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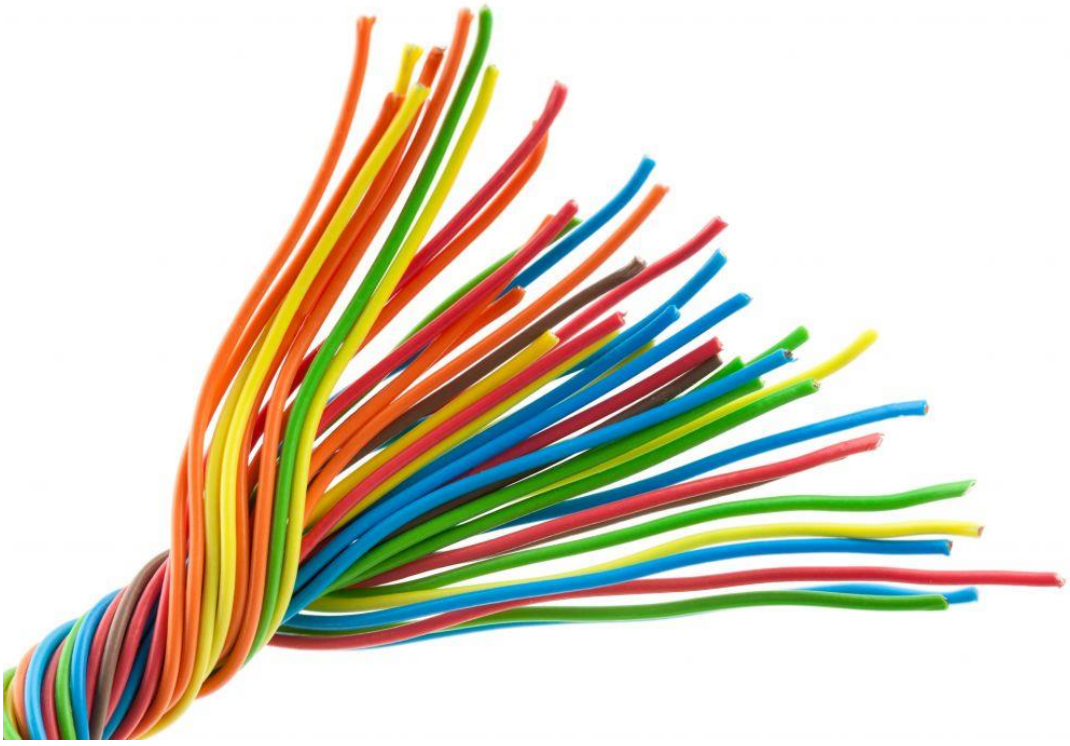
Recommendations on the TRAI Consultation Paper concerning the Implementation Model for BharatNet



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Contents

Executive summary

Background

The National Optical Fibre Network (NOFN) program, which provisions for a network of high-speed digital highways connecting all 250,000 Gram Panchayats (GP) of the country, has been significantly delayed. Initially planned for completion by 2016, the NOFN program has seen slow progress due to various structural and extraneous reasons, with only an estimated 1% of the Gram Panchayats being successfully connected by mid-2015.

Providing “infrastructure as a utility to every citizen” is one of the key visions of the Digital India program. The slow execution speed of the NOFN program has therefore emerged as a hurdle in digitization, delaying delivery of citizen services, including several flagship programs of the government.

The existing model of execution is driven by BBNL, which in-turn is working with Central PSUs (CPSUs) such as BSNL, RailTel and PGCIL for deployment and management of the network. This approach has resulted in a number of challenges including:

- Limited/ dispersed accountability of CPSUs
- Limited CPSU ownership and inability to implement a strong incentive program
- Fragmented approach to planning and execution
- Significant gap in the availability of skilled human resources both at BBNL as well as the CPSUs
- Inability to monitor and track progress closely / near real-time
- Unclear user demand and hence business case

This delay has prompted the government to reconsider various parameters such as planning, technological choices, project financing, operating model, and most importantly, execution and implementation strategy, which has resulted in the creation of a new and expanded plan called BharatNet. Consequently, The Review Committee on National Optical Fiber Network, and TRAI have suggested a number of implementation model options for BharatNet.

In this document, we have reviewed the following four implementation models:

1. CPSU-led
2. State-led (through a state Special Purpose Vehicle/ Entity (SPV))
3. Private sector led
4. BOOT (Build Own Operate Transfer) model, aimed primarily at the private sector with transfer of rights to the private entity for a specified period of time

We have also provided recommendations for specific topics raised in the TRAI consultation paper titled “Implementation Model for BharatNet”.

Summary of recommendations

Program based approach to execution

Past examples in implementation of large infrastructure programs suggest that the adoption of a single implementation model for development may not lead to the desired results. A program approach for development, including various implementation models, with a clearly defined waterfall approach for selecting the implementation model, may therefore be the preferred way forward for BharatNet. A strategic options study to identify project viability both at a national level and at each service area level should also be preferably commissioned.

Hybrid approach

In deciding an approach for India, it is important to keep in mind the diversity of the country. Variance in parameters such as geography, terrain, risk, demography and socio-economic factors should be considered and factored in.

The resultant model is likely to be a mixed one, in which the government drives the initiative in certain states and the private sector in others. Private sector participation may not be forthcoming in all service areas and therefore, for such areas, ownership by the government or a higher level of support for the private sector may be required to mitigate financial and operational risks.

Private sector participation

Private sector involvement is imperative to enhance the motivation, accountability and execution efficiencies. However such involvement could potentially raise concerns around competition, monopolistic tendencies, affordability, project financing and viability gap funding, windfall profits, etc. Each of these possible issues will need to be managed and are covered in detail in this report.

Models for private sector participation

A private sector-led model in which the role of the private sector is to build the network and hand it back to BBNL (the third model in the TRAI consultation paper) may not provide enough incentive to the private sector. Experiences in other parts of the world have indicated that operating and managing the network, once built, requires significant investment, capacity and capability building. Therefore, a model that involves longer association with the private sector, by tasking it with the operation and maintenance of the network as well, is more attractive for the private sector and provides better value for money to the government.

