

5G and IoT

To become general
purpose technologies?



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Which societal stakes in the future?

Energy efficiency and environmental responsibility

Efficient industries and agriculture

Efficient public services, cities and communities

Security, privacy and sovereignty

More quality time for individuals

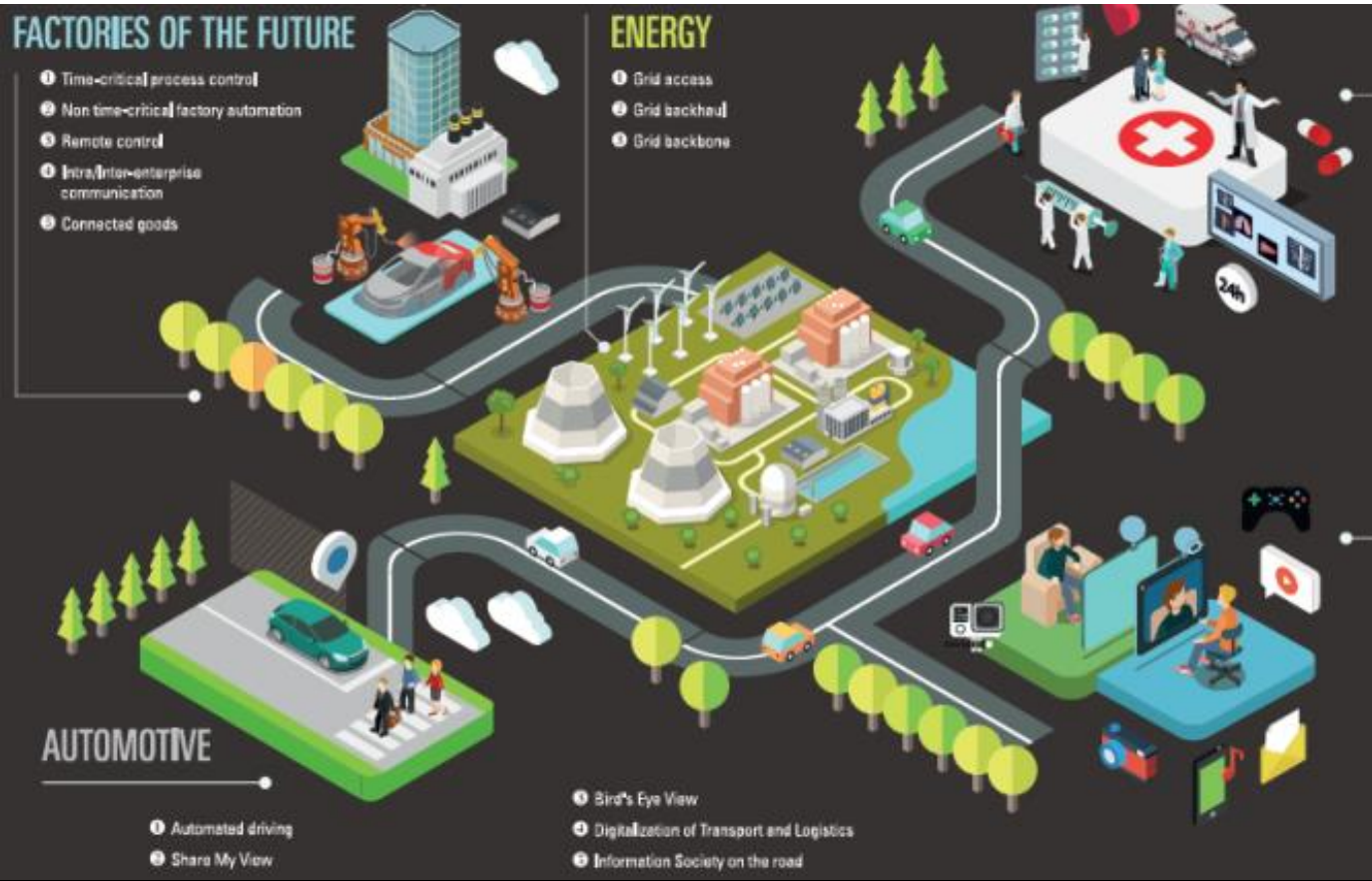
Others that we cannot predict now

4G and 5G have started to address these stakes...

