A Framework to Approach Shared Use of Mining Related Infrastructure: ICT

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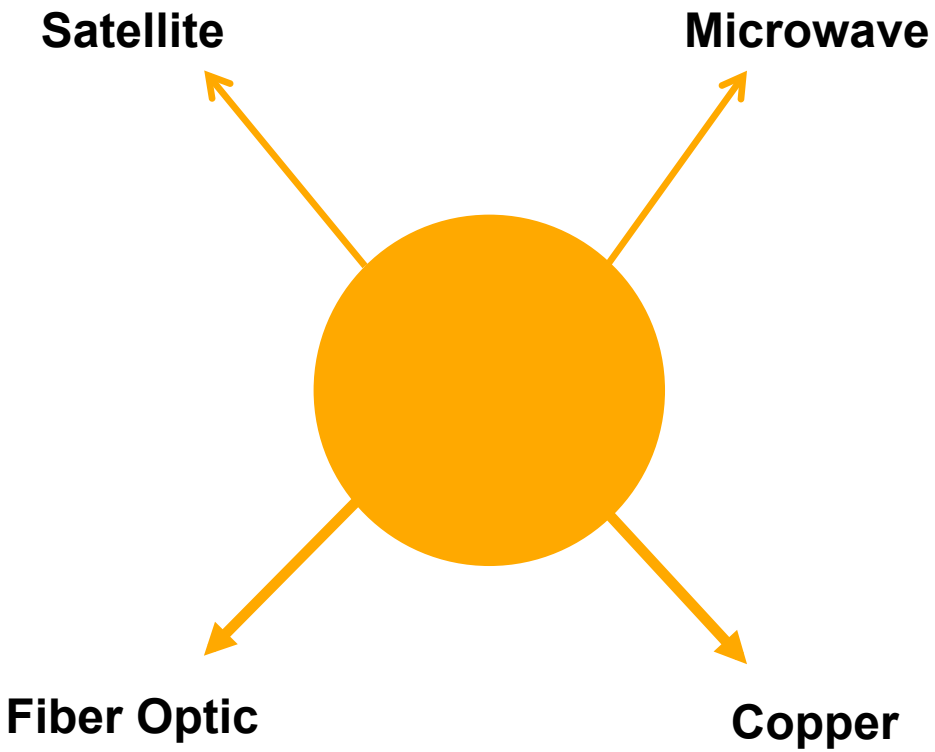
VALE COLUMBIA CENTER
ON SUSTAINABLE INTERNATIONAL INVESTMENT
A JOINT CENTER OF COLUMBIA LAW SCHOOL AND
THE EARTH INSTITUTE AT COLUMBIA UNIVERSITY

ICT Technologies: A short primer

Different Internet Technologies used by the Mines:



Background: ICT in Africa

ICT in Africa

- In Sub-Saharan Africa, as many as 16 of 24 countries (86% of the population) lack access to a submarine cable and continue to rely on satellite for international communications.

Source: World Bank

ICT Demand of Mines

- ICT infrastructure is employed in all phases of a mine life
  - Improve logistics
  - Allow more effective use of resources
  - Mitigate security risks

→ Increases efficiency and cost savings

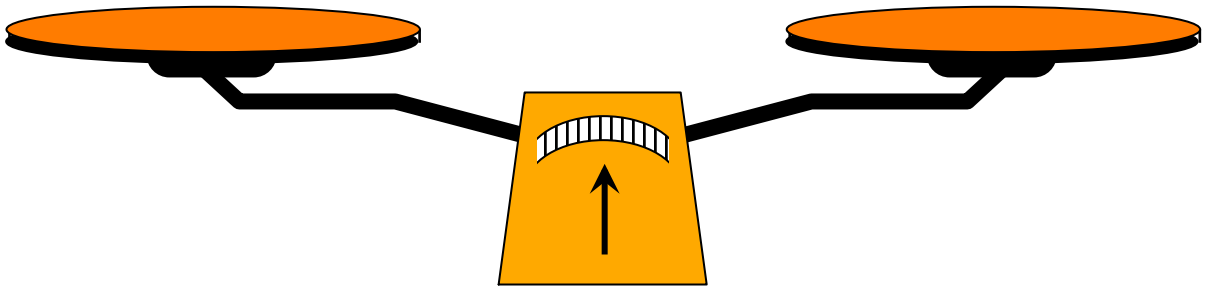
Economic premise for shared use

Benefit for country:

- Develop the national ICT infrastructure and service provision at a lower cost
- Increase ICT coverage in remote areas

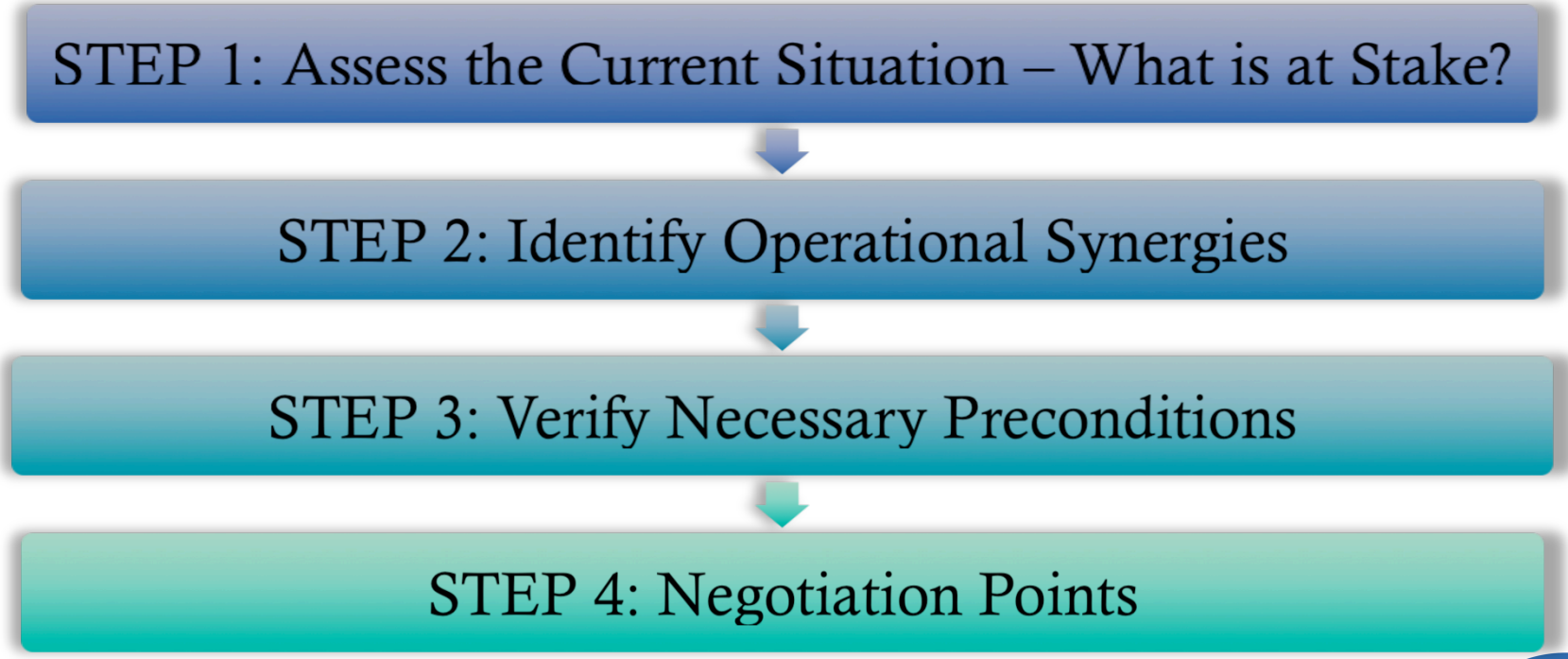
Benefit for mine:

- Effective coordination results in cost-savings
- Maintain social license to operate



Scope of Framework

- PURPOSE: Leveraging the mining industry's ICT demand and its capital investments in ICT infrastructure for the development of the national ICT system



STEP 1: Assessing the current situation

- What determines the mine's ICT arrangement?

