



#H2020Energy

Horizon 2020 Work Programme for Research & Innovation 2018-2020

SMART AND EFFICIENT ENERGY
5G PPP Phase 3 Topics
ICT-17-2018 & ICT-19-2019

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Research and
Innovation



Framework: 5G in the Digital Single Market (DSM)

The 5G Action Plan (5G AP)

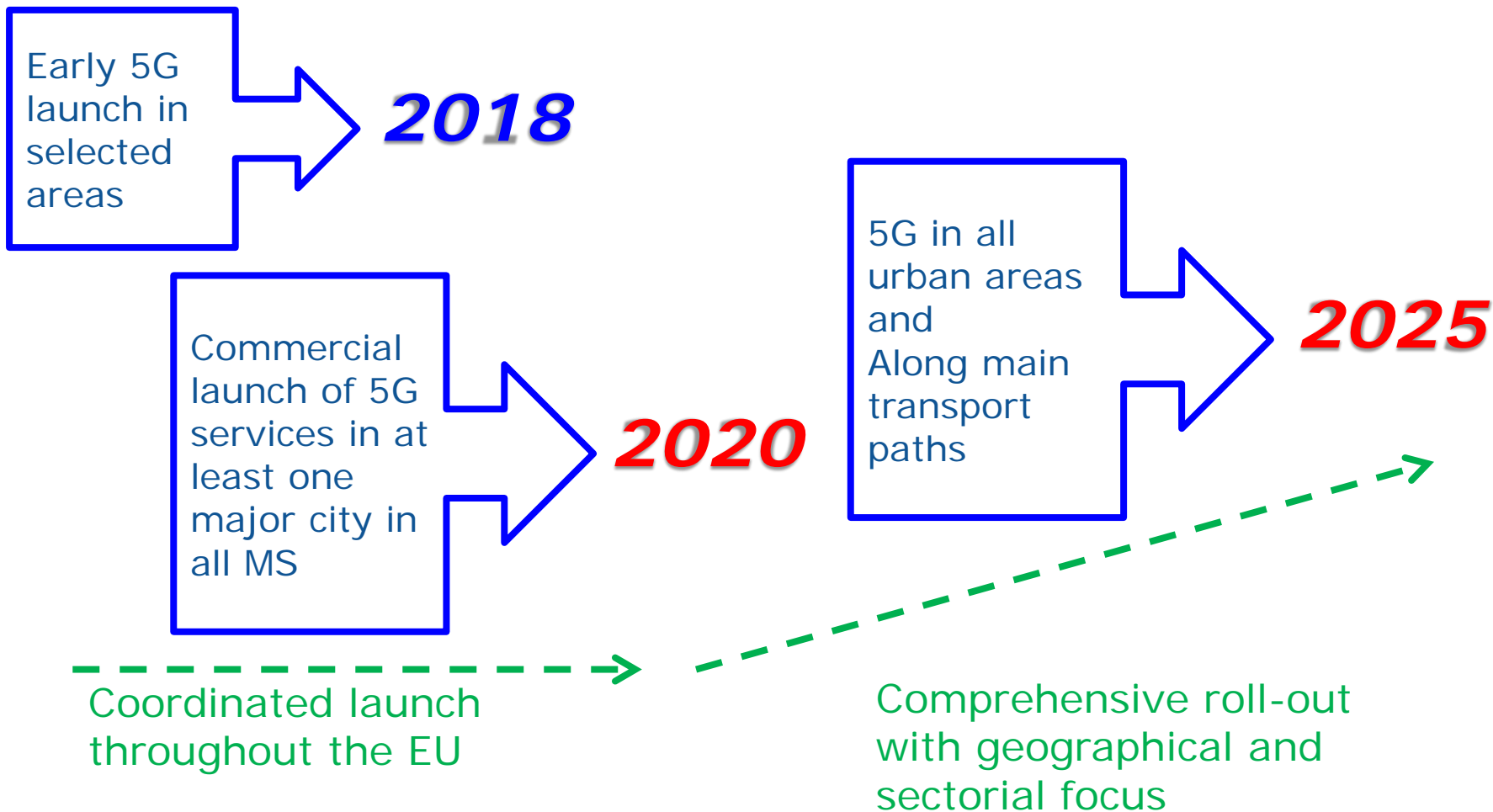
- EC Communication to support European industrial leadership;
- Part of the "Connectivity Package" (9/2016)
- Preparing Framework Conditions at EU level for 5G deployment

