

CIS Advocacy re communications infrastructure

CIS Objectives in Telecom (Broadband & Spectrum) Advocacy, Ubiquitous, reasonably priced broadband for Internet and voice services in India.

WHY ACCESS TO THE INTERNET IS IMPORTANT

Many factors go into what people consider good living. Infrastructure in the form of essential services comprises one set. While there may be differences in the extent to which individuals seek an “essential service” or “convenience” regardless of inclinations, some externalities are fundamental enablers. This is true of infrastructure -- systems that deliver water, sanitation, energy, transport and communications -- to support all our activities.

For communications today, broadband access to the Internet, voice, and TV services comprise the essentials. Individuals and their communities are empowered and enriched by their availability. It is therefore important for everyone to be able access these services at reasonable cost. Enabling policies can make such services more easily and broadly available. This is why CIS seeks reforms in policies to facilitate these services.

CIS ADVOCACY FOR SPECTRUM & BROADBAND REFORMS

CIS advocates changes in two areas to enhance these services:

1. Spectrum policy reforms, to extend access at reasonable prices.
2. Broadband policy reforms that will do likewise. For an explanation of spectrum, please see: <http://organizing-india.blogspot.com/2010/03/understanding-spectrum.html>. There are other aspects that deserve attention in terms of path-finding and future deployment of networks. These are:
 - a. Self-contained, green energy supply for equipment, because India’s energy grid is either absent or unreliable at many locations. Conventional equipment provided by transnational vendors assumes OECD-level infrastructure, including reliable grid supply of electricity. This is unrealistic in India.
 - b. Lower electromagnetic radiation, because of the deleterious health effects of current high-radiation installations. This is a particular vulnerability in India, because of under-developed building codes and norms.
 - c. Lower network and equipment installation costs through rationalized open-access to common networks and facilities, on the lines of electricity supply, railway systems, road transport, oil pipelines, airports and airline flight paths, or shipping. For instance, no one establishes separate electricity networks in the same location for each electricity supply company, nor separate tracks for each rail services company, nor separate roads for each car manufacturer or bus company, nor separate airports for each airline, and so on. This reduces capital costs enormously for society as a whole, and increases convenience for users, while drastically reducing the carbon footprint.

OUR SUGGESTED SPECTRUM POLICY REFORMS

Our recommendations are based on how mobile telephony grew exponentially in India as a consequence of three factors:

1. The change from auction payments to revenue sharing with NTP-99, after the percentage of revenue dropped to reasonable levels;
2. The introduction in 2002-3 of Calling Party Pays and reduction of Access Deficit Charges;
3. The CDMA build-out and subsequent legitimization in 2003.

A change to revenue-sharing for spectrum is likely to have a massive impact on broadband Internet access, because of lower costs and greater capacity. Spectrum access may be considered in the following ways:

1. To service providers at no more than reasonable usage fees. For instance, in the UK, Ofcom provides some spectrum to municipalities for essential services, as in Sweden and The Netherlands. Second, in the same way, state governments should be provided bandwidth for services. Third, building owners or, in the UK, new operators, are allowed some bandwidth to offer in-building services for use in wireless PBX's for internal communications. Fourth, public service providers are given spectrum to build networks accessible at minimal cost for all public services. These steps enable small-cell wireless deployment that reduces costs and emissions, while enhancing convenience.
2. To networks or for service providers to substantial bandwidth for backhaul from small cells.
3. Ideally, shared access to all equipment through common networks would provide the most effective and efficient solutions for access and throughput, if commercially feasible organizations with workable institutional arrangements can be set up. These could be consortiums on the lines of Singapore's OpenNet, allowing for three competing networks, each with an anchor investment and element of government presence, led by independent private-sector partners. In Singapore, OpenNet is led by Alberta's Axia.

There are problems with deployment in Singapore, however, because (a) they already have ubiquitous access at 2 Mbps, while OpenNet offers higher speeds at a higher price, and (b) OpenNet is a monopoly. In India, ubiquity itself is the desired objective, and the need for competition, security, and redundancy suggests the need for at least 3 competing networks.

BROADBAND POLICY CHANGES

Similar regulatory facilitation and incentives need to be designed and implemented for broadband service delivery.

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May 7, 2013

what is spectrum?

This is an attempt at a simple explanation of spectrum, though any explanation of fundamental particles and their interactions quickly tends to become complex.

Spectrum, like air, is all around us. It is energy in the form of electromagnetic radiation (EMR), which envelops the earth and extends through space. For Earth, EMR primarily emanates from the Sun, and in lesser quantities from the stars/cosmos, and radioactive elements in the soil, rocks and gases. For more on sections of the spectrum and their applications, see “Understanding Spectrum”: <http://organizing-india.blogspot.com/2010/03/understanding-spectrum.html>. “Energy” and the related concept of “work” are explained below. Those who are not interested in technical details are advised to skip the box below.

