

National Optical Fibre Network(NOFN)

***Empowering, Rural India by
DEMOCRATISING INFORMATION
through Broadband***

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Agenda

**National Optical Fibre
Network(NOFN)**

&

Broadband Eco-system

Past 2 days –Role of BB, convergence in Nation Building

- Potential and power of BB **to touch and empower our lives both in urban /rural**
- More so in **RURAL** where bulk of 72% people live bringing fulfillment, **Electronically/online** beginning with **key sectors:**
- Health ,Education ,Governance and Democratisation of information and so on
- Let us touch **Bottom of pyramid**: through resonance of Convergence, Policy, Regulation, **Action** (**Realisation**)

FACTORS RESPONSIBLE Urban-Rural FOR DIGITAL DIVIDE

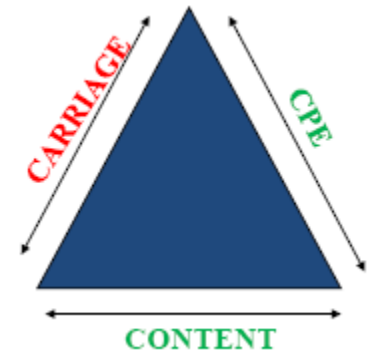
- **Difficult terrain & Scattered Population**
- **Lack of Infrastructure (Roads, Power etc.)**
- **Low income**
- **Higher CAPEX & OPEX, Low ARPUs**

BB a complex Ecosystem

- **BB ≠ Voice**
- **Voice evolution:** 4khz → 64 kbps → 32 kbps →
16kbps → 9600bps 1200bps
- **BB evolution:** Smoke signals-Morse-50bps telex-
Kbps-Mbps-Gbps – Tbps ∞ ?.....
→
- **Foundation of BB infrastructure= OFC**
- Power of fiber to cope growing needs of BB well understood

2-BB complex Equations

- BB ≠ Voice
- AVL Good BB= $\underline{\text{BHN}} + \text{AN} + \text{User D} +$
Con. + Lit + Awareness + AFFORD +
Trust+ Felt need
Felt need= natural for voice
= Cultivated by society for BB
Eco-system = simple for voice
= complex for BB (3C- triangle)
- Rural BB = Filling Gaps in BH+AN---unbalanced eqn. at
Bottom of Pyramid



Policy Aspiration of BB

Draft NTP-2012

- **TODAY**: No. of BB connections (≥ 256 Kbps) =13.5 million (Jan 2012)
- **Vision** : *BB on Demand*
- *Increase rural teledensity from 35 to 60 (year 2017)*
- *100 (year 2020)*
- *Affordable and reliable broadband on demand(year 2015)*
- **BB connections targets**
- *175 million -(year 2017)*
- *600 million -(year 2020) at minimum 2 Mbps DL speed*
- *higher speeds of at least 100 Mbps on demand.*
- **Recognise telecom and BB connectivity** as a basic necessity like education and health & work towards '**Right to Broadband**'.
- **Synergise between** existing, on-going and future **Government programs** viz e- gov, e-panchayat, NREGA, NKN AADHAR, AAKASH tablet etc. & **BB roll-out, Sharing;**
- ***GAP? : Miles to go ! How to we leap frog?***

How do we meet aspiration?

- **Urgent need for inclusive growth through BB**
 - **Deployment** of a National Broadband infrastructure is a prerequisite-
 - **Indeed A gigantic and challenging task**
 - for vast country with diverse terrain and diversity of people.
- **Need for STIMULUS- to trigger BB Eco-system**
- **Questions:**
- **Where required? From whom? How?**