Public-Private Partnership (PPP) models have been fairly successful for developing infrastructure and effectively implementing large-scale transformational projects in India. As of 2015, 60% of airport traffic in India is being managed under the PPP model[1]. A total of 100 PPP highway projects were completed by March 2014 and another 165 are on-going[2]. To fulfil the vision of Digital India for more than 1.2 billion people, the role of PPP is thus vital.

Numerous PPP models exist, including - Build Operate transfer (BOT), Build Own Operate Transfer (BOOT), Build Own Operate (BOO), Build Operate Manage (BOM) etc., with each model having its own advantages and challenges. This document covers our views on the BOOT model as envisaged in the TRAI consultation paper.

1. Airport, IBEF, http://www.ibef.org/download/Airports-March-2014.pdf
2. Highways, http://pppinindia.com/sector-highways.php

Capability enhancement at BBNL

The existing capabilities and capacity at BBNL will need to be enhanced for program management, management of multiple contracts, multiple vendors/consortiums, enforcement of SLAs and network performance, and quality monitoring.

The mixed model will result in significant management, operational and network complexities, for which the existing structure of BBNL is inadequate and substantial capability enhancement would be needed.

Capacity and skill enhancement can be achieved either through direct hiring or through staff augmentation from the private sector.

Establish framework for fair play and affordability of services

As mentioned earlier, private sector participation could potentially raise concerns of unfair competitive advantages for the consortium, thus defeating the objective of universal access.

The following aspects could be considered in this regard to mitigate some of the concerns:

- **Financial independence:** Execute the contract with a SPV solely created for the purpose of undertaking this project. The SPV should not be allowed to engage in any other business or activity
- **Wholesale only model** - Prohibit the SPV from entering retail services
- **Regulatory framework:** Establish a regulator or framework of terms and conditions for the concession, to ensure fair allocation of dark fibers to all service providers and prevent monopolies
- **Dispute resolution:** Resolve disputes through an ombudsman
- **Quota:** Ensure dark fiber allocation to central / state government and BBNL
- **Pricing control:** Control wholesale pricing through a regulator (e.g., in the energy sector)
- **Transparency:** Provide information on bandwidth allocation to and consumption by service provider(s)
- **Conflict of interest:** Control related party transactions (allocation of bandwidth / dark fiber to executing agency or other members of the executing consortium) and establish relevant guidelines
- **Technology obsolescence:** Build scenarios of technological obsolescence into the engagement model with the private sector. While fiber is clearly the preferred mode for the broadband network today, newer technologies could emerge during the concession period

Detailed recommendations on consultation topics

Challenges of Three-model Approach

Q1	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?

The three models suggested by the review committee are **build-transfer (BT)** type models, as the **ownership of the asset** post construction **rests with the Government** (Central or State). These BT models have inherent drawbacks in terms of viability, alignment to policy objectives, execution capabilities and asset ownership. As a result, **these models are not aligned** with the needs of rapid execution and aggressive timelines, as required by the NOFN project.

	CPSU-led	State SPV-led	Private Sector-led
Financial viability	**Not viable.** Potentially stuck with unprofitable areas further complicating demand generation and execution	**Viable.** Costs covered by central government	**Mixed.** Profits limited to margins on EPC and possibly O&M contracts which are usually limited
Policy objective alignment	**Aligned.** However, no focus on commercialization/ utilization of dark fiber through demand generation	**Marginally aligned.** As state may pursue different objectives towards political gains	**Not aligned**. No link between cost/profit and network utilization. Demand risk lies with government and no incentive for demand enhancement
Execution capabilities	**Limited**. Limited resources, low program execution skills. Limited project management tools. Inability to enforce control	**Poor**. Lack of technical and management expertise state governments. Resources, processes, MoUs and infrastructure need to be setup	**Strong**. However, limited autonomy in execution with significant oversight/ dependencies with government entities
Asset ownership	**No ownership.** CPSUs will be used in contracting capacity while ownership resides with BBNL/Govt.	**Full ownership.** Asset lifecycle management requires specialized skills Ownership with the state SPV	**No ownership.** Profits limited to margins on O&M contracts which are usually limited Ownership remains with BBNL / Government

Additional challenges common to three models

- **Demand generation**: There is little focus on commercialization of the middle-mile network. Generation of demand through increased private sector participation is likely to be low in all three models due to the **lack of incentives**. This may result in **low utilization of the network post completion** of construction. To overcome this challenge, it is essential to **perform detailed project viability studies** and suitably structure the contract and funding to preserve incentives

- **Harmonizing architecture**: Use of different ownership models may result in **increased complexity for network integration,** as each executing agency (CPSU, State Government, and Private consortium) is likely to modify standard design to suit regional needs/terrain. To achieve the policy objective of developing a single nationwide network, extra attention is required to harmonize network integration design across states

Three-model Approach plan feasibility

Q2	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.

The three models, as they are defined, may not be individually suitable for all states and hence a mixed model approach will likely be required:

- **Private sector model** Would be best suited for service areas with an easier terrain and low operational / executional complexities
- **State SPV led models** can be implemented in service areas where state governments have sufficient technical and management capabilities
- **CPSU-led model** will likely be needed in all other services areas characterized by difficult terrain, high operational complexity, insufficient state government expertise, security limitations and unsuitable political environment

As far as possible, most states should be assigned to the private sector for accelerated execution

Limitations of the mixed model approach

The following limitations with the mixed model approach could make adherence to cost and timeline targets difficult:

- A significant portion of the **decision making and final authorizations process is still retained by BBNL** (procurement, wholesale auctions, design authorization, ROW approvals, funding) which has been one of the major contributors of delay in NOFN
- High **complexity in the enforcement of standard SLA and quality metrics** across regions for procurement, deployment operations and network management
- Bottlenecks identified during construction have to be addressed in the regional context (subjective) rather through centralized operations (objective). **Uniform network availability may not be realistic**
- BBNL is unlikely to have the capacity to monitor and enforce regional contracts through dedicated resource management operations and standardized reporting processes

