

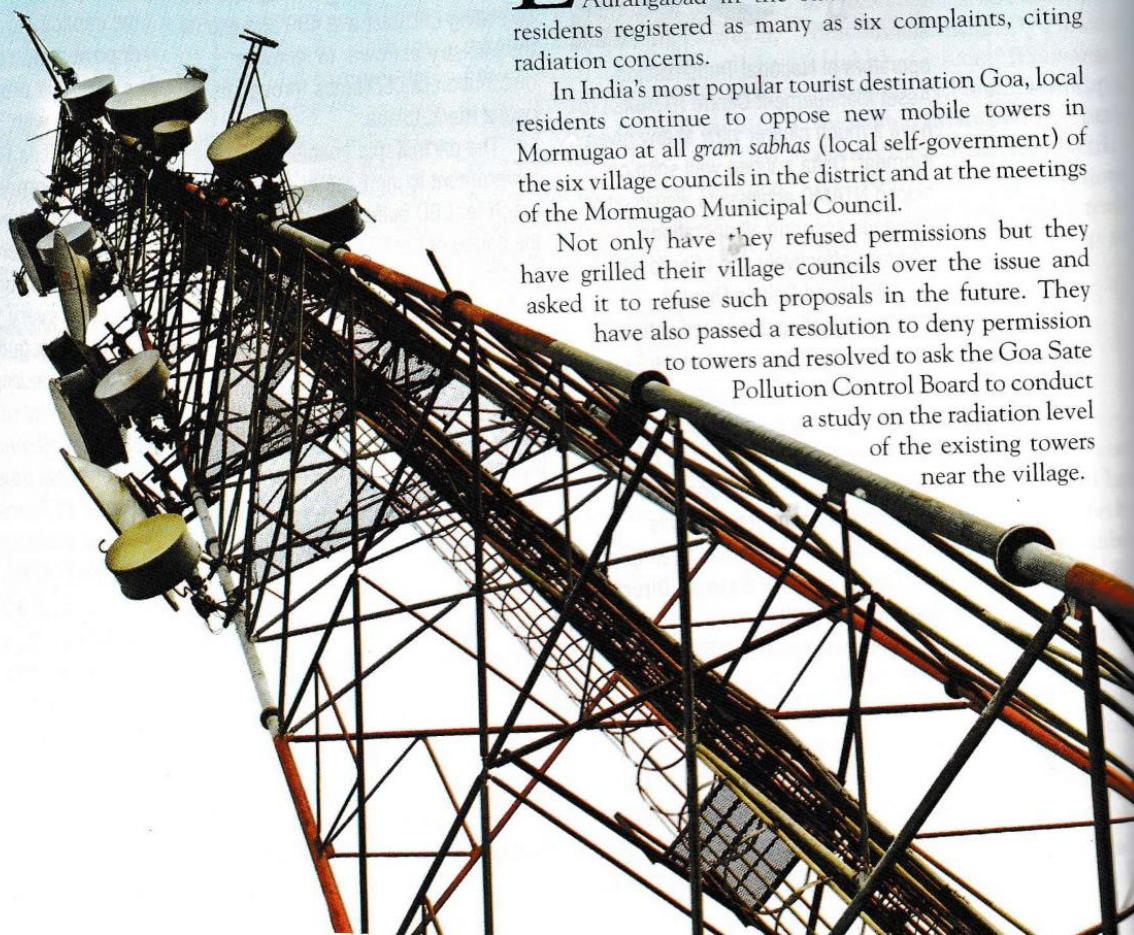
# A TOWERING PROBLEM

Criss-crossing the airwaves, radio frequencies (RF) have woven a tangled web of confusion that has the world's leading scientific authorities at loggerheads. We are none the wiser.

Earlier last month, civic authorities sealed a mobile tower atop a school building in the town of Aurangabad in the state of Maharashtra after residents registered as many as six complaints, citing radiation concerns.

