

For a societal and value-driven approach to 6G design



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6G is a tool to address the challenges of our times... and of the 2030s

sovereignty

more efficient transports

need for education and healthcare for all

climate change

privacy

resilience to massive and successive crises

elders care and autonomy

more efficient logistics

energy cost and availability

more efficient industry



sustainable energy production and usages

equality

security

more efficient agriculture

Leverage the lessons from 5G

Co-construction with future users is key ...also with citizens

Be precise on what to expect in terms of new services & capabilities, and their schedule for delivery

Anticipating future technology impacts (+/-) is important

5G is still young! more to learn from field operation of 5G SA:

- adoption and cost of delivery of 5G new capabilities
- network virtualisation/cloudification
- network disaggregation
- edge computing
- operation of non-public networks



6G to enable services that **bring value to society and address future societal and environmental stakes**

Particularly to contribute to the transformation of the economy towards a significantly reduced carbon footprint and natural resource consumption

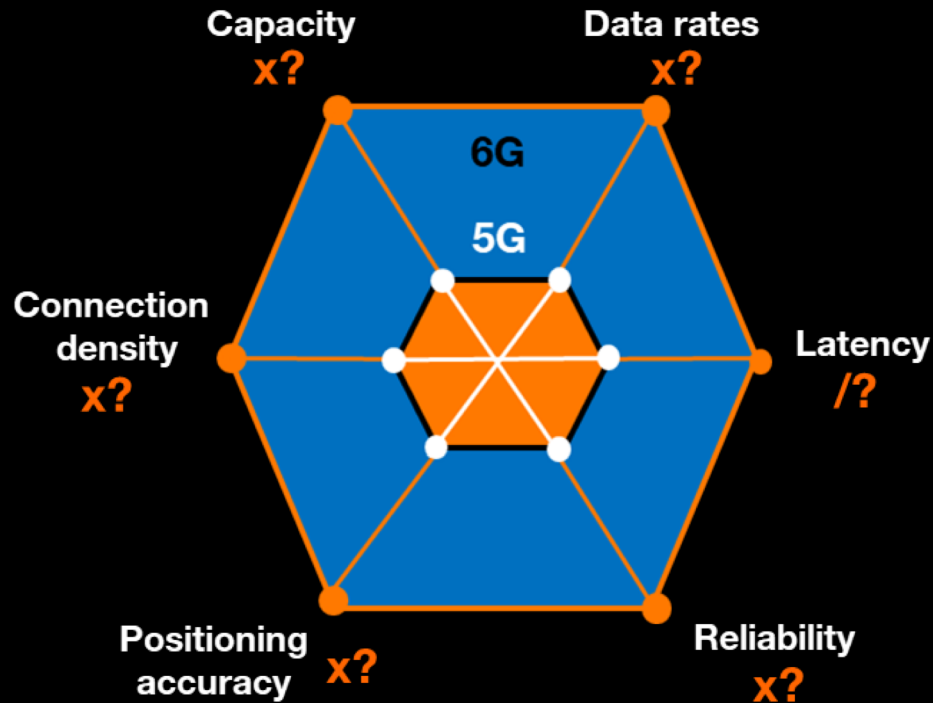


The use cases currently identified need to be **further analyzed in terms of technical feasibility, market relevance, and economic and environmental sustainability** to become real services in the 6G era.



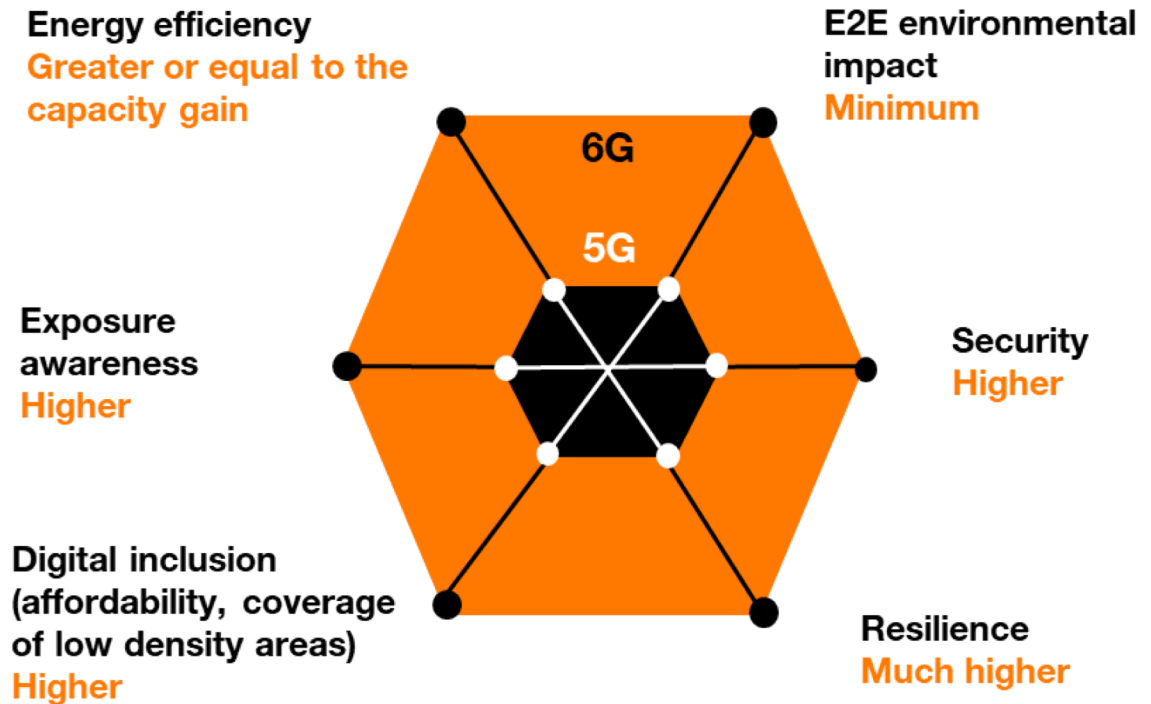
Co-design with the future users and stakeholders to maximise value