Program approach to determining best-fit model

It is essential to adopt a program approach for the BharatNet rollout. The program approach requires **each service area/Gram Panchayat** relevant to the network rollout, to **be treated as an individual project**. Evaluation of project plan per region should be done to determine the best-fit model for the service area/GP. The evaluation would also include high level assessment of demand, viability and incentives required for private participation. Post evaluation for a service area/GP, the best-fit model could be

- **One of the three models proposed** by the Review Committee – allocative preference given to the private sector, where possible, to improve efficiencies
- **Modified versions** of one of the three models, with specific enhancements made to the structure of funding, payment schedules, operational parameters addressing challenges related to issues like ROW
- **Potential new model** (BOOT / PPP variants) defined to best-suit the challenges of the service area
- Use of a **separate managed services provider** for network maintenance in states where CPSU-led or State SPV-led models are used

Efficiencies through the BOOT Model

Q3	Do you think that alternate implementation strategy of the 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

The Build-Own-Operate-Transfer (BOOT) model overcomes certain limitations in the three BT models discussed earlier, allowing it to better address the needs specific to the BharatNet rollout. However, the **viability of the model depends on how different elements of the model are structured** (funding, ownership, tenure, pricing structure, technology/architecture model, regulation, etc.).

	BOOT Model
Viability	**Moderate**. Asset ownership may improve the business case for private players. However, demand from GPs will likely be low for an extended period of time. Further, the issue of ownership also needs to be seen in view of the asset having the characteristics of a public good
Incentive alignment	**High**. All activities through the network lifecycle are outcome oriented. Below par performance has monetary penalties (incentive structure)
Execution capabilities	**Strong**. Best-in-class execution capabilities of private organizations. Adequate resources, program management skills and tools
Operational efficiency	**High**. Strong PMO and O&M enables the identification and reduction of cost inefficiencies across the rollout lifecycle
Ownership	**Full asset ownership**. Ensures high quality of construction and network maintenance
Demand generation	**Built-in**. Wholesale only model of private consortium requires them to develop regional demand and services ecosystem to be profitable
Harmonizing architecture	**Moderate**. 3 – 5 consortiums likely to participate. Integration architecture requires moderation, but less complicated compared to three model approach
Financing	**High:** Asset ownership may facilitate project funding by enabling the private sector to raise debt against the asset

Attributes of the BOOT model that enhance the ability to execute BharatNet

The BOOT model, if structured appropriately, can enable BBNL/private consortiums to achieve network rollout targets within defined budgets. Some of these enabling attributes of the BOOT model include:

- **Limited upfront outlay**: Initial investment from the Government is limited as capex is invested by the selected private consortium. This allows the Government/BBNL to utilize saved funds for enabling (or incentivizing) the private sector and managing rollouts in challenging service areas
- **Private sector economies**: Management of network rollout by the private sector may not necessarily reduce the overall budget of the program. However, the efficiencies of private sector organizations will ensure better value for money and ROI
- **Execution speed**: Private consortiums have more value to derive from an operational (utilized) network than through incentives and margins derived on construction/network maintenance work. This will ensure rapid completion of construction and active demand generation for the network
- **Quality focus**: Private consortium ownership of the network asset will ensure the quality of network construction and fiber used, as the consortium will need to establish long term network sustainability to ensure profitability

Advantages and challenges for the BOOT model

Q4	What are the advantages and challenges associated with the BOOT model?

Advantages (in addition to response to question 3)

Financial discipline: Direct link between operational efficiency and profits may enable the executing agency to minimize cost overruns during construction and operations. The agency will also determine the viability of markets, as it impacts profitability

Lean organization: Minimal management overheads for the project and use of agile/lean practices can be expected from the private consortium. BBNL could also work with a leaner structure

Complementary expertise: Private consortiums are highly likely to apply professional project management and risk control measures while implementing the project. Telecom service providers, if part of consortiums, will employ commercial grade quality standards and operational excellence practices

Existing assets: Telecom service providers, if part of consortiums, will look to leverage their existing network assets, where available, to reduce the extent of Greenfield fiber deployments. This improves utilization of their existing assets while reducing cost and saving time for the program

Services ecosystem: Ownership of the asset will incentivize the consortium to help seed demand, resulting in higher network utilization in the long term

Challenges

Private sector participation: Despite the improved business case from the BOOT model, private players may still question viability given the rural focus of the project. Suitably structuring the BOOT model through appropriate VGF funding, asset ownership tenure and combining profitable and non-profitable areas into clusters can potentially offset the viability issue and increase private sector participation

Affordability of services: The executing agency will look to minimize loss exposure and could likely pass on a greater portion of the operating costs to the subscriber

Monopoly: The executing agency could look to monopolize the market region/service area unless curtailed through suitable regulation. For instance, the private consortium could include a network equipment provider, a telecom operator, a media agency and a managed services provider – allowing the consortium to vertically integrate in the market. There is also potential for conflict of interest through preferential allocation of bandwidth to consortium participants

Lead time to setup: Once the executing agency is selected, there could be significant lead-time required to setup processes, monitoring, interconnect agreements, revenue share contracts and fair-usage agreements. Integration design should also be precise to enable interconnectivity across several consortiums owned networks

Access to funds: While ownership rights will help, clarifications are required by the banking sector to disburse loans to the private sector for this purpose. Normally banks do not accept guarantees on the basis of public assets. Additionally, higher VGF funding for regions with low project viability may not be possible in view of the current VGF caps as per the Department of Economic Affairs (DEA) guidelines

Precise regulation: Clearly defined and transparent regulation, robust public sector benchmarks and monitoring of operating contracts by the regulatory agency/ombudsman is essential through the lifetime of the program

Eligibility criteria

Q5	What should be the eligibility criteria for the executing agency so that conflict of interest can be avoided?

