Michael Finch
Head of Wire and Cable

► A REVIEW OF KEY FIBRE OPTIC MARKET DRIVERS

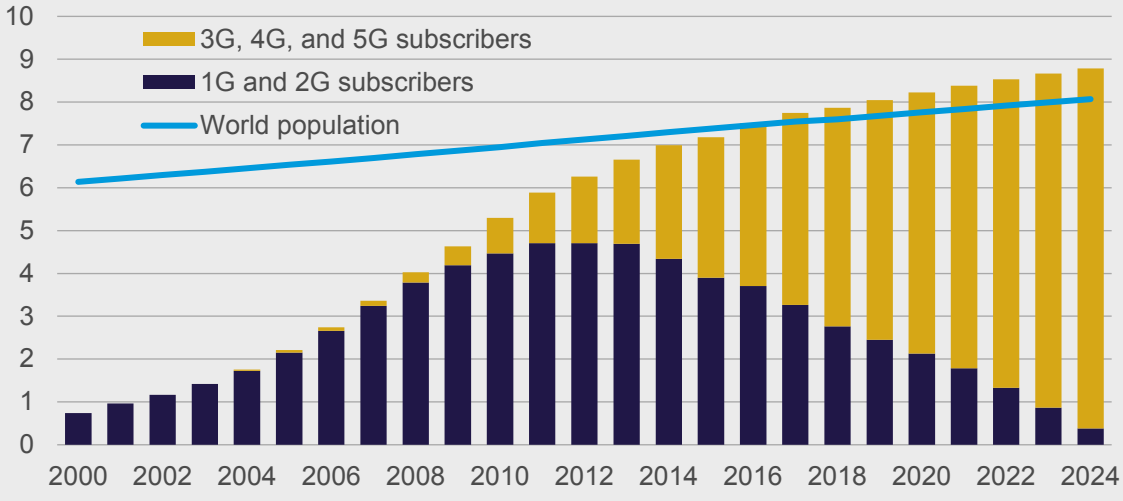
Mobile data, especially video, will be a major driver of local fibre

The latest edition of CRU's bi-annual *Telecom Cables Market Outlook* explores key drivers of fibre demand over a five-year forecast horizon. Amongst them, this *Insight* reviews the rising ownership of mobile devices and surging bandwidth requirements. This is looked at in tandem with the next mobile generation, 5G, and the potential implications to fibre demand.

As of 2018, the world had 7.6 billion people and 7.9 billion mobile subscribers. This tally of subscribers includes both post-paid and active pre-paid subscribers with access to a mobile service that includes voice communications. The tally of subscribers is based on the number of SIM (subscriber identity module) cards as reported by the mobile operators. The key point is that the available market for mobile phones is highly penetrated. This includes both developing as well as advanced economies. Of the mobile subscribers, 67% subscribe to a broadband service. either 3G, 4G, or 5G. This means that carriers are investing in 4G and 5G infrastructure mainly with the intent of selling higher-priced services rather than selling services to new mobile subscribers. The main revenue opportunity, therefore, is in higher-performance or higher-capacity data services.

