A TRIAD OF POLICIES TO DRIVE A NATIONAL AGENDA FOR ICTE

(INFORMATION & COMMUNICATIONS TECHNOLOGY AND ELECTRONICS)

1. Information Technology (IT) and Telecommunications are the twin sectors that best epitomize what modern, resurgent and young India is capable of accomplishing. Achievements in the recent past in the IT and Telecom sectors have been spectacular and unprecedented in India's history. Yet, it is the future that holds even more breathtaking possibilities. A fascinating opportunity has now arisen that rests on the foundations of what has been achieved in the last two decades in IT and Telecom. Information and Communications Technology and Electronics (ICTE) has the potential to script India's future across the economy, society and government.

2. ICTE has been contributing substantially to the economic growth of the country. More importantly, it can immensely help in accelerating the growth momentum by enhancing efficiency, competitiveness and technological edge across sectors, including particularly strategic sectors. Equally significant is the contribution of ICTE in enabling inclusive growth and development; in ensuring that people across the length and breadth of the country have access to the opportunities generated by growth.

3. Differential access to economic opportunities across nations that characterized the past has been fundamentally impacted and altered by Information and Communications Technologies (ICTs). The same phenomenon can be exploited to help equalize access to opportunity within and across the nation, straddling urban and rural, rich and poor. Ubiquitous and reliable connectivity holds the key. ICTE is thus not just a major part of a better future, but more importantly, is the key instrument in realising it. Imagining a credibly optimistic future and designing ICTE policy to realize that vision, could therefore be a self-fulfilling prophesy.

4. Of the three sectors – IT, Telecommunications and Electronics - Electronics presents special challenges. Lack of a strong base, an adverse international environment and failure to build an enabling eco-system are among the major barriers. A stage has now been reached where not only the lofty aspirations for the future, but even sustaining growth trends in IT and Telecom is critically dependent on our ability to foster a strong Electronics Systems Design and Manufacturing (ESDM) base in the country. A holistic view alone can overcome the enormous challenges and help emulate the successes of IT and Telecom in electronics. It is in

this context that a combination of three interdependent and synergistic policies for IT, Telecom and Electronics has been formulated.

5. As of September, 2011, there are over 850 million mobile subscribers. Over 90% of villages have mobile coverage. Increasingly, a number of private sector services are now being provided either online or via mobile phone. The National e-Governance Plan has begun putting an increasing numbers of government services online. An m-governance policy has been drafted to provide services via mobile phone. Basic banking services can be accessed via the mobile phone. Individual intimation of all kinds of public and private services like school/college admission/ assignments, pension payment, utility bill payments, first level health services, cash withdrawals/deposits will become the norm. A single number could be called for all government services across all three tiers, 24/7.

6. Services are becoming seamlessly linked through mobile, internet and other modes of delivery. Aadhar will enable IDs to be authenticated online or via the mobile phone. A National Broadband Plan has been initiated that aims to provide Broadband Connectivity across the length and breadth of the country by 2014 through a combination of wireless and OFC/ wireline. Telecom service providers will be able to support IPv6 services by December, 2011. This will enable not only computers and mobile phones to be connected, but a whole range of other electronically enabled devices. This can stimulate proliferation of relevant applications like the recent innovation which enables a farmer in a village to operate his agricultural pump set remotely using the mobile phone. Location based services, that too in any desired language, in either text or audio form on things ranging from market yards, farm product prices or commercial establishments in the vicinity of the user at his/her current location are just a few examples of a whole range of exciting services. The possibilities are limitless.

7. Meanwhile, the Indian IT industry has steadily moved up the value chain and is now fully capable of envisioning and developing a whole range of value added services that can be delivered through computers, mobile phones or other devices. The industry can create and sustain a service delivery platform for such services thereby extending the global reach of the entire service industry. The advent of cloud computing technology has thrown up another wide range of possibilities for India. Indian companies have already begun creating new products and services incorporating their own IPs and patents. The stage is now set for a quantum jump in this trend. Another positive aspect is that there is a growing trend of entrepreneurship and product/ service innovation. The three policies, namely IT, Electronics and Telecom, recognize that entrepreneurship and innovation hold the

key and so seek to provide the necessary enabling environment to nurture this evolution.

8. Key social sector ministries like Education, Health and Rural Development have ambitious digitization, content creation and e-service delivery programs and projects under way. Education, health and other vital services could progressively be delivered from a common platform that also serves as the springboard for making these services available across the world. Right to Information legislation has led to increased demand for information and transparency which can only be met through effective leveraging of technology. Legislation is being formulated to make e-delivery of government services mandatory. The pieces are there. It is time for a quantum increase in the ambition level. It is also time to connect the dots.

9. It is also time to look at some of the missing pieces. Electronics manufacturing remains the weak link for the reasons already indicated. With burgeoning demand fuelled by rising prosperity and no significant increase in domestic output, an import bill of upto US $ 300 Billion by 2020 is forecast. Security of telecom infrastructure is also threatened by a heavy reliance on imported equipment. Given the all pervasive nature of electronics in a modern economy and its status as a meta sector, absence of substantial manufacturing base also poses severe long term threats to India's strategic sectors and interests as well as to cyber security, which is a cause for rising concern. However the silver lining is the strong design and substantial Research and Development (R&D) capability that has developed in the country. Fragile power supply situation and low paying capacity, especially in rural areas, underline the need for innovative design, green technology and frugal engineering to create a whole range of new designs and products that are optimized for Indian/ developing country needs and pockets. Nanotechnology holds much promise in this respect. The lack of wafer fab facilities in the country, indigenously designed chips and a meaningful electronics component base are gaping holes in our foundation in the sector.