Prerequisite to BB Proliferation- Study

- Deployment of a **National Broadband infrastructure** is a prerequisite,
- **Way forward:**
- **Understand the Reach** of the **existing infrastructure** (core, middle and access) and
- **to identify and address the infrastructure gaps.**
- **A study** “**Deployment Models and Required Investments for Developing Rural Broadband Infrastructure in India**” was
- commissioned by the **CII** & conducted by **Analysys Mason**.
- Delved deep into the **most appropriate deployment & investment models** for the **Indian context**.
- One of the key findings is the role of the Government.
- Like in other countries, here too, government’s intervention and support is necessary for the broadband ecosystem to reach a critical mass.
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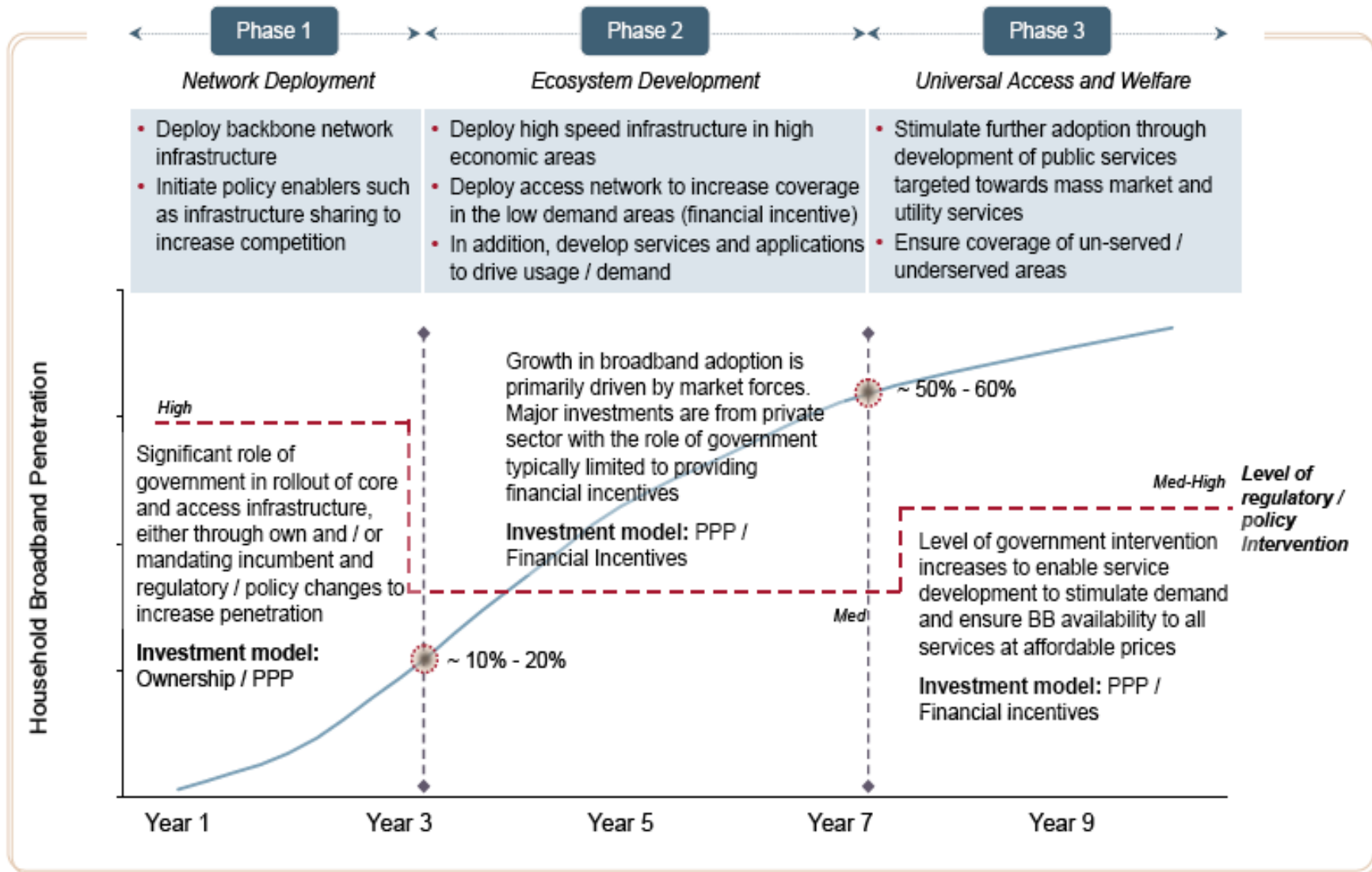
Global study: 3- Investment models possible:

- 1. Ownership**
- 2. Public Private Partnership (PPP) and**
- 3. Financial Incentives**

Depending on Extent of Govt. involvement

- The *Ownership model* has
- the highest level involvement with the govt **deploying** and **owning** the broadband core/middle mile infrastructure
- • The *PPP model* has
- relatively lower level of govt. role, with govt. partnering with one or more private operators in developing the BB infrastructure
- • The *Financial incentives model* defines
- govt's role as a facilitator for providing incentives & grants to public and private sector companies for deploying BB infrastructure, but **without having any ownership**

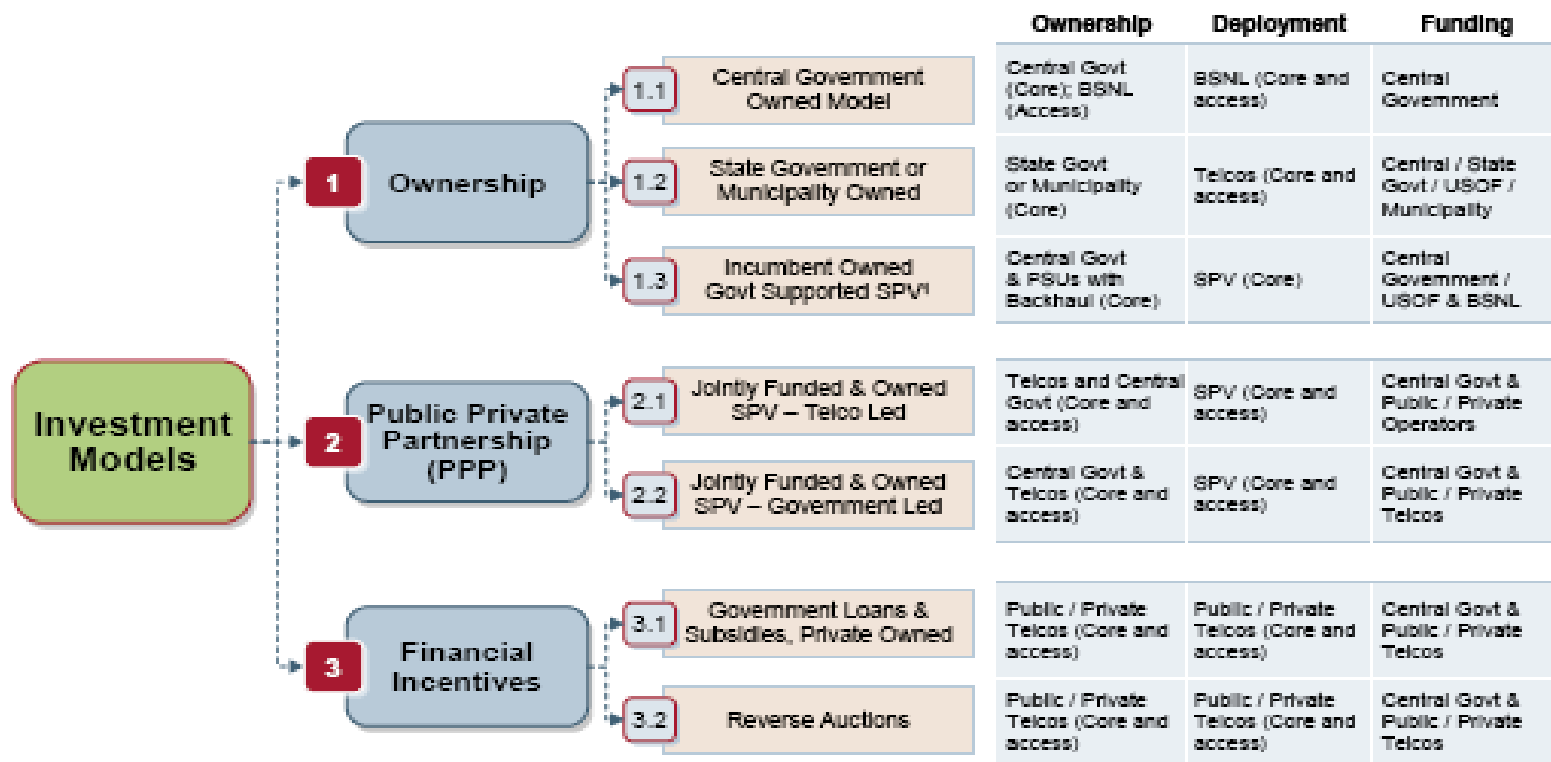
Broadband Evolution and Growth Framework