In India's most popular tourist destination Goa, local residents continue to oppose new mobile towers in Mormugao at all *gram sabhas* (local self-government) of the six village councils in the district and at the meetings of the Mormugao Municipal Council.

Not only have they refused permissions but they have grilled their village councils over the issue and asked it to refuse such proposals in the future. They have also passed a resolution to deny permission to towers and resolved to ask the Goa State Pollution Control Board to conduct a study on the radiation level of the existing towers near the village.





At another area in Goa, there were five incidents in 2015 in which residents got together and warned their local body to stop the installation of mobile towers.

Such opposition to mobile towers has become a regular occurrence, aided by the fact that towers are also set up routinely without the necessary permissions. In fact, site workers employed by Reliance Jio were taken to a police station by local residents as the employees continued to work to install a tower on National Highway 17.

A letter written last year by cellular companies in protest against their towers being sealed estimated that as many as 1,700 towers had been sealed in 2015 all over India.

The top six companies cited this as one of the reasons for the rising incidences of dropped calls, saying every 40 sites sealed caused an average 20 per cent increase in call drops. To be sure, the reasons for dropped calls are numerous, ranging from scarcity of spectrum, increasing smart-phones, dead zones, too many operators, networks optimised for data services by the operators themselves, unprecedented subscriber growth and greater tele-density, among others.

However, the problem of dropped calls has unwittingly but squarely put the focus also on the sealed towers and on the greater debate about radiation levels.

"Nowhere in the world do they have so many cellular operators," says **Prakash Munshi**, a concerned citizen who has been instrumental in getting towers sealed off in urban settlements in Mumbai. He adds, "Our country is the only country in the world that has 14 operators. Even in bigger countries like the US and Australia, there are just three or four major operators. Greater the number of operators, the greater the number of antennae to be found."

Indeed, with increasing numbers of towers and with multiple loading of radio equipment across technologies (2G, 3G, 4G, CDMA, Wi-Fi) at each tower, there has been an increasing concern regarding increased radiation levels at each tower site.

There are various estimates of cell towers (base stations) but they mostly put the number of towers between 4.5 and 5 lakh. Projections are that the country requires about 1-2 lakh more towers by 2017 and even that may not be enough given that 4G requires many more towers than 2G or 3G to meet both coverage and capacity requirements. With citizen groups like Munshi's creating awareness both online and offline about the radiation levels from these towers, residents' welfare associations are only going to be more watchful in the future. Already commanding a global following online, Munshi's awareness campaigns are spreading their messages as far away as the US and Europe where citizen groups have been instrumental in getting towers sealed off.

## SAFETY LEVELS

Most countries follow norms prescribed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP), a non-governmental organisation (NGO) based in Germany. However, this is where it gets contentious.

A number of academicians and researchers worldwide have contributed to a bio initiative report (BIR), first published in 2007, with subsequent updates in 2010, 2014 and 2014. The BIR believes that the safety norms should be far lower than those set by ICNIRP.

Second, even among the countries that have accepted the ICNIRP norms, the real radiation levels are far lower and actually closer to the limits set forth in the BIR. In India, the Department of Telecommunications came out with revised guidelines, adopting one-tenth of the norms set by ICNIRP from September 2012 onwards. However, even these lower limits that are currently in place in India are far higher than the BIR norms. Moreover, the Parliamentary Standing Committee Report on Information Technology 2013-14 also clearly mentions on Page 35 that even after the reduction of the norms, the emission is still higher than many other countries.

## COUNTRIES WITH LOWER RADIATION EMISSION NORMS

Country	Frequency	Power Density
Bulgaria	900, 1800 & 2100 MHz	0.1 Watt/msq
Italy	900, 1800 & 2100 MHz	0.1 Watt/msq
Lithuania	900, 1800 & 2100 MHz	0.1 Watt/msq
Poland	900, 1800 & 2100 MHz	0.1 Watt/msq
Russia	900, 1800 & 2100 MHz	0.1 Watt/msq

That hasn't stopped the Indian authorities from proudly advertising the fact India is one of the few countries in the world with the toughest EMF radiation standards for mobile towers and handsets. After all, why let facts get in the way of a good story!