10. The principal policy objectives are to optimally leverage our existing and developing ICT infrastructure and capabilities to meet the growing need for high quality social sector services like education, health, skill development, welfare or benefit programmes, e-government services, economic services like banking, insurance, transportation and logistics, and other societal needs like entertainment, communications, social media, information dissemination, etc. The other major objective is to use ICTE capabilities to enhance competitiveness and efficiency in manufacturing across the board and in key infrastructure sectors like power. The policy objectives include leveraging the mushrooming demand for

products and services in all these and other areas to foster innovation, catalyze manufacturing, encourage relevant R&D through academic institutions and industry and create a range of products and services that not only meet domestic needs but also address global demand as a logical extension of the IT and IT-Enabled Services (ITES) industry.

11. The integrated ICTE vision has twin goals, one focused inward and the other outward. The inward-looking goal is to bring the full power of ICT within reach of the whole of India. The intention here is to facilitate the application of new, technology-enabled approaches to overcome monumental developmental challenges in education, health, skill development, employment generation, governance, financial inclusion, etc. and to enhance efficiency, convenience and access across the board in the economy. The quest for equitable economic development backed by the ability to reach out to every citizen in the country is achievable only through sustained adoption of technology backed by a clear strategy. The externally-focused goal is to harness the power and capability of the whole of India in ICT to contribute even more substantially to meet global demand. This goal encompasses ESDM, Human Resource Development (HRD) and R&D.

12. Reaching every Indian directly, with an assurance of the identity of the individual and with the ability to transact financially is now an imperative for both the Government and the private sector alike. The mobile phone, with the level of coverage achieved, is the obvious choice as the preferred device to serve as the front end for this purpose. This would eliminate needless duplication in the form of a variety of smart cards proliferating for purposes ranging from identity to entitlements to financial transactions. Such a scenario not only adds costs and inefficiencies but even more alarmingly, leads to non-standardized technological islands that cannot later be integrated. Hence a major policy objective is to reposition the mobile phone from a mere communication device to an instrument of empowerment that combines communication with proof of identity, fully secure financial and other transaction capability, multi-lingual services and a whole range of other capabilities that ride on them and transcend the literacy barrier. This could then be expected to lead to a rash of innovation and entrepreneurship related to mobile value-added services (mVAS) services. The goal in this area is to emerge as a global leader in mVAS services.

13. Several actions are needed to support the above evolution. Development of language technologies that enable text to speech and speech to text conversion, voice recognition and eventually machine translation to support proliferation of services in multiple languages, creation and enablement of access to open source

GIS data that serves as a base for innovation and provision of a whole range of value added GIS and location based services are some of the obvious supporting initiatives needed. To ensure security in an increasingly insecure cyber space, indigenously manufactured multi-functional SIM cards with indigenously designed chips incorporating specific laid down standards are considered critical. The whole electronics eco-system for this and other purposes, starting from the wafer fab needs to be built and hence is viewed as a key policy objective and outcome.

14. Convergence at the carriage level, ubiquitous coverage and appropriate regulatory framework in this regard are key enablers to realising the vision that repositions the mobile as the converged device for a whole range of services covering every individual. Broadband services are expected to proliferate rapidly but wireless is likely to remain the dominant mode of last mile connectivity for some time to come. Hence ensuring adequate availability of spectrum and efficient spectrum management are critical. It is now imperative that broadcast, cable and telecom infrastructures are converged under an appropriate regulatory framework to create a single high capacity pipe that can be used for a variety of purposes. Convergence at both the device level and the carriage level will enable services and models to evolve that are affordable from the standpoint of an average Indian. The same set of services can then be accessed via a mobile phone, TV, computer or other devices. This would lead to new services and business models covering diverse areas like education, health, skill development, employment, e-commerce, etc. that not only serve domestic needs but are exportable across the world using recent technologies like cloud computing and building on India's service delivery strengths as well as skilled HR in diverse areas.

15. India is today a global source of skilled IT manpower. It has a market share of over 50% of all global IT and ITES outsourcing. HR development for IT, ITES and R&D is an imperative for sustaining the growth momentum and for meeting global demand for such skills. A concerted set of actions is necessary, in coordination with Human Resource Development (HRD) and other Ministries, to maintain and advance India's current dominant role in the sector.

16. Concerns about Cyber Security in general and security of telecom infrastructure in particular are escalating. Current efforts in these areas need to be stepped up by several orders of magnitude with appropriate arrangements for coordination across multiple agencies involved if they are to be effective in meeting new and emerging challenges. Department of Telecommunications and Department of Information Technology would need to play a key role in this effort. In cyber

security, India could play a major role along with other global forces that are working towards ensuring secure cyber space.

17. ICTE today permeates all aspects of society, business, governance, finance and indeed every other aspect of modern life. Hence, India's strengths in ICT constitute a major strategic advantage that needs to be maintained and systematically nurtured. Existing capabilities are already powerful enough to transform the economy, government and society. Recognizing this, the policies attempt to optimally leverage the global edge that the country has in ICT to advance national competitiveness in other sectors, particularly those of importance to the country as well as the economy in general. Current weaknesses in electronics manufacturing can be overcome to a significant extent by leveraging existing strengths in ICT, electronics design and R&D and by leveraging of domestic market demand. Governance objectives of promoting an inclusive and equitable society in which the opportunities being created by the overall economic growth are more evenly distributed can be immensely assisted through extensive use of ICTs. Finally, these policies are oriented towards use of ICTs in ways that consciously promote decentralization rather than centralization and aim to empower people.

18. The overarching national ICTE agenda is based on a holistic, optimistic view of what India would look like in the future and the role that ICTE would play in realizing that vision. Three separate policies covering IT, ESDM (including R&D) and Communications form an interlocked triad that need to be viewed and would work in conjunction with each other rather than each in isolation.

National Telecom Policy-2011
(NTP-2011)

PREAMBLE

Telecommunication has emerged as a key driver of economic and social development in an increasingly knowledge intensive global scenario, in which India needs to play a leadership role. National Telecom Policy-2011 is designed to ensure that India plays this role effectively and transforms the socio-economic scenario through accelerated equitable and inclusive economic growth by laying special emphasis on providing affordable and quality telecommunication services in rural and remote areas.