The 5G Public-Private Partnership (5G PPP)

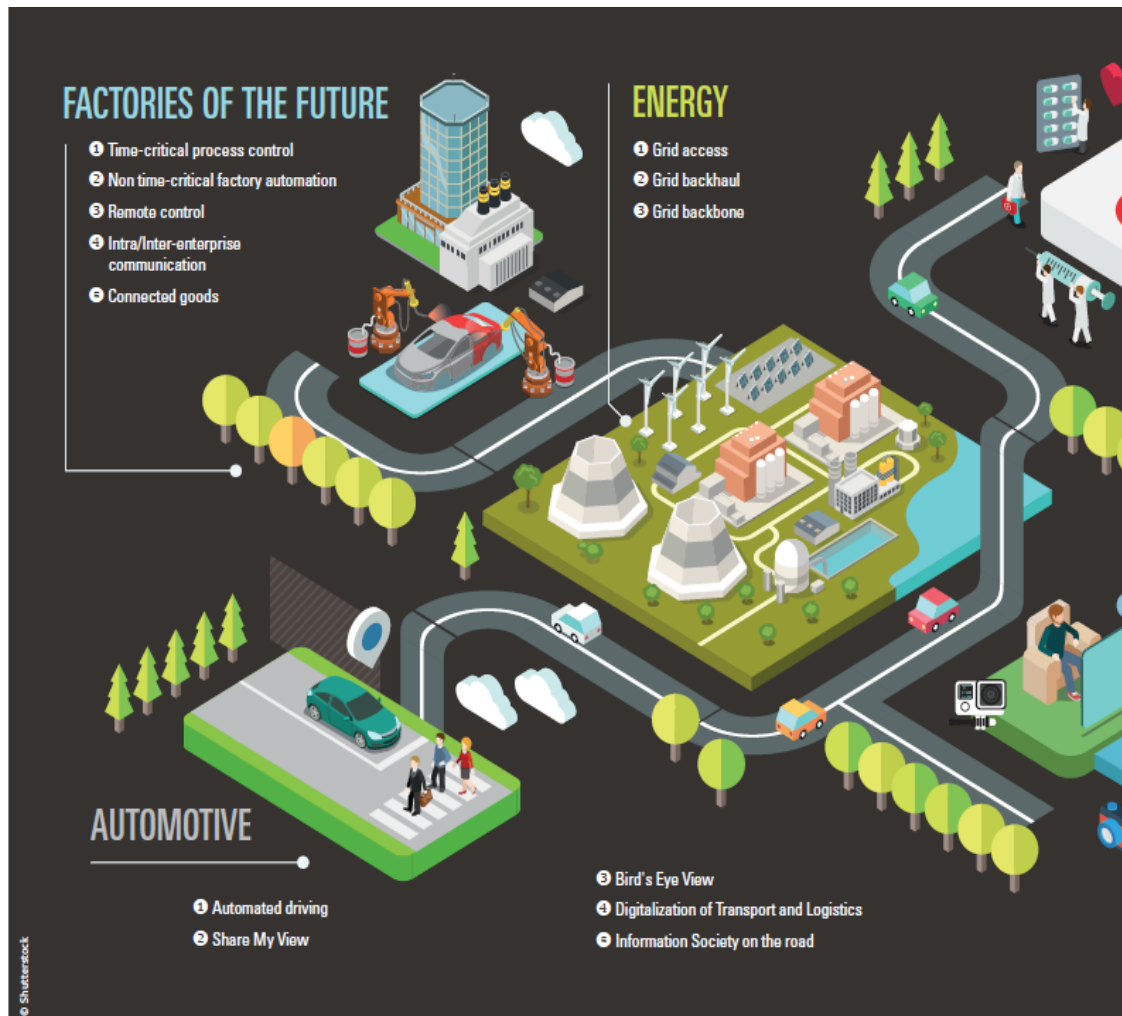


- 700 M€ initiative under R&I H2020 programme
- Technologies, systems, applications
- Programmatic approach
- Spectrum, standards, international cooperation, vertical sectors


5G AP: European approach to 5G Introduction



European Vision



Supported by the



5G empowering vertical industries

5G VERTICAL SECTORS

With 5G, networks will be transformed into intelligent orchestration platforms.

