Asia-Pacific Information Superhighway (AP-IS)

ESCAP resolution 71/10

The AP-IS initiative advocates enhancing seamless regional broadband fibre-optic backbone connectivity by upgrading and increasing the resilience of and integrating cross-border intra and interregional broadband backbone networks, which will lead to open access and better balanced undersea and terrestrial networks.
Co-deployment opportunities

Interactive Map, visit <http://www.itu.int/itu-d/tnd-map-public/>
**ESCAP’s technical studies**

To implement identified strategic initiatives in the AP-IS Master Plan and support discussions on co-deployment between ICT and other sectors, including transport

- Literature review -> preliminary cost-benefit analysis
- Review of AP-IS transmission map
- Case studies (China, Republic of Korea, Myanmar, India and Bangladesh)
- Technical study on connectivity among CLMV countries
- Consultations and discussions at the AP-IS Steering Committee meeting in Dhaka in November 2017
Co-deployment Overview and Global Trends
## Scope and type of co-deployment

<table>
<thead>
<tr>
<th>Co-deployment among telecom operators</th>
<th>Co-deployment with transport sector</th>
<th>Co-deployment with other sectors</th>
</tr>
</thead>
</table>
| - Co-deployment of backbone cables for economies of scale  
  - Sharing of ducts, towers and landing stations | - Co-deployment along railways and highways  
  - Rights-of-way granted by railway and highway authorities  
  - Cost saving | - Co-deployment with energy sectors (power grid, gas pipelines etc.)  
  - Power lines carry broadband services |

### Benefits
- ✓ Dig once to reduce cost of investment,
- ✓ Decrease frequency of construction on major highways;
- ✓ Promote the development of broadband and reduce the digital divide
- ✓ Redundancy communication duct can improve coverage
Co-deployment with transport sector: global examples

- In the US, deploying cable conduit through highway can save 25-33 per cent of costs in densely populated areas (San Francisco) and 15.5 per cent in rural areas (Utah).

- In Europe, network deployment with the use of existing ducts can save 75% of costs, while tower sharing can save up to 30%. A network based on existing ducts and some self-deployment can save 29%-58% of costs.

- In Africa, estimating that an operator sharing infrastructure with utilities or the transport sector can save at least $16 million for every 1000km of network deployed.

Source: 1) GAO-12-687r: Planning and flexibility are key to effectively deploying broadband conduit through federal highway project; 2) Analysys Mason Research (2012), PIA versus self-build fibre in the final third: digging into the finances; 3) Deloitte, unlocking broadband for all
Optical Fibre and Installation Cost

The study on connectivity in Cambodia, Lao PDR, Myanmar, and Viet Nam estimated the cost of duct and fibre installation.

### Optical Fibre and Installation Cost

<table>
<thead>
<tr>
<th>Material Cost</th>
<th>device</th>
<th>unit</th>
<th>quantity</th>
<th>Unit price (U$)</th>
<th>Total price (U$)</th>
<th>comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>COD km 10</td>
<td>Cable</td>
<td>km</td>
<td>10</td>
<td>12,200</td>
<td>122,000</td>
<td></td>
</tr>
<tr>
<td>Man Hole ea</td>
<td>Connection</td>
<td>ea</td>
<td>50</td>
<td>1,600</td>
<td>80,000</td>
<td></td>
</tr>
</tbody>
</table>

### Installation Cost

| Duct installation | Digging km 10 | 1,330 | 13,300 |
|                  | COD Installation km 10 | 12,150 | 121,500 |
|                  | Recovering km 10 | 7,100 | 71,000 |
|                  | Man Hole Installation ea 50 | 1,400 | 70,000 |
| Total Duct       | 477,800        |       |        |

| Fibre installation | Cable Installation km 10 | 5,400 | 54,000 |
|                    | Fibre Splicing ea 360 | 39 | 14,040 |
|                    | Splicing Test ea 360 | 69 | 24,840 |
|                    | Final Test ea 36 | 113 | 40,680 |
| Total Fibre        | 180,460         |       |        |

Source: ESCAP’s study on connectivity in the CLMV Countries

Note: Single 10 km duct (ex. COD), man Hole to Man Hole distance 200m; 10 km fibre optic cable that has 36 core fibre, every 2 km splicing. COD = Corrugated Optical Duct
Co-deployment is mandatory in Portugal

• Portuguese government made infrastructure sharing mandatory in Portugal in 2009.

