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Telecom Regulatory Authority of India
Mahanagar Doorsanchar Bhawan
Jawahar Lal Nehru Marg
New Delhi – 110 002

Kind Attention: Sh. Kapil Handa, Joint Advisor (NSL-I)
Subject: Consultation Paper on Implementation Model for BharatNet
Reference: TRAI's Consultation Paper dated 17th November, 2015

Dear Sir,

This is in reference to the above captioned Consultation Paper.

Please find attached Vodafone's inputs on various issues for your consideration.

Thanking you.

Yours faithfully,
For **Vodafone India Limited**,

P. Balaji
Director- Regulatory, External Affairs & CSR

Enclosures: a/a

Cc: Chairman, TRAI
Shri Anil Kaushal, Member, TRAI
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Response to Consultation Paper on Implementation Model for BharatNet

Introduction

BharatNet envisions to meet the digitally connected agenda by reaching broadband connectivity to 2.5L Gram Panchayats for public services and serving the needs of all central policy objectives with benefits of affordability to the intended user.

Hence cost and timeline for implementation of the BharatNet project become two crucial factors to address.

The rural market is not fully ready yet. The eco-system, availability of affordable handsets, digital literacy etc. are some of the key factors which would impact the returns on investment and influence the decision making, as well as, the pace of implementation.

Government alone cannot fill this gap. Private sector participation would allow government to leverage the existing resources and investment, so that government funds can be targeted efficiently and effectively.

This would translate to taking a holistic approach and also leveraging the opportunities provided by technology. **A mix of fixed and wireless technology (for backbone transmission, and local access) to build BharatNet network and engaging the operators from the middle mile level could help faster and cost effective network.**

The private participation amongst the private stakeholders could be encouraged by one or all of the following proposed steps:

- The collaborative, complimenting role of each of the stakeholders including mobile operators, the existing fixed line operator, the government –
- Identifying the key aggregation points till which the fibre network could be built and further engaging the operator on the areas that can be offered / taken by them.
- The BharatNet agenda can be enabled by operators by upgrading their physical site infrastructure

Government support through performance linked benefits by incentivising the Industry with phased reduction in USOF, (SUC), basis the rural coverage achieved. This would motivate the Industry towards higher participation and investing in building on the required and existing assets.

Phased approach for deployment, offering reinvestment utilization opportunities

Right combination of fibre supported by microwave technology can help bridge the coverage gap in a much faster timeframe and substantially lower cost for reaching broadband connectivity to Gram Panchayats

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?

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.

Q1 & Q2 Response:

The “Report of the Committee on NOFN” does cover most of the challenges of the three models and it is recommended to consider further the solutions which are practical and doable.

Execution challenge:

The execution of a project of this magnitude and size requires project management, ROW permissions, handling rolling out in difficult areas involving law and order and needing sufficient incentive for taking the risk.

Rather than the avenues proposed by the three models, the solution can be explored through a model that relies on service providers, electricity transmission and alternative methodologies. A joint venture route which in a way is a combination of two approaches would bring down the cost of execution. It would also resolve many execution and uptime challenges like power availability in rural India, ROW challenges in forest areas, law and order problem areas and terrain areas like in J&K, HP & Manipur etc. Through private sector & PSU partnership, project management skills challenges can be overcome.

Demand challenge:

Creation of fibre infrastructure is not enough, until the utilization of the infrastructure is not contemplated properly. In creating demand lies motivation and development of the eco-system and performance / reach linked incentives to attract investment in rural markets, for example making it viable to create local wireless and wireline broadband in rural India & government must auction 700 Mhz spectrum and doing so will create demand for the fibre to be laid for mobile backhaul.

To create sufficient rural demand government should bring the cost of gadget ownership down to less than Rs.1000. Policy promoting tablet / phone manufacturing with indirect subsidies of free land, free power supply, tax rebates on manufacturing such gadgets in India can help in the same.

Cost overrun challenge delayed rollout hence:

Since the solutions are not thought out in detail the possibility of cost overrun is extremely high. The three approaches are based on primarily underground fibre roll out as the mainstay method. A much more efficient infrastructure, and one that is quicker to roll-out, can be created with a combination of microwave backhaul, aerial fibre and balanced use of underground fibre depending on what technology is appropriate and efficient in a given area.

This would require a completely different partnership models to those proposed in the “Report of the Committee on NOFN”; it would involve partnerships between private telecoms and EPC companies for execution in conjunction with State electricity transmission corporations.

In order to help to mitigate the risk of over-recovery of cost, it is also important to have transparent, competitive contests for public funding. If more than one operator provides and runs publicly funded networks, costs can be checked between them to see if they are comparable before contracts are awarded.

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.

And

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

Response:

BOOT is a good model for achieving the objectives of the project, provided the BOOT operator finds the same attractive.