By cementing strong relationships between vendors, operators and verticals, 5G will open the field to new business value propositions.

Use-cases originating from verticals should be considered as drivers of 5G requirements from the onset with high priority and covered in the early phases of the standardisation process.

Energy sector is one of the main verticals

- **Lots of prospects, but also challenges:**
 - Smart grids driven by the emergence of renewables
 - Highly variable communications needs
 - New business models will need to be supported by:
 - ...Research and Innovation (by versatile industry consortia)
 - ...Standardisation efforts, which are increasingly important
- **Active involvement at workshops on 5G verticals in 2015**
- **Energy in the White Paper on 5G verticals at MWC 16**

Widely versatile and demanding needs

- **Latency** from 1 ms to 1s;
- **Data speeds** between 1 kbps and 1 Gbps;
- **Coverage** is essential (substations, metering);
- **Resiliency** is key for the safety of energy supply;
 - Including battery backup of base stations...
- **QoS** provisioning will be a must for 5G business case!

How can 5G serve different verticals?



5G network slicing allows for tailored vertical XaaS solutions:

Network as a Service

Safety &
Security

Mobile
living

Utility &
Energy

Traffic
Mgmt.

Automotive

Health

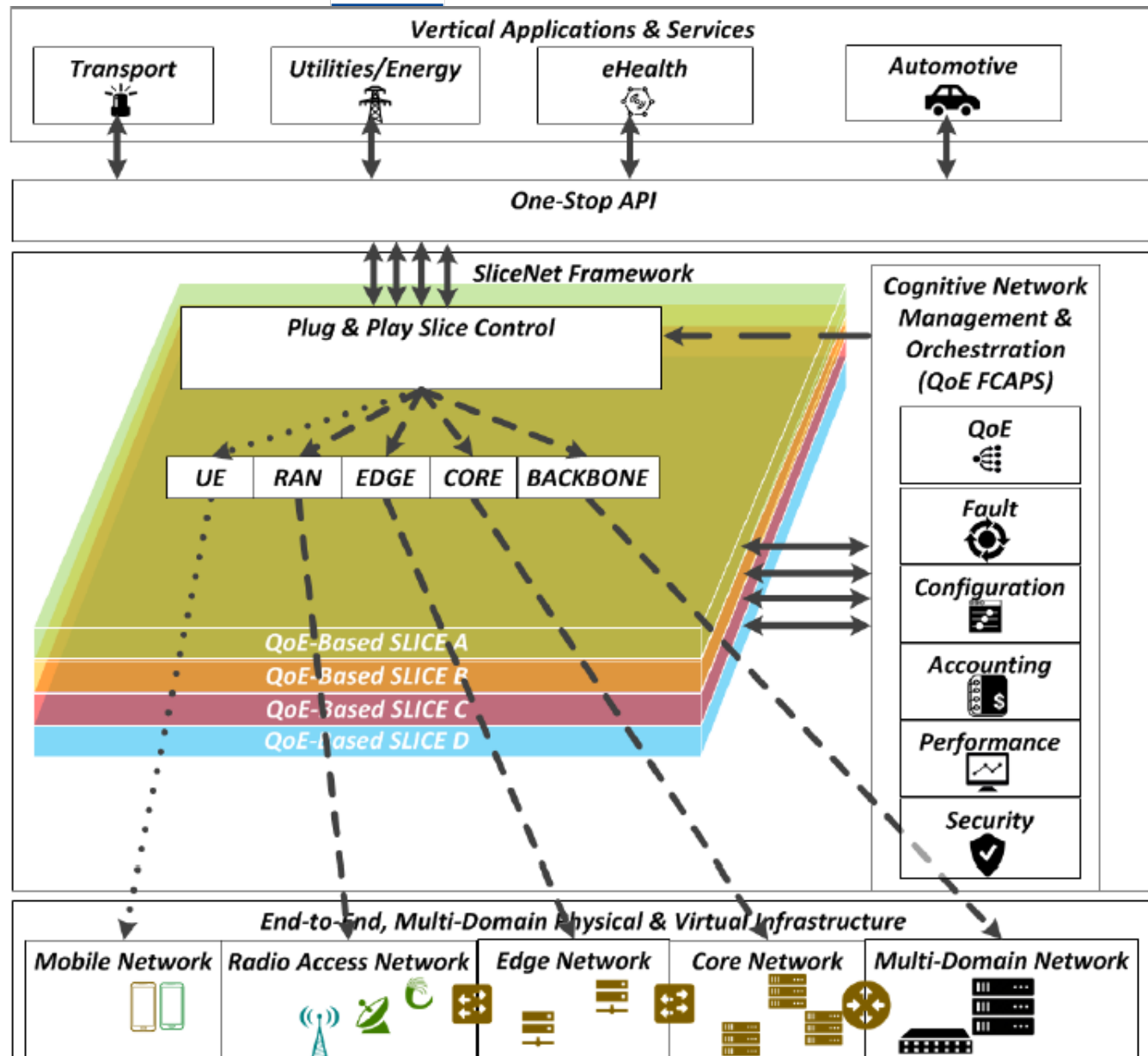
Communication

Logistics

What could slicing look like?



An overall vision
of SliceNet
(H2020 project)



European Trials Roadmap

Trials roadmap announced in the 5G Action Plan

- ✓ To help technology and business model validation
- ✓ To prepare for early deployments
- ✓ To **foster partnership with verticals and creation of ecosystem**

Roadmap announced at MWC 2017 in Barcelona

- ✓ Support by key players of 5G in Europe
- ✓ Emphasis towards **verticals and cities**

5G Pan-European Trials Roadmap (v.1)

- ✓ Announced in May 2017 at 3rd 5G Global Event in Tokyo
- ✓ **Part of this implementation is supported by the 5G PPP**
- ✓ Stakeholder commitment is key to implement the roadmap!

5G PPP Phase 3 WP18-20, ICTC agreed (pre- published; Part 5.i. ICT)

5G R&I for "Long Term Evolution"

User needs, partnerships with
vertical industries

Early 5G
introduction
Lower frequency
bands

Later 5G
introduction
Higher frequency
bands

Phase 3 b) Integrated Verification Trial
- radio+network+applications -

Kick off at EUCNC
Conference 12-15 June,
