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Enabling internet for all

Extract from the Ericsson Mobility Report
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Enabling internet for all

Over 40 percent of the world’s population lacks broadband internet access. The most cost-efficient way to bring people online is to leverage existing mobile network infrastructure.

Digitalization is a fundamental means to achieve the United Nations Sustainable Development Goals (SDGs).

The 2030 Agenda for Sustainable Development, containing the 17 SDGs, was adopted in September 2015 by all United Nations member states. Digitalization by leveraging existing and widely deployed technologies, such as mobile broadband, will play a vital role in achieving this. Through continued network upgrades and deployments, along with government-funded international development, service providers can help accelerate global digitalization and the fulfillment of Agenda 2030.

Globally, the main way of accessing the internet is through mobile networks and a mobile device; however, more than 40 percent of the world’s population still has no broadband internet access. Most of this population lives in locations with mobile broadband coverage but has no mobile broadband device or is not using internet due to issues including illiteracy, very young age, disinterest and affordability. However, lack of mobile broadband coverage is also a substantial barrier to internet access for many. An overwhelming majority of the population without internet access lives in developing countries. Internet access is a fundamental enabler for economic growth and a critical factor in fulfilling the SDGs. Recent research¹ shows there is a significant effect from mobile broadband on macroeconomic development in terms of gross domestic product (GDP), both when mobile broadband is first introduced,

and gradually as it diffuses throughout different economies. On average, a 10 percent increase in mobile broadband penetration causes a 0.8 percent increase in GDP.²

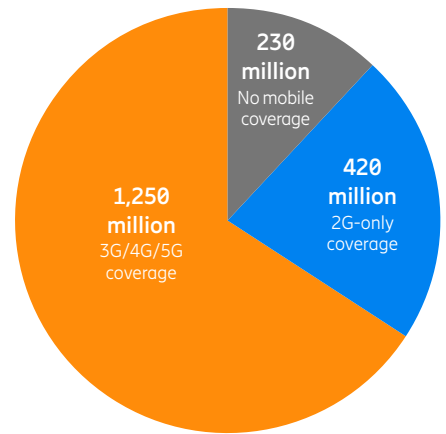
Through selective investment in mature mobile broadband technologies, communications service providers can sustainably expand coverage by upgrading existing 2G (GSM) sites, as well as targeting uncovered areas with new 4G (LTE) and 5G deployments.

Despite strong growth, 1.9 billion people still expected to have no mobile broadband connection by 2024

At the end of 2018, around 4.3 billion subscribers out of the world’s total population of 7.6 billion had internet access via mobile broadband technology. It is forecast that an additional 1.9 billion subscribers will have mobile broadband internet access by 2024.

However, this means there will still be around 1.9 billion people³ without a mobile broadband connection by 2024. Of those, 1.2 billion will be within a mobile broadband coverage area but will have no subscription to such a service.

Estimated number of people without a mobile broadband connection in 2024



1/4

One-quarter (1.9 billion) of the world’s population will still not have a mobile broadband connection in 2024.

Note: Update of an article published in Ericsson Mobility Report, June 2017

¹ Edquist, Harald; Goodridge, Peter; Haskel, Jonathan; Li, Xuan; and Lindquist, Edward (2018), “How important are mobile broadband networks for the global economic development?”, Information Economics and Policy, vol. 45, pp. 16–29: <https://www.sciencedirect.com/science/article/pii/S0167624517301695>

² The economic effect gradually decreases over time

³ According to UN world population estimates, there will be 700 million people under the age of 5 in 2024. Most of these are assumed not to have a mobile broadband connection

Connecting the unconnected

As more radio base stations are deployed, the world’s mobile network population coverage⁴ continues to increase. At the current trajectory, mobile broadband will provide network coverage to around 92 percent of the world’s population by 2024. But to address the very low average revenue per user (ARPU) customer segments, network coverage expansion requires cost-efficient solutions, enabling positive business cases for communications service providers. Service providers, vendors, governments, regulators and international organizations must continue to address digital development and enable internet access for the unconnected. Amongst other areas, cost/benefit-based business models, encouragement of local application services and ICT literacy development are of importance. In this context, international development organizations’ role is vital to develop financial ecosystems and enable the expansion of digitalization to connect the unconnected.

Mobile broadband network upgrades and deployment scenarios

The majority of those connected to the internet are 3G and 4G subscribers on mobile broadband networks. Many subscribers remain on 2G, which provides significant value to everyday life – including the possibility to use basic data services – but does not offer the full benefits of mobile broadband, or access to a wider range of services.

In areas with existing 2G coverage, upgrading the sites to 3G, 4G or 5G New Radio (NR) will provide mobile broadband network coverage. This would require a low incremental investment as most of the costly items – including towers, power, security and backhaul – are already available at the existing site.

In areas with moderate traffic demands, service providers can cover significantly larger geographical areas with mobile broadband solutions designed for cost-efficient coverage, based on traffic predictions indicating the best sites for expansion.