In 2012, a report by the World Health Organization's International Agency for Research on Cancer (IARC) classified radiofrequency (RF) electromagnetic fields (EMF) as Group 2B possibly carcinogenic to humans. One of the 30 experts involved in the evaluation of scientific evidence concerning wireless radiation and cancer was **Dr. Dariusz Leszczynski**, PhD, DSc, Adjunct Professor of Biochemistry from the University of Helsinki, Finland. He says there was enough scientific evidence to be suspicious about the possibility of health effects but it wasn't enough to be certain and consider the health effects as proven.

However, Professor **Girish Kumar**, IIT Bombay, and **Munshi** both say it is the long and prolonged



### **“India has made a “political” decision, not “health-based” decision to adopt 1/10 of ICNIRP norms”**

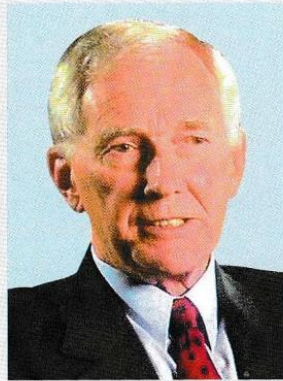
**Michael Repacholi, Founder Chairman, ICNIRP and former head of the World Health Organization’s EMF Project,** comments on the radiation issue in India and takes a few tough questions.

**Is it basically a technology investment that cellular operators need to make if they have to reduce the radiation levels from base stations? (Because it is then a simple explanation as to why they aren’t doing it)!**

Base stations are engineered to provide radio frequency (RF) signals to a given area called a “cell” (this is why they are sometimes called cell phones). The strength of the signal is just sufficient to allow the mobile phone user to make a good quality call. If the RF level of the base station is lowered, then the calls will either be low quality or voids will occur in the area covered so no call can be made. Obviously everyone wants to make good calls, but you need sufficient RF signal to do this.

**India has adopted one-tenth of ICNIRP’s norms for RF signals from base stations. Does that mean the ongoing agitation against cell site towers in India has no basis?**

Base station RF signals are normally extremely low, some 100s to 1000s of times below ICNIRP limits. So making the “political” decision, not “health-based” decision to reduce the standards to one-tenth of ICNIRP does mean that the ongoing agitation against cell site towers in India has no basis. However, if base stations are removed then coverage is lost and people will not be able to make calls. Alternatively, the base stations and the mobile phone try to increase their signal strength so the person using the phone is subjected to much higher RF levels. In addition, people living near base stations that have to increase their signal



to communicate with the mobile will also receive higher RF exposures.

**In India, you also find tower clusters. Some traffic police have complained of being unable to continue working beyond a week at a stretch, at one such location in Mumbai.**

Clusters of base station occur because different operators want to use the same location. Being near a high traffic area appeals to operators since their base stations will be used more. In this case however, the regulator must ensure that the RF signals from the cluster of base stations still complies with the Indian standard. There is no health reason why police could not work in areas where there are many base stations.

**Is it all right to set up base stations in the midst of urban settlements and schools without regard to maintaining guidelines with respect to distance, number of towers, i.e., unplanned growth?**

People should realise that the RF signals from base stations are generally lower than the RF signals from TV or radio stations. Also, the RF signals from TV and radio stations are absorbed by the human body to a much greater extent than base station RF signals. Secondly, the greater the number of base stations, the lower RF signals everyone receives. This is because with more base stations the mobile phone will be closer to a base station when making a call and

exposure of a number of tower clusters in the midst of urban settlements that have the ability to cause long-term harm. Moreover, with much that is yet unclear on the issue, people at large in India are unaware of what precautions to take. Kumar also adds that in addition to towers and indiscriminate usage of cellphones, a 24-hour daily exposure to wi-fi at one’s home over 5-10 years is also damaging.

