

1

To

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Subject: Point-by point response to questions

Dear Sir,

Please find here with BIF Point-by point response to questions in relates to the TRAI Consultation Paper on Implementation Model for BharatNet.

With regards,

For Broadband India Forum

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Issues for Consultation

Q.1 The “Report of the Committee on NOFN” has recommended three models and risks/advantages associated with these models. In your opinion what are the other challenges with these models?

1. CPSU led Model:

The CPSUs are not known to have the best project management skills ie. mechanisms to deliver the most optimised output in the least possible delivery times

Also they are not known to have the most competitive procurement mechanisms.

Their inherent processes are known to be very bureaucratic and their contract processes are not known to be the best.

Lack of accountability & responsibility in their DNA leads to project delays.

Apprehension of Project Cost & Time escalation is quite justified and routine , based on their past experience.

In this regard, one needs to analyse exactly what went wrong with the earlier execution award to CPSUs. Specifically, BSNL on its own does not have any inhouse abilities to plan, design and implement fiber networks, and in turn awards contracts to other entities to do this. This means the effective value-addition by BSNL is not much except in defining and monitoring the awarded projects. Why should not BBNL itself handle these aspects too? Also, any of the PSUs that have not shown project execution or management abilities should not be given further chance to take up further fiber deployments unless they demonstrate how they will overcome earlier weaknesses in execution, specifically in awarding contracts and managing timelines. Also, a major PSU, having all the competencies in execution and project management of mega projects, namely TCIL has been left out of this list. They are probably the most suitable for this work. They need to take up a substantial portion of the new work. Since the funding is from Govt. through BBNL, there is no need for the CPSU to own the network, but only to build and operate on behalf of BBNL. This also ensures that at any time BBNL can take over the operation or re-assign to someone else in case the CPSU cannot effectively handle the project. There has

to be a scheme of incentives and penalties to the fiber laying companies on timely completion as well as quality of the fiber laid.

The second aspect is to ensure there is adequate number of dedicated fibers all along the route, from the core to the GP, specifically when considering the available fiber with CPSU. This is not only the number of fibers but also carrying capacity as measured in Gigabits that can be carried. A lot of earlier fibers do not have either the capacity or are IP-enabled. The requirement is for all-IP managed/lit fiber and not just dark fiber that can be apportioned properly.

This brings into the issue the availability of core and access fiber with the Mobile Service Providers that can be spared or enhanced. It will be cheap and quick to take up spare capacity or to enhance the capacity using DWDM techniques rather than laying fresh fiber. Whether it is a CPSU or state-government or new private body putting in the cable, the fiber available from all existing providers must be considered and not just CPSUs. Private national carriers must be invited to provide details of spare capacity available and planned.

There have to be guidelines for selecting the fiber companies, such as experience, ability to carry out the intended work by way of monetary resources and manpower. This again applies to all – private or State Govt. or CPSU.

State Government led models

State Govt. model suffers from lack of control over the technology, network design and planning as these are under the control of BBNL

Presently the State Governments per se do not have any ability or experience to handle such a large project either technically or by way of expert manpower. They need to have an SPV where these resources have to be brought in through experienced partners who have these resources. These can be operating partners or equity partners who have adequate experience and resources that can be brought into the SPV.

Private Sector Led Model :

Lack of overall control & responsibility

Since the project will be implemented through multiple vendors and packages, the success & timeliness of the project depends on other vendors delivering their pieces and not just the private sector alone.

Also managing the network through a centralised monitoring system is more complex due to different network elements having their own management & control systems

Private sector players need to have relevant technical and project management abilities backed up by way of projects executed and net worth that can sustain such a project. These need to be clearly mentioned in the tendering. The conventional method of award to L1 tenderer cannot deliver for such projects. The criteria used in the first NTP licenses are a good example to follow. Also, there has to be a limit of how many districts/states a private company can bid for or take up.