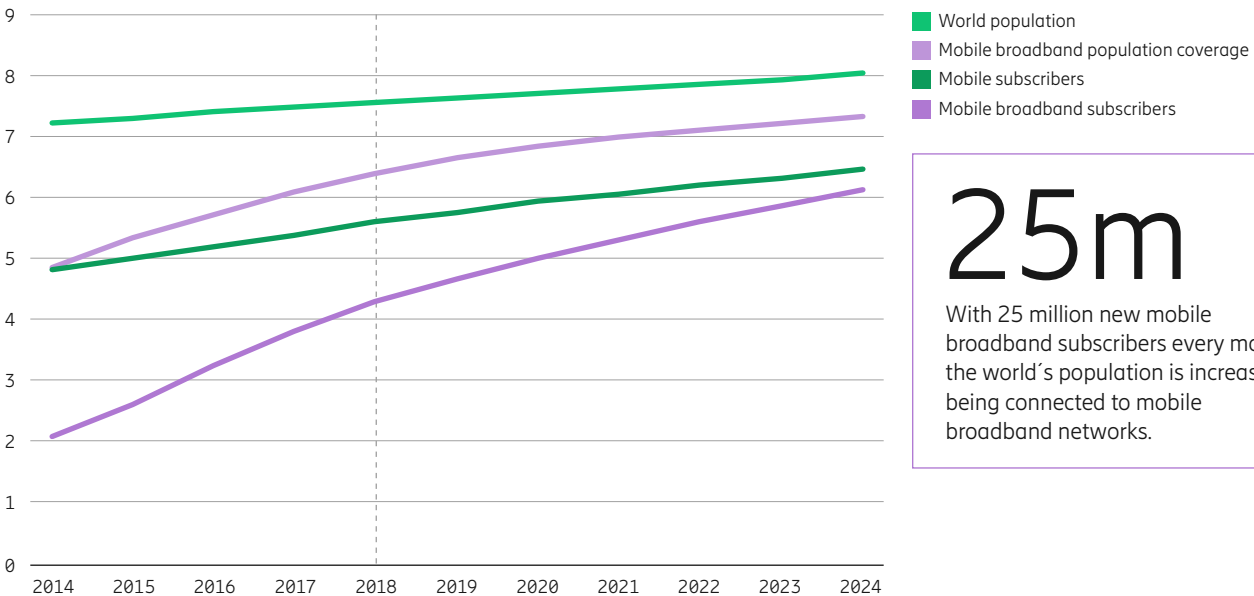
Upgrading existing 2G sites to 3G or 4G operating at low bands is possible on the existing network grid, and there is potential to utilize larger antennas and beamforming to increase 4G coverage and capacity even further. Today, there are hundreds of thousands of legacy 2G sites suitable for a cost-efficient 3G/4G technology upgrade.

5G NR for rural broadband

Upgrading sites with 5G technology will also be feasible. 5G NR can be configured to perform better or on a par with 4G, even in rural scenarios. For example, combining 5G NR 3.5GHz and LTE 800MHz on a 2G grid can provide vastly superior capacity compared to a 4G standalone network. When used together in an effective way, the high band offloads the traffic from lower band, resulting in significantly improved coverage as well as capacity. On an existing 2G grid it is possible to reach downlink data rates exceeding 100Mbps at cell edge with 5G NR using conventional terminals and normal base station equipment. By enhancing the network and terminal hardware, more than 350Mbps in the downlink and more than 30Mbps in the uplink can be achieved.

International development organizations’ involvement is vital to connect the unconnected.

Mobile broadband networks – population coverage and subscribers (billion)



25m
 With 25 million new mobile broadband subscribers every month, the world’s population is increasingly being connected to mobile broadband networks.

⁴ Population coverage is here displayed as the population that has sufficient radio signal to connect to a mobile network. The ability to connect to the network is subject to factors such as access to devices and subscriptions

Providing mobile broadband coverage in remote rural areas

Imagine a scenario where several villages have access to 2G coverage and others are outside any mobile coverage. Extending mobile broadband coverage to populations that reside outside any existing mobile coverage area is more challenging, as they are typically spread over large areas in different, mostly rural locations, without any reliant power infrastructure. Different solutions to provide mobile broadband coverage can be applied in those cases.

Areas within existing 2G coverage area:

These areas can easily be provided with mobile broadband coverage by site upgrade to 3G, 4G or 5G. Comparing 2G cell coverage with 3G or 4G on the same frequency band, a doubling of the cell range could be achieved.⁵ Using 4G with beamforming has the potential to double this extended cell range again, i.e. achieving a fourfold extension⁶ compared to the base case with 2G.

Areas outside existing 2G coverage area:

For important hotspots in, for example, a village, such as schools or a healthcare clinic, an outdoor high-gain antenna can be used to provide broadband access to the premises (fixed wireless). This solution requires low investment and the 4G site can serve a hotspot that is located 20–80km outside the 2G coverage range. An alternative solution could be to install a small cell network utilizing microwave or satellite as a backhaul solution.