Investment perspective

Based on analysis of international deployments and industry inputs, there are primarily seven investment models

Preliminary Analysis



INDIAN ADMINISTRATIVE SETUP



Population	1.17Billion 72% Rural
Area	3,287,263 Sq. Kms
States	28
UT	7
Districts	640
Blocks	6,382
Villages	6,38,619

Organisation of villages into GPs








Gram Panchayat= VILLAGE COUNCIL-

Basic administrative unit in villages

-Number crunching: High level view

No. of Villages	6,38,619
No. of Gram Panchayats	2,50,000
No. of Blocks	6,382
No. of Districts	640
Average no. of Gram Panchayats per District	390
Average no. of Gram Panchayats per Block	40
Average no. of Villages per Gram Panchayats	3

Existing Fibre=+8,00,000 Km Reach/Coverage ?

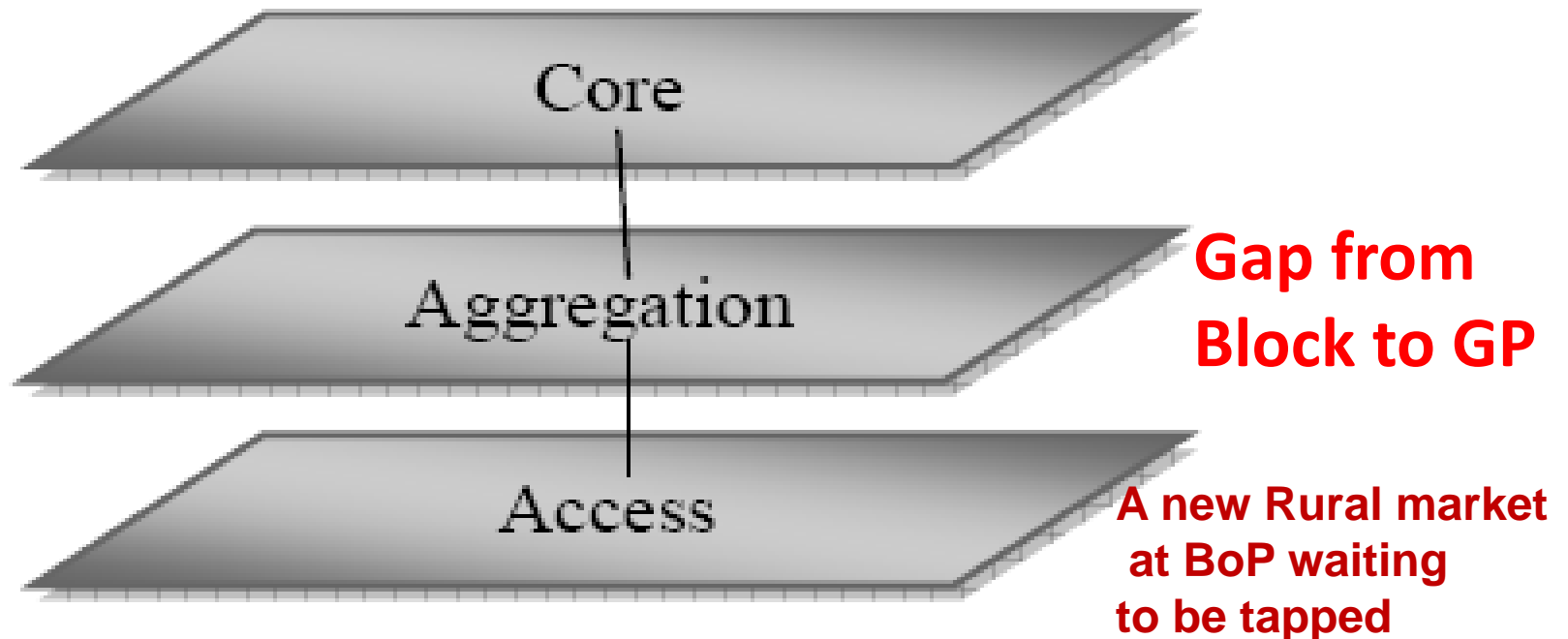
Service Provider	Total Fibre Laid	Cities / Towns Covered	Metros / Tier I Cities*	Other Cities / Towns	Gram Panchayats	Mid Sized Villages	Small Villages
 BSNL	814,755 RKm**	All cities & 28 K gram panchayats	●	●	🕒	○	○
 Reliance	190,000 RKm**	44	●	🕒	○	○	○
 Airtel	126,357 RKm**	130	●	🕒	○	○	○
 Tata Communications	40,000 RKm**	60	●	🕒	○	○	○
 RaiTel	37,720 RKm	600	●	🕒	🕒	○	○
 PowerGrid	21,852 RKm	110	●	🕒	○	○	○
 GAILTEL	13,000 RKm	200	🕒	🕒	○	○	○