...but we are just at the start of the path

Some networks evolutions are clear

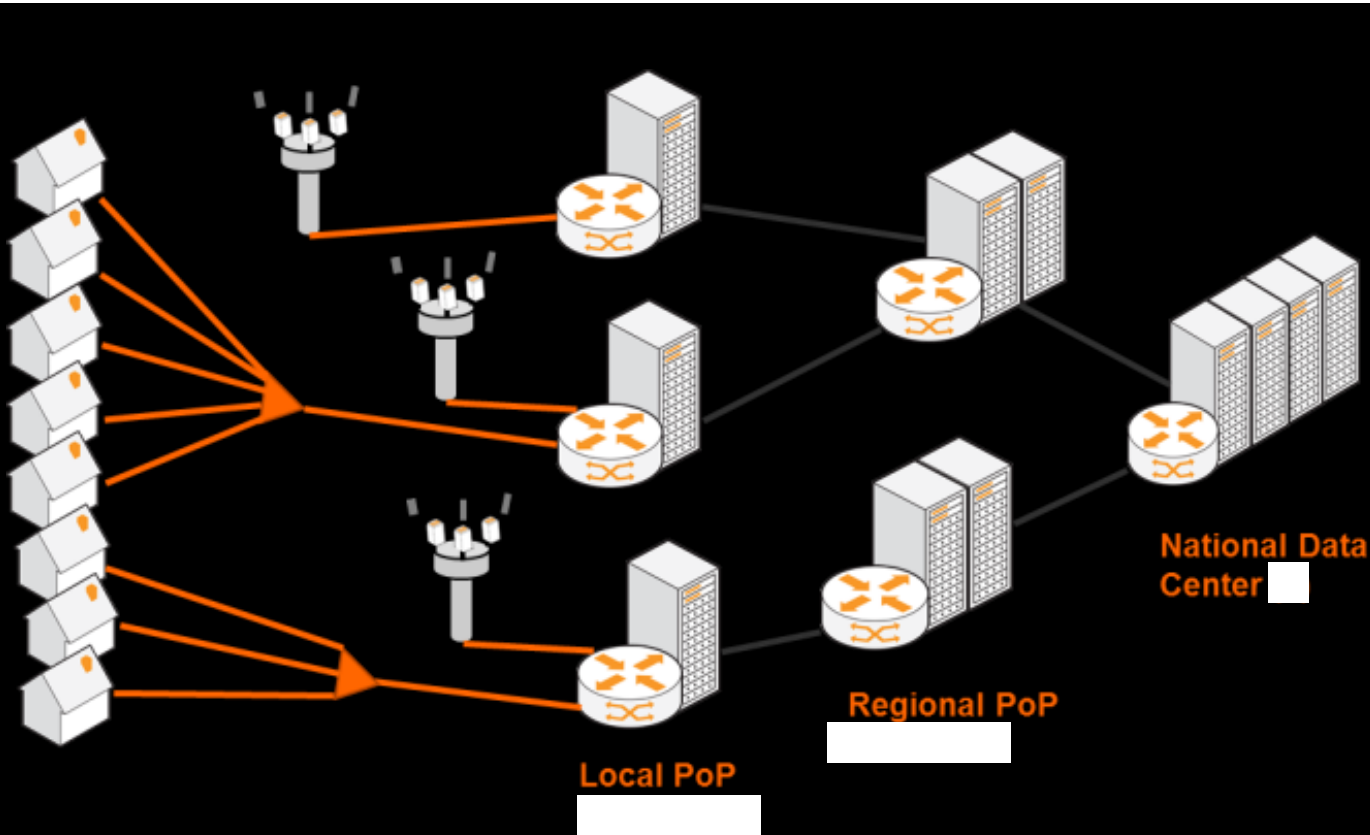
From essential to critical connectivity
need for trust, security and resilience



