



# 5G Concepts and Positioning

Completing the picture

**EURESCOM**

# What and Where to invest?



# What is 5G?

- \* **Assumed definition:**

- \* **5G (5th generation mobile networks or 5th generation wireless systems)** denotes the next major phase of mobile telecommunications standards beyond the current 4G/IMT-Advanced standards. 5G is also referred to as beyond 2020 mobile communications technologies. 5G does not describe any particular specification in any official document published by any telecommunication standardization body.

- \* **BUT THIS IS NOT SUFFICIENT !!!!**

- \* **Better definition:**

- \* **“The holistic communications infrastructure for 2020.”** As we expect 90% of all communications to be wireless in 2020 – it is unreasonable to expect the remaining 10% to be evolved and supported independently – so the 5G system must include the fixed network evolution (and satellites, and TV, and ... /) as part of the basic network design.



Image from [TECHINASIA](#) website

# Global Actions



EU - Framework Program 7, e.g. METIS and 5GNow projects  
- 5G PPP in Horizon 2020



UK - 5G Innovation Centre (5GIC) at University of Surrey



US - Intel Strategic Research Alliance (ISRA)  
- NYU Wireless Research Center  
- 4G Americas



China - 863 Research Program  
- Future Forum  
- IMT-2020 (5G) Promotion Group



Japan - 2020 and Beyond Ad-Hoc Group under ARIB's Advanced Wireless Communications Study Committee



Korea - 5G Forum



Taiwan - Ministry of Economic Affairs, National Science Council



Russia - 5GRUS by Russia's Icom-Invest

CJK White Paper



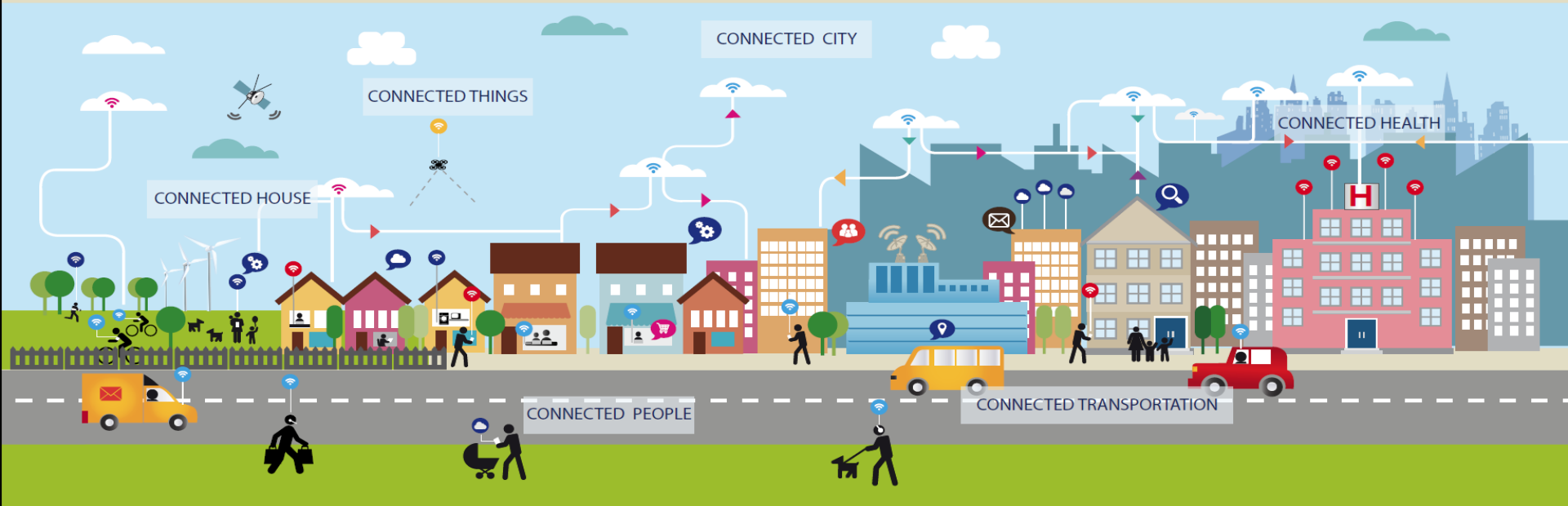
NGMN – White paper on future requirements