Level of Backbone Infrastructure Coverage : Very High ● High 🕒 Medium 🕒 Low 🕒 No Coverage ○

Source: Analysis Mason⁵⁵

Fibre needed

Telecom Network Layers-Gaps in OFC Reach



DIT/BSNL programmes by 2012 cover 2,50,000 GPs
For Panchayats
wimax/wireline/
CSC by DIT

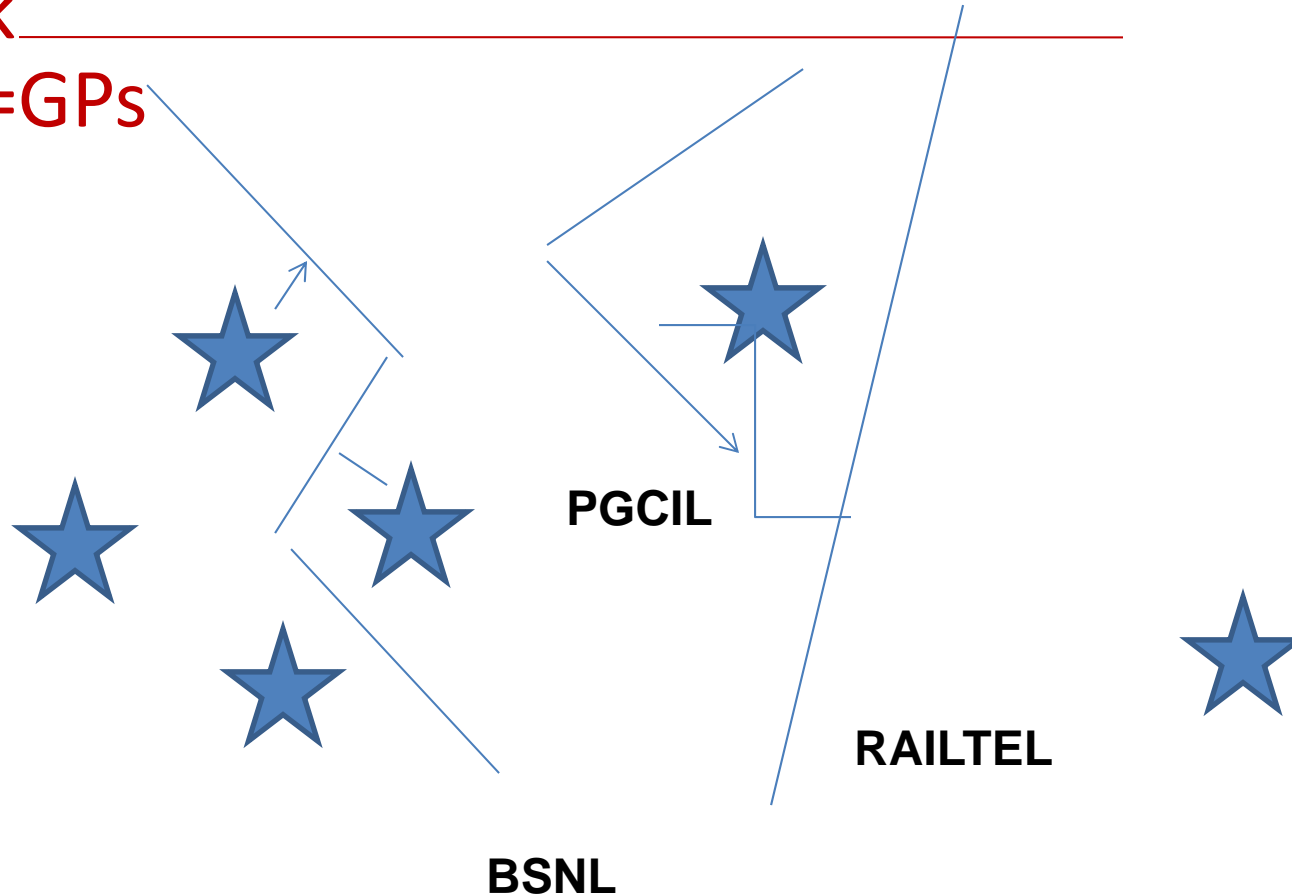
GIS mapping of fibre

- GIS mapping of 3 CPSUs –BSNL,RAILTEL,PGCIL completed by NIC
- GIS Data of few private telecom operators received. Data is inadequate.
- Data from others has requested without further delay.

Rough sketch OFC (Existing + Incremental)

Block

- Stars=GPs



Gaps estimation

- Existing fibers from Block to be leveraged by leasing existing operators (BSNL/RAILTEL/PGCIL)
- On average 2km incremental OFC per GP required from nearest existing OFC to GP
- No. of GPs to be covered 2,50,000
- Incremental cable needed to be laid 5,00,000 Km
- Associated electronics to be mounted on the cable from Block to GPs
- Estimated cost INR 20,000 Crore (**\$4 billion**)

What is National Optical Fibre Network (NOFN)?