Dr. Leszczynski concurs and says the problem in India is the location of cell towers. “Often, these are located in large clusters and, often, these clusters are too close to human dwellings. I have seen cell tower

antennas located in such way that a person could touch them from the window or balcony of the flat. This is a bad location,” says Dr. Leszczynski. He adds, “There are also concerns that the power emitted by cell towers is above the allowed limits.”

In the absence of universally acceptable guidelines on radiation norms, it has pretty much been left to respective governments of the world to decide their own standards. In some countries, self-policing has been a step in the right direction with respect to keeping radiation at low levels. So far, countries such as Belarus, Bulgaria, Chile, China, Israel, Lithuania, Poland, Russia,



so need a lower RF signal. A base station on top of a school or hospital actually provides the lowest exposure beneath the antenna. While there is parental sensitivity about base station near schools, there is no health reason not to have the base station on top or nearby. There are a number of countries where base stations have been installed illegally and so the regulator should require all illegally installed base stations to be removed. Also, the regulator must ensure the base stations comply with ALL appropriate regulations.

**ICNIRP guidelines set exposure norms for high-intensity, short-term, tissue-heating thresholds and do not protect us from low-intensity, chronic exposures common today.**

The ONLY established effects of exposure to RF are caused by short-term heating of tissue. NO adverse health effects have ever been established from long-term low-level exposures. ICNIRP and WHO have been studying this issue for decades and still no well-conducted scientific study has found any carcinogenic or any other long-term RF exposure effect on human health. If they did, they would have a case to lower the limits significantly. Besides radio and TV signals, at higher strengths and causing higher RF exposures than base stations have been around for many decades with no increase in cancer risk.

**There are increasing numbers of researchers and academics who are arguably seen as more credible, independent, without any links/and/or not funded by the industry, who advocate far stricter norms. According to the BioInitiative report (BIR), the safe radiation density is 1 mw per msq for outdoor and 0.1 for continuous indoor exposure.**

The BIR was written by "scientific activists" who have no credibility as research scientists. This report has been strongly criticised by many government agencies for being selective with their studies and accepting the results of very low quality studies to promote their preconceived agenda. Such a report has no credibility with mainstream science.

**While there can be variations in studies done by different groups of people, could you provide say why there is such a**

**difference of opinion on what is essentially a technical, empirical issue, and not a subjective one?**

Mainstream science requires that studies be conducted to a high quality level. Otherwise, there can be no confidence that the results of low-quality studies are accurate or provide any useful information.

**Are the ICNIRP guidelines any indicator of actual safety levels? They have long been criticised as being non-protective and developed by a self-selected group of industry insiders. I believe ICNIRP may be currently revisiting these limits.**

ICNIRP guidelines are now used by over 50 countries around the world. The limits ICNIRP promotes are very protective, by at least a minimum of 50 times below any RF exposure likely to produce an adverse health effect. ICNIRP has no relationship with industry, and it is forbidden for any ICNIRP member to have been a member of any industry group, or to receive any funding from industry. ICNIRP is funded only by government agencies and international organisations such as WHO, and is an entirely independent scientific commission. You should get the facts about ICNIRP from its website at: [www.ICNIRP.org](http://www.ICNIRP.org) Yes, ICNIRP is currently revising its RF guidelines and they should be ready for public comment later this year.

**The WHO's International Agency for Research on Cancer (IARC) classified Radiofrequency radiation as a Group 2B "Possible Carcinogen" in 2011. However, WHO continues to ignore its own agency's recommendations and favours recommendations made by ICNIRP. Why is this so?**

IARC did classify RF as possibly carcinogenic. However, this has been widely misinterpreted as meaning that RF exposure could cause cancer. This is not true. In fact, the 2B classification merely means that there are a couple of studies suggesting RF may cause cancer, but the vast majority of studies do NOT show RF causes cancer. As a result, WHO issued a fact sheet following the IARC classification clarifying the IARC statement by noting that RF has NOT been shown to cause cancer.

