

# **Regulating Access to International Gateway – A Singapore's Experience**

**Presented to NTC ITU ASP COE Training Workshop On Infrastructure Sharing**

**By Liao Chie Kiong, Asst Director (Interconnection and Access), IDA**

**1 September 2010**

# Agenda

- > **About IDA**
- > **Market Liberalisation and Regulation in Singapore**
- > **International Gateways (IGW)**
  - What are they
  - Why are they important
- > **Regulating Access to IGW**
  - Co-location
  - Connection Service
  - Price Determination
- > **Lessons**

# 1

## About IDA

# About IDA

- > Statutory board under Ministry of Information, Communications and the Arts (MICA)



# IDA's Vision & Mission

## > Vision:

**Singapore: An Intelligent Nation, A Global City, powered by Infocomm**

## > Mission:

**To develop the infocomm cluster as a major engine of growth and to leverage infocomm for economic and social development**

# IDA's Roles

Singapore: An Intelligent  
Nation, a Global City,  
Powered by Infocomm

Masterplanning,  
project-managing,  
implementing  
infocomm systems and  
capabilities for  
Government

Infocomm  
Industry  
Developer

Government  
CIO

Sector  
Transforma-  
tion

People  
Sector  
Enrichment

Transforming key  
people sector  
clusters & raising  
the infocomm  
sophistication of  
citizens

Develop vibrant and  
competitive IT and  
communications industry

Architecting Singapore's ICT  
roadmap, planning for key  
infrastructure, manpower  
development, security and  
technological developments

Infocomm Infrastructure

Manpower Development

Infocomm Security

Infocomm Policy

International Engagement

Technology

Corporate Functions

Spearheading  
transformation of  
key economic sectors,  
Government and  
society through more  
sophisticated and  
innovative use of  
infocomm

# About Singapore

- 
- > **Land Area** : 710 sq km
  - > **Population** : 4.99 million (3.64m residents)
  - > **GDP** : S\$265 billion (US\$182 billion)
  - > **GDP Per Capita** : S\$53,143 (US\$36,537)
  - > **Literacy Rate** : 96.3%
  - > **Labour Force** : 3.3 million

(Source : Singapore Department of Statistics <http://www.singstat.gov.sg/> dated Jun 2009)