National Coverage

- Is ICT infrastructure and required service being provided?

Reliability of Service

- Is the ICT service provided sufficient and reliable enough for the mine operation?

Cost of Service

- Is the cost of the ICT service adequate? Or could the mine build own infrastructure and get better prices?

STEP 2: Identifying ICT-Mine Synergies

Ownership model	Service Arrangement
1. Mine builds own infrastructure	a) Telecom adds capacity.
	b) Mine adds telecommunication capacity and leases to Telecom.
2. Mine does not build own infrastructure	a) Companies building required infrastructure to mines (e.g. power, pipeline and railways) add telecommunication capacity at a lower cost.
	b) Mine provides anchor demand for Telecom.
	c) Government, Telecom and mining companies coordinate efforts and investments.

1. Mines Build Infrastructure

Win - Win

a. Telecom adds capacity

- **Mine maintains social license**
- **Telecom expands coverage**

Example: Peru

- Minera Antamina built fiber optic network along slurry pipeline which Telefonica del Peru uses to provide ICT services.

Source: Antamina

b. Mine adds telecommunication capacity and leases to Telecom

- **Mine maintains social license and adds revenue**
- **Telecom expands coverage**

Example: Malaysia

- Celcom and Petronas build fiber optic network along gas pipeline with spare capacity.

Source: Agilent

Example: Brazil

- In 2001 Vale wanted to partner with railroad partners and install fiber optic along 10,000km of rail lines and lease to Telecoms.

Source: Globo

2a. Companies building required infrastructure to mines add telecommunication capacity at a lower cost

- **Objective:** Leveraging economies of scope by sharing with other infrastructure industries (such as power utilities, water and sewage pipelines, railways)
- **Rationale:** A large part of the costs is associated with costs of civil works.

Example: Canada

- De Beers mine allowed power utility FNEI to use electricity grid infrastructure to build fiber optic cable.
- FNEI with local municipalities then formed Western James Bay Telecommunications Network (WJBTN) to operate and provide telecommunications services.

Source: Five Nations Energy

Example: Potential in Mozambique – Nacala Corridor:

- Vale and Mozambique Ports and Railway (CFM) selected Siemens to install microwave-based telecommunications network for track-to-train data transmission.

Source: International Railway Journal

2b. Mines as an anchor for Telecom

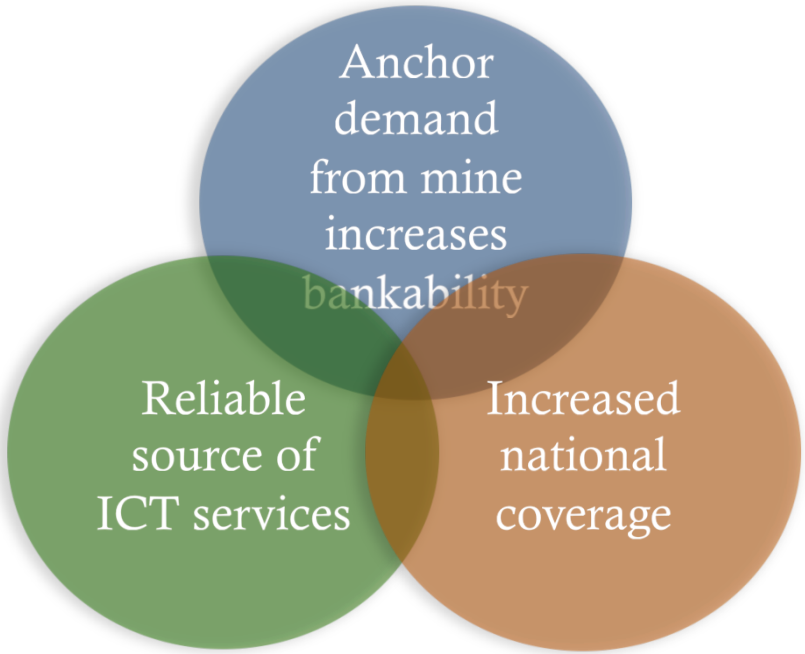
Example: Mozambique:

- Ncondezi Coal as an anchor customer for service provider Vodacom.
- Expansion of coverage to 10km around tower (3,000 contracts).