2. Thrust of this policy is to underscore the imperative that sustained adoption of technology would offer viable options in overcoming developmental challenges in education, health, employment generation, financial inclusion and much else. NTP-2011 is an initiative to create a conducive policy framework to address these issues and to touch lives of all citizens and transform India. By formulating a clear policy regime, NTP-2011 endeavors to create an investor friendly environment for attracting additional investments in the sector apart from generating manifold employment opportunities in various segments of the sector. In achieving the goals of National Telecom Policy 2011 revenue generation will play a secondary role.

3. NTP-2011 has the vision ***Broadband on Demand*** and envisages leveraging telecom infrastructure to enable all citizens and businesses, both in rural and urban landscape, to participate in the Internet and web economy thereby ensuring equitable and inclusive development across the nation. It provides the enabling framework for enhancing India's competitiveness in all spheres of the economy. NTP-2011 envisages support to platform neutral services in e-governance and m-governance in key social sectors such as health, education and agriculture that are at present limited to a few organizations in isolated pockets. This will expand the footprint of these services and thus foster an atmosphere of participative democracy delivery model that is truly citizen-centric.

4. For the continued growth trajectory of telecom sector, it is crucial to establish appropriate mechanisms to achieve balance between competition and consolidation while dealing with the legacy issues in the sector, thus benefiting both the users and providers of telecommunication services.

5. It is now imperative to move towards convergence between telecom, broadcast and IT services, networks, platforms, technologies and overcome the existing segregation of licensing, registration and regulatory mechanisms in these areas to enhance affordability,

increase access, delivery of multiple services and reduce cost. It will be a key enabler of equitable and inclusive growth. The policy aims to address and enable the coordinated action to respond to the dynamic needs resulting from confluence of telecom, broadcasting and IT sectors.

6. Given the continued predominant role of wireless technologies in delivery of services in ICT sector, NTP-2011 incorporates framework for increasing the availability of spectrum for telecom services including triple play services (voice, video and data) for which broadband is the key driver. This will be facilitated by deployment of services through appropriate instrumentalities, while safeguarding national interests.

7. The emerging technology trends in electronics hardware, telecom connectivity and IT will make it possible for millions of citizens to access services electronically in self-service mode using mobile phones and the Internet or through assisted service points such as Common Service Centres etc. This vision is made possible through ubiquitous network connectivity of mobile technology, broadband Internet, fiber penetration in all villages, high-technology low-cost affordable devices and software solutions which enable electronic access to service including m-payment. A unique AADHAR based electronic authentication framework would be integral part of providing service to the people. Cloud computing will significantly speed up ability to design and roll out services, enable social networking and participative governance and m-Commerce at scale which were not possible through traditional technology solutions.

8. A few million service points will be needed to service the population of billion and a quarter. These access points would include devices which will share the common components such as processors, RAM, LCD panels, solid state memories, bio-metric sensors and cameras etc. Domestic manufacturing capabilities could be leveraged to cater to these demands.

9. A concerted effort to boost manufacturing activity is now exigent as robust economic growth in the country is leading to an extraordinarily high demand for electronic products in general and telecom products in particular. NTP-2011 provides a roadmap for India to become a leader in cutting edge, state of the art technologies through R&D and creation and incorporation of Indian IPRs in global standards. This will require measures for boosting entrepreneurship and creating a major global manufacturing hub for telecommunication equipment to achieve self-sufficiency while squarely addressing security and strategic concerns. At the same time establishment of processes and standards for protection of the environment will also be required.

10. NTP-2011 recognises that the rapid growth in the telecom sector requires to be supported by an enhanced pace of human capital formation and capacity building. It

becomes imperative to put in place an integrated skill development strategy for the converged ICT sector as a whole so that there is continuous up-gradation of skills in tune with the technological developments. The cornerstone of this strategy is to derive maximal dividend from our young population and their creative abilities. The advent of technologies like cloud computing present a historic opportunity to catapult India's vaunted service delivery capabilities to a new level domestically as well globally.

11. Introduction of new technologies has posed fresh challenges in network security, communication security and communication assistance to law enforcement agencies. NTP-2011 provides a clear strategy for squarely addressing these concerns.

12. The PSUs have played a pre-eminent role in provision of telecom services in the country, particularly in rural, remote, backward and hilly areas. Contribution of BSNL and MTNL to broadband penetration in the country is significant. The importance of PSUs in meeting the strategic and security needs of the country can also not be understated. This policy recognises that these PSUs will continue to play such important role.

13. NTP-2011 recognises the importance of creation of the robust and resilient telecom networks for adequately addressing the need for proactive support for mitigating disasters, natural and manmade.

14. NTP-2011 recognises futuristic roles of Internet Protocol Version 6 (IPv 6) and its applications in different sectors of Indian economy.

15. New Telecom Policy 1999 has been a catalyst for growth of the telecom sector. It has resulted in unprecedented increase in teledensity and sharp decline in tariffs. The important objectives of NTP-99 included:

a. Availability of affordable and effective communications for the citizens,

b. Provision of universal service to all uncovered areas,

c. Encourage development of telecommunication facilities in remote, hilly and tribal areas of the country,

d. Provision of high-level services capable of meeting the needs of the country's economy,

e. Creating modern and efficient telecommunications infrastructure,

f. Enabling competitive environment in both urban and rural areas to provide equal opportunities and level playing field for all players,

g. Achieving efficiency and transparency in spectrum management,

h. Enabling Indian Telecom Companies to become truly global players

16. In the last decade Indian telecom sector contributed to the all round fast paced growth of not only knowledge and service sectors, but also of other social sectors. This has also resulted in the development of new business ecosystems. The contribution of the telecom sector to overall GDP grew from 1.5% to 3% during the decade. It has become the third largest sector in attracting FDI inflows, accounting for more than 8% of cumulative FDI inflows during the period. The composition of telecom sector has witnessed a structural change with increased participation of private sectors in providing telecom services.