A PPP model should be adopted, which provides sufficient incentive to encourage the private sector to form a Joint Venture.

The BOOT operator should be rewarded, if the project is completed before time.

The BOOT operator should bid for minimum financing to win the contract via a transparent and competitive tender process. Additional tender criteria ensure that other important objectives are achieved, such as service quality and financial sustainability.

Any private company winning the tender would automatically be based on most optimum infrastructure creation since there money is involved & hence most innovative solutions would be thought through. This would ensure best practise emulation as multiple BOOT operators would learn from each other. It would also get most efficient technology solution causing faster implementation also.

*The following risks may be present in a PPP project that would require institutional mechanism in handling and clearly agreed within a contractual framework:

1. **Technology Risk** –the biggest risk in Telecom. Unlike mature sectors like transport where user behaviour is predictable and technology risks are limited, Telecom is significantly impacted in this risk.
2. **Market Risk** – level of competition, services, usage, areas of operations and customer behaviour can impact telecom, hence this is another risk that should be managed
3. **Operational Risk** –RoW permissions, citizens’ activism, land issues, inadequacy of access spectrum also impact network rollouts
4. **Financial Risk** – this can be managed relatively better in PPP since capital/financing can be contributed by private entities, Governments (Central/state), grants from agencies etc.

5. **Compliance/Regulatory Risks** – A constant tracking of the project milestones against achievements, monitoring of network performance against parameters is required but may also entail risks of regulatory interventions. Higher regulatory levies like USO, SUC levies need to be lowered to ensure viability of business increases on its own in long term

BOOT is a good model for achieving the objective, provided the BOOT operator finds it attractive.

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

Response:

Conflict of interest / monopolistic tendencies can potentially be managed through mandatory sharing / swap of fibre by BOOT players of different circles/States (as a construct of the project) & thus creating at least three to four companies in each State selling same product.

The swap should be based on pricing formulae that can be determined by a regulator based on cost.

Competition created under this model would lead to more efficient creation of infrastructure as the BOOT operator would operate on marginal costing based calculations.

However, it should be considered that the terms and conditions need to be attractive enough for a sufficient number of operators to be interested in becoming a BOOT operators in different States. Furthermore regulatory safeguard requirements would be required (see response to question 8 below).

In the event that competition is not created through the mandatory sharing / swapping of fibre envisaged above, the most effective way to ensure competition is to impose a requirement or to prefer a wholesale-only operator.

Careful design of the tender for the project can promote the outcomes required, e.g. a wholesale-only operator and high-quality solutions by including weighted criteria against which each bid is evaluated. In addition to the amount of financing required and the overall cost, the eligibility and bidding criteria should include:

Service and quality parameters that ensure the right level of service will be delivered and reward operators who offer high quality;

Type and quality of wholesale product that would be made available as an open access product on a non-discriminatory basis (e.g. dark fibre, bandwidth); the availability of wholesale products for mobile backhaul is a critical consideration, as commercial mobile broadband investment can maximise the reach of the benefits of public funding;

Quality of the financial plan, to guard against unrealistic bidding; and

Governance structure. Where the type of governance structure is not a pre-requisite for participating in the tender, this is a crucial factor to be included in the tender to promote a pro-competitive outcome. Wholesale-only solutions, achieved through structural separation or special purpose vehicles embed non-discrimination.

Q.6 Should there be a cap on number of States/ licensed service area to be bid by the executing agency?

Response: There should be a cap of maximum number of States to 3-4 as this would ensure adequate capital participation, focus in execution and simultaneous development of all States.

Q.7 What measures are required to be taken to avoid monopolistic behaviour of executing agency?

Response: Please see response to Question 8.

The executing agency could be asked to honour the requirements for a mix of easy and non-easy geographical terrains.

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

Response:

Considerable care and expertise is required in the design and pricing of wholesale products and under both the mandatory sharing proposal described above and a wholesale-only model there are limitations to the outcomes that can be achieved (e.g. transparency) without additional regulatory intervention.

Obligations should be placed on recipients of public funds to provide wholesale services on a transparent and non-discriminatory basis. Wholesale price regulation is also likely to be required. Where there are competing wholesale operators under the mandatory swap model, competition should result in the offer of attractive wholesale products at market-determined rates. However, a regulatory backstop of a maximum wholesale price may still be required in case effective competition does not materialise due to lack of take up or due to the risk of co-ordination between the regional operators. If there is a single operator, even if they are wholesale-only, access should be made available on cost-based prices to avoid monopolistic pricing behaviour.

It is critical to ensure that operators who are purchasing wholesale services and retail operators are involved in the design and development of the products offered by the BOOT operator. In particular, this is needed to ensure that they are fit-for-purpose for mobile backhaul, and respond to the real and changing demands of end users.

Beyond this, information on the resources created and the availability of fibre should be made available publicly.