Source: Ncondezi

2c. Government, Telecom and mining companies coordinate efforts and investments

Telecom



Mining Company

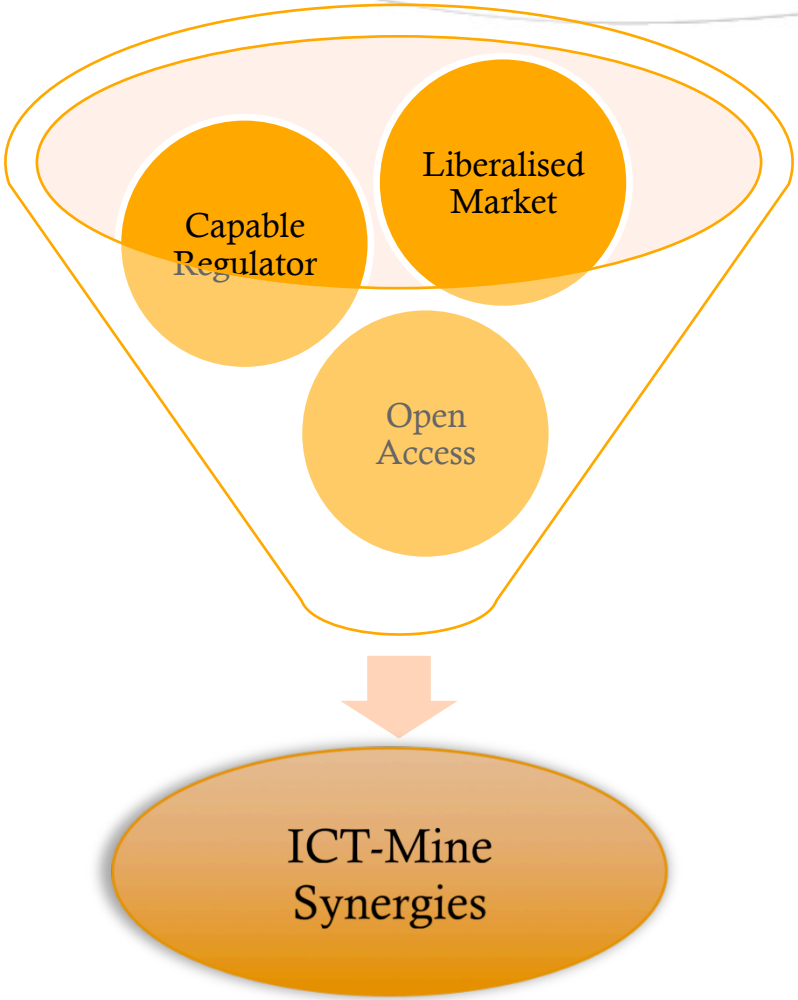
Government

Example: Australia

- Telstra, Australian Northern Territory Government and Rio Tinto partnered to build the Arhem Land Fibre Project.
- It involved connecting Rio Tinto and 9 communities (10,000 people) to the national system.

