

## So, what could be wrong with free Internet?

By Parminder Singh

Facebook has been splurging money on a simple argument, what's wrong with giving free Internet to those who cannot afford it, even if it is somewhat limited? Isn't it better than having no Internet? The Free Basics package will especially include content most relevant to people in poverty. Everyone, meanwhile, retains the same right to access the full Internet as they had before. But why are so many against this apparent act of selfless service?

If indeed the idea is to ensure an Internet for all, whether one can afford it or not, it is best done by declaring a basic access to the Internet as a right. And making it a licensing condition for telcos to provide every citizen a minimum monthly quota of free telephone time and data.

Further, with increasing digitalisation of governance and other essential services, it can be mandated that access to all such basic services, as identified by the regulator and not a private company like Facebook, will remain free of any data/call charges, at all times. One cannot be denied access to basic public and other essential/emergency services for having run out of one's data package. If the Free Basics debate is really about the digital rights of the marginalised,

then these are the directions to think in. Normally, the most forceful point against Net Neutrality has been that it will stifle investment by reducing telcos' profits. This more honest argument looks the opposite of the one expressing corporate zeal for serving the excluded, even at the expense of earning revenue. It is therefore worth inquiring how free services can enhance revenues and what can be wrong with it.

The real problem with Free Basics, or zero rating, requires us to first understand the nature and role of the Internet in the emerging digital network society.

The Internet is not only a telecommunication system, or just a new social media. In early years of the industrial revolution, the media first got called as the fourth estate. As recognition of its social role grew, the media attracted special regulatory approaches and was not treated as a normal commercial sector.

Today, with an emerging digital network society, it is similarly important to understand the Internet as a new kind of horizontal, foundational and a social layer. It is causing and underpinning far-reaching digital transformations across all sectors of society, from governance, democracy, education and health, to transport and entertainment, to work, trade and business.



The regulation of the Internet must focus on this unique social-structural role. Internet platforms is a useful emerging regulatory term, especially in Europe.

The Internet being foundational to our digitally reprogrammed social systems, it is important to ensure its complete neutrality, providing a fully even-playing field to all actors and activities on it.

True to the foundation/superstructure analogy, the smallest unevenness, or relative advantage/disadvantage, in the Internet layer, can get magnified manifold in its actual impact in every sector, and thus overall on society. This is why it is so important to

protect ex-ante the basic design of the Internet, of which full Net Neutrality is a core principle.

Any distortion in its basic design will get magnified and incorporated into the superstructure, affecting all areas of society. The decisions that we face today about Internet's regulation thus pertain to the very design of the emerging social paradigm, especially in terms of its egalitarian potential.

The current early stages of the digital network society suggests a tendency towards increased monopolisation in every sector as it becomes digital. All digital social systems require the public Internet as the essential public layer to connect to the people. It thus becomes the all-important manoeuvring zone for people, enabling some degree of resistance to monopolisation, allowing interoperability and switch-overs across different options.

But if this public connectivity layer is also allowed to be rigged, by selling privileged transit over it, the risk of monopolisation and lock-ins by a few corporates over key social sectors gets greatly enhanced. This is the real problem with zero or differential rating, where connectivity costs for consumers are fully or partly offset by content providers in exchange for subverting the egalitarian design of the Internet. This orig-

inal design ensures that all content on the Internet is given exactly the same treatment.

### Cause for inequity

One can already predict monopoly in digital education and health service companies, for instance, becoming a societal challenge, within the next few years. If they are also able to have privileged access to people through zero rating, it would be as good, or bad, as handing over our education and health sectors to them.

This extraordinary value of the Internet as the people connecting layer means that it is a small price for the monopoly-inclined corporates to pay the telcos for its privileged use, rather than the consumers paying for connectivity. Telcos also realise that, while the value transiting through their networks with increasing digitalisation of society is almost limitless, what they can charge consumers for connectivity has its limits.

Instead, charging those who use a privileged transit over their networks to consolidate monopolies, and profiteer from it, is an ever-expanding source of revenue. Facebook may, right now, not be paying anything to Reliance for Free Basics, but telcos' only long-term interest in allowing such free use of their networks is to open up the possibility of Net Neutrality violations, leading to rev-

enue streams from the content providers' side. The proverbial thin end of the wedge!