Generally, the following needs are to be kept in mind:

1. The statewide network upto District HQ can be handled by one agency.
2. The bidder for the district(s) should be responsible for building & managing the HQ-GP-Village level network. Most large states have around 20 plus districts, and the number of potential customers can be around 4 lakhs/district at village level, leading to 80 lakhs of customers in a state or higher. The smaller states have much smaller numbers, and are easier to manage. In order to build out and implement in a quick timeframe, it would be necessary to parcel out the fiber & other build-outs to more entities.
3. The bidder for the HQ-GP-Village network needs to study the topology, demographics and state of preparedness to absorb the services. From this, one has to derive the final last mile network. This should make use of all possible means of carriage in technology-neutral manner, from fiber to Coax to Ethernet to satellite (for difficult terrain) to WiFi and microwave. One should encourage unlicensed spectrum usage as in the 5.1-5.3 and 5.8 GHz band, apart from standard 2.4 Ghz. Other technologies like Low-earth-orbit satellites can be experimented, but can be taken up only on an equitable manner and on a non-exclusive tender basis.

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Q.2 Do you think that these three models along with implementation strategy as indicated in the report would be able to deliver the project within the costs and time-line as envisaged in the report? If not, please elucidate.

It is highly unlikely that the project objectives shall be met in a timely and cost effective manner. This is because certain core issues have not been addressed viz.

-Multi layered structure steeped with bureaucracy and lack of responsibility & accountability

-No single point of responsibility and lack of identification of " no single point of failure "

-There is no co-ordination of interests between those who are going to build the project and those that are likely to provide the citizen centric services

-No clear action plan defined for overcoming issues viz. ROW with non-state agencies

-No clear plan as to how to plug the possible delays that may occur while executing the project

-There is no alignment of interest between the project management organisation and that which is responsible in marketing it

. One may need to employ experienced project managers to help in critically planning and managing the networks. Experienced International bodies with capability of delivery can help in this. Also, one should not exclude the MSPs, who have a lot of experience in handling large time-bound telecom projects. They can act both as program managers and bidders. Also, internationally there are quite a few Telcos and others including Cable/satellite companies (for instance AT &T) who have a lot of experience. BBNL should look for employing these to help in project control and monitoring.

Without such additional inputs, it would not be wise to rely only on current BBNL staff to plan/control/monitor the projects.

In addition, the scope of work has to shift from:

6

1. Just providing the fiber
2. Stopping at the Gram Panchayat.

These only touch upon the physical infrastructure and that too only in part. The last mile and last inch are not covered adequately.

The original proposition behind the fiber coverage upto the GP was that the network costs had to be borne by the Government as these could not be justified otherwise by any carrier. The same has to apply to the last mile. It is just not affordable to put in the last mile in the village for a very long time, until the village services are attractive enough to pay for themselves. In such a case, one needs to subsidise the infrastructure for the last mile in order to interest the service providers to bring their services into the villages. We believe that in the medium term, the village services will become economically viable and these can be sustained by the villagers paying for these. However, the Capex namely the wired and wireless infrastructure needed to sustain these has to be borne by the Government. It is a moot point whether the fiber infra companies be allowed to take up the last mile or a separate setup is needed for this. Since the last mile is associated with retail services, it is better to award this to a consortium that will design, build and operate the last mile. This will allow the bearer services to come up on top. The consortium should ideally comprise of MSOs, SIs, ISPs, Network Equipment vendors, OTT players, E-Commerce companies and perhaps existing CSC operators, and MSPs who between them can cover all communication means and all services that will be needed by the rural customer.

Q.3 Do you think that alternate implementation strategy of BOOT model as discussed in the paper will be more suitable (in terms of cost, execution and quality of construction) for completing the project in time? If yes, please justify.

Yes. It has definite advantages. Here the implementation/execution agency has the right to earn revenues from the project and hence the issues related to cost, time & quality of work can be overcome. However, to make it more attractive, PPP model with long term lease (at least 25-30 years instead of the proposed 10 years) should be permitted. Also, the Government should get involved in the consortium through a SPV with special powers to disburse funds (Viability Gap Funding) rapidly to make it commercially viable for the operator. Also the consortium must enjoy special powers viz. assured ROW from all agencies.

Instead of BOOT, it may be better to look for Build & Operate model through EPC based , turnkey contracting in a PPP mode. The project milestones can be the way to manage the payment and clearance of deployment, and there will be an incentive to perform within time & budget. Very few companies can actually pay for the network (if BOOT means that) due to perceived risks for such projects. but enough people will bid if the burden of ownership is removed.

Q.4 What are the advantages and challenges associated with the BOOT model?