Belgium, Greece and Italy are observing limits below both the ICNIRP and the Federal Communications Commission (FCC) regulations.

Although France and Australia also follow the extremely high ICNIRP norms, their actual levels of radiation are much lower than the countries just mentioned. In France, actual radiation levels are at 20 mW/msq for 97 per cent of their antennae. In Australia too, according to the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), the actual radiation levels range from 0.904 mW/msq to 150.99 mW/msq.

## A WAR OF WORDS

In India, the decibel levels in the argument over the effects of radiation have risen over the last couple of years with no clear consensus thus far.

The Indian government's thrust for smart cities, digital highways, wi-fi hot spots, et al., have been given the thumbs up. However, it is worth noting that Prime Minister Narendra Modi had expressed caution as early as 2013 saying "there is an urgent and very essential need for assimilation of awareness about the hidden danger to the health of the masses."



### **“What is good for six minutes, we seem to have adopted for 24 hours”**

**Professor Girish Kumar** of the electrical engineering department of **IIT Bombay**, has researched electromagnetic fields for decades. Here, he explains why telecommunications is fast becoming the second cigarette industry.

**The Bio-initiative Report (BIR) has been criticised for its alarmist stance. Comment.**

The Bio-initiative Report was first prepared by 29 scientists from 10 different countries. They submitted 3,800 scientific papers, 2,000 of which appeared in 2007 and another 1,800 in 2012. Since then, there have been several hundred more papers by more numbers of scientists. These have been published in all the possible reputed journals which have also been referred by other experts. Do you think that close to 4,000 papers with maybe hundreds of scientists and several hundreds of reviewers are all wrong?

**Why do you think anyone would criticise a group of academics?**

All governments in the world are making huge money through auctioning spectrum. Since we are talking about India, we have had three rounds of major spectrum auctions. Four years back, the government raised ₹61 thousand crore. Two years ago, they raised about ₹67 thousand crore and in March 2015, they raised ₹1.1 lakh crore. Out of that, they received 25 per cent as advance i.e., ₹28 thousand crore. The balance Rs 82 thousand crore is yet to come from the cell operators. This is why the government is supporting the operators as they need to get that money. This is the situation all over (again). The operators are big cash cows. Of course, this is only part of the explanation.



**Nevertheless, India does follow international guidelines set by ICNIRP, also adopted by most countries...**

Yes, the name sounds good. It is the International Commission for Non-Ionising Radiation Protection. A common man thinks it must be an international body of repute. It is actually an NGO started by a person known to have industrial links. He is the Founder Chairman of ICNIRP. The same person was also Chairman of the World Health Organization's EMF Project. As long as he was there, WHO never admitted a health problem. In 2006, scientists

actually filed a petition to remove him from WHO. If you see the WHO reports till 2006, there is absolutely no effect on health. However, coming back to your question, ICNIRP has also mentioned that their guidelines are only for short-term exposure and not long term. They've mentioned it is for an 'average over six minutes'. What is good for six minutes, we seem to have adopted it for 24 hours! However, the guideline itself was not correct and the guideline for GSM 900 was 4,500 and for 3G and 4G it was 10 thousand milliwatt per meter sq.

**Are we to conclude the guidelines are not an indicator of actual safety levels?**

I am claiming those guidelines are not safe and according to the BIR also, they are not safe. This is why I have been asking the Indian government to ask operators to reduce the transmitted power and adopt a better radiation

In 2012, the Department of Telecommunications (DoT) issued advertisements in national dailies warning of health hazards and listing precautionary measures.

Kumar of IIT Bombay says, "Based on our reports in December 2010 which I presented to the government, an Inter-Ministerial Committee had then made many recommendations to the DoT." He adds, "Unfortunately, I am not invited to any deliberations on the subject any more since I am seen as a scaremonger."