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?

Response:

There should be flexibility to consider alternate architecture, selection of alternate routes, and choice of alternate network topology to offer the rural experience in a phased manner and build on it. To allow execution in timely manner is very important and the use of alternative deployment strategy, which can leverage the existing infrastructure with the scope for upgrade and scalability over time should be considered.

It is recommended that the project should be based on objectives rather than hard coding the method. There should be incentive linked targets to be achieved for the rural penetration.

Also, factors like availability of affordable handsets; readiness of the rural market; Digital readiness; expected revenue and business case etc. are the important gaps to be filled and addressed, to ensure the outcome expected out of the project. Hence a model which allows focus on respective core competencies, **private to focus on deployment strategies and building the network AND Government to create the demand through CSC, ehealth centers (PHC), educational institutions.**

Flexibility to consider a mix of deployment strategies and methodologies including microwave, electricity infrastructure will be much needed.

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?

Response:

Revisiting the exercise on estimation of cost requirements and comparing to achieve cost saving through choice of various methodologies for outreach to the villages with the current requirement of bandwidth need as per the population density, is a recommended starting point for funding exercise.

Project should be based on minimum funding that a company bids to win the project. The competing bids would ensure minimum cost to exchequer and also non escalating budgets. Any windfall profits based on account of innovative practice would also get shared by the practice mandatory swap. The only windfall advantage that any BOOT player would be able to retain would be the extra profits due to lower cost of execution due to technology choice innovations etc, which anyway should be a reward for better execution. This will get negated after the BOOT transfers the property back to government after a period of time.

Extra financial incentive should be added to execute the project faster. Penalty should also be included for delayed execution.

The method to determine the maximum value of VGF would require detailed economic analysis to prepare a viable business case for the bidder/executing agency. It would also depend on the terrain/area mix for the particular package, demographic data of the area, etc.

A phased approach for deployment can offer reinvestment opportunities, which is the case in New Zealand.¹

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

Response:

There should be a performance linked incentive built in the model, an incentive, which can offer a motivation for the deployment agency to deliver in timely manner and be cost conscious in the choice of execution methodology.

The incentive should be enabling, rather than just the basic fiscal incentive.

Government support through performance linked benefits by incentivising the Industry with phased reduction in USOF, (SUC), basis the rural coverage achieved. This would motivate the Industry towards higher participation and investing in building on the required and existing assets.

The implementing agency would have more incentive to bid for the project in case it is able to retain ownership for a longer period and thus require less funding support from the government.

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

Response:

The period after which the ownership should be transferred should be 20 years

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?

Response:

It is believed that there will be very little of profit or high turnover in the first few years.

Any windfall profits based on account of innovative practise would also get shared by the mandatory swap practice. The only windfall advantage that any BOOT player would be able to retain would be the extra profits due to lower cost of execution due to technology choice innovations etc., which anyway should be a reward for better execution. This will get negated after the BOOT transfers the property back to government after a period of time.

¹ Although applicable to the fibre access network, it is interesting to see that the New Zealand Government's preferred model includes a recycling mechanism that allows Crown funds to be invested in infrastructure more than once. Crown Fibre Holdings funds communal infrastructure (fibre that passes the premises) while a commercial partner funds fibre to each premises. In return, each acquires shares in the Local Fibre Company created for this purpose. As premises are connected, the commercial partner is required to purchase Crown Fibre Holdings' shares, thereby releasing the Crown funds to be reinvested in fibre infrastructure. This model has been used with two of Crown Fibre Holdings' four investment partners (an alternative arrangement is in place with the largest partner, Chorus).

Extra financial incentive should be added to execute the project faster. Penalty should also be included for delayed execution.

Q.14 Whether there is a need to mandate the number of fibres to be offered as a dark fibre to other operators to ensure more than one operator is available for providing bandwidth at GP level?

Response:

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.

Q.15 What measures are required so that broadband services remain affordable to the public at large?

Response:

For broadband services to remain affordable, it is important to ensure that the costs of network deployment are minimised. This means ensuring that existing assets of the participants are leveraged rather than duplicating the efforts. In particular, the rural presence of mobile operators could be developed to meet the requirements of broadband and achieve rural broadband penetration in a fast and cost effective manner, promoting affordable prices.

The use of fibre could target at meeting the data requirement at key aggregation points identified on the basis of population and other factors.

Facilitating lower cost rollout options can also extend the reach of competing networks, promoting competition on quality, innovation and price.

*Kindly refer to the paper attached on "Using electricity infrastructure to reduce deployment cost"

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?

Response:

In a Public Private Partnership such as a BOOT model, part of the value of such an arrangement is that the right party can take on appropriate risks. ROW should be the Government's responsibility to manage as such permits are granted by government authorities. Further to this, the risks related to ROW should be assumed by the Government as part of the contract with the executing agency.