Advantages:

-It is Milestone based and result oriented

-It has potential for fast rollouts and scalability

-Since Govt. is not directly involved in day-to-day implementation issues, it has the potential to function like a typical private sector owned and led project.

-The onus of project quality and completion is on the bidder, leaving the function of monitoring and reward/penalty alone with BBNL/DoT.

Challenges:

-Certain non-lucrative service areas/states may not attract the consortium and hence gaps in implementation may be there.

-Inflow of private funding into the consortium may be limited -The disadvantage is that if the bidder consortium is not capable of doing a good job, it is a messy job to remove and re-appoint a new bidder. The recent failures of the Delhi Airport Metro, Chennai Metro underground etc. are examples.

A better model is that of DMRC, where DMRC had the complete plan and carefully chose the contractors and ensured that they did perform. This model can be applied very effectively in this case. Also, the empowerment of a trustworthy team to oversee and manage the project is important. Typically in Telecom, things have gone well in Mobile where the targets were given to winning Telcos who were left to carry out the project and reach the targets, and there was no looking-over-the-shoulder. Wherever the projects were Government-centric or PSU centric, performance was not as desired. Some examples are National Knowledge Network, NIXI, VPTs

etc. Whereas Railtel took up the job of carrier's carrier, and left to do the job on their own, they have performed.

Q.5 What should be the eligibility criteria for the executing agency so that conflict of interest can be avoided?

The supervising authority and funding agency should not take up the network contract ownership or implementation. Let's say BBNL takes up execution. In this case there is no effective outside control. Similarly if BSNL takes up a state there has to be a total arms length relationship between BSNL and BBNL/DoT. This has not been the case in the past. Everyone knows what happened with ITI and DoT- there was no effective control on any performance or pricing. If the CPSU can be at arms length and cannot influence the monitoring (or claim favorable payment terms or completion deadlines) then this model can work. Else, one cannot avoid conflict of interest.

Eligibility criteria may include amongst others:

- 1. Executing agency should be selected for a single or group of LSAs or states or a combination of both**
- 2. Agency should be selected on the basis of minimum Viability Gap Funding(VGF) sought by the agency for the given state/LSA.**
- 3. Agency shall build, operate & own the network during the lease period.**
- 4. Agency should be entitled to a share of the revenues due to sale of dark fibre or bandwidth or both, during the lease period.**
- 5. At the end of the lease period, the infrastructure shall be transferred back to the Govt. at a mutually agreed transfer price.**

Q.6 Should there be a cap on number of States/ licensed service area to be bid by the executing agency? Q.7 What measures are required to be taken to avoid monopolistic behavior of executing agency?

1. It may be advisable to have a mix of easy and not-easy geographical areas/terrains and these may be divided into three or four packages .

One agency may be permitted to bid in all the tenders but overall award must be permitted for a maximum of two packages out of three or four.

So, a minimum of two and a maximum of four agencies should be selected and involved in the execution of the project.

To avoid monopolistic behaviour , regulatory framework is required towards

-control of access

-control of price

-make the process transparent

-make the process non-discriminatory

Yes-there should be a cap. No agency should be allowed to bid or take up more than two or three states so that completion is increased and multiple entities get involved to execute in parallel. This will ensure that no agency whether private or public gets into resource constraints. Also, in the model suggested above, the state agency should call for bids for full coverage of districts from HQ to the village. By awarding only partial set of districts, monopoly in a state can be avoided.

Q.8 What terms and conditions should be imposed on the executing agency so that it provides bandwidth/fiber in fair, transparent and non-discriminatory manner

The must-provide access rule and unbundling of both the main fiber as well as access fiber has to be a given. In the sense, the network operator must equitably provide access to all on a first-come first served basis. In case demand exceeds supply, one needs to see if the supply can be augmented or rationed out by way of fair usage and QoS. All availability of fiber and all other resources should be publicly known and updated in real time.

Q.9 What flexibility should be given to the agency in terms of selection of route of laying optical fiber, construction, topology and deployment of technology?

The implementing agency should be given the flexibility to survey the route plan for laying the Optical Fibre to minimise the cost. It should also be allowed the flexibility to use technology of its own choice with scope for upgrade/scalability over time. It should also have the flexibility to consider alternate architecture, selection of alternate routes, choice of alternate network topology, if its finds the existing one as not appropriate & efficient to complete the project in a timely manner.