- **NOFN** - A Project to connect 2,50,000 Gram Panchayats(GPs) through OFC
- Approved by Gol on 25.10.2011
- NOFN Project will bridge connectivity gap between GPs and Blocks.
- Project to be implemented by NOFN-SPV namely **Bharat Broadband Network Ltd (BBNL)**.
- Envisaged as a **Centre-State joint effort** .
 - **Govt. of India** to fund the project through the Universal Service Obligation Fund (USOF). **Rs. 20,000 Cr.(\$4B)**
 - **State Govts** are expected to contribute by way of not levying any RoW charges (including reinstatement charges)
 - Reinstatement to be done by BBNL
 - Suitable **Tri-partite MoU** to be signed by GOI, State Govt & BBNL

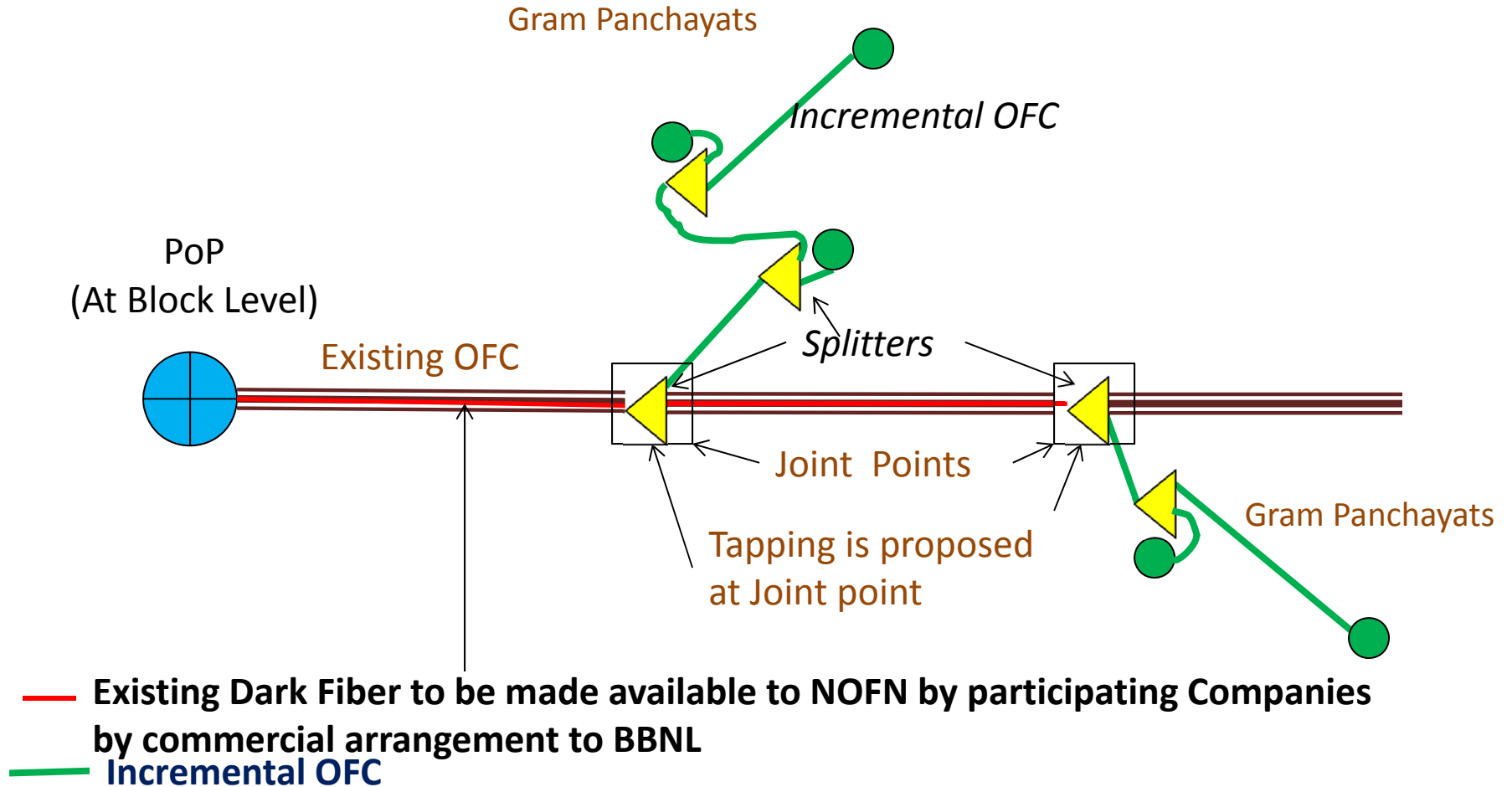
BBNL-Infrastructure Provider

- Bandwidth Provider
- Gap filler in aggregate layer
- Users of NOFN are access operators(TSPs/ISPs/Cable TV operators)
- Enables them to launch various access services
- Operator of operators (carrier of carriers)
- B2B, No retailing
- Non-discriminatory access to all licensed operators
- Seeks to trigger Ecosystem **opening up new Rural markets**
- **Incremental in nature**