17. The key achievements of NTP-99 are: (as on June 2011)

a. Telephone on demand,

b. Increase in overall teledensity from 2.3 in 2000 to 74.0,

c. Number of telephone connections increased from 33 million in 2000 to 886 million,

d. Sharp decline in telephone tariffs to as low as 0.5 paisa per second and STD at about 1 paisa per second,

e. Increase in Rural teledensity from 0.4 in 1999 to 35.6,

f. Coverage of 97.6% of the inhabited villages (5,79,421),

g. High speed data and multimedia capability provided to all towns with a population greater than 2 lakhs

18. Although there has been a rapid rollout of cellular mobile networks with over 886.0 million subscribers as on June 2011, there has been relatively less penetration in rural areas with only 298.1 million connections. Besides huge gap between rural and urban teledensity, broadband penetration (approx. 1.0%) has lagged behind the growth of telephony in India (teledensity of 74.0). The sector related skill development has also been limited. The contribution of telecom related R&D, IPR creation, design to promote development of products and indigenous manufacturing of telecom equipment has not measured up to the expectations. Against this backdrop, Government recognises the need to formulate a new telecom policy to bridge the gaps and face the challenges for becoming a world leader.

I. VISION

To provide to the people of India, secure, reliable, affordable and high quality converged telecommunication services anytime, anywhere**.**

II. MISSION

1. To develop a robust, secure state-of-the-art telecommunication network providing seamless coverage with special focus on rural and remote areas and bridging digital divide.

2. To create knowledge based society through proliferation of broad band facilities in every part of the country.

3. Make India a global hub for telecom equipment manufacturing and provisioning of converged communication services.

4. To promote Research and Development and Product Developments in cutting edge ICTE technologies and services for meeting the domestic security needs and worldwide market.

5. To promote development of new standards and generation of IPRs to make India a leading nation in the area of telecom standardization, especially among Asia Pacific countries.

III. OBJECTIVES

1. Provide high quality, affordable and secure telecommunication services to all citizens.

2. ***Increase in rural teledensity from the current level of around 35 to 60 by the year 2017 and 100 by the year 2020.***

3. *Provide affordable and reliable* ***broadband on demand by the year 2015*** *and* ***to achieve 175 million broadband connections by the year 2017 and 600 million by the year 2020 at minimum 2 Mbps download speed and making available higher speeds of atleast 100 Mbps on demand.***

4. Enable citizens to participate in and contribute to e-governance in key sectors like health, education, banking etc. to ensure equitable and inclusive growth.

5. ***Provide high speed and high quality broadband access to all village panchayats through optical fibre by the year 2014 and*** progressively to all villages and habitations***.***

6. Promote indigenous R&D, innovation and manufacturing that serve domestic and foreign markets by addressing market distortions, enhancing market accessibility, making available factors of production, increasing skills and competency in telecom and providing incentives wherever necessary.

7. ***Create corpus to promote indigenous R&D, IPR creation, entrepreneurship, manufacturing, commercialising and deployment of state-of-the-art telecom products and services during the 12th five year plan period.***

8. Promote the domestic production of telecommunication equipment to ***meet 80% Indian telecom sector demand through domestic manufacturing with a value addition of 65% by the year 2020.***

9. Provide preferential market access for domestically manufactured telecommunication products including mobile devices, SIM cards with enhanced features etc. with special emphasis on Indian products for which IPRs reside in India to address strategic and security concerns of the Government, consistent with international commitments.

10. Develop national standards and contribute to and participate in evolving international standards. This will be supported by establishing appropriate linkages with industry, R&D institutions and academia.

11. Create licensing framework to ensure flexibility in licensing to further extend converged services. This will not cover content regulation. This will provide high quality converged services across the country including rural and remote areas.

12. Strive to create ***One Nation - One License*** across services and service areas.

13. Achieve ***One Nation - Full Mobile Number Portability*** and work towards ***One Nation - Free Roaming***.

14. To ***reposition the mobile phone*** from a mere communication device ***to an instrument of empowerment*** that combines communication with proof of identity, fully secure financial and other transaction capability, multi-lingual services and a whole range of other capabilities that ride on them and transcend the literacy barrier.

15. To encourage development of mobile phones based on open platform standards and capable of supporting multi lingual services for enabling secure and authenticated online transactions.

16. Deliver seamless voice, data, multimedia and broadcasting services on ***converged networks*** for enhanced service delivery to provide superior experience to users.

17. Facilitate consolidation in the converged telecom service sector while ensuring sufficient competition.

18. Optimize transmission of services to consumers irrespective of their devices or locations by Fixed-Mobile Convergence thus making available valuable spectrum for other wireless services.

19. Promote an ecosystem for participants in VAS industry value chain to make India a global hub for Value Added Services (VAS).
20. Ensure adequate availability of spectrum and its allocation in a transparent manner through market related processes. ***Make available additional 300 MHz spectrum for IMT services by the year 2017 and another 200 MHz by 2020.***
21. Promote efficient use of spectrum with provision of regular audit of spectrum usage.
22. De-licensing additional frequency bands for public utility services.
23. Recognize telecom as Infrastructure Sector to realize true potential of ICT for development.
24. Address the Right of Way (RoW) issues in setting up of telecom infrastructure.
25. Mandate an ecosystem to ensure setting up of a common platform for interconnection of various networks for providing non-exclusive and non-discriminatory access.
26. Strengthen the framework to address the environmental and health related concerns pertaining to the telecom sector.
27. Encourage adoption of green policy in telecom and incentivize use of renewable resources for sustainability.
28. Protect consumer interest by promoting informed consent, transparency and accountability in quality of service, tariff, usage etc.
29. Strengthen the grievance redressal mechanisms to provide timely and effective resolution.
30. Strengthen the institutional framework to enhance the pace of human capital formation and capacity building by assessing and addressing educational and training needs of the sector.
31. Encourage recognition and creation of synergistic alliance of public sector and other organisations of Department of Telecommunications (DoT) through appropriate policy interventions and support for optimum utilisation of their resources and strengths in building a robust and secure telecom and information infrastructure of the country.
32. Evolve a framework for financing the sector and streamlining taxes and levies for long term sustainability of telecom sector.
33. Facilitate access to the financial resources on favourable terms and fiscal incentives required by indigenous manufacturers of telecom products and R&D institutions.