Conflict of interest may be avoided by including the following criteria for evaluation during the RFP process for selecting the executing agencies for service areas

Distinct legal entity

- The executing agency should be established as a **separate legal entity**
- The operations, finances, assets and business should be completely separated from those of the constituent members forming the consortium
- One of the members in the consortium should be **designated as a lead agency** and is responsible for all actions of the executing agency
- The agency's day-to-day operations are subject to monitoring and independent audits

Separate wholesale vs. retail operations

- Given the possibility that the consortium could include telecom operators, cable companies and other service providers, it is essential that the **retail operations of such companies be separated from the wholesale network operations of the executing agency**
- Any company providing retail services using the network should do the same through a separate legal entity

Non-discriminatory access

- The executing agency should provide uniform non-discriminatory access to the middle-mile network to all interested service providers
- Dark fiber bandwidth should be **sold at universally set wholesale prices** to all buyers
- There should be no preferential access and bandwidth provided to service providers as members of the executing agency consortium
- No service providers should be subject to **throttling** on the network

Related party transactions

- Any entity of the executing agency consortium looking to engage in any related party transactions through a related agency (where one or more members of the consortium have an interest in), should first **submit the transaction for approval** to BBNL/TRAI/independent watchdog
- BBNL/TRAI should establish detailed criteria on related party transactions and the subsequent approval processes

The role of the independent watchdog agency/ombudsman is essential to enforce these conditions through the lifetime of the contract. Any deviation from these conditions will result in discriminatory operations and will impact the ability of the program to achieve stated policy objectives.

Other eligibility criteria

In addition to the specific criteria discussed above to curb conflict of interest, the following represents illustrative criteria to establish general eligibility of interested participants during the RFP process:

- **Relevant experience**: The applying consortium or its entities should have prior experience in building and managing outside planned networks (OSPs). They should have the necessary personnel, tools, processes and demonstrated experience in managing large scale programs similar to BharatNet

- **Constitution of the consortium**: The participating consortium should contain equipment providers (fiber, routing, G-PON), systems integrators and network management service providers. This is to ensure that the combined entity has all the necessary skills and knowledge to execute the project

- **Financial standing**: The participating consortium should demonstrate adequate financial standing in relation to the size of the project; the soundness and flexibility of the financing plan in terms of the liquidity position throughout the life of the project and the ability to handle adverse situation

Service area caps

Q6	Should there be a cap on number of States/ licensed service area to be bid by the executing agency?

All interested consortiums **should be allowed to freely bid on any number of service areas as part of the RFP process.** However, **BBNL/TRAI can specify a cap on the number of contracts that can be awarded to a single agency/consortium**.

This will allow adequate participation in all service areas, thereby **reducing the risk of monopolistic activity** by a single consortium.

There is likely to be a limited number of eligible consortiums interested in participating in the program. It is therefore important to reduce the number of service areas/RFP units to a limited number. This can be achieved through a clustering approach.

Clustering approach

BBNL/TRAI should define the **right grouping of GPs/service areas to build clusters** (similar to the concept of circles used in the telecom industry). These **clusters should be used as the unit for conducting the RFP process,** with private consortiums bidding to take ownership of one or more clusters.

The definition of clusters should consider the following principles:

- Clusters should be **limited to 5 – 10** and should be defined **based on anticipated future demand** in GPs/service areas
- All clusters defined should be **near-equal in terms of lifetime profitability**. This can be achieved by combining high and low profitability areas in a region with a similar approach being followed across regions
- An **RFI process should be conducted to identify the number of interested consortiums**. The number of clusters should be comparable to the number of interested consortiums
- Each cluster should have **built-in financial viability**

Determining award caps

Award caps for one participating consortium should be "discovered" by taking into account the following considerations

- **Market discovery**: Definition of award caps should be precluded by a thorough market discovery process to determine demand and anticipated levels of private sector participation per region
- **Controlling monopoly**: Award caps should be defined to ensure that no single consortium is allowed to control a majority of service areas or VGF outlay in the country. The determination of "majority" would be through the market discovery process
- **Maximizing participation**: All eligible consortiums should be allowed to participate. Award caps should be set based on anticipated levels of participation from private consortiums which can be identified through an RFI process prior to releasing RFPs

Bid evaluation

In addition to determining award caps through market discovery, such **caps can be altered per region based on evaluation of participant bids** – to ensure potential monopolistic moves by consortiums are identified and reduced:

- **Number of bids**: During the RFP process, award caps can be readjusted during the bidding process (between evaluation rounds or clock rounds in the case of an auction model). This will ensure caps dynamically follow demand (participation levels)
- **Financial strength**: Consortiums should be limited to manage service areas/clusters based on their financial strength. Financial standing of the consortium should be evaluated against the total capex outlay required to build in multiple service areas/clusters

Technical capabilities: Consortiums should have enough technical resources (personnel, tools) to manage parallel network rollouts

Measures to avoid monopoly

Q7	What measures are required to be taken to avoid monopolistic behavior of executing agency?

Focused measures need to be included in the structuring of the BOOT model and in the contractual agreements made with the executing agency, towards reducing chances of monopolistic behavior.