# 2

## **Market Liberalisation and Regulation in Singapore**



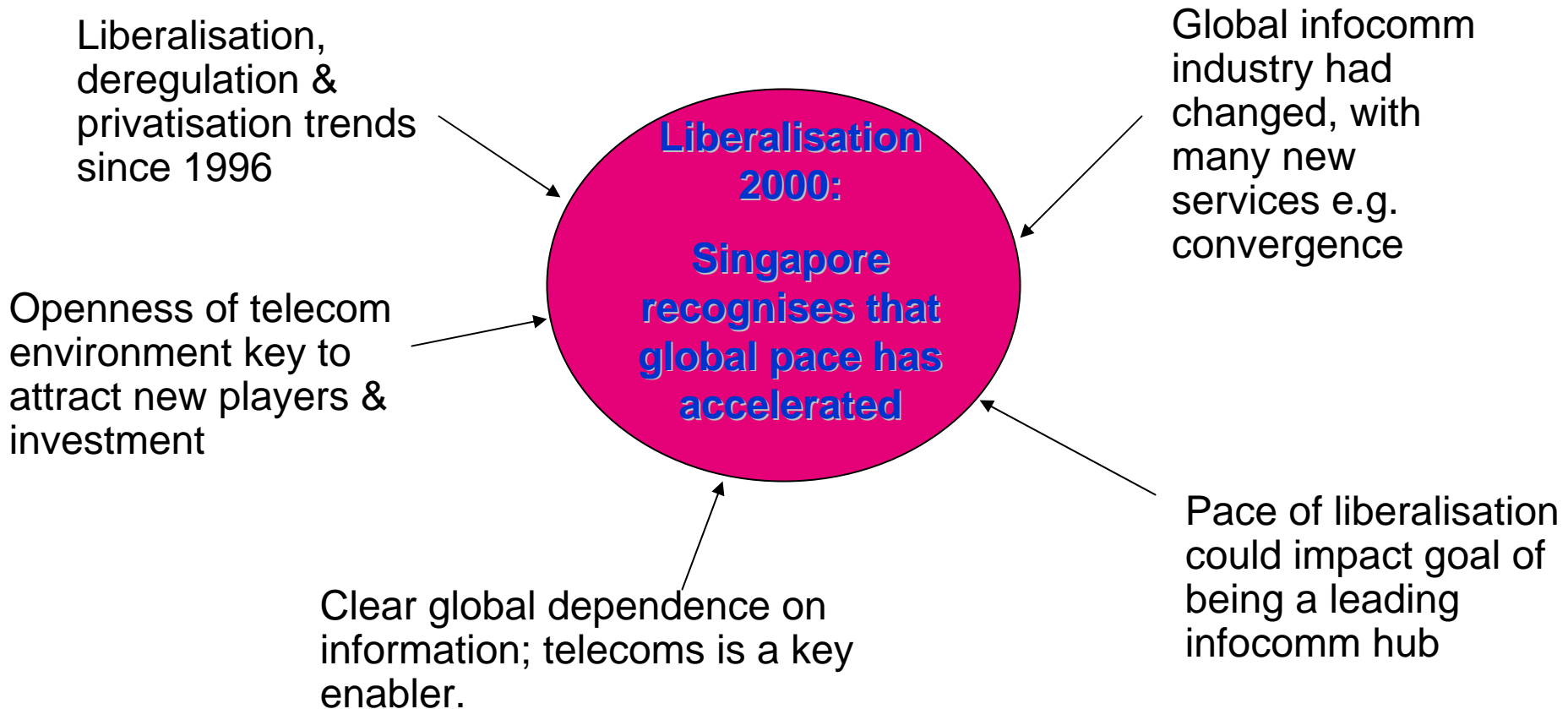
# Liberalisation History

- > **1989 – 2000** : Phased liberalisation
- > **1992** : SingTel privatisation  
(Given monopoly rights: mobile - 5 yrs, fixed-line - 15 yrs)
- > **1996**: Shortening of SingTel's fixed-line monopoly to 2002
- > **1997** : Entry of 2<sup>nd</sup> mobile operator, M1
- > **1998** : Licensing of 2<sup>nd</sup> fixed-line and 3<sup>rd</sup> mobile operator, StarHub
- > **2000** : Shortening of fixed line duopoly : **Full market liberalisation**



# Telecom Market Liberalisation...

## > Why advance full liberalisation to April 2000?



# Telecom Market Liberalisation...

No restrictions on

- > **Foreign equity:** previous cap of 49% removed
- > **Number or type of players:** except when physical/resource constraints are present.
  - e.g., frequency spectrum – market based approach for allocation [3G auction, 2G auction, WBA auction]
- > **Choice of technology:** Players free to decide what technology to adopt for networks, systems and facilities used to offer services

# Transition From Monopoly to Full Competition

## Challenges:

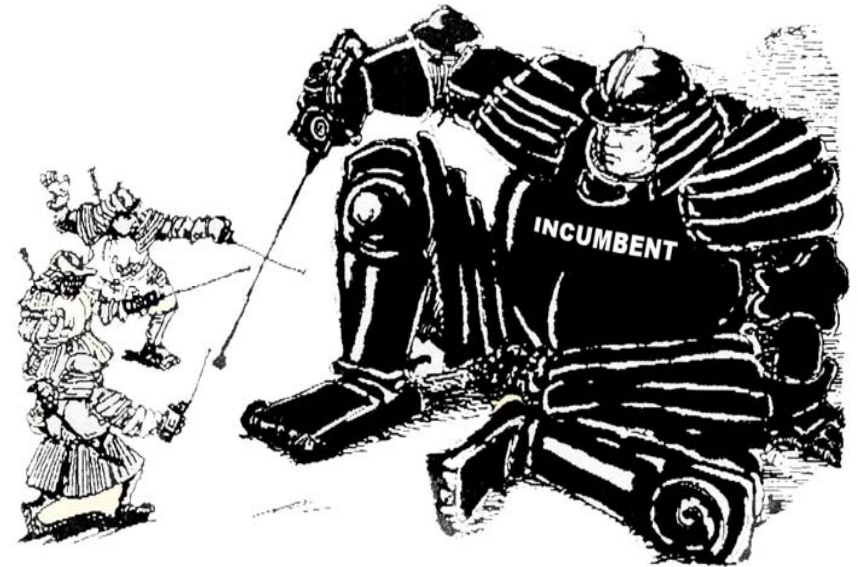
- > New entrants face strong incumbent
- > New entrants need incumbent's cooperation to interconnect networks and to share bottleneck facilities
  - Incumbent has no incentive to cooperate
- > Incumbent could use market power to unfairly restrict competition

Battle for the Singapore handphone market

**Will it be a case of David fighting Goliath?**

**Difficult for new phone, paging operators to dislodge Telecom**

Local giant has customer base even major competitors are envious of



# Telecom Competition Code

- > First issued in September 2000
- > Sector-specific competition management framework
  - developed in close consultation with the industry
  - sets clear boundaries for competitive behaviour in the telecom market
  - provides a regulatory framework to facilitate the rapid entry of new competition in Singapore and a strong incentive for companies to invest in infrastructure
- > Subject to review every 3 years
- > Code revised March 2005