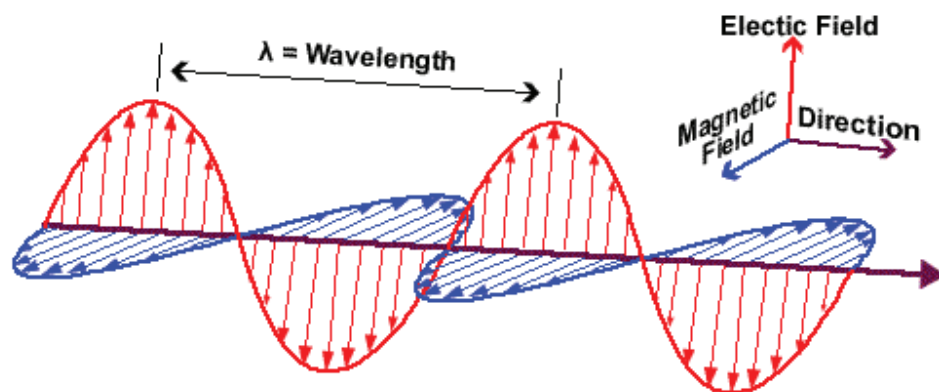
ENERGY, WORK, & FORCE

Energy is the capacity to do work. More precisely, it is the state or property of a system that enables it to perform work. Work is defined as the change in position of an object, or of the state of an object or another system in motion or at rest through a transfer of energy to it, e.g., its temperature, which is a measure of the random motion of the particles comprising that system, or of the amount of light (i.e., radiant energy) or chemical energy in it, or its state of motion or rest.

Work is done through the application of force, which can be provided by any form of energy. The major forms of energy are: electromagnetic radiation energy -- including RF spectrum, light, gamma rays, x rays, and so on; electrical energy; thermal or heat energy; mechanical energy; chemical energy; nuclear energy; sound energy; and gravity. Force is any influence that produces change in an object's or system's state of motion or rest, or in its internal state. Force has both direction and magnitude. There are four known “fundamental forces” or “interactions” in physics:

- Gravitation, which affects all objects with mass. Every object exerts a gravitational force on all other objects. It is the weakest interaction, operates over infinite distances, and governs the structure of the universe.
- Weak interaction, which affects all particles, and operates only at very short range. It acts at the subatomic scale of atomic nuclei.
- Electromagnetic interaction, which affects all particles, has infinite range like gravity, and is much stronger than both gravity and weak interaction. This form of interaction is responsible for the attractive or repulsive forces between electrical charges.
- Strong interaction, which affects subatomic particles called hadrons, which are themselves made up of quarks. This type of interaction binds the nucleons in the nucleus of all atoms with the strongest force, operating at very short range.

These interactions hold particles together and organize them into complex objects (<http://keyhole.web.cern.ch/keyhole/theory/main-5.html>). For details on the fundamental forces, see <http://hyperphysics.phy-astr.gsu.edu/hbase/forces/funfor.html>; for more about electric and magnetic charges and fields, see http://en.wikipedia.org/wiki/Electric_charge. Electromagnetic radiation is pure energy without mass, and consists of waves of electrical and magnetic energy (see diagram).



Source: <http://www.ndt-ed.org/EducationResources/CommunityCollege/RadiationSafety/theory/nature.htm>

These waves consist of a stream of photons, which are packets of energy that can be thought to behave like waves. The energy in a stream of photons determines what kind of wave it is, i.e., whether it is light waves that are visible, or radio waves or X-rays that are invisible. This energy also determines the effect the photons have when they come into contact (interact) with particles of matter.

WHAT GIVES RISE TO EMR?

All matter consists of atoms, which are mostly empty space. Atoms consist of negatively charged electrons revolving around a nucleus at the centre, made up of positively charged protons and neutrons with no charge. For example, a hydrogen atom has one proton and one neutron in its nucleus, and one electron in orbit. The atom is 100,000 times the size of the proton. This means if the nucleus of the atom were enlarged to the size of a tennis ball (6.5 cm), its electron would be at a distance of 6.5 km away.

When energy is absorbed by an atom, one or more of its electrons shifts to a more distant, higher-energy orbit around the nucleus. When the electron returns to its original level of orbit, energy is released in the form of EMR. Depending on the material of the atom and the amount of energy released, the EMR takes the form of heat, light, or other radiation such as X-rays or gamma rays.

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