Escalating the war of words, TRAI and cellular companies have spoken out and/or issued full-page newspaper advertisements to allay public fears over

radiation, claiming mobile towers are totally safe as well as a necessity.

What has caused the authorities to change their stance between 2012 and now? "Lobbyists and industry stakeholders obviously play a part in these matters," says Kumar. He points to the fact that the government has raised over ₹2 lakh crore thus far in spectrum auctions and is set to conduct another round of auctions soon.

Munshi continues to attend talk shows, discussion forums and meet local government authorities to spread awareness and to try effect a change in legislation for



norm. Russia, China, Italy, France, Poland — all these countries have adopted absolute maximum cumulative radiation as 100 milliwatt per meter sq whereas in India we have 450 for GSM 900 and 1,000 for 3G and 4G. This is a gap of ten times! Switzerland and Sweden have adopted 42 milliwatts per meter sq. The Austrian Medical Association (AMA) is also very clear about it. They say exposure of more than four hours a day and greater than 1 milliwatt per sq is very far above normal. Therefore, what I am saying is not only based on the BIR, but also the AMA as well as other places where scientists have done experiments.

**You also have a critic in KS Parthasarathy, former secretary of the Atomic Energy Regulatory Board.**

I have never met him. I don't know what the problem is. I know he is a retired BARC scientist and has been working mainly on nuclear radiation which is ionising radiation. However, if you say non-ionising radiation is not harmful, that is not correct. There is an equation for energy i.e., energy is power multiplied by time. The more the power, the more the radiation, and hence the discomfort. Next is time. If you stand in the sun in the noon for five minutes as compared to 50 minutes, there will be a difference. So, time is also important. If you are exposed to higher power, it will take less time to affect you. If it is lower power, it will take longer to affect you. That's the basic principle.

For instance, let's see how the microwave reacts with humans. When microwave radiation impeaches on the human body, it penetrates the skin. It goes inside and heats the blood and the water inside our bodies. They start vibrating at 900 MHz, or 900 million times per second when the radiation impeaches on it. This creates friction, which causes heat and DNA damage. This is known as non-thermal effect. This is what happens in microwave cooking and that is why the heat penetrates the food and heats it from inside out. However, normal heating is from outside to inside. Heat from the sun is also from outside to inside. If you stand in the sun, it is first the skin which gets heated. In microwave, it penetrates the body and at 1800 MHz, it is almost like two billion times per second. What happens is that the heat which is generated inside the body is trapped by the skin. From the sun, the skin

offers protection but from microwave radiation, it keeps the heat intact.

**Where does India stand now with respect to the regulations on radiation?**

When cellphone technology came to India in 1995, there were no norms at all. In 2008, they adopted these ICNIRP guidelines. Then, in 2010, they were planning to come out with another paper. That is the time I got seriously involved. Since 2010, I probably made about 40 trips to Delhi and have been meeting all the officials of the government. I made various presentations and we saw that the government did not know there are so many associated health hazards. Subsequently, they formed an inter-ministerial committee in 2010 to look into the matter.

**What happened then?**

They came out with their independent report which took a lot of inputs from the report I had presented to them in December 2010. I had never said to do away with towers. I said that the norm of 4,500 was extremely high and should be immediately reduced to 100 milliwatt per meter sq with immediate effect. In two years, I proposed to reduce it to 10 milliwatt per meter sq. This meant that operators had to reduce the transmitted power and put up more numbers of towers to account for the reduced power output. That would generate a lot of savings as companies wouldn't need a power amplifier at the output, hence no cooling and no diesel generators. Since the power requirement would reduce, maybe they could put up just a solar panel to do the job. That would be a true green telecommunication industry.

