

TV RAMACHANDRAN

WILL GREEN 5G HELP EMBRACE A MORE SUSTAINABLE FUTURE?



5G and the technologies it enables are critical tools in a wide arsenal that can help nations effectively address the climate challenges of our time

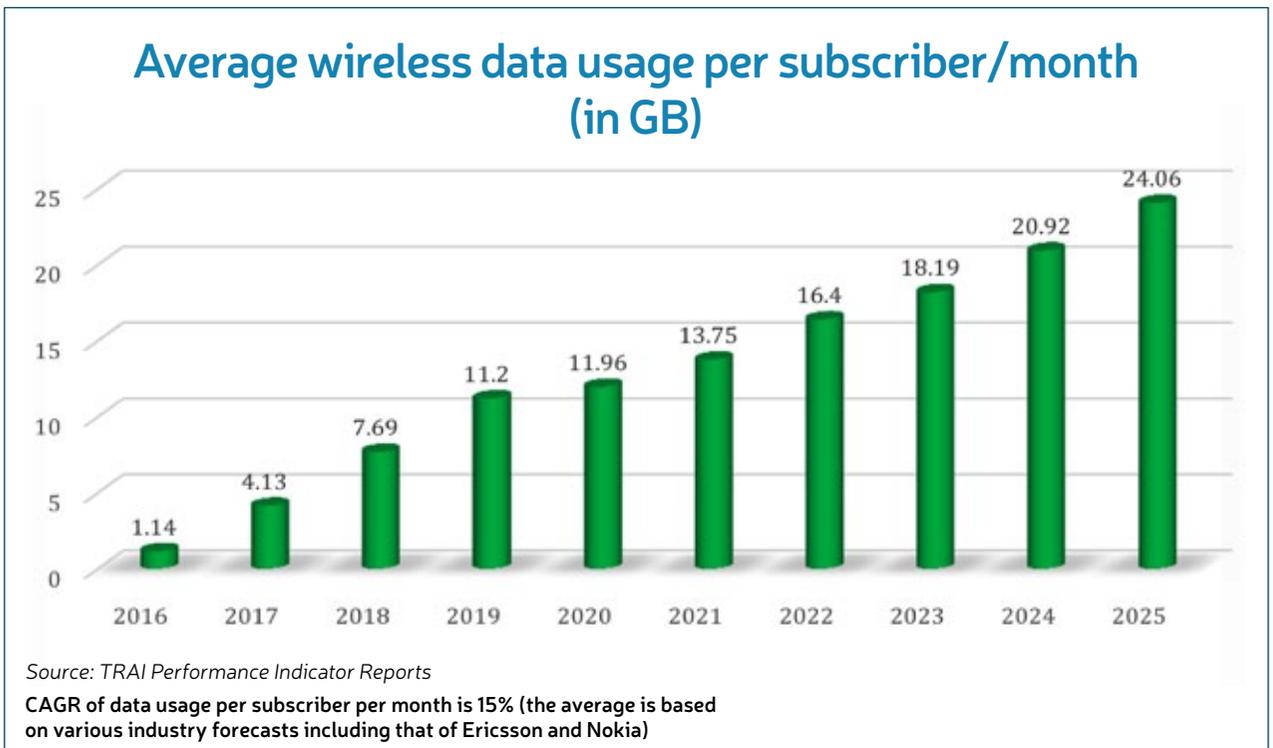
Telecom users in India as well as across the world have a ravenous appetite for data-rich services, particularly video. The humongous growth in data consumption per subscriber per month in India, however, is amazing and one of the highest in the world. With the onset of the 4G mobile broadband era, the consumption pattern changed from a level of less than 1GB per month before 2016 to the current level of over 16 GB per month (industry average). Some individual operators are reporting usage as high as 18 GB or 19 GB per month per subscriber.

With India now having around 800 million broadband connections for a population of 1.4 billion, and growth shifting more to rural and semi-urban areas where the demand is higher for video traffic, it is clear that our growth in data consumption will continue to rise sharply. Apart from the rural pressure, our net penetration is expected to rise from the current level of less than 60% to about 80%-90% in line with economies like China, Korea, the USA, etc. This will provide a further sharp kick in data demand and consumption.