Wholesale-only model

- The executing agency should be allowed to provide only wholesale access to the network
- If an entity participating in a consortium is interested in providing retail services, they may do using a **separate legal entity**
- However, the entity would be required to purchase wholesale bandwidth at the same **standard wholesale access rates** as other operators/service providers
- In addition, there should clear **redressal mechanisms/forums** to quickly address retailer/reseller complaints on discriminatory access

Regulatory ombudsman

- Instituting a regulatory watchdog with full access to operational and financial information of consortium participants will provide **required control and periodic validation of non-discriminatory access**
- The agency will also **liaise with the Central Competition Commission (CCI)** or its equivalent and utilize its guidelines to prevent a monopoly and/or any conflict of interest

Distribution of dark fiber ownership

- The available pairs of dark fiber per GP/region should be apportioned between the following entities/purposes
  - Government services delivery (including Central, State, GPs and Municipalities)
  - Wholesale access to be provided by the executing agency
  - Wholesale access to be provided by BBNL
- Allocation of a part of the fiber capacity to BBNL/BSNL to offer to service providers through a **wholesale model will limit the monopoly of the executing agency** in the service area
- In the event of **windfall profits** in a particular service area, the allocation of fiber capacity to BBNL will **ensure that the Government gets its share of the profits**

Service price controls

- TRAI/BBNL or another watchdog agency should be responsible for setting wholesale and retail bandwidth prices, which would be cascaded to individual service areas
  - **Wholesale access** to middle-mile network should be made available at **nationwide standard prices** set by BBNL. The executing agency should be contractually required to sell at this price only
  - **Retail service prices** should be allowed to **float freely between upper and lower price caps** set by BBNL. Both the executing agency and BBNL/TRAI/watchdog agency should continuously monitor service pricing by retail service providers/resellers

Terms and conditions

Q8	What terms and conditions should be imposed on the executing agency so that it provides bandwidth/fiber in fair, transparent and non-discriminatory manner?

Terms and conditions included and effected through contracts established with executing agencies can be used to ensure fair allocation of bandwidth in a non-discriminatory manner. The following critical terms and conditions need to be defined in these contracts.

Pricing transparency

Wholesale and retail prices should be regulated through a central agency (BBNL/TRAI/independent watchdog):

- The executing agency should be required to demonstrate adherence to regulated pricing by **developing open dashboards that shows pricing information** used for sale of wholesale access
- The executing agency should also **include information on contracts executed** with retail service providers for offering wholesale access with related pricing
- The information made available is subject to public scrutiny and independent audits

Network utilization

It is imperative that BBNL/TRAI/independent watchdog has **near real-time access to network availability** and utilization metrics from executing agencies:

- The agencies should be required to create dashboards/websites that catalogue this information
- Network usage information should be captured by retailer, service area and service type
- Such information can be used to identify **underutilized network capacity with retailers** and pursue them to release such bandwidth

Independent audits

Operations and finances of executing agencies should be subjected to independent audits by BBNL, TRAI and independent auditors.

- In addition to penalizing poor network quality and availability, agencies should also face **monetary penalties for** any instance where the agency has been identified to be in violation of **terms and conditions pertaining to non-discriminatory access**
- **Repeated violations should result in termination of contract** with the executing agency and re-opening cluster/service area to bidding by other consortiums

Subject to RTI / equivalent mechanism

Executing agencies should be subject to Indian Government's **Right to Information (RTI) regulation and scrutiny by Competition Commission of India** (CCI). Requests for information to the executing agency should be serviced in accordance to pre-defined SLAs. The agency should also catalogue all such requests to be made available for public access.

Implementation flexibility

Q9	What flexibility should be given to the agency in terms of selection of route of laying optical fibre, construction, topology and deployment of technology?

A balance needs to be established when assigning ownership and enabling flexibility during the planning, design and construction stages between the private and public sector entities involved. In process chains where significant interfacing with public sector agencies is required, BBNL/TRAI should take ownership of threads to guarantee execution in the fastest way possible. Similarly, the private sector can bring process efficiencies to fast track other threads.

Flexibility could be limited due to the need for tight integration of networks and long lead-times in working with public sector agencies for approvals.

The table below highlights the potential ownership and flexibility required for different threads.

Dimensions	Primary Ownership	Ownership Dynamics
Technology choices and interconnect design	*BBNL/Central Govt. technical panel*	• BBNL or a Central Govt. technical panel should be responsible for establishing technology choices and network design standards • Elements: topology/GPON architecture, fiber/wireless/satellite/wifi choice, point of interconnect design, NOC integration model and data center design
Regional network design	*Private consortium*	• The private consortium is responsible for optimizing network design per region while adhering to broader design and interconnect standards defined • Once optimized, the consortium should be required to have the final design reviewed and approved by BBNL/technical panel
Route selection	*Central Govt./BBNL*	• Central Govt./BBNL should be responsible for route selection (as finalization of route and land acquisition can have significant lead-time) • They should perform appropriate market discovery to ensure accuracy • Final route per region should be included in RFP for private participation • Close coordination required with agencies responsible for ROW
RoW approvals for construction	*Central Govt./BBNL*	• Central Govt./BBNL should acquire required RoW approvals • 90 – 95% of RoW approvals should be finalized prior to rollout start • State Govt. participation in consortiums can accelerate regional approvals
Network quality	*Private consortium, independent auditors responsible for monitoring quality*	• Private consortium is responsible for construction and network quality • Independent auditors and design engineers assigned by BBNL to the region are responsible for periodic monitoring of network quality

Viability Gap Funding (VGF)

Q10	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?

A mix of private sector investments, supported by Viability Gap Funding (VGF) from the Government, **could be well suited to ensure financial viability** in the BharatNet context. The mix will ensure that private sector interests are preserved, which will in turn incentivize participation. Determining VGF per region and VGF caps requires suitable market discovery for demand and revenue potential. However for these the existing VGF guidelines of the Government of India may need to be managed

Determining VGF per region

- VGF per region should be determined by performing a detailed demand vs. cost assessment for the region
- VGF should be evaluated using a "project" approach
- Factors to consider for VGF determination
  - Revenue potential, profitability, cash flows
  - Cost of construction (capex outlays required)
  - Network utilization levels during operational period
  - Network asset depreciation during contract period
- VGF per region should be sufficient to recover a minimal ROI on the invested costs

Establishing caps for VGF

- VGF cap determination requires detailed market price discovery process
- VGF should be restricted to a certain level per region to ensure that majority investment is done by the private consortium
  - This is to ensure that private consortium buys into the ownership in the BOOT model
- VGF caps should align with the definition given in the Department of Economic Affairs' guidelines

Payments to private consortium

- VGF outlay should be linked to physical and financial milestones determined prior to the RFP process
  - VGF should vary within defined positive and negative ranges based on performance of deployment
  - Construction phase: Evaluation focus on output parameters – so long as the output SLAs are met
- VGF should be distributed in a **step-up** manner across the remaining years of asset ownership to ensure motivation through the period

Incentive structure

Q11	What kind of fiscal incentive and disincentive be imposed on the agency for completing the project in time/early and delaying the project?