See also answer to Q1 in this context. The relevant portion is repeated here for convenience:

- 1. The statewide network upto District HQ can be handled by one agency.*
- 2. The bidder for the district(s) should be responsible for building & managing the HQ-GP-Village level network. Most large states have around 20 plus districts, and the number of potential customers can be around 4 lakhs/district at village level, leading to 80 lakhs of customers in a state or higher. The smaller states have much smaller numbers, and are easier to manage. In order to build out and implement in a quick timeframe, it would be necessary to parcel out the fiber & other build-outs to more entities.*
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Q.10 What should be the methodology of funding the project? In case of VGF, what should be the method to determine the maximum value of VGF for each State/ service area and what should be the terms and conditions for making payments?

The OFC network needs to be fully funded by BBNL via USOF as originally intended. This funding should also be extended up to the village and for the Access network in the GP. The last mile can be given on lease to the consortium for a period of at least 25 years, so as to provide a long-term comfort to the consortium. Fiber plant, NOCs, transmission elements for GPON or other technologies and project management software, billing & customer care hardware & software etc. all need to be considered as Capex and must be fully funded. In case of satellite feed, the earth station cost and monitoring also need to be taken care of.

A major condition for the states to take up and handle the project on their own, and also for funding any state network (CPSU or Private) should be that RoW should be fully waived. O&M, customer care and CPEs should be to the account of the operator. If fiber is to be leased, the rate should be at the level of prevailing STM-4 rates and not based on the actual bandwidth.

Dark fiber should be set aside at each phase of the network, from Core to the village, for future usage. This cannot be factored into any cost, except when the fiber is actually required and converted into lit fiber.

Similarly, BBNL should negotiate bulk rates for Internet access with Tier I ISPs in US (and perhaps the Indian operators of international fiber), buy and distribute this to all providers at the same rate plus a small management fee. With this, the monthly bill of the end user will be reasonable and there will be no need to subsidise this. It may be noted that the bandwidth cost is anywhere from 40 to 60% of all Opex because of retail-level pricing, which in turn drives up the cost to everyone.

Many service areas may not be lucrative for private service providers. In such areas, the government must consider subsidy in the form of Viability Gap Funding (VGF). In remote and difficult terrains or areas, maximum Viability Gap Funding may be considered. Also Viability Gap Funding should be considered for the entire project right up to its completion.

12

Q.11 What kind of fiscal incentive and disincentive be imposed on the agency for completing the project in time/early and delaying the project?

The best guideline is the DMRC. Also, some of the Airport deals with private companies like GMR and GVC as well as Bangalore & Hyderabad airports have the precedents for this.

The implementing agency should have more incentive to bid for the project in case it is able to retain ownership for a longer period & thus require less funding support from the government. However, any delay in project implementation should attract penalties as well in the form of lesser funding disbursement on achievement of subsequent milestones , higher interest rate for balance funding etc

Q.12 What should be the tenure/period after which the ownership of the project should be transferred to the Government?

Govt should extend the lease tenure to at least 25 years from the current proposal of 10 years. This is in tune with the fibre life span which is usually taken as 25 years.

This model has worked successfully in the case of development of the new Bangalore Airport (BIAL) where the Concession period is 30 years, extendable to 60. This would allow operators to scale up & become profitable with time and also concurrently discharge important social objectives

We believe that the Government should own the core & access fiber and lease it on a long-term basis upto 25 years. At the end of this period, the fiber can be sold to private parties who would have to enhance the fiber cables for higher capacity and multimodal usages.

Q 13 Do you think that some measures are to be put in place in case the executing agency earns windfall profits? How should windfall profits be defined?

There has been no known case of windfall profits in the Telecom industry. In fact to the contrary, there is a lot of project-oriented risk. Only when the tariffs are low enough, the customer take-up will be adequate to ensure profits. We believe that there will be very little of profit or high turnover in the first few years. Later, competition from different technologies would ensure the pricing competitiveness. One needs to remember the examples of MSPs in India, who have managed to make profits by lean and competitive management, even while offering the world's lowest tariffs. Windfall profits can always be monitored and controlled by existing mechanisms like the Competitiveness Commission.

Regulatory mechanisms are already in place through existing corporate and IT laws to ensure curtailment of monopolistic growth and lack of competitiveness and also curb windfall profits, if any due to reasons not covered under the ambit of law.