Source: Telstra

STEP 3: Verify Necessary Policy and Regulations



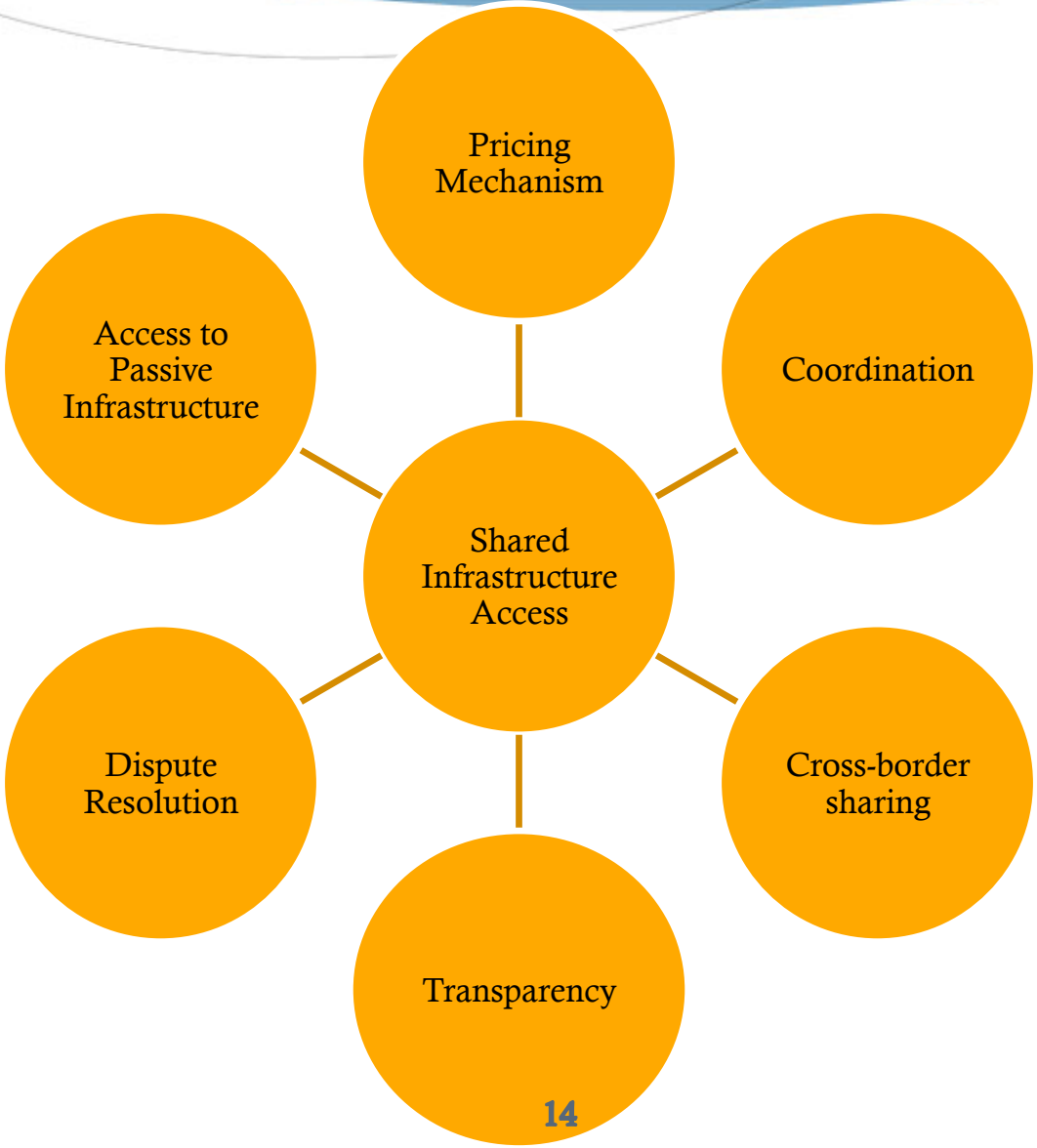
Common policies

- Liberalization of the market.
- Well-regulated market with respect to quality of service and tariffs.

Case specific policies

- PPP enabling environment.
- Coverage obligations.
- Licensing facilitation.
- Open access.
- Shared infrastructure.

STEP 3: Policies for Shared Infrastructure Access



STEP 3: Verify Specific Necessary Policy and Regulations

Scenario	Categories	Necessary regulatory framework
Mining Company builds infrastructure	a) Telecom adds capacity	
	b) Mine adds telecommunication capacity and leases to Telecom	
Mining Company does not build infrastructure	a) Companies building required infrastructure to mines (e.g. power, pipeline and railways) add telecommunication capacity at a lower cost.	
	b) Mine provides anchor demand for Telecom	
	c) Government, Telecom and mining companies coordinate efforts and investments.	

