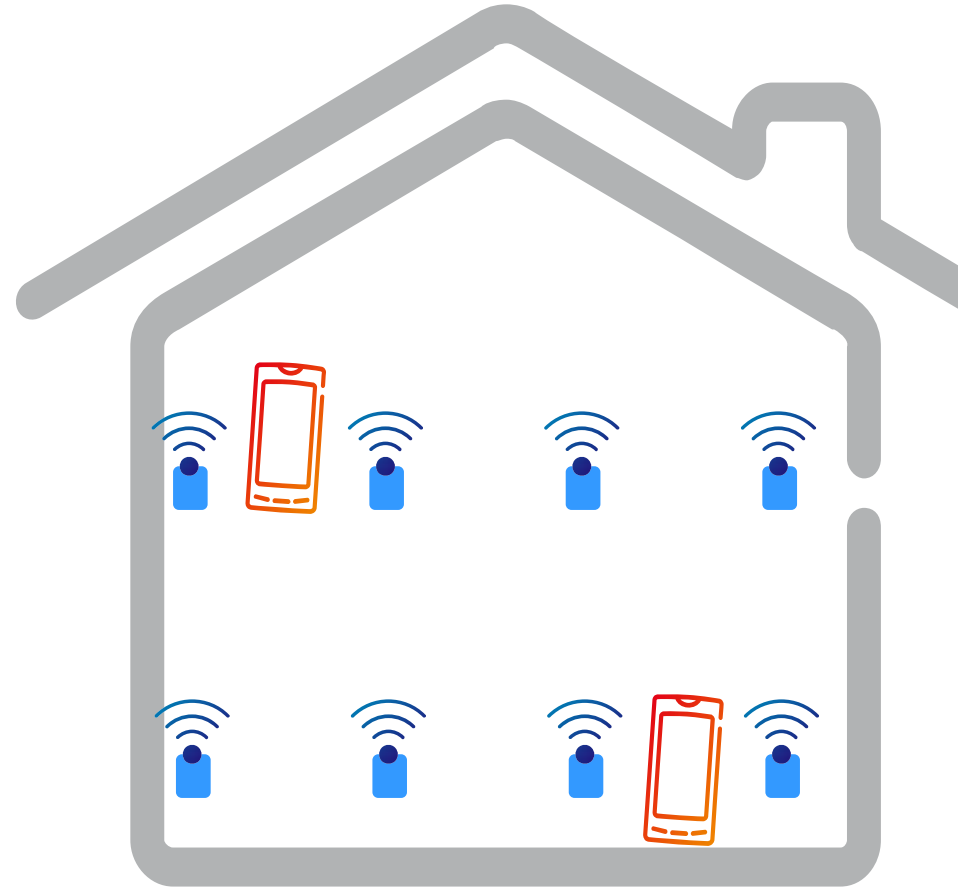


**NEW RAT MAY BE FULLY OPTIMIZED
FOR KEY SCENARIOS**

SUPER DENSE DEPLOYMENTS

- › #BS > #UE
- › Low cost
- › SON
- › New spectrum

CHALLENGE THE
EXISTING STRUCTURES



SUMMARY

› MBB is established and continue to grow

› Current challenges

- user experience improvements
- M2M and 50B connected devices
- energy efficiency, SON

› Time to ramp up research for next generation systems

- complementing existing systems
- optimized for new scenarios



ERICSSON