# The next generation of communication networks will be "Made in EU"

[www.5g-ppp.eu](http://www.5g-ppp.eu)

## The 5G Infrastructure Public-Private Partnership



**THE 5G PPP**

# The 5G Infrastructure Public-Private Partnership

Industry manufacturers

Telecommunications operators

Service providers

SMEs

Researchers

The 5G PPP will deliver solutions, architectures, technologies and standards for the ubiquitous next generation communication infrastructures of the coming decade.

REINFORCE INDUSTRY COMPETITIVENESS



SPEED UP ADVANCED ICT SERVICES



SUPPORT SUCCESSFUL R&D ACTIVITIES



5G PPP

## CONTRIBUTION



BETTER QUALITY OF LIFE AND SERVICES



OVERCOME DIGITAL GAP IN EUROPE



OPEN NEW INNOVATION OPPORTUNITIES



1000 times higher wireless area capacity



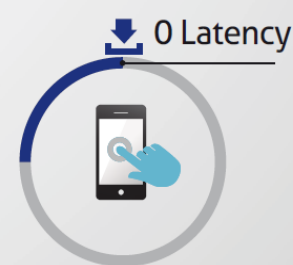
connecting 7 billion people



connecting 7 trillion things



save 90% energy



zero perceived downtime

# What is Special about 5G?

- \* **Key Challenges / High level KPIs in the European 5G Initiative**
  - \* Providing **1000 times higher wireless area capacity** and more varied service capabilities compared to 2010
  - \* **Saving up to 90% of energy per service provided.** The main focus will be in mobile communication networks where the dominating energy consumption comes from the radio access network
  - \* **Reducing the average service creation time** cycle from 90 hours to 90 minutes
  - \* Creating a secure, reliable and dependable Internet with a **“zero perceived” downtime** for services provision
  - \* Facilitating very dense deployments of wireless communication links to connect over **7 trillion wireless devices** serving over **7 billion people**
  - \* Enabling advanced **User controlled privacy**

Image from

website

# What needs to be done?

## **Faster, More Powerful and More Energy Efficient Solutions for integrated High Capacity Access and Core Networks for a Wider Range of Services**

- Wireless Networks
- Optical Networks
- Automated Network Organisation - Network Management and Automation
- Implementing Convergence Beyond the Access Last Mile

## **Re-Designing the Network**

- Information Centric Networks
- Network Function Virtualisation
- Software Defined Networking
- Networks of Clouds

## **Ensuring availability, robustness and security**

## **Ensuring efficient hardware implementations**

Source: 5G PPP Annex to contractual arrangement.

## \* **Standards and Spectrum:**

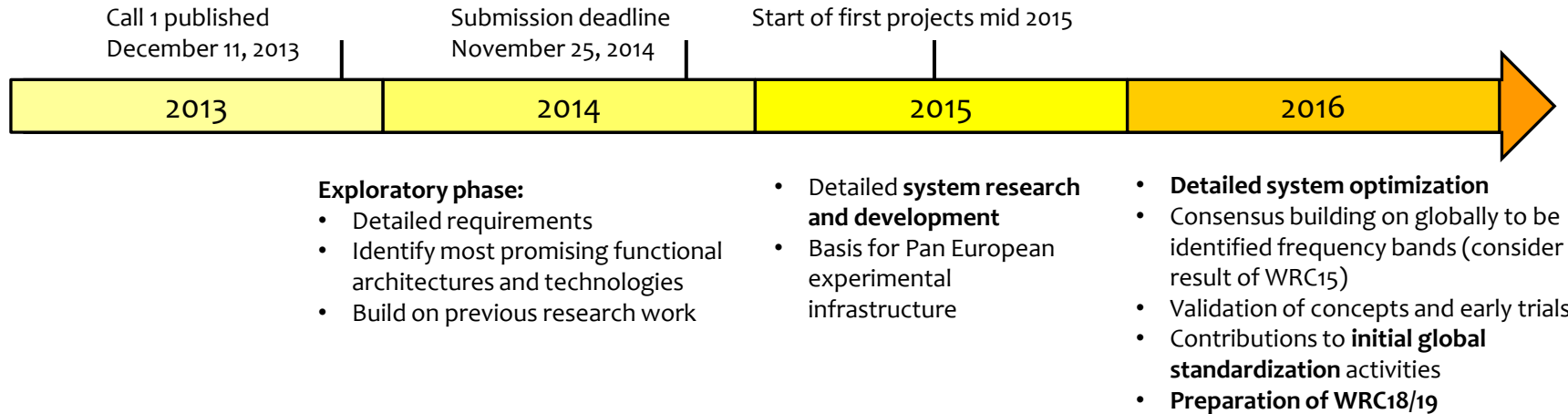
- \* We need to agree on the 5G specification,
- \* We need to get 5G globally standardised, and
- \* We need to find spectrum for 5G