Oulu, Fin

**5G Connected Cars in EU X
border corridors**

**Phase 3 a) Verification
Demo/Trial Platform**
- Integration radio+ network

Phase I Core Technologies

**Phase 2 - Demos
PoC- Core Techs
Components**

Y2015

2016

2017

2018

2019

2020

2021

2022

5G PPP Phase 3 - Objectives

Reinforce 5G PPP as an industry-driven & impactful initiative, supporting the EU positioning in the global 5G competition through:

- Support implementation of the EU Vision <https://5g-ppp.eu/wp-content/uploads/2015/02/5G-Vision-Brochure-v1.pdf>
- Reinforce links with **new players, especially vertical sectors (incl. Energy)**
- Reinforced trend towards **demos and pilots with high industrial impacts**
- Preparing for **deployment, trial support, and longer term needs**
- Programmatic approach through **collaboration agreement** between projects

5G PPP Phase 3 topics closing in 2018

	Title	Closing Date
ICT-17-2018	5G End-to-End Facility	31 January 2018
ICT-22-2018	EU-China 5G Collaboration	
EUJ-02-2018	EU-Japan Joint Call - 5G and beyond	
EUK-02-2018	EU-Korea Joint Call - 5G	
ICT-18-2018	5G for cooperative, connected and automated mobility (CCAM)	17 April 2018
ICT-21-2018	EU-US Collaboration for advanced wireless platforms	
ICT-19-2019	Advanced 5G validation trials across multiple vertical industries	14 November 2018

ICT-17-2018: 5G End-to-End Facility - General Context

- **Availability of Pan-European platforms** that can be used to validate the 5G KPI's (in an end-to-end manner), from the 5G PPP and beyond
- Critical to go **beyond capabilities that can be demonstrated with running pre-commercial trials of industry**
- Novel **features supporting vertical industries**, notably **end-to-end slicing**, are of particular importance
- Platforms are **to be reused by ICT-19 projects**, in support of trials
- Open to support implementation of 5G AP trial roadmap
- **Impact** is critical element!
- Open to support different 'stakeholder constellations'

ICT-17-2018: 5G End-to-End Facility – Scope I

- The target 5G end-to-end network facility covers fixed/multi-radio access, backhaul, core network, service technologies and architectures targeted for 5G, **including end-to-end virtualisation and slicing as key component**
- The objective is
 - **to validate the 5G network KPIs** through representative network trials, as defined by the 5G PPP;
 - **to prepare an extensive validation platform for vertical use cases**