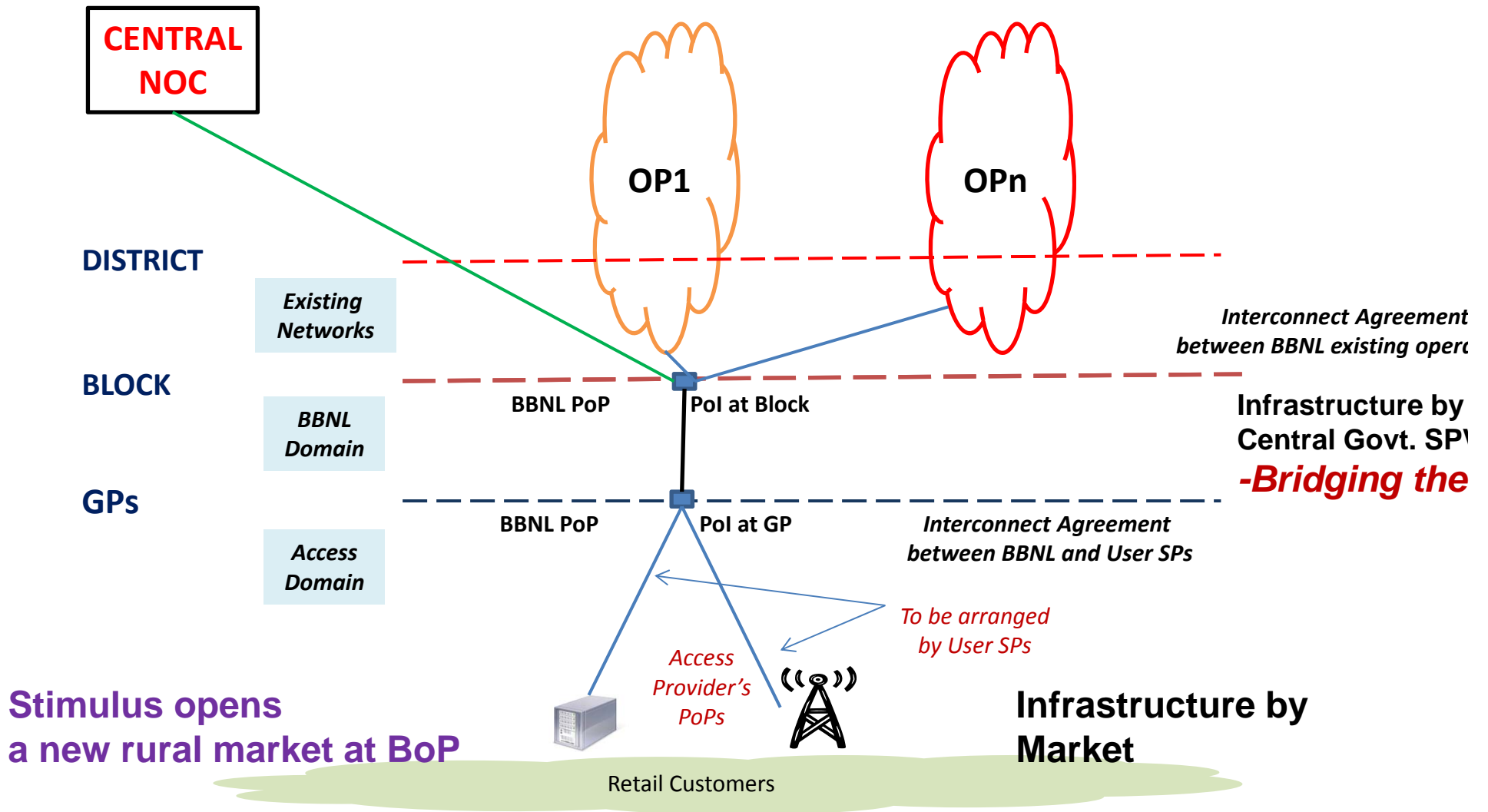
NOFN Details

- NOFN will ensure that Broadband of at least 100Mbps is available at each GP
- NOFN will provide **non-discriminatory access** to all categories of service providers.
- On NOFN, e-health, e-education, e-governance & e-commerce applications & Video conferencing facilities can be provided.
- NOFN Project implementation time - 24 months (by **31.10.2013**).

Concept: Making available Dark Fibers by participating Companies



BBNL Interconnection



What does NOFN offer to Service Providers ?

- Guaranteed Bandwidth at GP and Block
- Beneficiary operators to interconnect NOFN at its PoP at Block and further built up connectivity using existing networks upwards
- Access Providers to interconnect at GPs to launch their retail services.
- Standard interfaces for interconnection at GPs as well as Blocks
- Centralised Management – NMS, OSS/BSS

Highlights of NOFN(Contd.)

- Both Active & Passive technologies to be deployed depending on ground situation
- Ring & tree architecture to be used depending on ground realities and requirements
- NOFN will use technologies that are scalable, maintainable, observable & controllable meeting ground realities of diverse rural environment.
- NOFN to be operated and controlled centrally (NMS) by BBNL

Highlights NOFN

- Evolution: **HLC-Advisory body-SPV(Incorporated as BBNL)**
- NOFN to be built using dark fibres leased from three CPSUs (or any other desirous telecom operator) and laying incremental fibre.
- NOFN to offer interconnection at Block level and Gram Panchayat (GP) level
- Guaranteed Bandwidth of **100 Mbps** at GP

Functions of the Advisory Body- Evolving Eco system & Resonance of stakeholders

1. Implementation Issues
2. Upstream and downstream integration
3. Issues relating to non-discriminatory access
4. Providing strategic vision to entire BB Eco-system including Content, Localisation, Services, Applications, Customer end devices / CPE etc. for accelerating BB penetration
5. Any other matter considered vital for acceleration of broadband penetration

NOFN MANAGEMENT

- | | |
|-----------------------------------|--|
| 1. ASSET CLASS | NATIONAL ASSET |
| 2. ASSET HANDLING | SPV as AMC (ASSET MANAGEMENT COMPANY) |
| 3. ASSET OPERATION | SPV – CPSU’s AGREEMENT
BOM (BUILD-OPERATE-MAINTAIN) |
| 4. ASSET RELIABILITY | SPV TO OPERATE NOC |
| 5. ASSET QUALITY ASSURANCE | SPV – TCIL AGREEMENT |

RoW (Right of Way)

- Telecom Cables are laid along roads/railway tracks/ on electric transmission/ distribution towers.
- This requires permission (termed **RoW**) from the concerned authorities viz. PWD, Municipality, Forest, Panchayat Authorities, Rural Engineering Service, Electricity Boards, Irrigation, Private Electricity Distribution Agency, etc.
- Project execution by **BBNL** will commence after tri-partite MoU is signed .