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	c) Government, Telecom and mining companies coordinate efforts and investments.	PPP enabling environment

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	b) Mine adds telecommunication capacity and leases to Telecom	
Mining Company does not build infrastructure	a) Companies building required infrastructure to mines (e.g. power, pipeline and railways) add telecommunication capacity at a lower cost.	
	b) Mine provides anchor demand for Telecom	**Coverage obligations**
	c) Government, Telecom and mining companies coordinate efforts and investments.	**Coverage obligations** PPP enabling environment

STEP 3: Verify Specific Necessary Policy and Regulations

Scenario	Categories	Necessary regulatory framework
Mining Company builds infrastructure	**a) Telecom adds capacity**	
	b) Mine adds telecommunication capacity and leases to Telecom	**Licensing facilitation**
Mining Company does not build infrastructure	**a) Companies building required infrastructure to mines (e.g. power, pipeline and railways) add telecommunication capacity at a lower cost.**	**Licensing facilitation**
	b) Mine provides anchor demand for Telecom	Coverage Obligations
	c) Government, Telecom and mining companies coordinate efforts and investments.	Coverage obligations PPP enabling environment

STEP 3: Verify Specific Necessary Policy and Regulations

Scenario	Categories	Necessary regulatory framework
Mining Company builds infrastructure	**a) Telecom adds capacity**	**Open access**
	b) Mine adds telecommunication capacity and leases to Telecom	Licensing facilitation **Open access**
Mining Company does not build infrastructure	**a) Companies building required infrastructure to mines (e.g. power, pipeline and railways) add telecommunication capacity at a lower cost.**	Licensing facilitation
	b) Mine provides anchor demand for Telecom	Coverage Obligations
	c) Government, Telecom and mining companies coordinate efforts and investments.	Coverage obligations PPP enabling environment

STEP 3: Verify Specific Necessary Policy and Regulations

Scenario	Categories	Necessary regulatory framework
Mining Company builds infrastructure	**a) Telecom adds capacity**	**Shared infrastructure access** Open access
	b) Mine adds telecommunication capacity and leases to Telecom	Licensing facilitation Open access
Mining Company does not build infrastructure	**a) Companies building required infrastructure to mines (e.g. power, pipeline and railways) add telecommunication capacity at a lower cost.**	Licensing facilitation **Shared infrastructure access**
	b) Mine provides anchor demand for Telecom	Coverage Obligations
	c) Government, Telecom and mining companies coordinate efforts and investments.	**Shared infrastructure access** Coverage obligations PPP enabling environment

STEP 4: Negotiating Points

1a. Mining Company builds infrastructure, Telecom adds capacity

- If no legal obligation: voluntary arrangement or contractual requirement?
- Conditions of infrastructure access.
- Allocation of the access.
- Rights and responsibilities of the parties.

1b. Mining Company builds additional capacity and leases to Telecom

- If no commercial motivation, contractual requirement?
- Allocation of the access.
- Financial incentives needed?

- Post–closure sustainability?
- Dispute resolution mechanisms?

STEP 4: Negotiating Points

2a. Companies build required infrastructure to serve mines and add telecommunication capacity at a lower cost

- Which parties to involve?
- If no access to passive infrastructure regulation requirement – contractual requirement?
- Allocation of access.
- Terms of the access.

2b. Mines as demand anchor

- Responsibilities and obligations of each party
- Key terms of offtake agreements.
- How to share the capital cost?
- How to ensure reliability and quality of ICT services to local communities?
- Provisions for mine closure.

2c. Government, Telecom and mining companies coordinate efforts

- Responsibilities and obligations of each party.
- Key terms of offtake agreements
- How to share the capital cost?
- Who owns the infrastructure?
- Priority access for the mine if service is restricted?

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