ICT-17-2018: 5G End to End Facility - Scope II

The targeted facility

- allows to **validate early versions of the standards** and to prepare for later "forward-compatible" versions
- may be based on the interworking of several experimental platforms existing in Europe
- requires availability of **an open framework** (both legal and technical, e.g. open APIs) **enabling "vertical" projects to access** and use it
- requires **a methodology to consistently compare technologies** where appropriate

ICT-17-2018: 5G End-to-End Facility - Expected Impact

- Demonstrated feasibility of **5G PPP KPIs beyond 4G evolution**. It requires clear analysis of the state of the art and how 5G goes beyond
- Demonstration of **innovative radio spectrum use** and sharing applicable to 5G spectrum: (un)-licensed, licensed-shared access
- Validation of a representative **end to end 5G architecture** including end to end service provisioning with slicing capabilities
- Impactful contribution to **standards**. Participation of key European industrial partners with high standardisation impact is desired
- Availability of 5G facility that may be further used for validation through specific **vertical use cases** and/or for **large scale showcasing** events

ICT-17-2018: 5G End-to-End Facility

- Opening: 31/10/2017
- Closing: **31/01/2018**
- Target: 3 to 4 projects
- Type of action: Research and Innovation Action (RIA)
- **Special conditions:**
 - The limit for a full proposal is **100 pages**
 - Complementary Grant Agreements will be implemented across projects originating from 5G-PPP Phase 3 topics

up to 60 M€

ICT-19-2019: Advanced 5G validation trials across multiple vertical industries - General Context

- Trials and demonstrations are key to **demonstrate 5G applicability to vertical industries** and to prepare for mature cross sector business cases
- Trials may also be considered in support of the 5G AP Trial Roadmap developed under the 5G PPP
- 5G technology can only be validated in its fullest extent if **used by several applications (verticals) at the same time with different requirements** (cloud like behaviour and isolation)
- **Security** of particular importance in such shared technology environments
- Trials expected to support later releases of 3G PP standards, **enabling full coverage of vertical requirements**

ICT-19-2019: Advanced 5G validation trials across multiple vertical industries – Scope

RIAs:

- **Trials of various scales**, depending on the target technology, demonstrating that performance conforming to **5G PPP KPIs requirements are met in the context of specific vertical use cases**
- Technology/architecture trials targeting **concurrent usage of resource by multiple verticals, addressing eMBB, mMTC, URLLC use cases**
- To demonstrate that **5G architecture and technologies enabling multi domain management of resources** are in line with concurrent vertical performance requirements
- **Preferably implemented over the 5G end to end platforms developed under ICT-17-2018** and contribute to 5G demonstration in the context of large showcasing events

ICT-19-2019: Advanced 5G validation trials across multiple vertical industries - Expected Impact

RIAs:

- Validated core 5G technologies and architectures in the context of specific vertical use cases and deployment scenarios and for differentiated performance requirements
- Viable business models for innovative digital use cases
- Impactful contributions towards standardisation bodies, involving vertical actors
- Validation of relevant KPIs linked to specific vertical sectors
- Europe 5G know how showcasing

ICT-19-2019: Advanced 5G validation trials across multiple vertical industries

- Opening: Early September 2018
- Closing: **14/11/2018**
- Target: 6 to 9 projects
- Types of action: RIA (90 M€), CSA (2 M€)
- **Special conditions:**
 - The limit for a full proposal is **100 pages**
 - Complementary grant agreements will be implemented across projects originating from all 5G-PPP Phase 3 topics

up to 92 M€

Stakeholders' Information Opportunities



<https://ec.europa.eu/digital-single-market/en/events/ict-proposers-day-2017>

Find out more

5G Action Plan for Europe

<https://ec.europa.eu/digital-single-market/en/5g-europe-action-plan>

ICT Work Programme

<https://ec.europa.eu/programmes/horizon2020/en/what-work-programme>

5G PPP

<http://www.5G-PPP.eu>

Horizon2020 web site

<http://ec.europa.eu/programmes/horizon2020>

Participants portal

<http://ec.europa.eu/research/participants/portal>

H2020 Helpdesk, including FAQ

<http://ec.europa.eu/research/index.cfm?pg=enquiries>

Thank you!

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www.ec.europa.eu/research

Participant Portal www