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?

Response:

Maximising private sector investment rests on two fundamental tenets:

1. Making the BOOT terms and conditions attractive to private investors, including financing.
2. Facilitating private investment as far as possible on commercial terms by:

Employing public investment only in areas where the Government's broadband ambitions cannot be achieved by the market on a commercial basis so as not to crowd out public investment; and

Taking measures to reduce the costs to the private sector of rolling out broadband networks, such as making available spectrum at a reasonable price (the value of which can be accounted for in other ways, such as data coverage obligations) that can be used for more efficient wireless broadband networks and reducing the costs of site approvals and rights of way.

Government must also take responsibility in stimulating demand for the services required for CSC, PHC, educational institutions etc.

Finland case study: targeted public financing and private sector involvement

Under its "Digital Spine" model, Finland aims to have 99% of permanent residences and businesses within 2 km of a network that enables 100 Mbps. Public funding is directed at underserved areas, while simultaneously a policy action plan is in place to encourage deployment in commercially viable areas. Subsidies are directed only at infrastructure that is further than 2 km from a customer's premises as it is intended to finance backbone and backhaul connectivity, enabling private investment to focus on delivering high speed, high quality access services in areas that otherwise would have been uneconomic to reach. There is an obligation for the operators receiving public funds for the subsidised network to provide open access for service providers on fair and non-discriminatory terms.

The form of subsidy is direct grants to the network operators. Although the maximum level of public financing was increased from 66% to 90% in order to increase the success rate of selection procedures by attracting applicant operators interested in building the subsidized networks, the total amount targeted for subsidies is relatively modest, at €130 million, compared to what it would have been if the network had been extended closer to the customer. In Ireland, a country around one quarter the size of Finland but with a similarly sized population, the funds earmarked for its broadband plan, which includes access network subsidies, are €500 million.

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

Response: Please see "Introduction".



Using electricity infrastructure to reduce deployment cost

– Vodafone Group, 2015

Using electricity infrastructure to reduce deployment cost

- Leveraging existing infrastructure can help reduce significantly the cost of rolling out fixed networks where the civil engineering cost typically represents between 60 to 80% of deployment cost.
- The use of electricity infrastructure is relatively common: in Nordic countries and New Zealand for example, electricity lines co-operative/companies have entered the telecoms market and provide services. In France ERDF is selling access to its poles to local authorities and operators. A more comprehensive and novel approach is the ESB / Vodafone joint venture (JV).

The SIRO Model

- Following a public tender, Vodafone and the Irish state owned electricity company ESB created in 2014 a JV to invest €500 million in building a FTTH broadband network. Fibre will be deployed directly to homes and businesses, initially reaching 500k premises across 50 towns in 26 counties. A Phase 2 (another potential 500K premises) will depend of the commercial success of Phase 1.
- Each partner brings complementary expertise and resources. Fibre is deployed on ESB's existing overhead and underground infrastructure, ensuring a fast and cost efficient roll-out to every county in Ireland and reversing the digital divide between the capital and regional towns.
- The JV will sell FTTH services on a wholesale and open access basis to any operators such that retail competition is stimulated and maximised without the need for retail intervention.
- This is the first time in Europe has seen a commitment to roll-out FTTH using national electricity infrastructure. The main characteristics of the model are:
 - It is a **co-investment model** combining a telecoms company and an energy company
 - It is **private-led investment** contributing to **bridging the urban-rural divide** for fixed ultra-fast broadband
 - The JV is deploying a **future proof and pro-competition technology** with a clear upgrade path, FTTH, ensuring that today and tomorrow's needs of consumers and business can be met
 - It is a 50/50 joint venture which makes it **structurally a wholesale only and carrier neutral entity** ensuring by its very structure retail competition.



Relevant considerations and potential applicability in India

- ESB, the only electricity company in Ireland was keen to optimise its revenues from its state of the art electricity distribution network.
- Backing of the Government was necessary to remove restrictions on business activities and revenues of ESB.
- It took 2-3 years to finalise the project as formal public tendering to become ESB's partner was necessary.
- The extent to which the electricity infrastructure can be used in the roll out of fibre in India will depend on a number of considerations:
 - Structure and ownership of electricity distribution industry.
 - State of the infrastructure and potential for coordinated deployment and therefore cost sharing (electricity companies have rights of way and experience in obtaining necessary permits).
 - Government support: there are often line of business / revenues restrictions that would need to be lifted.
 - Organisational and technical expertise: using electricity infrastructure present specific challenges and security issues. ESB will provide services to the JV, such as supervision of the network roll-out by contractors and maintenance.
 - Coordination and implementation capabilities between the entities involved.
- In France, the electricity line company offers access to its poles and makes agreement with various parties, including operators, local authorities. Some local authorities are involved in the roll-out of networks using subsidies.