Two thirds of mobile phone subscribers use a mobile broadband service

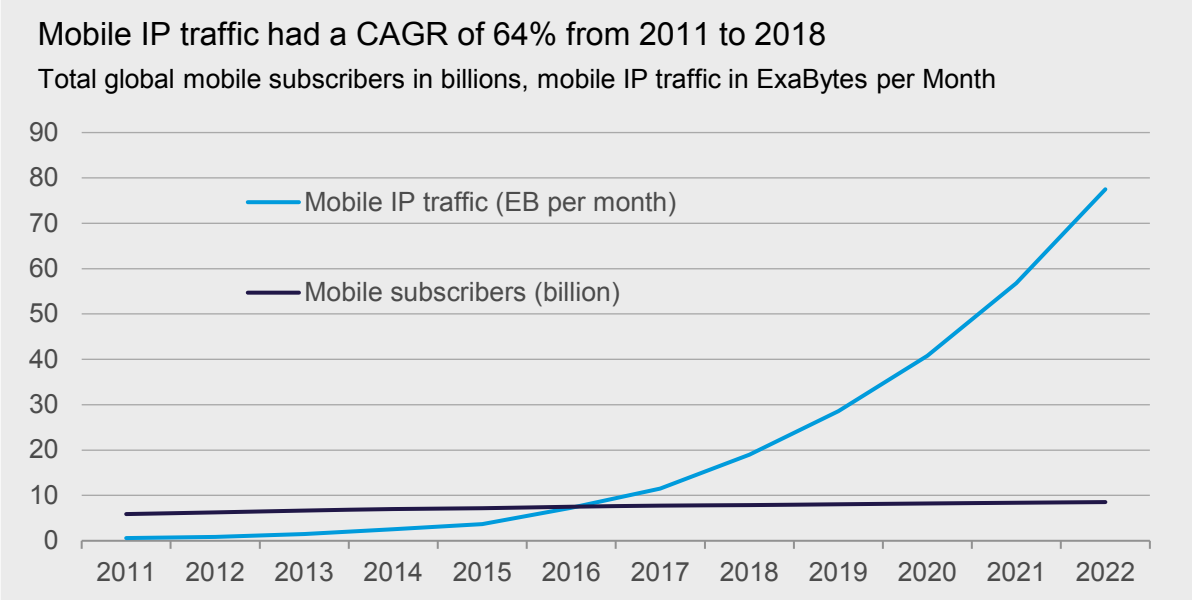
Mobile service subscribers and world population in billions



DATA: UN, ITU, Ericsson

Cisco Systems provides data on Internet Protocol (IP) traffic in a series of annual reports called the Visual Networking Index (VNI). These reports have data on both fixed and mobile IP traffic. Dividing the Cisco VNI totals of mobile IP traffic by the number of subscribers, we can see that the average amount of data consumed per month has increased from 0.2 Gbps per month in 2013 to 2.4 Gbps per month in 2018. This increase represents a CAGR of 61%. What's more, the Cisco forecast of mobile IP traffic, along with forecasts of mobile subscribers from Cisco and Ericsson suggest that mobile data consumption will increase to 9.1 Gbps per month, as an average of all mobile subscribers in 2022. The year-on-year growth in mobile data consumption, according to Cisco's VNI, will be 36% from 2021 to 2022, down from 65% from 2017 to 2018.

Nonetheless, the 2022 growth rate still represents a doubling of mobile IP traffic almost every two years. This, in short, is a major reason for building 5G networks.



DATA: ITU, Ericsson, Cisco VNI

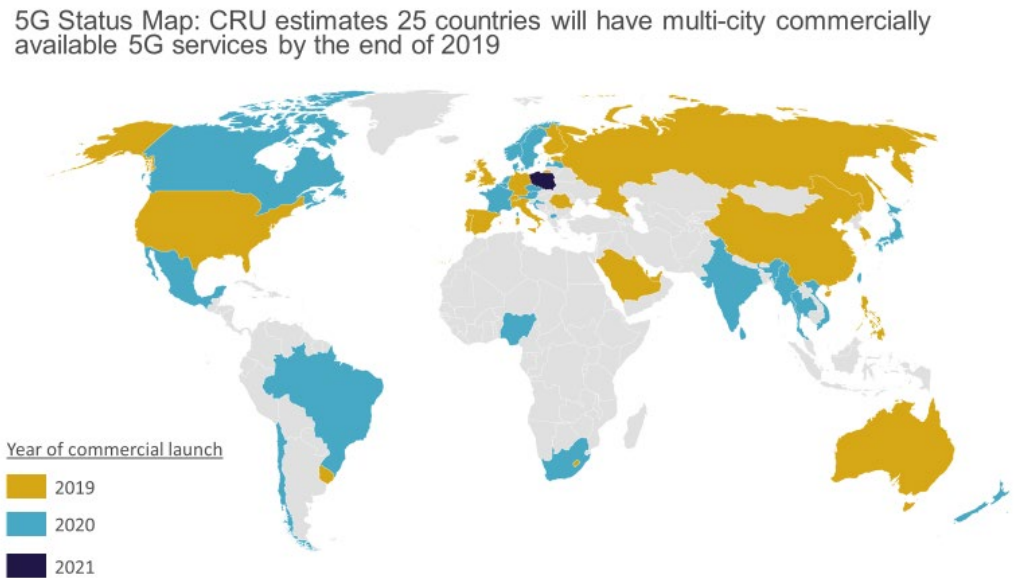
In addition to the increased data consumption, which is largely due to video communications, mobile network operators are seeing increases in M2M (IoT) applications and cloud-based applications. In the future, there also will be increased use of applications that will rely on low-latency, such as robotic controls, or further out, autonomous vehicles. These applications are among the "use cases" that lead carriers to justify investments in 5G network construction.