6G requirements: performance req. driven by value



Research challenge to develop transparent **value evaluation methods**, e.g. to estimate CO2 emissions reduction enablement

AND societal requirements



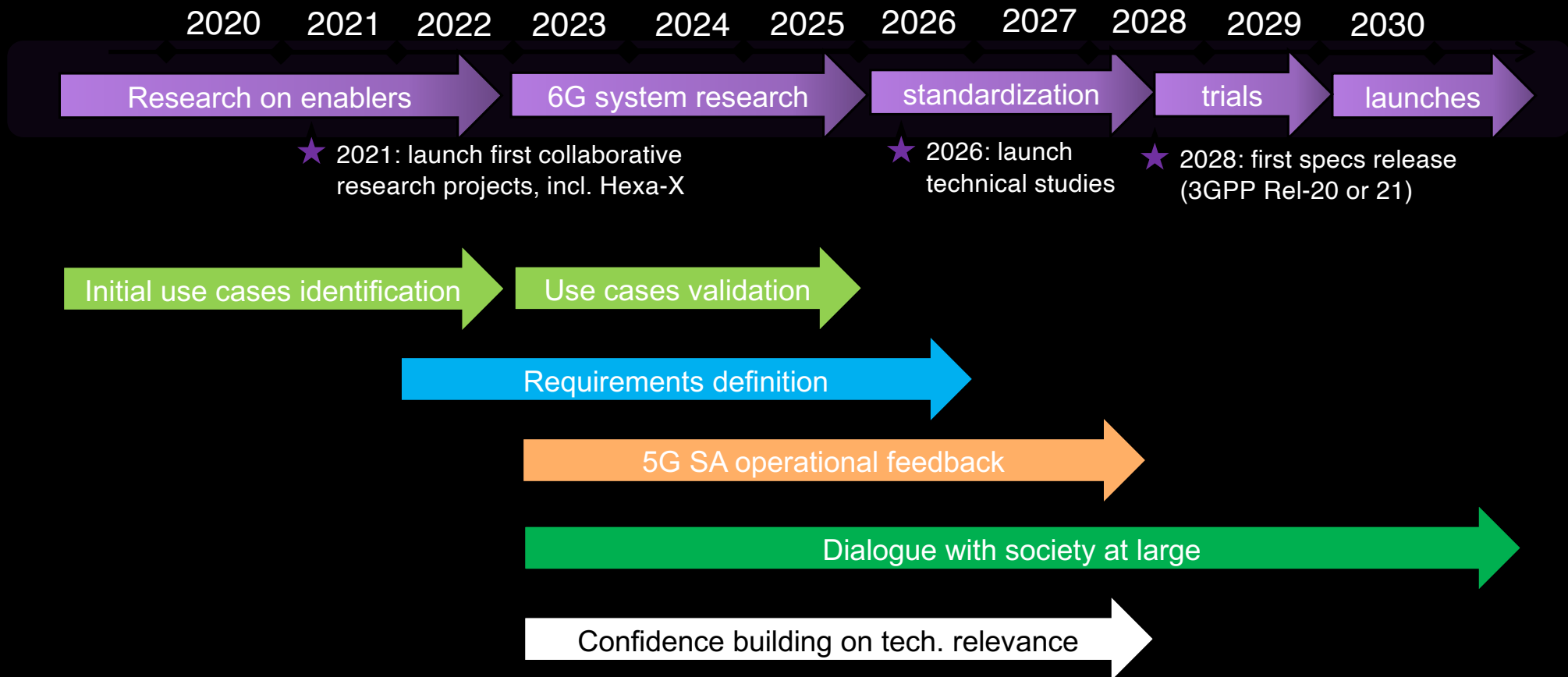
Research challenges to define **indicators and tools** to evaluate them, and **technical solutions** pushing the limits of technology in these directions

6G operational requirements

- Energy efficiency, security, resilience and EMF awareness can also be regarded as operational requirements
- Automation of service delivery
- Flexible optimization goals
- Flexibility for future evolution
- Dynamic software upgrade



6G development envisioned roadmap



Key design principles

Monitor energy use and evaluate embedded environmental impact

Consume zero Watt at zero load

Rely on hardware and software modularity to extend equipment usage time

Extend and strengthen resource sharing

Integrate all access network types for coverage, energy, and resilience, optimization

Design 6G as Trustable Networks

Design 6G as cloud native

Design 6G as AI centric

6G technology enablers

**Towards more spectrum;
new frequency bands
and spectrum sharing**

**Radio sensing and
imaging**

**More efficient photonic
systems**

**Satellite & High-Altitude
Platforms (HAPS)**

**Reconfigurable Intelligent
Surfaces (RIS)**

Zero-Energy Devices (ZED)

Takeaways

- **6G to provide value to society in a secure, resilient, environmentally and economically sustainable way**
Research challenge to develop value indicators and common evaluation methods
- **6G to be equally based on societal and performance requirement**
Research challenge to define societal requirements and methods to assess them
- **6G made for society, with society**
Need to establish and maintain a dialogue with representatives of the society at large, including citizens, industries, public services and regulators.
- **This vision applies not only for 6G, but also for future networks in general**

Thank you!

More details on Orange's 6G vision in
<https://oran.ge/386d9US>