The absence of a clearly defined incentive structure, enforced through the measurement of a holistic set of KPIs, was one of the key reasons for the delayed execution of NOFN. **The absence of linkages between performance and revenue/profitability will adversely impact execution speed, timelines and quality.**

Enforcement of a suitable incentive/disincentive structure **requires validating performance of the executing agency through measurement of KPIs**. The validation can be done by making it mandatory for the executing agency to publish these metrics of performance periodically during construction and operational phases or through independent audits.

KPI dimensions for incentive evaluation

Transparency	**Adherence to plan**	**Efficient utilization**	**Construction safety**
Network utilization	**Network availability**	**Customer feedback**	**Quality**

The incentive structure can be enforced using a combination of variation in VGF, bonuses and penalties tied to performance against KPI categories defined above. **The structure should be defined in a way such that the cost to the government from payouts is kept standardized across years**.

VGF variation

Based on performance of the executing agency during a particular period, the **VGF payout for the period can be varied by specific percentages pre-defined during the RFP process** and the contract signed with the executing agency. The ranges can be different for the construction and operations periods.

Bonuses

Annual bonuses can be provided based on performance of the agency during the period, both linked to construction as well as demand generation. The **bonuses should be linked to timeliness and quality of construction** during network implementation. **Network availability and utilization can be similarly suitable metrics during the operational** phase. Bonus payout can be in the form of **direct payments or an increase in the share of network revenues** for the executing agency for the period under consideration.

Penalties

Similar to bonuses, sub-par performance by the executing agency should be addressed by imposing monetary penalties. Penalties can in the form of **liquidated damages for the period of delay, or a reduction in the share of revenue** for the executing agency during the corresponding period. Before imposing penalties, the executing agency should be **compensated for any delays and sub-par performance caused by externalities** (delays in RoW approvals, site availability, climate-dependent delays, etc.).

Ownership tenure

Q12	What should be the tenure/period after which the ownership of the project should be transferred to the Government?

Asset ownership tenure is a critical lever in structuring the BOOT model as it has a high impact on the financial viability of the project for the private sector. Determination of asset ownership tenure requires detailed evaluation of regional demand potential over a 20 – 30 year horizon (similar to the project based approach used to determine VGF per region) and also keeping in mind the life of the asset

Considerations for determining asset ownership tenure

- **Revenue potential**: Financial viability, and hence ownership tenure, is dependent on forecasted revenue potential per region, project NPV, **break-even period (construction cost recovery)** and potential for windfall profits in the region
- **Asset-life span**: Structuring network maintenance and upkeep requires a clear understanding of the **expected life-span of the network, depreciation of the fiber assets** and the investments required through the years to ensure network upkeep
- **Technology obsolescence**: Given the rapid changes in technology and depreciation of the value of unit bandwidth, it is necessary to **include provisions for network upgradation during the ownership period,** to prevent the asset from becoming obsolete. This will ensure that the BharatNet network is state-of-the-art, and is comparable to continuously upgraded private operator networks
- **Network utilization**: Forecasting network utilization over a longer term (10 – 20 years) based on expected demand will help determine a **suitable time to transfer ownership of the network** back to the Government, while limiting service disruption
- **Termination**: Provisions should be included in the contract to terminate the ownership tenure of the executing agency prematurely and revert ownership back to the Government, if the executing agency does not meet the SLAs defined

Structuring ownership tenure

Ownership tenure can be structured to separate base ownership, renewal and capacity addition contracts separately based on evaluation of the considerations mentioned above

Base Tenure	Contract Extension	Capacity Addition
▪ Establish standard base tenure across regions/clusters for participating consortiums ▪ Fiber replacement to extend asset-life should be included in base tenure	▪ Provide the option of extending the BOOT contract, post expiration of base tenure, to consortiums ▪ Consortium to have right to refuse extension in which case the contract is opened for public bidding	▪ Capacity addition should be included in base tenure/extension contract ▪ Consortium should be responsible for adding capacity to meet demand and SLAs

Managing windfall profits

Q13	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?

Windfall profits are typically defined using thresholds on projected revenues. Actual revenues that exceed these thresholds can be considered as windfall profits and shared among stakeholders in a pre-determined manner.

Defining and monitoring windfall profits

1. **Defining windfall profits**
   - Leverage regional market discovery process to define benchmarks for potential profitability
   - Windfall profits should be defined using thresholds on projections (say, profits exceeding 20% of project profits)
2. **Financial audit by ombudsman**
   - Participating consortiums should be required to submit annual/quarterly financial closure statements which will be audited to determine profit share (windfall profits)
   - TRAI/BBNL or an independent agency to function as the auditor of financial statements

Guaranteeing Government share of windfall profits

Partial asset ownership and standard revenue share defined in the contract with the executing agency will guarantee that the Government gets a share in the event of windfall profits.