## \* **Business and Economics:**

- \* We need the technical capabilities to emerge over the next 6 years for progressive implementation,
- \* We need investment models that are viable and sustainable,
- \* We need new business models for 5G,

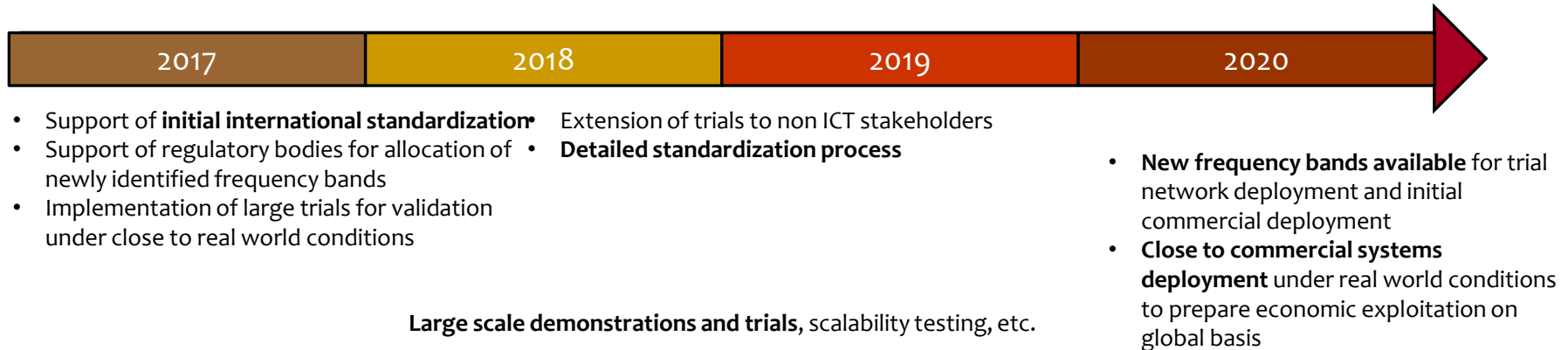


# 5G ppp Timeline -> 2016



Source: 5G Infrastructure Association.

# 5G-ppp Timeline -> 2020



Source: 5G Infrastructure Association.

# Developing 5G in Europe



**Applications  
and Services**

**Devices and  
Things**

2014 – 2020

# Conclusions

- \* **The 5G-ppp is critical for all industry and society in Europe for enabling a viable and capable future**
  - \* Sector involvement in future communications infrastructure evolution is important
  - \* The long term perspective may be damaged by H2020 short-term impact requirements
- \* **A European 5G “end to end” Applications and Services initiative is still missing - opportunity for Celtic-Plus and the Eureka nations.**
- \* **Many of the horizontal aspects will need a lot of innovative work:**  
**Security, Privacy, Data engineering, ... etc., etc., .../**
- \* **European National Authorities can identify complementary initiatives and have a win-win scenario.**



**Part of the European 5G  
Leadership Initiative**