34. Achieve ***substantial transition to new Internet Protocol (IPv 6) in the country in a phased and time bound manner by 2020*** and encourage an ecosystem for provision of a significantly large bouquet of services on IP platform.

35. Strengthen the institutional, legal, and regulatory framework and re-engineer processes to bring in more efficiency, timely decision making and transparency.

36. Put in place a web based, real time e-governance solution to support online submission of applications for all services of DoT and issuance of licences and clearances from DoT.

IV. STRATEGIES

1. BROADBAND, RURAL TELEPHONY AND UNIVERSAL SERVICE OBLIGATION FUND (USOF)

1.1. To develop an eco-system for broadband in close coordination with stakeholder ministries to ensure availability of media for last mile access, aggregation layer, core network of adequate capacity, cost effective Customer Premise Equipment and environment for development of relevant applications. Regulatory policies to promote competition by encouraging service providers, whether large or small, to provide value added services under equitable and non-discriminatory conditions.

1.2. To recognise telecom and broadband connectivity as a basic necessity like education and health and work towards **'Right to Broadband'.**

1.3. To lay special emphasis on providing reliable and affordable broadband access to rural and remote areas by appropriate combination of optical fibre, wireless and other technologies. Optical fibre network will be initially laid up to the village panchayat level by funding from the Universal Service Obligation Fund (USOF). Extension of optical fibre connectivity from village panchayats progressively to all villages and habitations. Access to this Optical Fibre Network will be open and technology neutral.

1.4. ***To revise the existing broadband download speed of 256 Kbps to 512 Kbps and subsequently to 2 Mbps by 2015 and higher speeds of atleast 100 Mbps thereafter.***

1.5. To encourage Fibre To The Home (FTTH) by independent Infrastructure Providers (IPs) with enabling guidelines and policies, favouring fast transformation of cities and towns into ***Always Connected*** society.

1.6. To incorporate enabling provisions in the current regulatory framework so that existing infrastructure including cable TV networks are optimally utilised for extending high quality broadband services in rural areas also.

1.7. To establish appropriate institutional framework to coordinate with different government departments/agencies for laying of ***Optical Fibre Cable networks*** for rapid expansion of broadband in the country.

1.8. To encourage indigenous manufacture of cost effective customer end terminals and devices including mobile devices, SIM cards with enhanced features etc.

1.9. To build synergies between existing, on-going and future Government programs viz e- governance, e-panchayat, NREGA, NKN AADHAR, AAKASH tablet etc. and roll-out of broadband.

1.10. To ensure the availability of sufficient microwave spectrum to meet current and future demand for wireless backhaul especially in prime bands below 12 GHz, in addition to higher spectrum bands. Unlicensed spectrum will be made available for proliferation of wireless broadband services.

1.11. To stimulate the demand of broadband applications and services, work closely with Department of IT in the promotion of content creation particularly in vernacular languages which would enhance the investment in All-Internet Protocol (IP) networks including NGN.

1.12. To take steps to minimize the cost per site in rural areas. The use of low power and renewable energy solutions will be promoted to reduce the operational costs and achieve sustainability in the long run.

1.13. To undertake periodic review of methodology adopted for utilising USO fund and benchmarking the same against the best practices followed in other countries.

1.14. To provide continued support from USO fund for converged communication services in commercially unviable rural and remote areas.

2. R&D, MANUFACTURING AND STANDARDIZATION OF TELECOMMUNICATION EQUIPMENT

2.1. To spur the domestic telecom equipment manufacturing segment to meet the indigenous demands for becoming self-reliant in telecom/ICT equipment design and manufacturing. The domestic demand is estimated to be of the order of Rs.2,50,000 crore by the end of 12^{th} five year Plan.

2.2. To ensure focused indigenous development in the telecom sector, efforts would be concentrated towards a definite policy direction by creating a suitable road-map to align technology, demand, standards and regulations, after considered evaluation of candidate technologies and the emerging trends.

2.3. To set up a council consisting of experts from Telecom Service Providers, Telecom Manufacturing Industry, Government, Academia and R&D institutions. The council will

2.3.1. Carry out technology and product development forecast.

2.3.2. Evolve, and periodically update the national program for technology/product development.

2.3.3. Be a nodal group to monitor and ensure the implementation of various recommendations made for promoting indigenous R&D, IPR creation, and manufacturing and deployment of products and services.

2.4. To promote synergy of academia, R&D centres, manufacturers, service providers, and other stakeholders for achieving collaboration and reorientation of their efforts for creation of IPRs, development and deployment of new products and services suited to Indian environment.

2.5. To harness India's entrepreneurial energy and intellectual capital for the cause of R&D and manufacturing.

2.6. To encourage the young entrepreneurs by making available needed funding (pre-venture and venture capital), management and mentoring support.

2.7. To assist entrepreneurs to develop and commercialize Indian products.

2.8. To strengthen the links in the complete value chain from basic research to IPR generation, product design and development, product commercialization, and simultaneously achieving economies of scale, thereby enabling the product to compete internationally.

