

**T**HERE IS MUCH EXCITEMENT in the air about the wondrous new technology, 5G, which holds promise of being the technology of all access technologies. The new government has firmly put it in its 100-day action plan, which is most encouraging. It is heard that the government is planning a big bang spectrum auction involving as many as eight bands and as much as 8600MHz, the largest such auction in India. We also hear that the government is expecting a humongous sum—about ₹6 lakh crore. Ay, there's the rub! For, from such a high-priced mega auction, what huge adverse effects may flow, must give us pause...

That radio-frequency spectrum is a precious but finite resource which is extremely vital for modern mobile telecommunications is well-known. Also, well-established by multiple credible agencies such as the World Bank, London School of Economics and India's internationally-reputed ICRIER is that spectrum can be an extremely powerful engine of socio-economic growth, with strong quantitative relationships firmly established.

In fact, spectrum's greatest value comes from its usage rather than from the direct short-term revenues generated by its sale. Short-term revenue generation must be balanced against the indirect long-term socio-economic gains. Idle or unused spectrum does nobody any good—neither the government nor economy nor society nor consumers. The opportunity cost of unused spectrum is enormous and far outweighs any short-term gains in auction revenue.

Given that more than 1300MHz of radio spectrum remained unsold in October 2016 and has not been put to use results in an unrealised potential. Adopting a conservative approach, India had 762 million active mobile connections in 2016 served by over 3800MHz of spectrum allocated to licensees. This would indicate that the idle spectrum with the government could enable connectivity for roughly 278 million additional active connections—these many active connections correspond to 21% of the total Indian population. Applying the result of the ICRIER economic impact study which reveals that a 10% increase in teledensity leads to an increase of 1.9% in GDP, the financial cost of this idle spectrum can then be estimated at ₹5.4 lakh crore, or over 160% of the financial benefit of ₹3.3 lakh crore from all spectrum auctions so far. The socio-economic relevance of the technology and of such a figure is significant, especially for developing nations such as India. It is also important to take note that this estimated increase in national GDP is over and above the increase that accrues to the national exchequer in exchange for the rights to use radio spectrum. One is definitely not advocating that we should give away spectrum free, but that reasonably low enough reserve prices be set to facilitate maximum auction participation and sale of more spectrum so that an optimal combination of both direct and indirect benefits is realised. Due to our very high reserve prices in past auctions, we have accumulated huge unsold spectrum, and thereby lost to the nation and the public as much



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# Getting spectrum prices right

Consumers and the economy lost at least ₹5 lakh crore due to earlier auctions. If we can get spectrum prices right, we can ensure India does not miss its golden chance to get on the digital highway with 5G spectrum not lying 'idle' but put to 'ideal' use. Else, the loss to the economy and consumers could mount by several lakhs of crores of rupees more

as ₹5.4 lakh crore and consumers have lost out on quality of service.

It is important to note that spectrum price in India is the single most important factor that can translate the auction into a success or failure. Under such a serious situation, mere price adjustments would not obviously suffice and one needs a radical review of the price valuation fundamentals. The situation becomes much graver at a time when we need more spectrum to support surging data traffic (India now has the highest data traffic in the world), but we have one of the lowest allocations in the world. Many developed nations have assigned spectral resources far in excess of the quantum that is available to Indian operators. India has 185MHz of spectrum, far behind 370MHz in the US, 296MHz in France and 260MHz in China. For a country with a large population and rapidly-growing mobile usage, this is an enormous problem that constrains the coverage as well as quality of service.

Let's look at 5G now, whose massive capacity makes it stand out as compared to other technologies. The amount of 5G spectrum as recommended by TRAI at 175MHz is less than one-third of the US's. The current 5G reserve price (3.5GHz band) at ₹492 crore per MHz is out of line with international norms. In absolute terms, the TRAI recommended price is 5-6 times higher than other countries, while in terms of ARPU (average revenue per user) adjusted dollar cost per MHz per population, which is considered the right benchmark for countrywide spectrum price comparisons, India is about four times of South Korea and the UK. We need a radically changed spectrum auction policy for 5G to become a reality. We need to discard the legacy shackles, break the vicious circle and set low reserve prices.

While revenue from spectrum auctions to help address fiscal deficit can be one of the government's goals, it is very important to maintain balance with India's socio-economic goals. The latter is, in fact, more important for a developing or emerging economy like ours. Many past auctions have yielded similar results—much spectrum lying unsold due to high reserve prices. This is a big opportunity in front of the current government to correct the anomaly and start the auction with a lower reserve price as reserve price, and then let the market determine the correct valuation.

The National Digital Communications Policy 2018 recognised spectrum as "a key natural resource for public benefit to achieve India's socio-economic goals" and advised "optimal pricing of spectrum." With the Digital Communications Commission recently referencing back to TRAI to review its spectrum pricing recommendations, we hope that corrective measures for setting up reasonable reserve prices will be taken. If we can get spectrum prices right, we can ensure India does not miss its golden chance to get on the digital highway with 5G spectrum not lying 'idle' but put to 'ideal' use. Else, the loss to the economy and consumers could mount by several lakhs of crores of rupees more.

(Research inputs by Garima Kapoor and Kartik Berry.)

### Economic value lost due to spectrum lying idle

Teledensity gain as a percentage of total population: **21%**

Economic Impact of spectrum lost as a % of GDP: **3.95%**

Economic value loss when applied to GDP: **₹5.4 lakh cr**

### Issues with spectrum pricing

- Low proportion of spectrum sold
- Prices increasing exponentially
- Few circles with premium over reserve price
- No correlation between prices across bands
- No correlation between prices and revenue

### 5G spectrum price-India price (ARPU adjusted) versus respective country price

Country	Auction date	Respective Cost (\$ mn /MHz)	Population (mn)	Respective country cost (\$/MHz/Pop)	ARPU multiplier	India price ARPU adj cost (\$/MHz/Pop)	Higher by (times)
UK	Jun 11, 2018	11	66.9	0.159	12.5	0.641	4.03
South Korea	Jun 19, 2018	11	51.3	0.214	15.9	0.815	3.80
Spain	Jul 26, 2018	3	46.4	0.055	8.9	0.455	8.23
Finland	Oct 1, 2018	0	5.6	0.049	8.9	0.458	9.43
Italy	Oct 3, 2018	28	59.2	0.470	7.1	0.363	0.77
Germany	May 14, 2019	16	82.4	0.190	7.1	0.366	1.92
India	TBD	70	1368.7	0.051	1.0	0.051	

\*ARPU of other countries basis Global Wireless Matrix Report 2016

### Country wise present spectrum allocation status for mobile wireless services (MHz)

Source: BIF analysis, Data updated as of Sep 2018