**So, where do you think we are headed?**

It is exactly the cigarette industry which is repeating itself here. Forty years ago, I knew cigarette smoking was not good. Yet, it is only in the last five years that governments around the world woke up and started saying that smoking kills. Earlier, they would just say cigarette smoking is injurious to health.

better safety standards and proper procedures and permissions for setting up new towers.

In an attempt at bringing in more transparency, the Department of Telecommunications, cellular service providers and Ramboll India have set up a National Electro Magnetic Frequency Portal (NEP) to provide a public interface. However, government is yet to open the portal to the public to access EMF related information and a GIS-based database of cell towers in their areas. Currently, the platform serves all Indian cellular service providers to manage their tower base, tenancies and radio frequency

technical parameters for handling EMF regulatory compliance.

However, citizen stakeholders such as Munshi and others are not impressed and have called it an eyewash.

**FALLOUT**

What cellular operators worldwide need to take note of is the fact they could be faced with the same situation as exists in other industries where EMF fields are generated. In such industries, insurance companies generally exclude cover for illnesses caused due to



# COVER STORY

## INDIA'S RADIATION EMISSION NORMS

Frequency (MHz)	ICNIRP Radiation Norms mW/msq	Revised DoT Norms effective from 01.09.2012
900	4500 mW/msq	450 mW/msq
1800	9000 mW/msq	900 mW/msq
2100	10000 mW/msq	1000 mW/msq

prolonged exposure to radiation. Insurance brand Lloyds' Emerging Risks team has already published a report on EMF from mobile phones but has refrained from commenting further on the issue since then.

The world's second largest reinsurance provider Swiss Re also published a report in 2013 titled SONAR. The report pointed out a high loss potential to the insurance industry caused by the large numbers of people being exposed to EMF worldwide. However, Reto Schneider, Head, Emerging Risk Management, Swiss Re, says, "Our assumptions are scenario driven, not fact-based. The long-term effects of low energy radiation or the effects of highly pulsed high frequency signals on the human body are still unclear. In particular, in a world of connected smart devices and sensors, this is an area to be closely followed."

### VESTED INTERESTS AND POLITICS?

Accusations and counter-accusations have been levelled thick and fast in this dispute with academicians and scientists pointing the fingers of blame at Michael Repacholi, Founder Chairman of ICNIRP, for his and ICNIRP's close links to the industry. Repacholi subsequently went on to head the WHO's EMF Project,

thereby creating a situation that can at the very least be described as a conflict of interest.

In a Wikipedia entry about ICNIRP, the Council of Europe, a regional, intergovernmental organisation of 47 states, has this to say: "it is most curious, to say the least, that the applicable official threshold values for limiting the health impact of extremely low frequency electromagnetic fields and high frequency waves were drawn up and proposed to international political institutions (WHO, European Commission, governments) by the ICNIRP, an NGO whose origin and structure are none too clear and which is furthermore suspected of having rather close links with the industries whose expansion is shaped by recommendations for maximum threshold values for the different frequencies of electromagnetic fields."

Denying these charges, Repacholi says the recommendations made by the BIR do not reflect "mainstream science" and is the work of "scientific activists" (see inset interview).

### A POSSIBLE SOLUTION?

Interestingly, parties on both sides of the argument agree on at least one thing. Repacholi, Kumar, Munshi and Dr. Leszczynski all concur that cellular companies do need to erect more towers, albeit for differing reasons.

"The greater the number of base stations, the lower RF signals everyone receives. This is because with more base stations, the mobile phone will be closer to a base station when making a call and so need a lower RF signal," says Repacholi.