Q.14 Whether there is a need to mandate the number of fibers to be offered as a dark fiber to other operators to ensure more than one operator is available for providing bandwidth at GP level? Q.15 What measures are required so that broadband services remain affordable to the public at large?

Basically the thumb rule in designing for long term is to put in as dense a fiber bundle as possible. Make the core ducting upto district HQ large enough to accommodate three cables of 144 pairs each, initially put in one bundle and increase later. This is because: fiber is cheap enough, and it is much easier to put in the fiber upfront than to add capacity later. Once this is done, there will be enough fiber to go around. This applies to the access networks as well, where one can go for three bundles of 48 pairs, and the cables to GP should definitely have enough redundant fiber, not just 4 pairs etc.

The Govt./Regulator should mandate that at least 50-60% of the dark fibre at GP should be set aside for allocation to the Telecom Service Providers/Internet Service Providers/Cable Service Providers or the MSOs, etc who are the principal agents of service provisioning to the rural areas besides the government. These are expected to be paid services which will also be the principal generator of revenues for the backbone network provider.

Affordability of Broadband services can be ensured through

-use of innovative technology

-ensuring competition in provisioning bandwidth to retail TSP/ISP/CSPs

-Central & State Governments and their agencies can also buy bandwidth for providing affordable G2C services which are meant for socio-economic development.

As for affordability, once the fiber cost is borne by USOF, and Internet port charges are got in bulk, the cost of the Internet to the retail user, as well as providers like WiFi/micro-ATM will be quite tolerable and cheap.

14

Q.16 What safeguards are to be incorporated in the agreement entered between Government and executing agencies if RoW is not being granted to the executing agency in time?

RoW has to be waived by the state government, which should also ensure that the local authorities toe the line in not levying any RoW. Digging permissions should be provided within a stipulated time. The cost of digging and covering will have to be charged at actuals and not inflated. Without these stipulations, there will be chaos and the competitiveness will go away. All states should be required to execute agreements to this effect before any network can be sanctioned in the state. This has to be done upfront. In case a local body does not obey this, that body has to be excluded from the Bharatnet.

The agreements signed between Central Govt, State Govts, BBNL & the implementation agency must facilitate free ROW.

Central and/or State Govts must facilitate execution of the project by taking the responsibility of removing all the ROW related hurdles

They must also take on the responsibility of removing all power and space related issues that could possibly delay the execution of the Project

Q.17 The success of BOOT Model depends on participation of private entities, which will encourage competition. What measures should be adopted to ensure large scale participation by them?

The BOOT model has special motivation for the private sector as it involves the following:

-clearer objectives

-scope for innovation

-flexibility in strategy, planning & execution

-provides incentives for early execution & quality network construction

-greater value for money

-since ownership is for long time, it provides better long term investment potential

-provides better opportunity to make profits & grow the business

-encourages private investment and technology know-how

The measures suggested above are adequate to ensure interest. Private companies have to worry about profitability and sustenance because they are answerable to shareholders. They also need to make profits in order to sustain the increasing costs and need for new services. Hence it is vital that the major infrastructure Capex is not borne by them. They may also need to get Debt at reasonable rates for their operations and to sustain until the operations are profitable. If at all, the government can consider a small revenue share from the provider. (Not a large % as in the earlier case of IPTV, which was just unsustainable).

Q.18 Please give your comments on any other related matter not covered above

We believe that the focus in this and other papers by the Government have focused a lot on the fiber itself, and enough attention has not been given to the access network (last-mile) and services riding on this. Our separate note lays stress on this, specifically on what services and how these can reach out to the villager riding on Bharatnet. Unless these services make life easier and better for the villager, he will not touch Bharatnet at all. So, it is important to plan for and specify the services as part of the tenders. Also, it is important to bring in all stakeholders, from Local Government to NGOs that serve the countryside, to rural banking entities to self-help groups to E-Commerce companies so their services can benefit the villager. To achieve this, the government should:

1. Ensure there are consortia that will ensure these when bidding for the last mile
2. These consortia get the infrastructure and its use at very reasonable rates so as to keep their service tariffs low
3. Actively bring in current (and later, future) MSPs, ISPs, satellite operators and others to bring in their resources to augment the new resources.

We recommend two ALTERNATE approaches for fast , low cost deployment and as an alternate media to the optical fibre approach.