5G launches across the globe, China joins the party

Telecom operators in multiple countries have recently made headway with 5G network construction and the provision of 5G services. US and Chinese carriers have been investing heavily in the construction of 5G base stations as well as securing spectrum to cover a significant proportion of their framework. After many months of speculation, trials and pre-commercials offerings, CRU understand the three major telcos in China have now officially launched full commercial 5G services and have started selling 5G data plans as of October 31. Reportedly, all three carriers have launched at least partial 5G services in 50 cities across the country, making it the largest 5G network in the world.

Elsewhere, we have now seen all four major carriers in the UK launch their 5G services. The UK is one of the first European countries to launch 5G services, amongst Switzerland, Germany and a number of other small countries such as Monaco, San Marino and Jersey, albeit on non-standalone architecture. Other recent launches of 5G services have taken place in Romania (Orange), Ireland (Vodafone), Maldives (Dhiraagu) and Bahrain (Batelco), alongside Germany Outside of the US, China, Europe and South Korea, other countries have conducted trials and respective spectrum auctions and aim to launch commercial 5G services between 2020 and 2022.

As can be seen from the map below, CRU estimate 25 countries will be offering commercially available, 3GPP-standards compliant 5G services in multiple cities by end-2019. Most other advanced telecom nations will follow in 2020. According to GSMA intelligence, a further 65+ markets will follow during the 2021-2025 period, bringing the total to 116 countries.



DATA: GSA, CRU, Industry Reports. NOTE: Launches date refers to multi-city, commercially available 3GPP compliant 5G networks.

A picture of 5G's role in fibre demand is still emerging

Whilst it is extremely difficult to try and quantify the impact to fibre demand directly related to 5G, China provides an excellent case study due to its advanced status in both FTTH and 4G. For some time now, CRU has been citing concerns regarding optical cable demand in China following the near-completion of large-scale FTTH projects and nationwide coverage with high-density 4G networks. Whilst 5G provides considerable upside potential to fibre demand, the question has always been – will the upside be enough to offset the declines from both 4G and FTTH applications? To-date, it appears not. Whilst 5G progress remains largely on track in China, early-stage 5G related network construction and launch-phase simply has not been enough to offset declines elsewhere in domestic demand and hence the recent near-term downturn in China's optical cable consumption.

Outside of China, CRU have similarly seen little uplift in fibre demand directly related to 5G during early-stage network construction and initial deployments. It appears downside risks to our demand outlook, such as; utilisation of existing dark-fibre, active network sharing and simple upgrading of existing 4G cell sites are beginning to be realised and are stifling demand to some degree during these early stages of 5G. However, we are more optimistic in the mid-term.