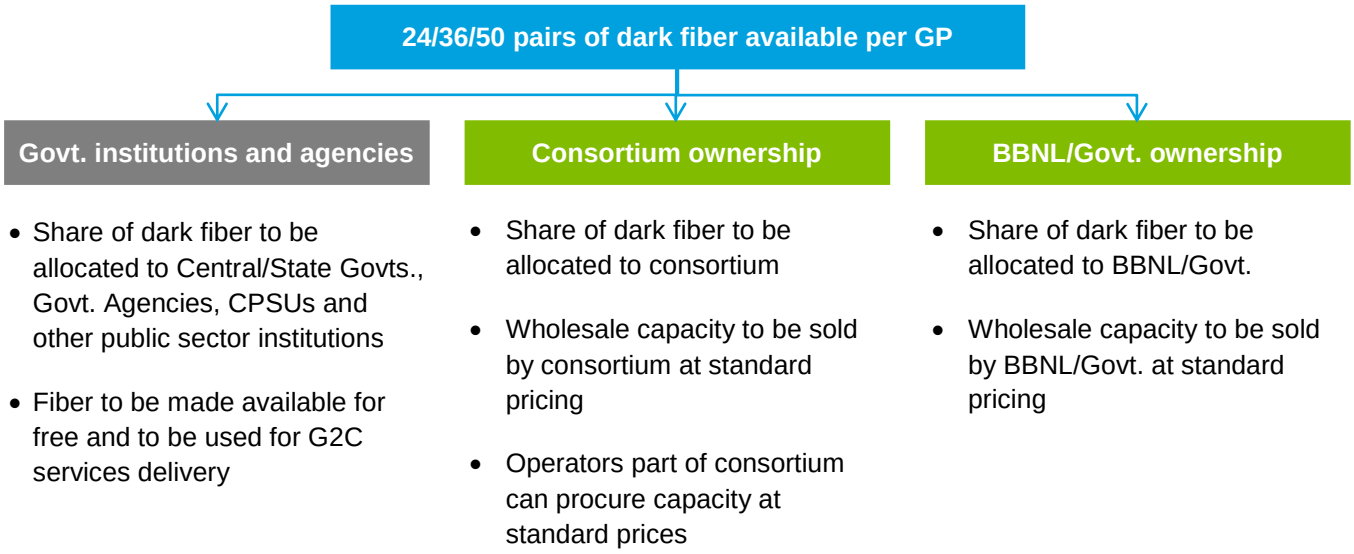
3. **Standard revenue share defined in contracts**
   - Pre-defined share to be included in contracts for Government to partake in windfall profits (profits exceeding threshold)
   - Balance revenue share with ensuring adequate profitability for participating consortium
4. **Revenues through dark fiber ownership**
   - A portion of dark fiber asset per region should transition to the ownership of BBNL/Govt. to enable non-discriminatory wholesale access
   - Revenue streams from selling dark fiber capacity to retailers/resellers will ensure a share of windfall profits (as long as wholesale pricing is standardized between Government and consortium)

Dark fiber allocation to increase participation

Q14	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?

Despite enforcing measures and contracts to curtail discriminatory practices for wholesale bandwidth allocation, **there is potential for the executing agency to procure available bandwidth in a region through a separate legal entity and monopolize regional markets**. To prevent this, a portion of the middle-mile network capacity (pairs of fibers) can be assigned to BBNL/Central Government. BBNL/Central Government should have the authority to allocate this capacity to operators that are not part of the executing agency consortium.

The following graphic represents a potential way to split available dark fiber pairs per region



By this mechanism, **preferential allocation of bandwidth** to other operators would not be necessary as they can procure available bandwidth from BBNL/Central Government at standard wholesale prices. In addition, conditions requiring separation of wholesale and retail activities of the executing agency into separate legal entities will ensure transparency in bandwidth purchase and use.

Benefits of the approach

- Utilization of network is determined by open market demand without any preferential allocation
- Absence of restrictions/caps for operators in participating consortiums encourages utilization and service delivery, even if other private operators are not interested in a particular region/cluster

Broadband affordability

Q15	What measures are required so that broadband services remain affordable to the public at large?

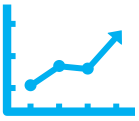
TRAI/BBNL has a critical role to play in ensuring that service pricing is regulated and enforced in a uniform manner to guarantee affordability of services. **Though it is necessary to allow retail service pricing to move freely under open market demand dynamics, price caps should be used to define boundaries.**

The following measures are critical to ensuring broadband affordability in regions:

Ensuring adequate competition

TRAI/BBNL should institute and enforce price caps and competitive pricing scenarios through **regulation and contracts with private consortiums and retailers**. In addition, the competition commission should periodically monitor service pricing to **detect and eliminate price cartelization** in any regions. Each region should continuously be monitored to ensure adequate open market competition.

Enforcing service price caps



Retail service price caps **(high and low price caps)** should be established at the national level and cascaded to individual regions

- All service providers should price retail bandwidth below the high price cap
- Retail service price cap is independent of the type of service being offered and instead is based on a **price per unit bandwidth model**
- Retail service providers should be **allowed to float service pricing freely** based on market demand as long as pricing is between the price cap range

A possible model could be similar to the **electricity regulator model** where the tariff has to be approved by the regulator based on **cost of service delivery + any subsidies** need to be provided and tracked separately.

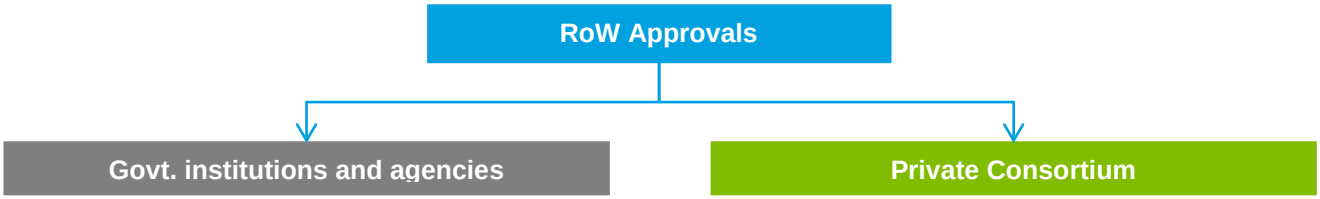
Using regulation to moderate

TRAI/BBNL should periodically monitor wholesale bandwidth and retail service demand to adjust price caps based on market price discovery. The agencies should ensure/enforce contractual obligations related to pricing (through monitoring dashboards created by the executing agencies and through independent audit of operations).

RoW approvals

Q16	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?