Munshi, Kumar and Dr. Leszczynski agree to a greater degree when they say tower companies and operators

## RECOMMENDED NORMS BY GLOBAL BODIES

Country	Institution	Power Density Milliwatts per metre square	
Austria	*Austrian Medical Association (Adopted on March 3, 2012, in Vienna)	<input type="checkbox"/> $\geq 1 \text{ mW/m}^2$ <input type="checkbox"/> $0.01\text{-}1 \text{ mW/m}^2$ <input type="checkbox"/> $0.001\text{-}0.01 \text{ mW/m}^2$ <input type="checkbox"/> $\leq 0.001 \text{ mW/m}^2$	Vary Far above normal Far above normal Slightly above normal Within normal limits
Germany	Baubiologie MAES, Germany Building Biology Evaluation Guidelines for Sleeping Areas	<input type="checkbox"/> $\geq 1 \text{ mW/m}^2$ <input type="checkbox"/> $0.01\text{-}1 \text{ mW/m}^2$ <input type="checkbox"/> $0.001\text{-}0.01 \text{ mW/m}^2$ <input type="checkbox"/> $\leq 0.001 \text{ mW/m}^2$	
Sweden	Bio-Initiative Report 2012	<input type="checkbox"/> $\geq 1 \text{ mW/m}^2$ <input type="checkbox"/> $0.01\text{-}1 \text{ mW/m}^2$ <input type="checkbox"/> $0.001\text{-}0.01 \text{ mW/m}^2$ <input type="checkbox"/> $\leq 0.001 \text{ mW/m}^2$	
India	2012 September	<input type="checkbox"/> $450 \text{ mW/m}^2\text{-}1000 \text{ mW/m}^2$	

\*Austrian Medical Association: Irrespective of the ICNIRP recommendation for acute effects, the Austrian Medical Association benchmark apply to regular exposure of more than four hours per day





A proliferation of mobile towers in the midst of urban settlements is a common sight all over Indian cities.

need to set up more low power towers. "This would be a win-win situation for all as it will result in less dropped calls and less exposure from both cellphone and cell tower radiation. The problem is that this issue is not well explained to people," says Dr. Leszczynski.

"Lower power towers would also not need a power amplifier, hence no need for the air conditioning either. That means no need for diesel generators and the towers could probably be served by just a solar panel. That would be true green telecom," says Kumar.

However, setting up more towers would need huge investments to the tune of ₹15 -20 lakh for a single tower, or about ₹75,000 crore to ₹1 lakh crore for another 5 lakh towers. Kumar has a simple solution. He proposes raising the rate for voice calls by a mere 5 paise. Considering 18 minutes of average talk time multiplied by 90 crore subscribers and 365 days, the industry could easily raise at least ₹30,000 crore a year, says Kumar, who presented his calculations to the government in 2010. "It fell on deaf ears," he laments.

The Cellular Operators Association of India did not respond to repeated emails from *Infrastructure Today* on the issue of why companies did not see it fit to invest in low power towers but only on high power ones.

## CONCLUSION

The argument by the Indian government authorities that conclusive proof is needed doesn't wash. At least, not in the aftermath of reports that have linked long and prolonged exposure to cell-tower radiation with cancer

in many urban dwellings. No doubt that the awareness over the health impacts of cell tower radiation is still at a nascent stage worldwide which makes it more important to exercise utmost caution.

Equally, policies must be industry-friendly so that companies can make judicious investments in the right technologies as and when required. For instance, pricing spectrum 25 times higher than other countries will obviously use up what capital companies have with them and leave them cash-strapped for investments in the right technologies for safe and effective services. Additionally, spectrum allocation needs to be more efficient. It is also high time the merger and acquisition rules were amended in order for consolidation to take its natural course so that a healthy market develops.

Both Munshi and Kumar are of the firm opinion that telecommunications is headed the way of the tobacco industry. "My parents told me 40 years ago that smoking cigarettes can kill a person," says Kumar. "However, it is only as recently as five years ago that pictorial warnings were mandated on cigarette packets."

"How many more cases of cancer will we have before the powers that be consider them as conclusive evidence?" Munshi demands.

In as populous a country as India which has an urban teledensity of about 150 per cent, it is time the government looked at the issue through a different lens. Or with each call, we could be dialling disaster.

- Rouhan Sharma