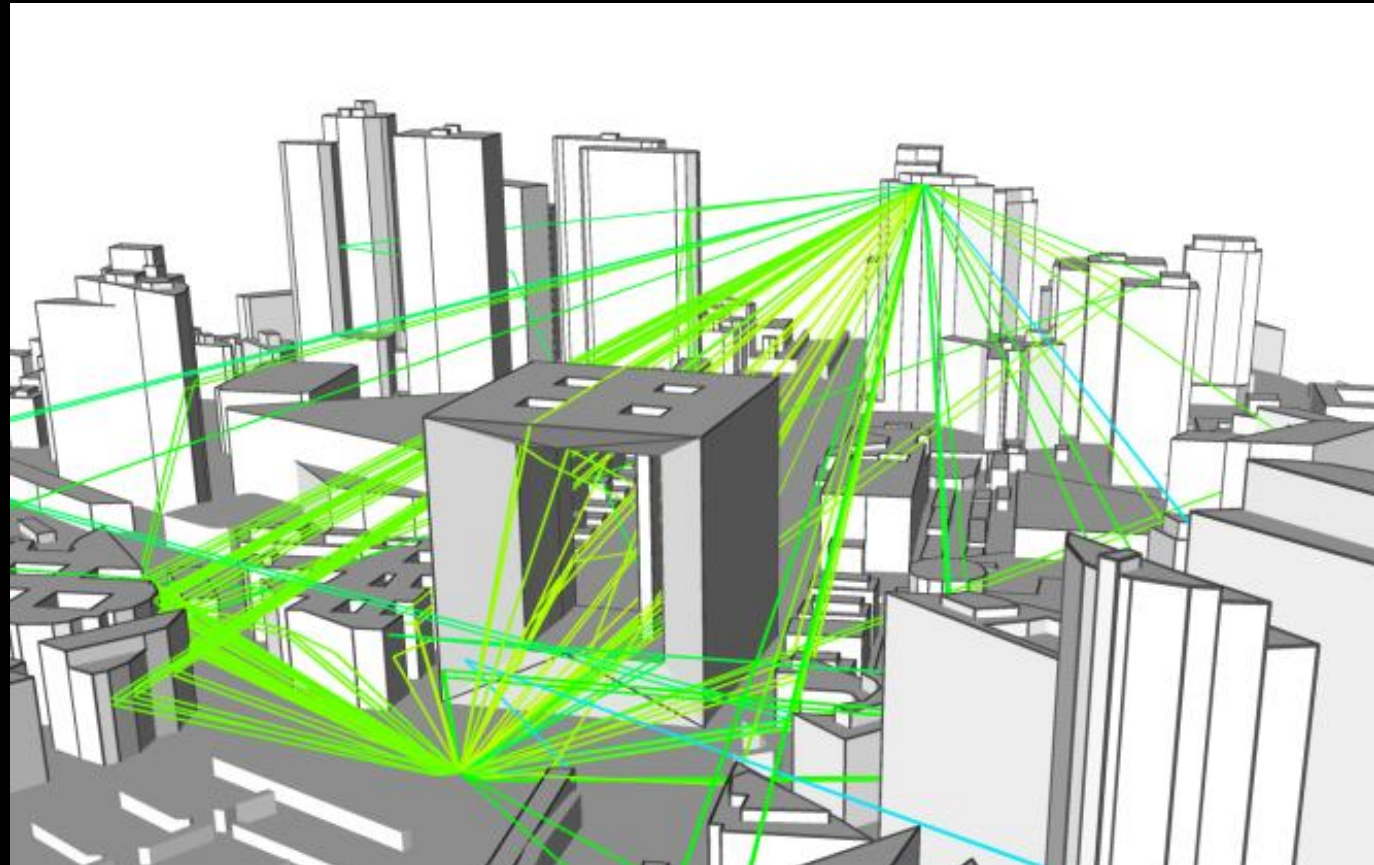
From pop. to ubiquitous coverage
calling for new deployment models