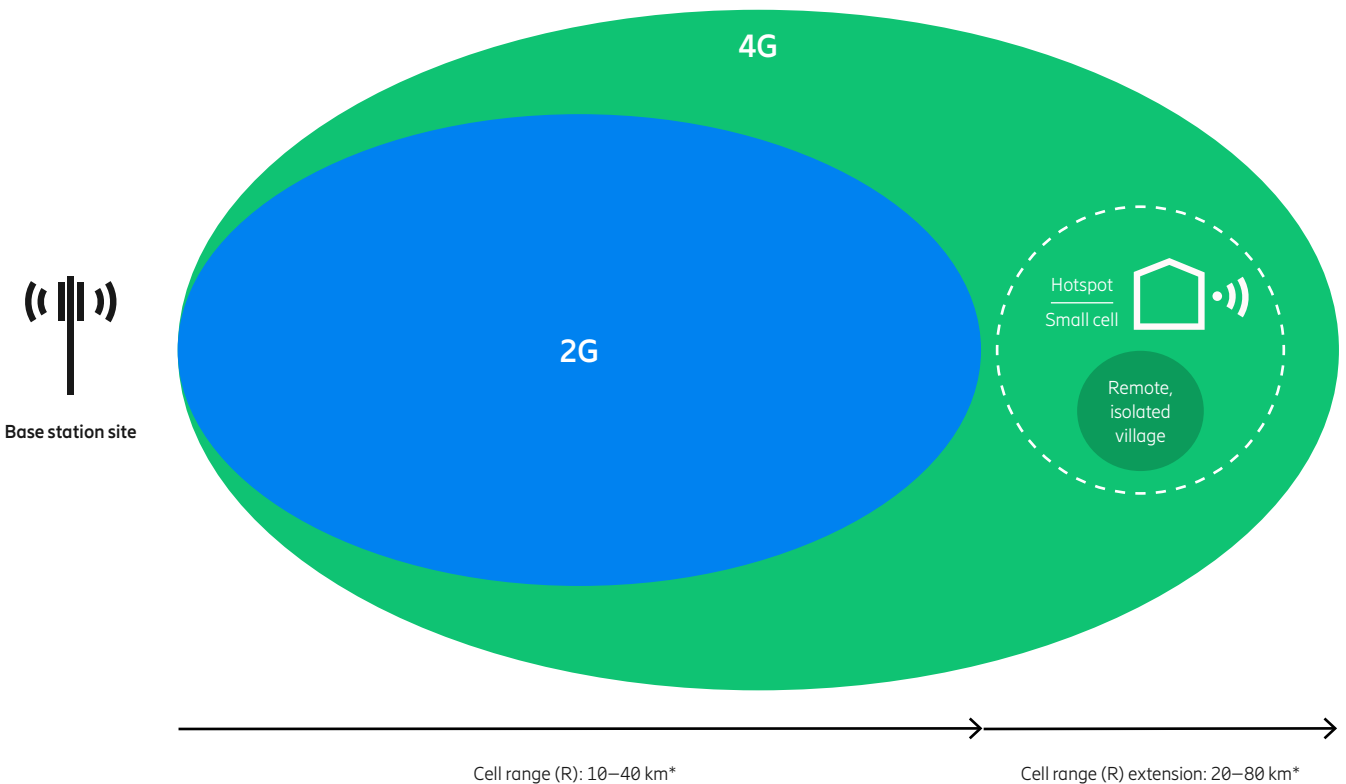
Mobile broadband technology to connect the unconnected is an enabler for digitalization.

Deploying scalable mobile broadband technologies to achieve Agenda 2030 goals

By deploying cost-effective mobile coverage solutions, it is possible to connect low-income subscriber groups with low-cost, energy-efficient solutions where needed, in presently uncovered areas. The technology is scalable as the demand for performance grows, providing economies of scale decreasing the cost per unit of output. Furthermore, by addressing affordability, digital literacy skills and local applications in languages that users understand, the uptake of people utilizing the internet through mobile broadband services can further expand.

Mobile broadband technology to connect the unconnected is an enabler for digitalization, playing a fundamental role in achieving the UN sustainability development goals. Service providers' continued business case-driven network upgrades and deployments, as well as deployments in conjunction with government funding and international development, to connect the unconnected is a means to accelerate global digitalization and the fulfillment of Agenda 2030.

Example of solutions for providing mobile broadband coverage in remote rural areas



* Depending on area and base station height

⁵ Assuming free-space propagation loss

⁶ Calculation based on using eight antenna elements

Ericsson enables communications service providers to capture the full value of connectivity. The company's portfolio spans Networks, Digital Services, Managed Services, and Emerging Business and is designed to help our customers go digital, increase efficiency and find new revenue streams. Ericsson's investments in innovation have delivered the benefits of telephony and mobile broadband to billions of people around the world. The Ericsson stock is listed on Nasdaq Stockholm and on Nasdaq New York.

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