2.9. To ***create*** **fund** to promote indigenous R&D, IPR creation, entrepreneurship, manufacturing, commercialising and deployment of state-of-the-art telecom products and services. Emphasis will be given to creation of Indian IPRs which go into international standards as well as in product manufacturing in implementation of major programs and projects as a vehicle to develop ***Brand India***.

2.10. To promote setting up of Telecommunications Standard Development Organisation (TSDO) as an autonomous body with strong participation of the industry, R&D centres, service providers, and academia to drive consensus regarding national

requirements. It will facilitate access for the Indian Industry in the International Standards Development Organisations and act as an advisory body for incorporation of Indian requirement/IPRs/standards in the international standards.

2.11. To provide preferential market access for domestically manufactured products with special emphasis on Indian products for which IPRs reside in India to adequately address the strategic and security needs of the country consistent with international commitments.

2.12. To incentivize telecom service providers to use indigenous products by encouraging:

2.12.1. Commitment to purchase Indian products that are comparable in price and performance to imported products.

2.12.2. Commitment to participate in trials of newly created Indian products, nurture them and place pilot orders.

2.12.3. Funding R&D and support Indian IPR creation and participate in creation of standards

2.13. To support Electronic Design and Manufacturing Clusters for design, development and manufacture of telecommunication equipment.

2.14. To mandate testing and certification of all telecom products for conformance, performance, interoperability, health, safety, security, EMF/EMI/EMC, etc. to ensure safe-to-connect and seamless functioning in the existing and future networks.

2.15. To create suitable testing infrastructure not only for carrying out conformance testing and certification, but also to aid in development of new products and services. These state-of-the-art labs/infrastructure would be suitably positioned in vicinity of strong R&D clusters and academic institutions and make them available to engineering/academic institutions to assist the scholars in real time telecom product development.

2.16. To actively incentivize export of telecom equipment and services. Synergies among the various telecom players (manufacturers and service providers) would be leveraged to provide integrated communication solutions for exports.

2.17. To facilitate soft credit to the Indian product manufacturers for domestic deployment and exports.

3. LICENSING, CONVERGENCE AND VALUE ADDED SERVICES

3.1. To orient, review and harmonise the legal, regulatory and licensing framework in a time bound manner to enable seamless delivery of converged services in technology neutral environment. Convergence would cover:

3.1.1. Convergence of services i.e. convergence of voice, data, video, Internet telephony (VoIP), value added services and broadcasting services

3.1.2. Convergence of networks i.e. convergence of access network, carriage network (NLD/ ILD) and broadcast network

3.1.3. Convergence of devices i.e. telephone, Personal Computer, Television, Radio, inter-operable set top boxes and other connected devices.

3.2. To move towards Unified Licence regime in order to exploit the attendant benefits of convergence, for which there is already an in-principle acceptance. A migration path will also have to be provided for existing licensees to Unified Licence Regime.

3.3. To encourage digitalisation of the local cable networks.

3.4. To establish new licensing regime taking care of the requirements of level playing field, rollout obligations, policy on merger & acquisition and non-discriminatory interconnection while ensuring adequate competition.

3.5. To promote introduction of area specific services and applications.

3.6. To allow sharing of Networks and ***delink the licensing of Networks from the delivery of Service to the end users to facilitate faster roll out of services*** across the country , enhance the quality of service, optimize the investment and address the issue of the digital divide. This will also facilitate increased competition in the telecom sector without putting any entry barrier in setting up of networks by new operators and at the same time allowing the existing operators to increase their network utilization by sharing the network facilities

3.7. The technology neutral Unified Licenses are envisaged to be in two separate categories:

3.7.1. Network Service Operator (NSO)/ Communication Network Service Operator (CNSO)

3.7.2. Service Delivery Operator (SDO)/ Communication Service Delivery Operator (CSDO)

3.8. Network Service Operator (NSO) would be licensed to set up and maintain converged networks capable of delivering various types of services e.g. Voice, Data, Video, broadcast, IPTV, VAS etc. in a non-exclusive and non-discriminatory manner.

3.9. The Service Delivery Operator (SDO) would be licensed to deliver any/ all services e.g. tele-services (voice, data, video), internet/broadband, broadcast services, IPTV, Value Added Service and content delivery services etc.

3.10. To ***facilitate resale at service level*** – both wholesale and retail – especially keeping in mind the need for robust competition at the consumer end while ensuring due compliance with security and other license related obligations.

3.11. New Unified licensing regime will provide flexibility to operators to operate any or all segment of services of the total basket of services provided in the scope of licence.

3.12. To provide clear guidelines and terms and conditions for the extension/migration of existing licences.

3.13. To ***delink spectrum in respect of all future licences***. Spectrum shall be made available at price through market related processes.

3.14. To ***frame an appropriate Exit Policy*** for the licencees.

3.15. To put in place an appropriate regulatory framework for delivery of VAS at affordable price, that can fuel growth in entrepreneurship, innovation and provision of region specific content in vernacular languages.

3.16. To put in place a framework to regulate the carriage charges, which are content neutral and based on the bandwidth utilisation. This will also encourage non value added services such as provision of data and information over the mobile platform.

3.17. To endeavour to make available mobile satellite services compliant with security requirements.

3.18. To extend Intra-circle mobile number portability facility on nationwide basis so that the users can retain their mobile number while shifting from one service area to another, irrespective of the service provider.

3.19. To review roaming charges with the ultimate objective of removing the roaming charge across the nation.

3.20. To seek TRAI recommendations for new licensing framework, migration of existing licensees to new framework, exit policy etc.

4. SPECTRUM MANAGEMENT

4.1. To permit spectrum pooling, sharing and later, trading for optimal and efficient utilisation of spectrum.

4.2. To undertake periodic audit of spectrum utilisation to ensure its efficient use.

4.3. To move existing users of spectrum i.e. Government departments, public sector, private sector and telecom service providers to alternative frequency bands or media to make spectrum available for introduction of new technologies.