• Co-deployment along infrastructure owned by the state (including local authorities and Autonomous Regions), infrastructure owned by entities under the state supervision, and public infrastructure and utilities (including roads, railways, ports, water, sewage, gas, and electricity).

• The availability of sharable infrastructure made new network deployments economically viable, contributing to an increase in household coverage.
  • As of 2016, Portugal extended its next-generation broadband to 95% of households ranking 5th in Europe in terms of high-speed broadband.
  • The costs to governments were found to be negligible, being limited to legislation drafting.

Source: Details on the calculations can be found in: Tahon et. al. 2013. Improving the FTTH business case—A joint telco-utility network rollout model. pp. 432
Case study: Co-deployment in China
Opportunity to enhance regional connectivity along Asian Highways
Co-deployment backbone cables map of China Unicom

Most backbone cable built by co-deployment in China

Co-deployment among telecom operators

- 43% co-deployment

Source: 3-year plan of backbone transmission network China Unicom (2016)

Co-deployment with transport sector

- 72% Superhighway
- 4% High-speed railway

Source: 3-year plan of backbone transmission network China Mobile (2016)

China Unicom has 181 backbone cables that 78 were shared with other telecom operators by 2015.

China Mobile built/planned 25 backbone cables: 18 cables were laid in superhighway ducts and one was along with the high-speed railway in 2015.
Mechanism of co-deployment in China

1. Operators make network plan
2. Consult with ICT department of the Government
3. Find out the same route; suggest co-deployment
4. Discuss & Develop Feasibility Study and Network design
5. Consult with Superhighway company (SOE)
6. Determine the route; negotiate the leasing fee
7. Project proposal

- Regulations (cap leasing fee)
- New-built or direct-buried by operator; negotiate RoW;
- Source: ESCAP, data from CAICT
Revenue gain from leasing duct: the case of highway authorities in China

The highway duct can bring more income to the transport sector based on leasing fee estimation in China.

<table>
<thead>
<tr>
<th>No.</th>
<th>Type</th>
<th>Leasing fee (USD/km/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HDPE Pipe (Φ 40mm)</td>
<td>450</td>
</tr>
<tr>
<td>2</td>
<td>PVC Pipe (Φ110mm)</td>
<td>750</td>
</tr>
<tr>
<td>3</td>
<td>Inner Pipe (Φ25-32mm)</td>
<td>230</td>
</tr>
<tr>
<td>4</td>
<td>Other ducts</td>
<td>According the diameter</td>
</tr>
</tbody>
</table>

Note: based on regulation which is set out by province government of China to cap the leasing fee of superhighway duct.

**Estimation:**

HDPE and PVE pipelines are common pipelines which are built along with highway. Assumed that four pipelines are leased for 20 years which is the lifespan of optical fibre. Total leasing fee of duct for 20 years is $ 36,000 per km. (4 × $450 × 20 years)
The way forward
Elements of co-deployment: case of ICT and Highway Authorities

1. Government guidance and market-oriented operations
2. Co-deployment practiced in some countries
3. Regional co-deployment initiatives?

- Policy to encourage telecom operators and highway authorities to share duct, pole, and cables;

- Coordination and consultation mechanism to communicate the requirements of new fibre cables between telecom operators and transport authorities;

- Platforms for coordination and negotiation for regional infrastructure initiatives.
SOME PEOPLE WANT IT TO HAPPEN, SOME WISH IT WOULD HAPPEN, OTHERS MAKE IT HAPPEN.
Thank you!

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Mechanism for cross-border co-deployment among telecom operators in Europe

- Industry association of telecom operators, agreements with incumbents
- Informal coordination at national level backed by general rules and consultations
  - General rules mandating suitable passive facilities to be used for fibre optic rollout
- Commercial work-exchanges systems