From communication to cloud infra
new business value propositions



Reaching EMF limits in some cities
need for EMF-aware technologies



Intensive use of rare natural resource
need for energy efficiency & recycling

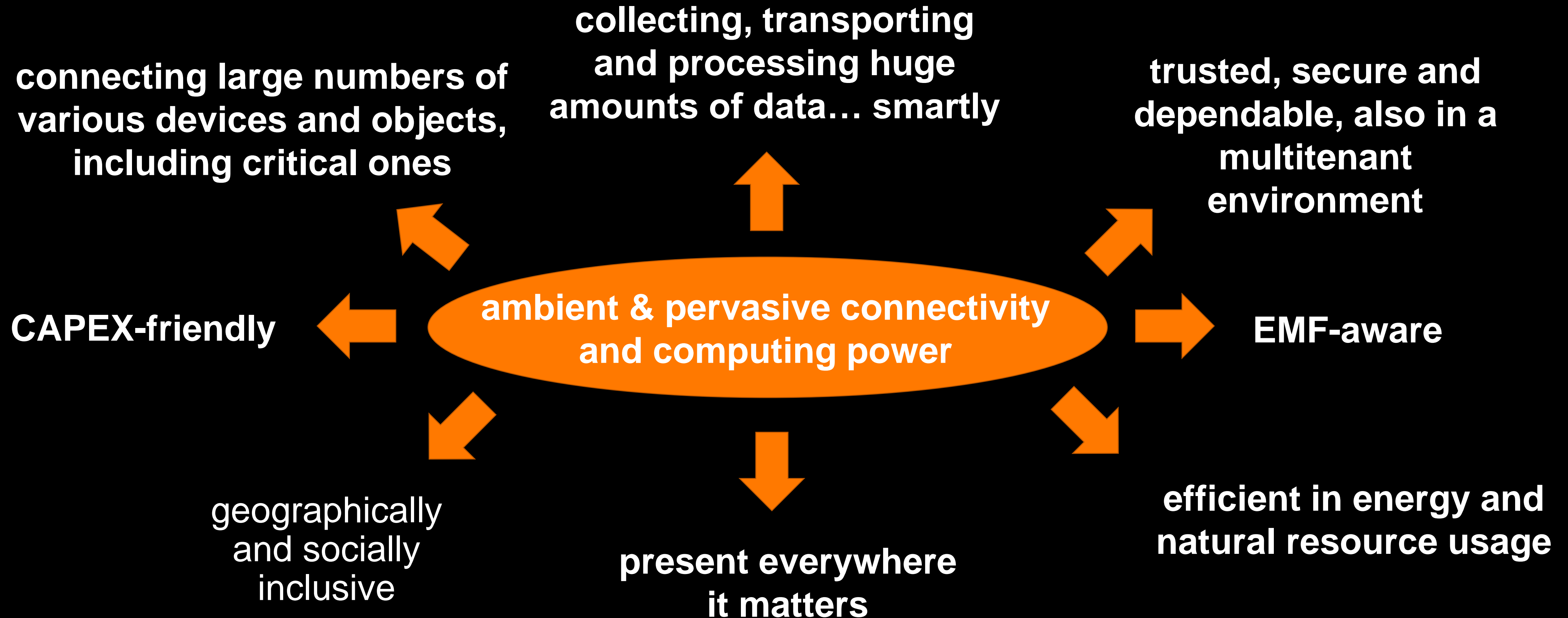


From facilitator to socially mandatory
need to ease the basic Internet access



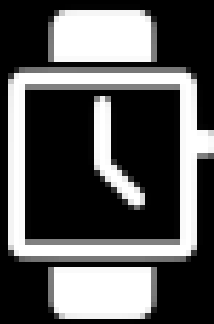
Source: Jeffrey Thompson | MPR News

The future networks vision



Orange & IoT today LPWA

IoT business is on:



625,000

B2C devices sold in Europe in 2018

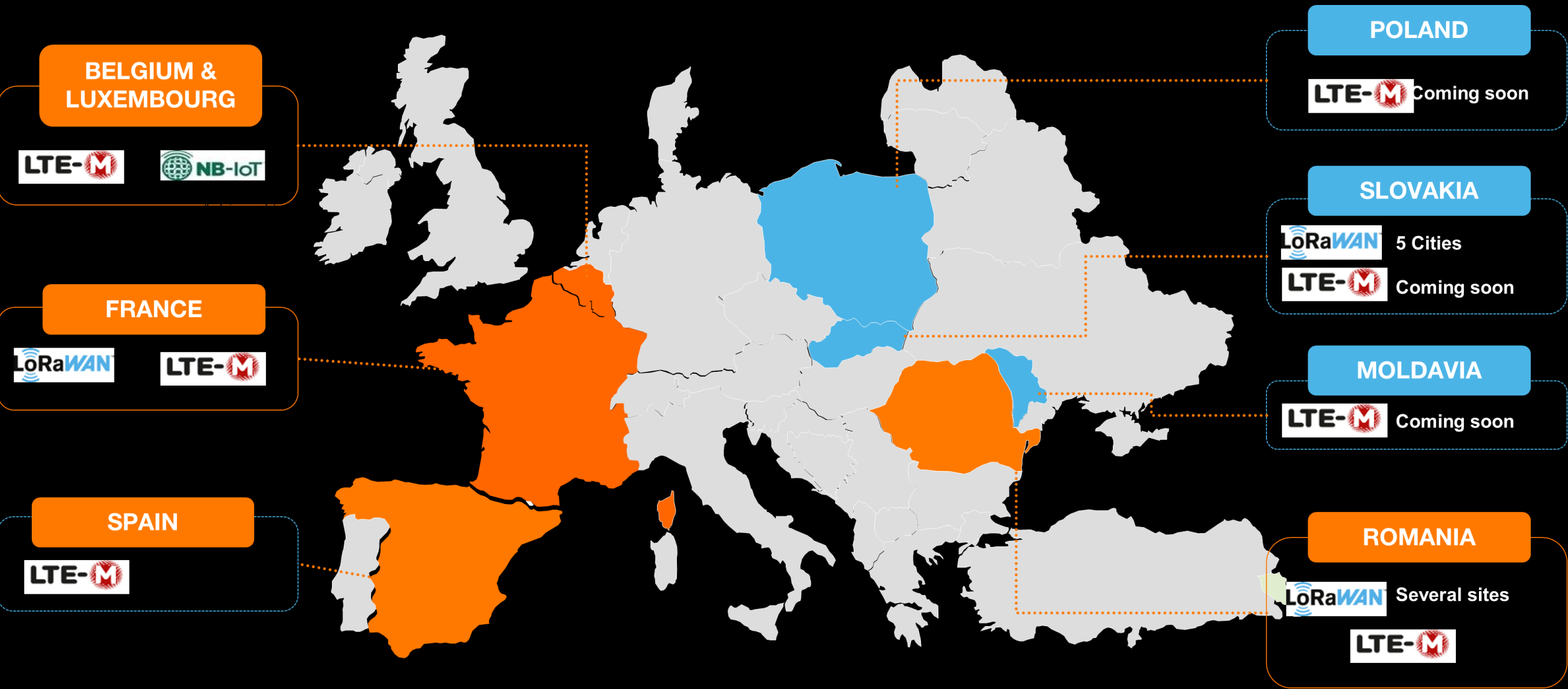


18,8 Million



B2B objects

Orange IoT LPWA network deployments



Six key areas

Individuals



Smart cities & territories



Smart home



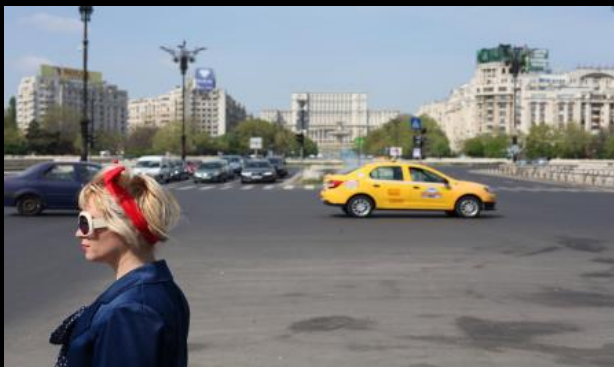
Industry & manufacturing



Health



Automotive



Datavenue: E2E IoT and data analytics offer



5G will further expand the support of industries, cities and communities

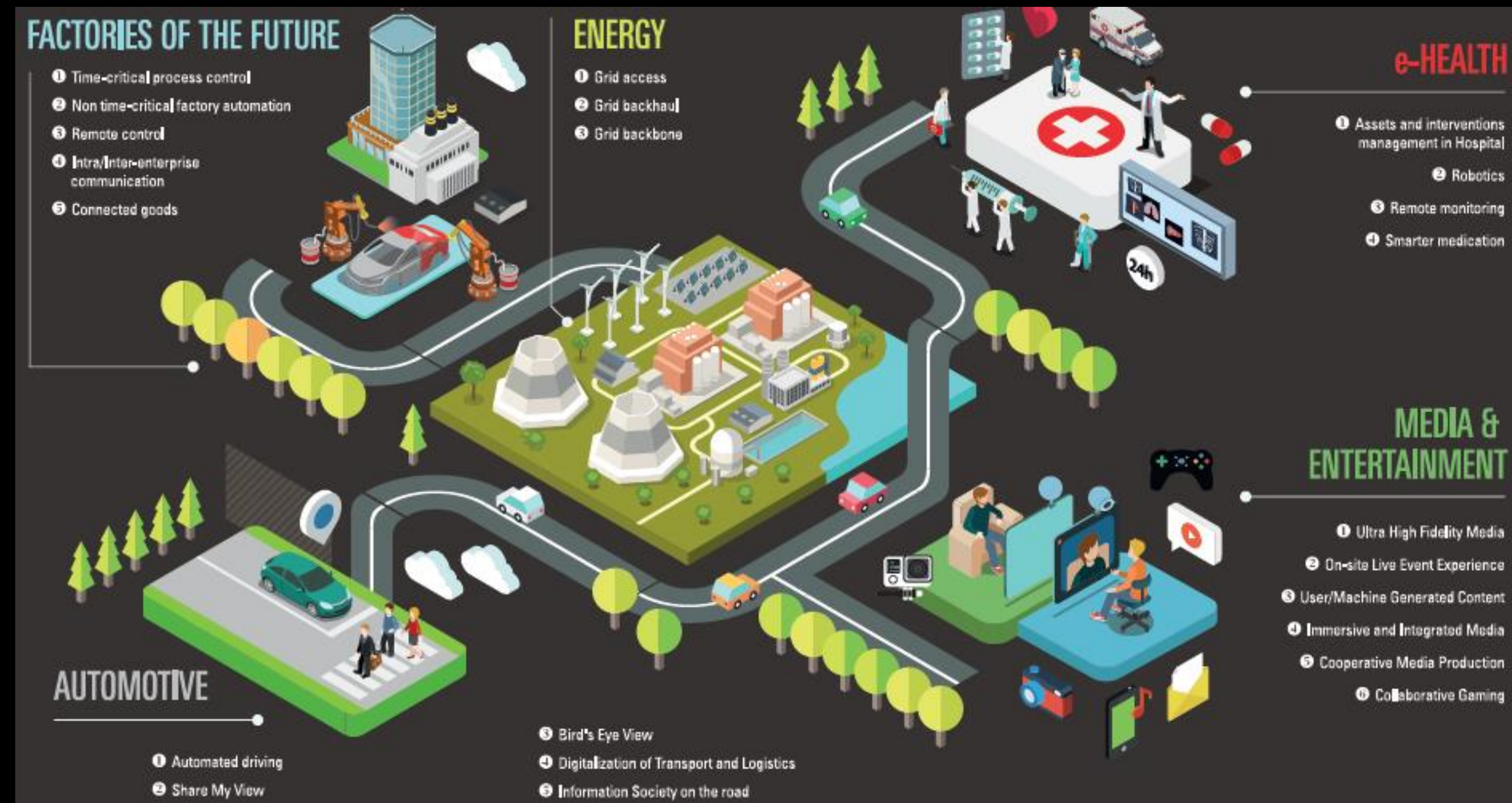
5G new features

- Massive IoT connectivity
- Ultra-reliable and low latency communications
- Network slicing

Networks will become critical for wide parts of the economy, public services and public safety

Strong research stakes

- Trust, security and resilience, especially in multi-tenant environment
- To fulfill all the industry needs, e.g. deterministic networks



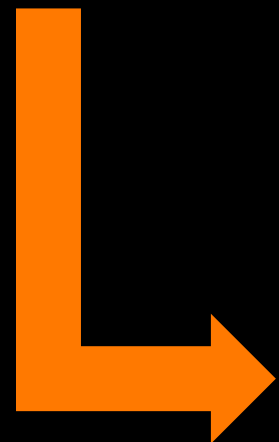
Source: 5G PPP

Co-construction with users is essential for meaningful technology evolutions... and adoption

- to understand technical requirements
- to experiment solutions
- to prepare ecosystems and business models

Orange 5G co-innovation with enterprise customers

5G experimentation 5GPPP research projects



Factory of the future
(Electronics sector)



AR for maintenance
(energy management and process automation)



V2X communications and multi-access computing



Train monitoring/scheduling.
High-speed, HD video downloads

Take-aways

- . Beyond performance aspects, research on future networks has to address
 - Trust and resilience, in multi-tenant environments
 - EMF-aware transmissions
 - Energy and natural resource usage efficiency
 - Digital inclusion
- . Need to keep a balance between mid-term and long-term research:
 - Still a lot of research needed to deliver the full 5G potential!
- . The exploding complexity of the networks multi-requirements optimisation calls for system-level research: research on isolated building blocks is not sufficient!
 - Computing power and open-source now allow us to test innovations in close to real-life environments at moderate cost – see <http://www.pluginthefuture.eu/>

Thank you.