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The above scenario makes us consider the implication on energy consumption because, instinctively, one tends to associate the higher data requirement with a direct increase in energy consumption. However, the latter is true only if other aspects like technology remain the same. In this case of telecom, we have a good option in 5G which is a more energy-efficient technology as compared to 4G.

5G was designed to use less energy per bit right from the initial drawing board stage. Energy efficiency is improved because of two principal reasons. 5G, unlike its predecessors (2G, 3G, and 4G) is capable of automatically shutting down when no data is being transmitted, which can shrink base station energy usage by 40%. The other reason is the major improvement in 5G's use of millimetre-wave spectrum bands that allow for directed beams of communication, which saves a lot of energy.

Instead of bathing an entire area in radiation, 5G can localise data transmission over short ranges, a targeted approach like a spotlight following you around as opposed to lighting an entire area. 5G antennas already consume half the energy as their 4G counterparts per GB transported, and by 2025, widespread deployment will mean they consume 10 times less traffic per GB transported while accommodating more users.

Through the deployment of ultra-lightweight massive MIMO or multiple input multiple output radio access network gear, 5G has shown improved energy efficiency and network performance. Field measurements have shown a reduction of up to 40% in energy usage, helping deliver immediate energy savings thereby helping contribute to wider sustainability goals which are so incredibly important to our customers and the planet.

Deployment of ultra-lightweight massive MIMO or multiple input multiple output radio access network gear ensures up to 40% reduction in energy usage.

At COP26, along with targets to achieve net zero carbon by 2070, and reduce emissions intensity by 45%, India has set the ambitious target to reduce total projected carbon emissions by one billion tonnes (BT) by 2030. This would indicate a return to carbon emission levels last observed in 2007.

Fulfilling our ambitious commitments would require a whole-of-economy approach that strikes a balance between the integration of new energy technologies and the implementation of energy-efficient systems for all economic and industrial activity of the nation. 5G and the technologies it enables will be critical tools in a wide arsenal that will help nations effectively address the climate challenges of our time.

ENVIRONMENT-FRIENDLY

The accelerated rollout of 5G networks globally will provide numerous opportunities for nations including India to advance to newer and more powerful technologies while still protecting the environment. By enabling the deployment of sophisticated AI and IoT networks at scale, 5G will make power grids more efficient, drive significant reductions in greenhouse emissions, as well as enable and optimise the integration of greater amounts of renewable energy.

A recent report from Ericsson in conjunction with BT highlights that 5G and IoT could yield carbon emissions savings of as much as 15%. At a micro or local level, one could expect even greater savings. As part of a technology upgrade, Ameresco, a Massachusetts-based company, discovered that replacing an old steam plant with a fully automated plant supported by 20,000 solar modules and its microgrid, reduced energy usage by over 75%.

The beneficial environmental impact of 5G will multiply as the technology touches a greater number of sectors and aids the integration of new smarter technologies. Notable products and services that improve decision-making across sectors already exist, and many firms are gearing up for enhanced offerings that would only be

possible with 5G. In addition to enabling other industries to become more energy efficient, the 5G network will itself be more power efficient than its predecessors.

An analysis of The Columbia Climate School reveals that one kilowatt-hour (kWh) of electricity is consumed to download 300 high-definition movies on a typical 4G network. On 5G, that same one kWh would be enough to download over 5,000 ultra-high-definition movies. Another study by the European Commission contends that power consumption per bit can be up to 90% lower on 5G than on 4G.

Notable controlled experiments, deployments and proof of concepts also reveal how the way 5G is deployed has a significant effect on its emission profile. In 2018, Nokia, Elisa and Efore commercially deployed a proof of concept (PoC) network with a liquid-cooled base station system in an apartment building in Helsinki, Finland. Analysis from Finland's VTT Technical Research Centre indicated that this tech stack directly reduced CO2 emissions by up to 80% and operating energy expenditure by a significant 30%.

Not only is 5G more energy efficient than its predecessors, but it is also best positioned to transform for better, interconnected supply chains and networks, improve data sharing, optimise systems, and increase operational efficiencies across the board.

Ultimately it boils down to this – as demand for data connectivity increases, it is best for the environment if that demand is addressed by 5G rather than by other available technologies. Failure to act quickly in rolling out 5G networks would mean that this increased demand would have to be served by 4G and older technologies, at a significant emission premium that we can ill-afford. 🌍

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