Once such a defect in the Internet's basic design, meaning the zero or differential rating model, is allowed to take root, given the extremely high economic stakes involved, it will quickly propagate and consolidate as the default. At that stage, it may be impossible to reverse it. Strong regulatory intervention is, therefore, urgently required to expressly and fully disallow this model, which alone can keep the Internet open and egalitarian.

Facebook is basically arguing that the poor cannot afford regulatory protections about what kind of media/ Internet they get. It is similar to a media organisation offering free or cheaper news to the poor in exchange for being released from regulatory constraints, like the ban on paid news, and keeping a minimum ratio of editorial to advertisement space.

So we get two versions of a healthy Internet-like healthy media, healthy education system and well-regulated health sector—one for the rich and another for the poor. The politico-ideological basis of such reasoning is quite problematic and is made worse when unleashed in the name of "digital equality." *(The writer is Executive Director, IT for Change)*

# Electrifying India, with sun and small loans

The idea is to create a business model that will leapfrog the coal-dependent grid to renewable energy

By Max Bearak

A few years ago, the hundred or so residents of Paradeshappanamatha, a secluded hamlet in Karnataka, gathered along the central pathway between their 22 densely clustered homes and watched as government workers hoisted a solar-powered streetlamp. As the first display of electricity in the town, it was an object of mild interest, but, being outside, the light didn't help anyone cook or study, and only attracted moths.

Still, when B Prasad arrived two years later to encourage people here to abandon kerosene lighting for solar-powered home systems, people had some idea what he was talking about. What sounded preposterous to the village residents was the price. Prasad, an agent for Solar Electric Light Co, or SELCO, was selling a panel and battery that would power three lights and an attached socket for phone charging for approximately Rs 12,800.

"There was no way we could afford that," P C Kalayya remembers thinking. He and his neighbours rise early in the morning to walk miles along a nearly impassable dirt road to work on coffee, pepper and betel nut plantations. Kalayya earns \$3 a day—he'd been earning \$2.25 until a raise came through this year—and half his wage is withheld by his employer as repayment for various loans.

And yet, despite what seemed on its face an impossibly high cost, SELCO agents succeeded in persuading Kalayya and 10 other village households to make the switch. Now, Kalayya's wife can better see how much spice she is putting in as she cooks, and Pratima, their 18-year-old daughter, can study long after dark.

The idea behind SELCO, and other companies like it, is to create a business model that will help some of the 1.2 billion people in the world who don't have electricity to leapfrog the coal-dependent grid straight to renewable energy sources.

About a quarter of the world's off-the-grid people, or 300 million or so, live in India, mostly in remote, rural communities like Paradeshappanamatha, or in informal urban settlements. Hundreds of millions more get electricity for only a few hours a day.

Prime Minister Narendra Modi has pledged to achieve universal electrification in India by the end of 2022. His main effort is adding hundreds of new coal plants, which have contributed to near-apocalyptic pollution levels across large swathes of the country.

On the other hand, Modi has also promised investments that would significantly increase production from renewable sources. Partly to that end, Modi and President François Hollande of France started an "International Solar Alliance" during the recent climate talks in Paris.

With an initial pledge of \$30 million from India, Modi said that the eventual goal was \$1 trillion in global funding for solar technology



**POWERING UP:** Solar panels sit on houses in Paradeshappanamatha in Karnataka. About a quarter of the world's off-the-grid people (about 300 million) live in India, mostly in remote, rural communities such as this or in informal urban settlements. *NYT*

development by 2030.

Solar power accounts for just one per cent of India's current electricity production, mostly through large plants that contribute power to the grid, but a generation of energy entrepreneurs is out to prove that a faster, cleaner and ultimately more economical route to universal electrification is through solar home systems.

"Why is it always about a grid?" asked Harish Hande, a co-founder of SELCO India. It was one of the first of more than 40 companies now offering solar home systems in India.

SELCO systems typically include a small panel connected to a battery that stores enough power to run one or more lights, phone chargers and, with higher wattage options, some small appliances. Since its inception in 1995, Selco India has sold 3,18,400 solar home systems, and has provided power systems to almost 10,000 schools, hospitals and other institutions, almost all in Karnataka.

"Solar home systems have been around for a long time by now, and they are a successful model," said Robert Stoner, the director of the Tata Centre for Technology and Design at MIT, which works directly with SELCO and others, including the Indian government, on renewable technology development. "Their challenge is that they cost a lot—far more than the average

person has, even a relatively well-off person."