Salient features of Tripartite MOU :

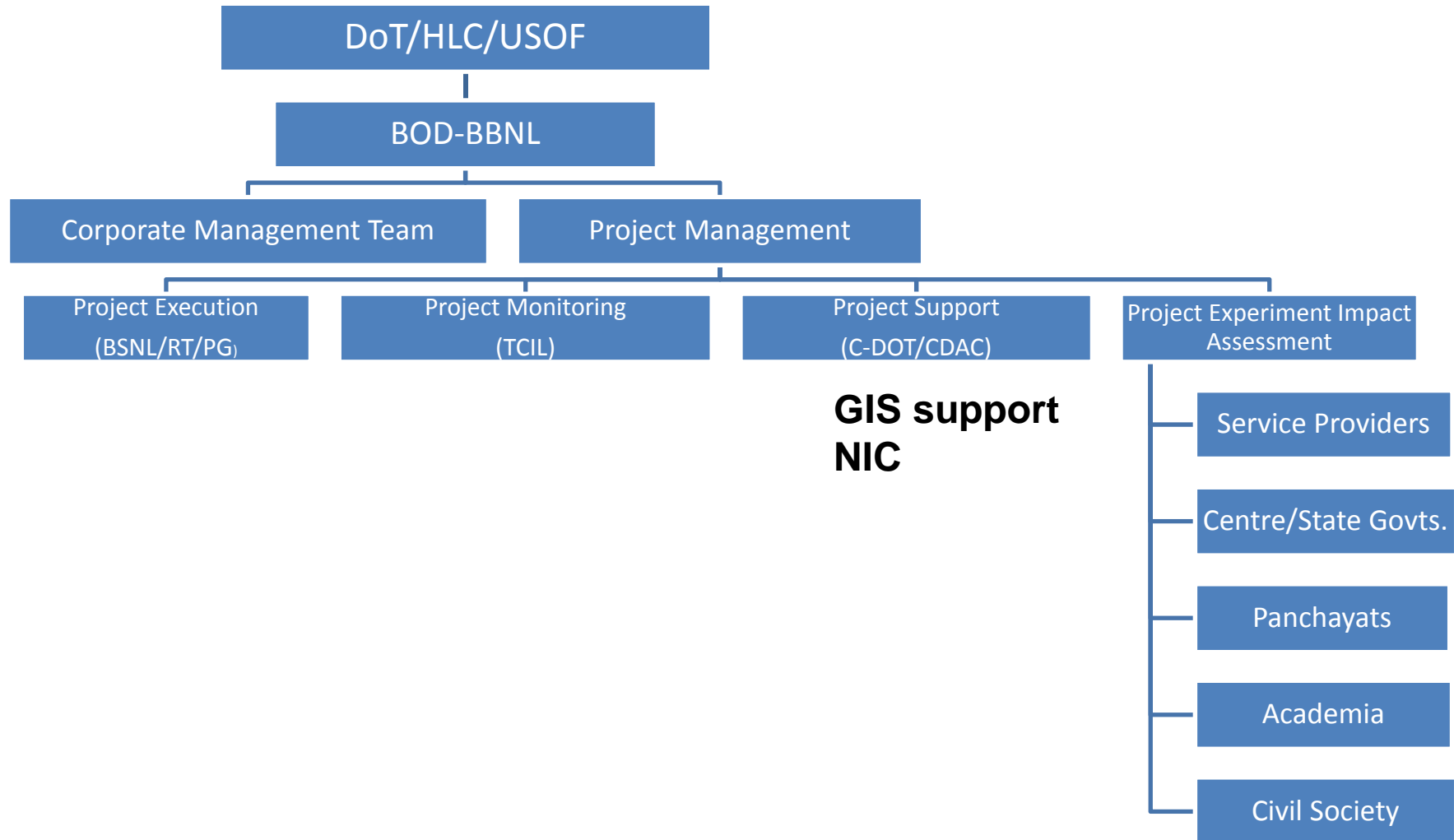
Support required from State Governments/UTs

- To grant **RoW permission** by issuing instructions to all state government agencies (as applicable) - PWD/ RES/ Forest/ Municipality/ Panchayat Authorities/ Electricity Boards/ Irrigation/ Private Electricity Distribution Agency etc. for enabling NOFN SPV to lay OFC without any charges (including reinstatement charges). **The executing Agency (BSNL,RAILTEL,PGCIL) will reinstate at its cost.**
- State Govts to plan out services to be offered on the network (e-governance, e-learning, e-health, etc.)

Other Issues-Ecosystem

- Availability of relevant applications & content particularly in priority areas viz.
e-Education, e- Health, e-Gov applications to suit local requirements
- Timely availability and affordable customer end devices relevant to rural applications
- Pilot Trials – Participation by access providers at GPs, content providers & Govt. Departments