Despite limited impact to date, fibre outlook hinges on 5G

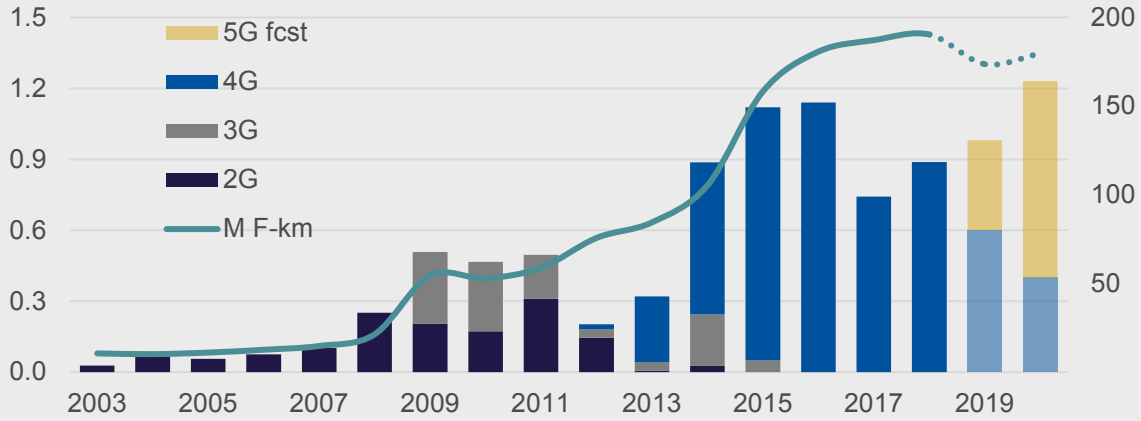
In preparation of the commercial launch and ongoing provision of 5G services in countries such as South Korea, China and the US, many carriers have been busy constructing and installing necessary 5G base stations in the launch cities. In total, CRU understand that all licensees in China will deploy up to 130,000 5G base stations by end-2019, maybe more. In comparison, South Korea had around 85,000 5G base stations deployed at the time they launched 5G services. With aggressive coverage targets nearing 90% by end-2019, operators such as LG U Plus have committed to deploying far more 5G base stations this year.

Huawei expects that 6.5 million base stations will have been deployed in 5G networks across the world by 2025. Based on the above estimate, over 1 million base stations per year will need to be built over that period starting from 2020. Further 5G base station installations and deep fibre deployments will buoy global fibre demand moving forwards.

The figure below plots the number of base stations installed each year by China's three carriers as a group. The data on base stations is from the carriers' annual reports. The cumulative total of all 4G base stations installed from 2012 to 2018 is 4.8 million. This compares with a total of 1.1 million for 3G base stations – indicating a rough four-fold increase in base stations per coverage area. The chart also includes a line showing the amount of cabled fibre installed in local-telecom applications. This again is the combined total of fibre installed in each year by all three carriers. It also includes fibre installed for FTTH networks.

Strong correlation between base station installations and fibre demand from local-telecom applications in China

LHS: M base station units added; RHS: M F-km installed in local-telecom applications



DATA: CRU, MIIT, Company reports.

If China's 5G network construction proceeds at a pace comparable to its 4G construction, it is quite possible that China's carriers alone could install four or five million 5G base stations by 2025. Most mobile industry participants acknowledge that 5G networks will require a much denser array of radio heads, meaning more base stations per coverage area and a deeper and denser fibre approach – all contributing to increased demand for fibre. Furthermore, China's 5G construction will be progressing in parallel with that of other advanced telecom markets in North America, Western Europe, and the Asia-Pacific region.

As such, 5G will be a key variable in fibre demand for many advanced telecom markets, including China, over the coming years. This is predominantly due to the cell densification described above and a deep fibre approach to network architecture. Furthermore, 5G networks will support communications between many devices other than smart phones, tablets, and computers. Examples include automobiles, trucks, cargo containers, point-of-sale terminals, vending machines, smart-grid equipment, smart-city apparatus (sensors, cameras, traffic control systems, public safety equipment, utility-network monitoring, etc.), and many other types of devices. These systems will rely on connections to new data centres, which also will drive demand for fibre.

The topics explored above, alongside current developments and the outlook for the global optical fibre, cable and preform markets in key regions such as China, North America and Europe are top priorities for CRU's research. They also are key topics in CRU's 5th World Optical Fibre & Cable Conference held in Charlotte, USA. CRU will continue to cover these topics in future reports and at future events. Please feel free to contact us if you have any questions about our services.

Michael Finch, Head of Wire and Cable
+ 44 207 903 2270
Michael.Finch@crugroup.com