The FIRST APPROACH uses High capacity Mobile Backhaul technologies using Millimeter Wave i.e. E band attached as Annexure-I

The SECOND approach is using Satellite based technologies attached as Annexure-II

ANNEXURE-I

ALTERNATE APPROACH TO SPEEDY IMPLEMENTATION OF BHARAT NET

This approach uses Millimeter Wave technology (70 & 80Ghz band), i.e. E band

E band is a cost effective Mobile Backhaul Technology solution which provides High Capacity throughputs over distances of upto 3Kms in Rural areas.

Typical configuration of one E band point-to-point link is that it can provide 1Gbps capacity throughput over a distance of approx. 3Kms

By having multiple hops (in the form of a chain in back to back manner) , we can cover the entire distance between the Block and the GP , with backup by UBR for redundancy. The network availability and reliability of E band is ~ 99% for 1Gbps capacity.

E band solutions have evolved today and some vendors can provide reach up to 2Gbps also with a single hop of 10-13Kms. E band solution consumes very low power-below 60W, which can be supplied by solar energy backed up by batteries. Additionally the installation of E band solution is very quick. E band is immune to environmental disruptions due to floods, clouds, dusts, snow and light rain. It is sensitive merely to highly intense rain. The amount of highly intense rain showers last for minutes. The adaptive modulation techniques and larger dish diameter enables E band solution to cope better with highly intense rain showers.

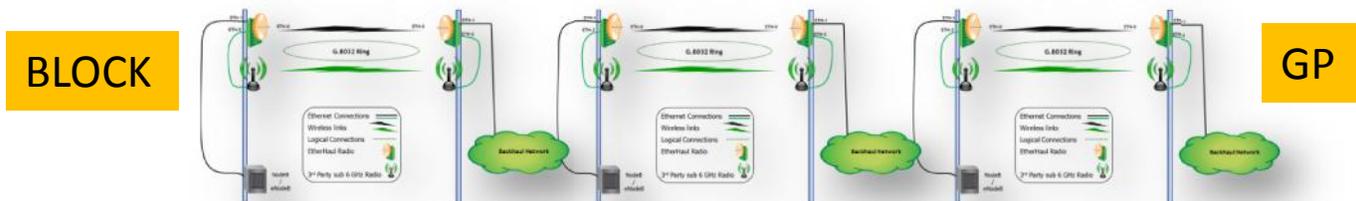


Diagram 3 – E band links chain from Block to GP

ANNEXURE -II

SATELLITE BASED APPROACH TO IMPLEMENTATION OF BHARAT NET

BIF recommends the Australian model of alternate implementation to their National Broadband Network or NBN. NBN is laid out using Optical Fiber to the building or the home wherever possible and by also providing High Capacity Satellite bandwidth using a mix of Ku & Ka band both in the Technically non-feasible areas (where it is not possible to lay fibre) but also as an alternate medium in high utilisation or mission critical areas to ensure that there is " No single Point of failure " of the network to high usage and/or critical areas.

In India we could use high capacity Satellite Bandwidth available from foreign satellites, of which sufficient capacity is available. Based on a study carried out at the beginning of this year, it was estimated that adequate satellite bandwidth exists to connect upto 20% of Gram Panchayats (GPs) as of now (which can be made operational within a span of 9 months). With increased satellite capacity being added progressively, it was anticipated if a clear demand estimation can be made coupled with regulatory and policy changes in Satcom , India could easily have a redundant satellite based connectivity network which could make Bharat Net operational in the quickest time frames. This network could not only be used to implement the remote and difficult areas/terrains but could be used to speed up deployment in the regular service areas to kick start the Digital India process. Once the fiber reaches these regular areas, this satellite bandwidth could be easily re-deployed to plug other gaps till the fiber network reaches those locations.

Some of the regulatory & policy changes that would be required to enable this process would include

- Direct Procurement of Satellite Bandwidth from the foreign satellite providers by DOT/BBNL
- Permission to use Ka band
- Permission to use NGSO satellites
- Use of High Throughput Satellites (HTS) beams for high usage/mission critical areas
- Permit modern innovations viz. use of multicasting & caching

BIF also recommends that in case of Satcom, if demand projection is managed properly, then foreign satellite operators may be interested in offering the B-O-O-T model with a minimum lock-in period.