A Question

In April 2015 Commissioner Oettinger concluded a speech about the need for adequate broadband connectivity in Europe by asking: “What capacity do our fixed and mobile digital networks need to meet future connectivity needs beyond 2020?”

Tech4i2 has undertaken a number of broadband and wireless studies for the Commission. This paper provides our thoughts on targets for 2030.

The Present

The Digital Agenda for Europe flagship initiative was launched in March 2010 as part of the European Commission Europe 2020 strategy. It set a number of targets for broadband connectivity. The basic broadband for all citizens target by 2013 was achieved through satellite connections two years ago.

Two further connectivity targets, to be achieved by 2020, were:

1. All Europeans have access to internet speeds of above 30 Mbps;
2. 50 per cent or more of European households subscribe to internet connections above 100 Mbps.

In 2014, less than halfway through the ten year target period, 97 per cent of EU28 households are able to connect to a fixed broadband connection, 68.1 per cent of households have 30 Mbps connectivity and 44.8 per cent of households have 100 Mbps connectivity.

Some have commented that the Digital Agenda targets represented a sea change for European digital policy. Whilst it is true that most Member States have aligned national policies with the targets, some commentators have suggested that with hindsight the targets appear under-ambitious.

A problem for policymakers is to decide whether they will create ‘safe’ or ‘aspirational’ targets for 2030. A second problem is what on earth either of these might be?

The Future

Thomas Jefferson is quoted as saying that “appraising the past can enable us to judge the future”. There are a number of well known technology trends or Laws. Probably the best known is Moore’s law - Gordon E Moore’s observation that the number of transistors in integrated circuits doubles approximately every two years. The Law led to the observation that computers double in capability every 18 months: this corresponds to about 60 per cent annual growth.

In 2009, when working on a study examining the socio-economic impact of bandwidth (SMART 2010/0033) for the European Commission, Tech4i2 (with Analysys Mason) observed that over a seven year period (2002 to 2009) there had been a log-linear relationship in commercial bandwidth provision.

In 2014 Jakob Nielsen updated earlier work he had undertaken examining connectivity bandwidth. His study of commercially available bandwidths over 31 years found a very similar log-linear relationship to the trend observed by Tech4i2, see the graphic over page.

The red (Nielsen) and blue (Tech4i2) lines in the graphic provide observations for the two studies from 1983, with forecasts to 2030. The diamonds are data points recorded by the two studies.

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1 HIS and VVA. 2015. Broadband coverage in Europe

Further Thought Piece articles can be found at www.tech4i2.com
Some commentators have suggested that Gigabit (1 Gbps) connectivity should be the goal for 2030. As the graphic demonstrates, if adopted, this would be a very conservative target. The trendlines suggest Gigabit connectivity should be more widely commercially available in 2020. Indeed, several operators are already providing Gigabit connections using fibre optic or cable connections.

The trendlines predict that by 2030 household bandwidths could be 80 Gbps. If trends continue a ‘safe’ 2030 target would be 10 to 20 Gbps. A more ‘aspirational’ target would be greater than the 80 Gbps that past trends suggest would be prevalent in 2030.

**So what? and another question**

A common reason put forward for greater bandwidth is rising demand for high-resolution TV, video-on-demand and other complex video oriented Internet services. In the past this has undoubtedly been a problem.

When Standard Definition (SD) video compression was first commercially broadcast in early 2000 bandwidth requirements were 1 to 2 Mbps. As the graphic shows commercially available broadband in early 2000 did not meet this requirement.

High Definition (HD) video, requiring 4 to 8 Mbps connection speeds, became more widely available in 2007. A broadband connection in 2007 could just about enable users to access an HD broadcast.

Ultra High Definition (UHD) was first demonstrated in 2014. Commercial UHD video compression bandwidth requirements are expected to be about 20 Mbps.

Current broadband connections should enable users to access four UHD channels simultaneously. 8K UHD is expected to require about 50 Mbps connectivity. The green line on the graphic below shows that if video compression technologies increase at a similar rate in the future improvements in broadband connectivity will easily outpace user requirements for simultaneous video channel access.

It appears that by 2030 prevailing bandwidths should be able to accommodate easily access to more than 200 video channels simultaneously.

Having answered a question, we feel it is only fair if we ask a question: **How on earth might the additional bandwidth be utilised in 2030?**