So if it is difficult to persuade a middle-class family in an industrialised country to invest in solar, how do you persuade a family that lives on a couple dollars a day?

Prasad is a consummate salesman who talks a mile a minute, wears his hair in a side-part and keeps three pens in his breast pocket. On his home turf in the villages of the Chikkamagaluru district in Karnataka, his salesmanship is put to the test.

If he can manage to interest people in what is often an unfamiliar technology, he then pitches his potential customers on the more mysterious, but crucial idea of financing.

### Step towards banking

For two decades, SELCO has worked to persuade a network of banks to provide financing options to poor people who were typically seen as too risky. As Mohan Hegde, the company's operations manager, noted, "The idea behind SELCO is to take a poor man to the bank and see if what he can afford to pay per month is acceptable to the lenders."

The sales presentation, once it includes assurance of financing from a bank, is much more palatable to potential customers: Pay the bank monthly installments of roughly the same

price you'd spend on kerosene, and in a few short years, you'll own the system and your basic energy needs will be fulfilled by the sun free. "When we say free, their ears prick up," Prasad said.

Without financing, decentralised renewable energy could never compete in India with kerosene, which is cheap because the government subsidises its sale at a cost of more than \$5 billion a year.

Use of kerosene contributes to carbon emissions, but also to more personal and immediate hazards like skin irritation, respiratory problems and a significant fire risk. Ultimately, it provides only dim, flickering lighting.

For many of SELCO's customers, financing the solar home system is their first interaction with a bank. The experience is often new for the bankers, too.

Kalayya's family hopes that their solar home system, with its lights and phone charger, is only the beginning. Pratima, who is one of four people in the village to have attended school, said that getting bank accounts and understanding loans had broadened her family's sense of possibility.

"The faster we pay off this loan, the more likely we are to get another one," she said. **International New York Times**

## Gene editing to treat muscular dystrophy

By Nicholas Wade

After decades of disappointingly slow progress, researchers have taken a substantial step toward a possible treatment for Duchenne muscular dystrophy with the help of a powerful new gene-editing technique.

Duchenne muscular dystrophy is a progressive muscle-wasting disease that affects boys, putting them in wheelchairs by age 10, followed by an early death from heart failure or breathing difficulties. The disease is caused by defects in a gene that encodes a protein called dystrophin, which is essential for proper muscle function.

Because the disease is devastating and incurable, and common for a hereditary illness, it has long been a target for gene therapy, though without success. An alternative treatment, drugs based on chemicals known as antisense oligonucleotides, is now in clinical trials. But gene therapy—the idea of curing a genetic disease by inserting the correct gene into damaged cells—is making a comeback. A new technique, known as Crispr-Cas9, lets researchers cut the DNA of chromosomes at selected sites to remove segments or insert new ones.

Three research groups, working independently of one another, reported in the journal Science that they had used the Crispr-Cas9 technique to treat mice with a defective dystrophin gene. Each group loaded the DNA-cutting system onto a virus that infected the mice's muscle cells and excised from the gene a defective stretch of DNA known as an exon.

Without the defective exon, the muscle cells made a shortened dystrophin protein that was nonetheless functional, giving all of the mice more strength. The teams were led by Charles Gersbach of Duke University, Eric Olson of the University of Texas Southwestern Medical Centre and Amy Wagers of Harvard University. "The papers are pretty significant," said Louis Kunkel, a muscular dystrophy expert at Boston Children's Hospital who discovered the dystrophin gene in 1986.

The dystrophin protein plays a structural role, anchoring each muscle fiber to the membrane that encloses the muscle-fiber bundle. The dystrophin gene, which guides the protein's production in the cell, sprawls across about 1 per cent of the X chromosome and is the largest in the human genome. That

gene has 79 sections, or exons, but can evidently maintain reasonable function even if a few exons in the middle are lost. The protein works as long as its two ends are intact.

This is what happens in a milder disease known as Becker muscular dystrophy, in which mutations cause instructions from a few exons to be skipped during protein-making process. In Duchenne muscular dystrophy, however, mutations cause muscle cells to make a truncated protein missing one end, and this protein does not work at all.

This difference suggests a possible treatment strategy: removing damaged exons from Duchenne patients so that their muscle cells produce an intact, though shorter, dystrophin protein, much like that seen in Becker patients.

