India’s vision for 6G Network in India

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Why is in news? Prime Minister Narendra Modi has unveiled a vision document for rollout of 6G communications technology in India by 2030

What is 6G?

While, technically, 6G does not exist today, it has been conceived as a far superior technology promising internet speeds up to 100 times faster than 5G.

PM Modi had formally launched 5G services in October 2022 and said at the time that India should be ready to launch 6G services in the next 10 years.

As opposed to 5G, which at its peak can offer internet speeds up to 10 gigabits per second, 6G promises to offer ultra-low latency with speeds up to 1 terabits per second.

As per the vision document, 6G use cases will include remote-controlled factories, constantly communicating self-driven cars and smart wearable taking inputs directly from human senses.

However, while 6G promises growth, it will simultaneously have to be balanced with sustainability since most 6G supporting communication devices will be battery-powered and can have a significant carbon footprint, the document said.

India’s 6G roadmap

As part of its 6G mission, India will identify priority areas for research by involving all stakeholders including industry, academia and service providers spanning theoretical and simulation studies, proof-of-concept prototypes and demonstrations and early market interventions through startups, the vision document said

The document will be key in boosting the faster adaptation of new technology in India.

The 6G project will be implemented in two phases, and the government has also appointed an apex council to oversee the project and focus on issues such as standardisation, identification of the spectrum for 6G usage, create an ecosystem for devices and systems, and figure out finances for research and development, among other things.

In phase one, support will be provided to explorative ideas, risky pathways and proof-of-concept tests.

Ideas and concepts that show promise and potential for acceptance by the global peer community will be adequately supported to develop them to completion, establish their use cases and benefits, and create implementation IPs and test beds leading to commercialisation as part of phase two.

The government will have to explore shared use of spectrum, particularly in the higher frequency bands for 6G.

A reassessment and rationalisation of congested spectrum bands, and adoption of captive networks for Industry 4.0 and enterprise use cases will also have to be done.

“Open up a few bands to generate demand (for example 450-470 MHz, 526-612 MHz, 31-31.3 GHz, etc.),” the document recommended.

“Expand and position a larger mid-band to meet the requirements of 5G+ and 6G technologies. This requires initiating a new inter-ministerial process of repurposing several bands like that has been done earlier,” it added.

To fund research and innovation on 6G, the document recommended the creation of a corpus of Rs 10,000 crore to facilitate various funding instruments such as grants, loans, VC fund, fund of funds, etc. for the next 10 years.

“Two tiers of grants are proposed i.e. up to Rs 20 crore to service funding requirements ranging from small to medium and grants above Rs 20 crore for high impact projects,” the document said.

To decide on standardisation around 6G and related technologies, the document called for India to take on a greater role in various international bodies such as 3GPP, ITU, IEC, and IEEE.

India’s immediate action plan

The government has set up a Bharat 6G project and appointed an apex council to oversee the project and focus on issues such as standardisation, identification of the spectrum for 6G usage, create an ecosystem for devices and systems, and figure out finances for research and development, among other things.

The apex council will facilitate and finance research and development, design and development of 6G technologies by Indian start-ups, companies, research bodies and universities.

It will aim to enable India to become a leading global supplier of intellectual property, products and solutions of affordable 6G telecom solutions and identify priority areas for 6G research based on India’s competitive advantages.

A key focus of the council will be on new technologies such as Terahertz communication, radio interfaces, tactile internet, and artificial intelligence for connected intelligence, new encoding methods and waveforms chipsets for 6G devices.

Other countries looking at the 6G rollout

South Korea has outlined a 6G research and development plan with Rs 1200 crore worth of investments in the first phase running till 2025, for attaining global leadership, developing key original technologies, making significant contributions to international standards and patents, and building a strong foundation for 6G research and industry.

In Japan, the Integrated Optical and Wireless Network (IOWN) Forum has published its Vision 2030 white paper for 6G, which laid out key technology directions for infrastructure evolution in four dimensions: cognitive capacity, responsiveness, scalability, and energy efficiency.

Key developments in 6G have also been identified and are being pursued in China. The country expects that the next generation 6G network will support connectivity plus sensing plus AI, with security implemented by design throughout the network.