Ensuring timely Right of Way (RoW) approvals requires precise coordination between BBNL, CPSUs, the executing agency and public sector entities. **It is essential that 90 – 95% of the required RoW approvals across regions be completed prior to the start of the construction activity** (during planning and design phases). To achieve this, there should be clearly defined ownership of different aspects of the approval process between the Government and the executing agency.



Responsible for

- Guaranteeing RoW approvals through MoUs and direct involvement to remove delays
- Providing bank guarantees (or waiving them) to support private consortiums for RoW approvals
- Making annual lumpsum payments to CPSUs (NHAI, GAIL, Oil Cos) for RoW approvals (to avoid per RoW payment)

Responsible for

- Identifying and pursuing RoW approvals through workback schedules, to ensure approval availability prior to construction start
- Developing route surveys and other related documentation required to pursue RoW approvals

Safeguards to reduce impacts of RoW delays

Though it is necessary to enforce strict penalties against delays (as defined in the incentive structure earlier in the document), it is equally critical to **ensure that the executing agency is not adversely penalized due to RoW delays.** The executing agency will likely have limited control on these delays and the Government is required to ensure timely availability of the same.

Safeguards that compensate and protect the executing agency from delays in RoW approvals need to be put in place in the incentive structure:

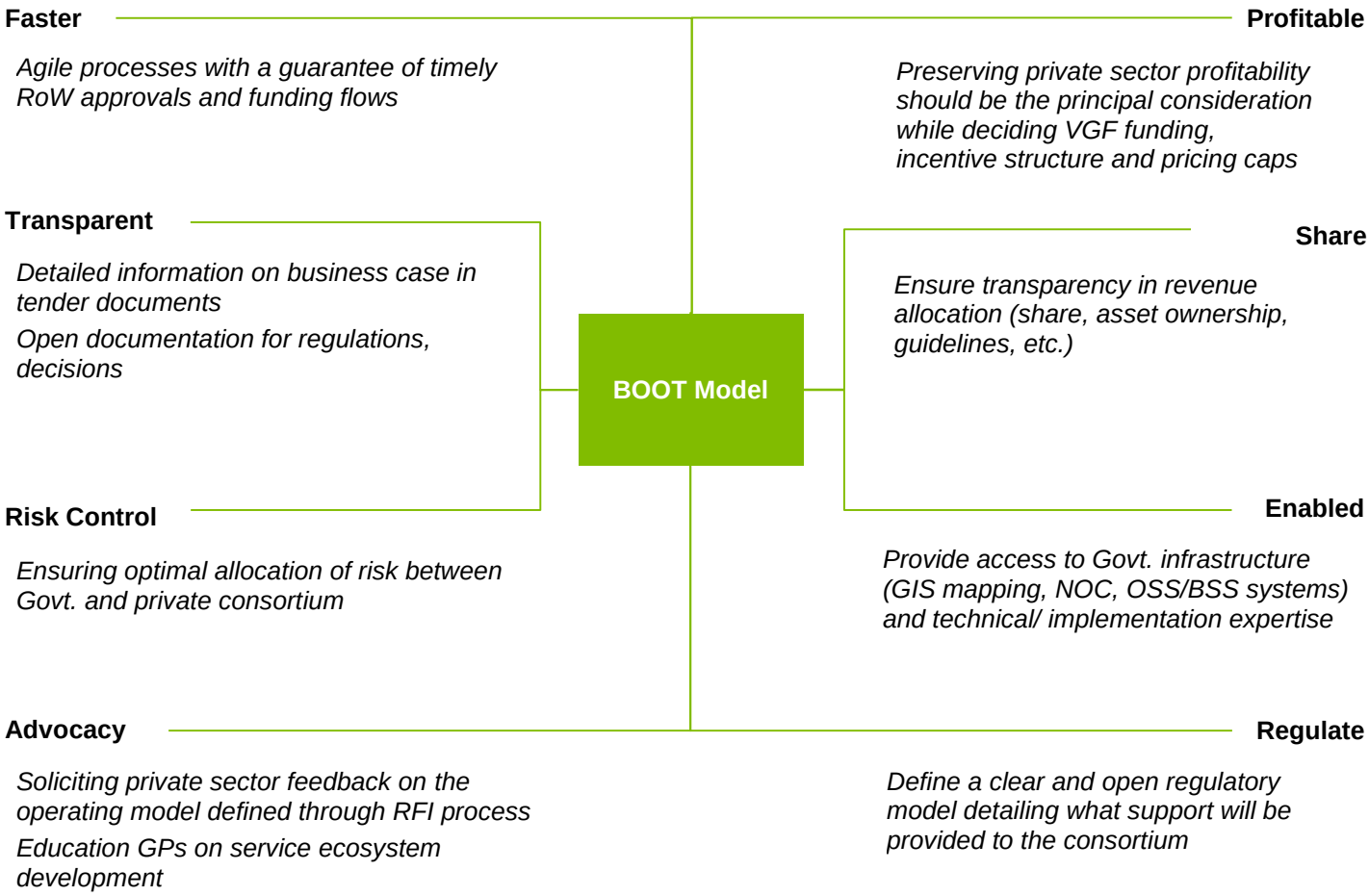
- **Compensation**: The private consortium should be compensated for any losses incurred due to stalling of operations as a result of RoW delays (unutilized labor, equipment rental, etc)
- **Alternate options:** Beyond a pre-defined delay duration, the private consortium should be free to pursue alternate technology and implementation models. The cost of change should be borne by the Government.
- **Incentive adjustments**: Penalties incurred by the private consortium due to construction delays and not meeting plan should be adjusted by the duration of delay due to RoW processing

Private participation

Q17	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?

Fostering a service oriented ecosystem, building a viable business case and developing focused regulation are all instrumental for incentivizing increased participation from the private sector. Elements of the BOOT model should be defined from the **perspective of private sector participants considering their mechanisms of evaluating viability and presence of an enabling atmosphere for operations**.

When structuring the BOOT model, due attention must be accorded to the dimensions depicted in the graphic below.



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