4.4. To prepare a roadmap for availability of additional spectrum every 5 years.

4.5. To make available adequate globally harmonised spectrum in the bands of 450 MHz, 700 MHz, 1800 MHz, 1910 MHz, 2.1 GHz, 2.3 GHz, 2.5 GHz, 3.5 GHz and bands identified by ITU for commercial mobile services.

4.6. To identify additional frequency bands periodically, for exempting them from licensing requirements for operation of low power devices for public utility services.

4.7. To consider requirement of spectrum in certain frequency bands in small chunks at specified locations for encouraging indigenous development of technologies/ products and their deployment.

4.8. To review the existing geographical unit of allocation of spectrum with a view to identify scope for optimization.

4.9. To promote use of white spaces with low power devices, without causing harmful interference to the licensed applications in specific frequency bands by deployment of Software Defined Radios (SDRs), Cognitive Radios (CRs), etc.

4.10. To make best use of spectrum in line with technological advancement, an appropriate regulatory framework will be established for progressive liberalisation of spectrum utilisation with a view to making spectrum utilisation voice/data/video neutral.

4.11. To Strengthen Wireless Planning & Coordination (WPC) Wing and Wireless Monitoring Organisation (WMO).

4.12. To strengthen Institute of Advanced Radio Spectrum Engineering and Management Studies (IARSEMS) for undertaking policy research in radio spectrum engineering, management/radio monitoring and related aspects.

4.13. To enact a separate ***Spectrum Act*** which *inter-alia* deals with all issues connected with wireless (spectrum) licences and their terms and conditions including re-farming/ withdrawal of allotted spectrum, spectrum pricing, cancellation or revocation of spectrum licence, exemptions on use of spectrum, spectrum sharing, spectrum trading etc.

5. TELECOM INFRASTRUCTURE/ ROW ISSUES, GREEN TELECOM, CLEAR SKYLINE, MITIGATION EFFORTS DURING DISASTERS AND EMERGENCIES

5.1. To emphasize the active role of both private sector and Government including the State Governments and Local bodies to enable the growth of telecom infrastructure necessary for meeting the telecommunication demand of the country and leveraging USOF wherever appropriate.

5.2. To work towards ***recognition of telecom as Infrastructure Sector*** for both wireline and wireless and extension of the benefits available to infrastructure sectors to telecom sector also, to realize true potential of ICT for development.

5.3. To review and simplify sectoral policy for Right of Way/Installation of Tower for facilitating smooth coordination between the service providers and the State Governments/ local bodies.

5.4. To engage with concerned ministries/ departments like Ministry of Surface Transport, Ministry of Urban Development, Ministry of Power, Ministry of Rural Development, Ministry of Railways, State Governments and local bodies for facilitating development of guidelines for provision of common service ducts for orderly growth of Telecom Infrastructure**.**

5.5. To mandate for mapping and submission of information of the infrastructure assets on the standards based inter-operable GIS platform by all telecom infrastructure/ service providers to the licensor.

5.6. To review Standing Advisory Committee on Frequency Allocation (SACFA) clearance process for faster and simplified site clearances.

5.7. To facilitate increased use of alternative sources (Renewable Energy Technologies) of energy for powering telecom networks through active participation of all the stakeholders – the government, the telecom industry and the consumer for green telecommunications. Sector specific schemes and targets for promotion of green technologies will be finalised in consultation with Ministry of New and Renewable Energy (MNRE) and other stakeholders.

5.8. To promote the use of energy efficient equipment and devices in telecom networks and adopt measures for the reduction of carbon footprint in the telecom sector.

5.9. To promote designing and deployment of low power active radio devices.

5.10. To promote use of In-Building Solution (IBS) and Distributed Antenna System (DAS) and their siting in coordination with Ministry of Urban Development by aligning the National Building Code as well as embedding these critical requirements in the process of developmental planning and finalization of master plans for rural and urban areas in consultation with the State Governments.

5.11. To undertake periodic review of EMF standards that are safe for human beings for mobile towers and mobile devices with reference to international standards.

5.12. To encourage use of innovative methods like camouflaging, landscaping, monopole towers and stealth structures to conform to aesthetic requirements.

5.13. To prescribe sectoral ***Standard Operating Procedures*** for effective and early mitigation during disasters and emergencies. To mandate Telecom Service Providers to provide alternative reliable means of communication at the time of disaster by creating appropriate regulatory framework.

5.14. To encourage use of ICTs in prediction, monitoring and early warning of disasters and early dissemination of information.

5.15. To facilitate an institutional framework to establish nationwide Unified Emergency Response Mechanism by providing nationwide single access number for emergency services.

6. QUALITY OF SERVICE AND PROTECTION OF CONSUMER INTEREST

6.1. To identify the performance standards and QoS parameters benchmarked against the best international standards and evolve suitable compliance mechanism in consultation with TRAI. To improve transparency, NTP -2011 recognises the need for formulating a separate ***Code of Practice for Sales and Marketing***.

6.2. To fully support the sector regulator in their efforts to enhance consumer awareness about services, tariffs, and QoS.

6.3. To make mandatory provision for web based full disclosure of area coverage by telecom service providers.

6.4. To ***undertake legislative measures*** to bring disputes between telecom consumers and service providers ***within the jurisdiction of Consumer Forums***/ Consumer Protection Act.

7. SECURITY

7.1. To mandate and enforce that the Telecom Service Providers take adequate measures to ensure the security of the communication flowing through their network by adopting contemporary information security standards.

7.2. To provide communication assistance to the Law Enforcement Agencies (LEAs) through regulatory measures in tune with national needs, keeping in view individual privacy and in line with international practices. To develop and deploy a state of the art system for providing assistance to LEAs.

7.3. To create an institutional framework through regulatory measures to ensure that ***safe-to-connect*** devices are inducted into the Telecom Network and service providers take measures for ensuring the security of the network and the data/information flowing/stored in it.