PROJECT ORGANOGRAM



Bharat Broadband

सुनहरे भारत की ओर

THANK YOU

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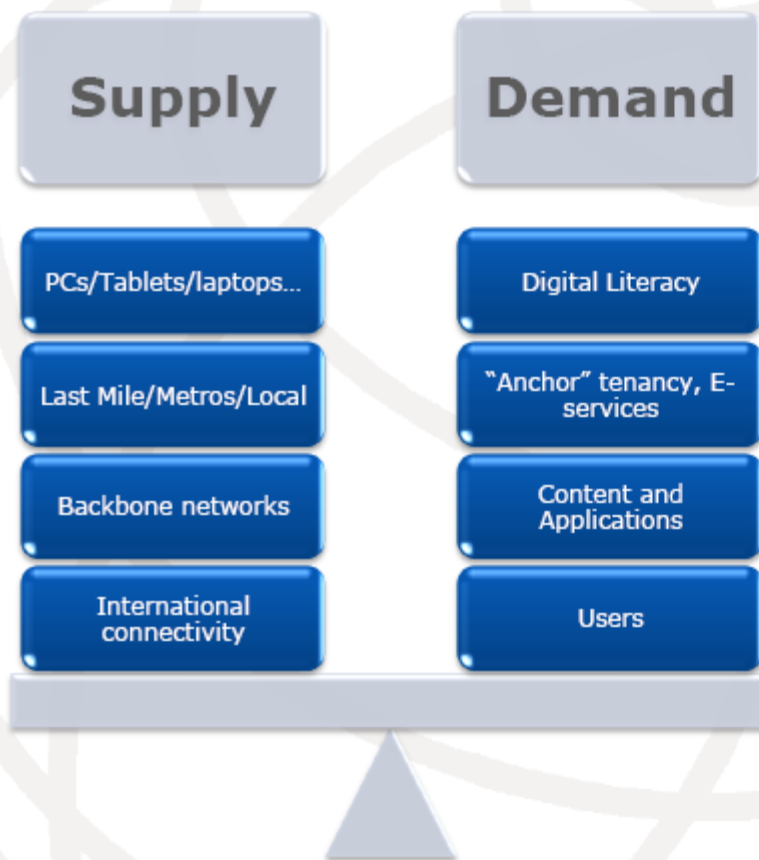
INDIA

SOURCE OF FUNDS & STATUS

- **Funded through Universal Access Levy @ 5% of Adjusted Gross Revenue (AGR) from all Service Providers**
- **Levy amount is credited to Consolidated Fund of India**
- **Fund is made available to USOF after due appropriation by the Parliament**
- **As on 31.12.2012 :**
 - **Subsidy of Rs Rs.15,059.46 Crores (US\$ 2.34 billion) disbursed**
 - **Potential Balance available is about Rs 16,803.84 Crores (US\$ 3.73 billion)**

* Exchange rate: 1 USD=Rs 45

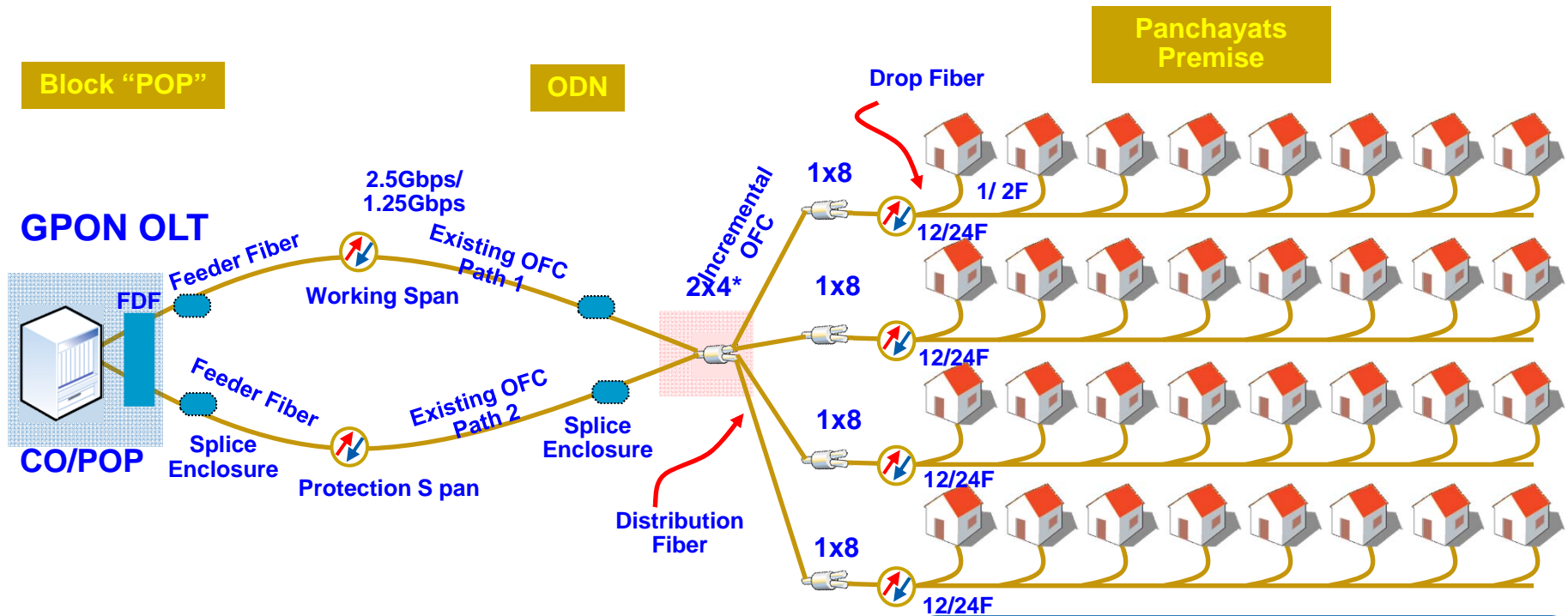
Ensure Adequate "ROI"



The strengths of a funding mechanism can be assessed relative to:

- economic efficiency
- equity
- competitive neutrality
- technology neutrality
- certainty
- Transparency
- cost effectiveness

GPON RING-Branch Topology



Applications:

- High construction neighborhoods where Protection against Feeder fiber cuts is required
- High availability GPON for businesses with path and equipment protection

* Splitter located in remote CO, pole mount, Strand mount, pedestal, below grade etc

Advantages:

- Protection Up sell for business
- Protection for feeder fiber cuts
- Efficient use of distribution fiber
- Accommodates basic churn
- Few types of splitters

Disadvantages:

- May have some stranded drops
- Feeder fibers must be diversely run