### Clinical trials

All three teams have filed for patents. But considerable work lies ahead before clinical trials can start. It is not clear how the human immune system would react to the components of the gene editing system or to modified dystrophin proteins to which it has not been habituated.

If a gene therapy for muscular dystrophy can be developed, it will compete with the antisense oligonucleotide drugs that are already in clinical trials. These work on the same principle of avoiding damaged exons, but instead of cutting them out of the DNA, they force the exons to be skipped at a later stage of the protein manufacturing process.

The drugs do not target the heart muscles very well, however, and they must be given weekly. A gene therapy treatment should last longer. "The advantage of the DNA approach is that the cell has no choice but to make the protein you want," Wagers said.

Some fear that Duchenne patients may get only one shot at treatment before developing resistance to the virus used to edit the defective exons. But Gersbach played down this concern. "The hope for gene editing is that if we do this right, we will only need to do one treatment," he said. "This method, if proven safe, could be applied to patients in the foreseeable future."

Olson also said that progress would be rapid. "To launch a clinical trial, we need to scale up, improve efficiency and assess safety," Olson said. "I think within a few years, those issues can be addressed." **INVT**

## WHAT'S THE BUZZ

### Children aged 4 to 10 eat 22 kg sugar yearly

Children between the ages of four and 10 years consume 22 kilograms of sugar every year, an amount equivalent to the average weight of a five-year old, according to a public health campaign in the UK.



The campaign urges parents to take care of their offspring's diet and prevent them from consuming three times as much sugar as they should. The 22 kgs is equivalent to 5,500 sugar cubes. The main culprits of sugar are soft drinks, biscuits, buns, cakes, breakfast cereals, confec-

tionery, fruit juices, pastries and puddings.

"Children are having too much sugar. This can lead to painful tooth decay, weight gain and obesity, which can also affect children's wellbeing as they are more likely to be bullied, have low self-esteem and miss school," said Dr Alison Tedstone, chief nutritionist for Public Health England.

As part of its "Sugar Smart campaign", Change4Life, a public health programme in the UK, has launched a free app that allows people to scan the barcode of a product to show the amount of sugar it contains in cubes and grams.

"Our easy-to-use app will help parents see exactly where the sugar in their children's diet is coming from, so they can make informed choices about what to cut down on," Alison added. The maximum added sugar intake for seven to 10-year-olds is 24 grams (six sugar cubes) and for anyone aged above 11, it is 30 grams (seven cubes).

### Antibody targeting fat-tissue hormone may treat diabetes

Researchers have found a potential new treatment for diabetes in an antibody that they developed to target a hormone in adipose or fat tissue. Besides Type-2 diabetes, the new therapeutic that improves glucose regulation and reduces fatty liver, could potentially be used to treat fatty liver disease, and other metabolic diseases, the study said.

These monoclonal antibodies have the potential to be transformative first-in-class therapeutics to fight obesity-related metabolic and immunometabolic disease, the researchers said. The hormone in fat tissue that the antibody targets is called aP2 (also known as FABP4).

"The study has two-fold importance: demonstrating the importance of aP2 as a critical hor-

mone in abnormal glucose metabolism, and showing that aP2 can be effectively targeted to treat diabetes and potentially other immunometabolic diseases," said Gokhan Hotamisligil, of the Harvard T H Chan School of Public Health.

Researchers described the development and evaluation of novel monoclonal antibodies targeting the hormone aP2. They found that one of the antibodies effectively improved glucose regulation in two independent models of obesity. Additionally, beneficial reductions in liver fat were observed.

### Psychotherapy for gut illness can have long-term benefits

While doctors have known for some time that psychological therapy can reduce the symptoms of irritable bowel syndrome (IBS) in the short term, a

study has found that the benefits can extend up to one year after the completion of therapy.

The study analysed 41 clinical trials involving more than 2,200 patients. "We found that the moderate benefit that psychological therapies confer in the short term continue over the long term. This is significant because IBS is a chronic, intermittent condition for which there is no good medical treatment," said Lynn Walker, pediatrician at Vanderbilt University Medical Centre, US.

"Western medicine often conceptualises the mind as separate from the body, but IBS is a perfect example of how the two are connected," noted first author Kelsey Laird. The studies analysed included different types of psychotherapies, such as cognitive therapies, relaxation and hypnosis.