7.4. To build national capacity in all areas - specifically security standards, security testing, interception and monitoring capabilities and manufacturing of critical telecom equipment - that impinges on Telecom network security and communication assistance for law enforcement.

7.5. To ensure security in an increasingly insecure cyber space, indigenously manufactured multi-functional SIM cards with indigenously designed chips incorporating specific laid down standards are considered critical. The whole electronics eco-system for this and other purposes, starting from the wafer fab needs to be built and hence is viewed as a key policy objective and outcome.

7.6. To mandate standards in the areas of functional requirements, safety and security and in all possible building blocks of the communication network i.e. devices, elements, components, physical infrastructure like towers, buildings etc.

7.7. To promote creation of robust, reliable and resilient communication networks.

7.8. To develop a rational criterion for sharing of costs beyond a threshold limit between Government and the service providers in implementing security measures.

8. SKILL DEVELOPMENT AND PUBLIC SECTOR

8.1. To put in place an ecosystem to:

8.1.1. ***Assess the manpower requirement at different skill and expertise levels by partnering*** with ***National Skill Development Council*** and ***industry*** to identify the relevant needs of the sector and prepare a roadmap,

8.1.2. Create an enabling framework in partnership with Ministry of Human Resource Development (MHRD) to periodically upgrade academic curriculum of telecommunication courses, which are aligned with the technological advancements in the sector for meeting the human resource requirement,

8.1.3. Coordinate efforts to meet the demand for human resources in different parts of the telecom eco-system,

8.1.4. To form a high level Apex body (supported by advisory groups comprising representatives from industry, academia, PSUs, etc.) to oversee and to act as guiding and enabling source for all aspects relating to skill development in telecom field.

8.2. To promote and augment training institutes in urban and rural areas to cater to the skill and training needs of telecom sector.

8.3. Training institutes under the Department of Telecommunication and its other organisations will be developed as national level schools of excellence.

8.4. To encourage collaboration with premier educational institutes like IITs and telecom institutes of excellence for bridging the gap between research/ academics and field problems.

8.5. To encourage Public Sector Units under the DoT to identify and exploit strategic and operational synergies so that they play a significant role in service provision, infrastructure creation, and manufacturing.

8.6. To exploit individual strengths of organisations under DoT/DIT to their mutual benefit for ensuring these organisations to effectively flourish in the competitive telecom market while adequately supporting the security needs of the country. Efforts will be made for according preferential treatment for procurement of products and services rendered by individual organisations.

9. CLOUD SERVICES

9.1. To recognise that cloud computing will significantly speed up design and roll out of services, enable social networking and participative governance and e-Commerce on a scale which was not possible with traditional technology solutions.

9.2. To take new policy initiatives to ensure rapid expansion of new services and technologies at globally competitive prices by addressing the concerns of cloud users and other stakeholders including specific steps that need to be taken for lowering the cost of service delivery.

9.3. To identify areas where existing regulations may impose unnecessary burden and take consequential remedial steps for propelling India to emerge as a global leader in the development and provision of cloud services to benefit enterprises, consumers and Central and State Governments.

10. TELECOM ENTERPRISE SERVICES, DATA USE NEW TECHNOLOGIES AND IPV 6 COMPLIANT NETWORKS

10.1. To formulate appropriate policies in the area of enterprise services and data to fuel further growth of India‘s ICTE sector and attract large scale investments.

10.2. To undertake a comprehensive review of critical issues such as encryption, security, privacy, interconnection, etc. keeping in view emerging technologies and unique needs of the sector.

10.3. To recognize the role of new technologies in furthering public welfare and enhanced customer choices through affordable access and efficient service delivery. The emergence of new service formats such as ***Machine-to-Machine (M2M) communications*** (e.g. remotely operated irrigation pumps, smart grid etc.) represent tremendous opportunities, especially as their roll-out becomes more widespread.

10.4. To adopt best practices to address the issues related to cloud services and M2M for example privacy, network security, law enforcement assistance, inter-operability, preservation of cross- border data flows to promote a global market for India.

10.5. To recognize the importance of the new Internet Protocol IPv6 to start offering new IP based services on the new protocol and to encourage new and innovative IPv6 based applications in different sectors of the economy by enabling participatory approach of all stake holders.

10.6. To establish a dedicated centre of innovation to engage in R & D, specialized training, development of various applications in the field of IPv6. This will also be responsible for support to various policies and standards development processes in close coordination with different international bodies.

11. FINANCING OF TELECOM SECTOR

11.1. To create a special purpose ***Telecom Finance Corporation*** as a vehicle to mobilize and channelize financing for telecom projects in order to facilitate investment in the telecom sector.

11.2. To endeavor to include telecom sector projects within the ambit of financing from existing entities such as India Infrastructure Finance Company Limited (IIFCL).

11.3. To rationalize taxes and levies affecting the sector and work towards providing a stable fiscal regime to stimulate investments and making services more affordable.

12. ROLE OF REGULATOR, CHANGES IN LEGISLATION

12.1. To review the TRAI Act with a view to addressing regulatory inadequacies/ impediments in effective discharge of its functions.

12.2. To undertake a comprehensive review of Indian Telegraph Act and its rules and other allied legislations with a view to making them consistent with and in furtherance of the above policy objectives.

The primary objective of NTP-2011 is maximizing public good by making available affordable, reliable and secure telecommunication and broadband services across the entire country. The main thrust of the Policy is on the multiplier effect and transformational impact of such services on the overall economy. It recognizes the role of such services in furthering the national development agenda while enhancing equity and inclusiveness. Direct revenue generation would continue to remain a secondary objective. NTP-2011 also recognizes the predominant role of the private sector in this field and the consequent policy imperative of ensuring continued viability of service providers in a competitive environment. Pursuant to NTP-2011, these principles would guide decisions needed to strike a balance between the interests of users/ consumers, service providers and government revenue.