# Key Regulatory Principles

- > Reliance on market forces & proportionate regulation
  - Where markets are effectively competitive - only minimal requirements for consumer protection and preventing anti-competitive behaviour
  - Where markets are not effectively competitive - balance between *ex ante* and *ex post* regulation
- > Promote effective and sustainable competition
  - Remove or minimise entry barriers, and eliminate anti-competitive behaviour
- > Promote facilities-based competition
  - Sustainable competition best achieved through facilities-based competition
  - IDA tries to balance between facilities-based and services-based competition
- > Technology neutrality
- > Efficient, transparent and reasoned decision-making

# IDA's Licensing Regime

- > No pre-determined number of licensees!
- > 2 main classes:
  - Facilities-Based Operators (FBOs)
  - Services-Based Operators (SBOs)
- > **FBOs**
  - Deployment of any telecom network, system or facilities to offer telecom services to other operators, business or consumers
  - 49 FBOs
- > **SBOs**
  - Leasing of services and facilities from FBOs to provide/resell telecom services
  - 237 SBOs(Individual)

# 3

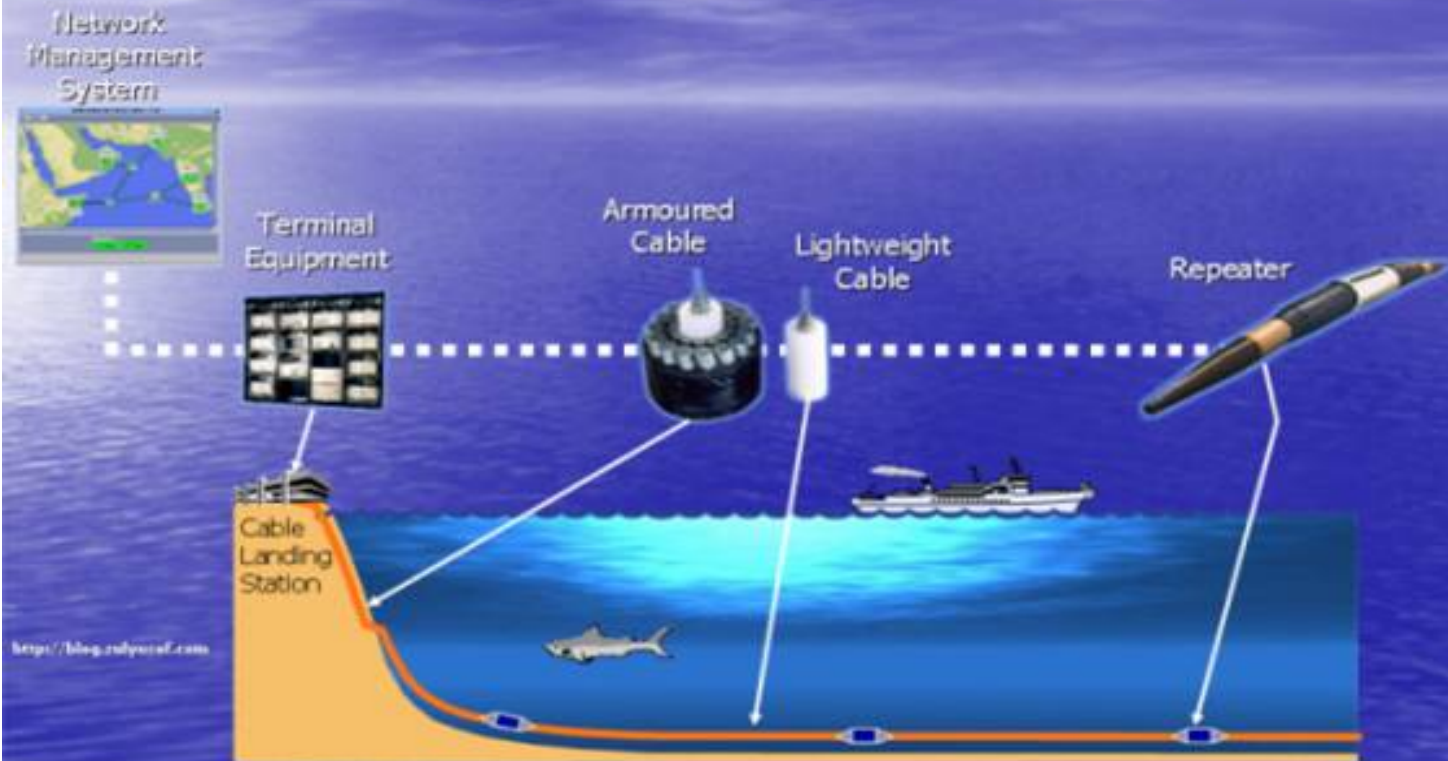
## **International Gateway**



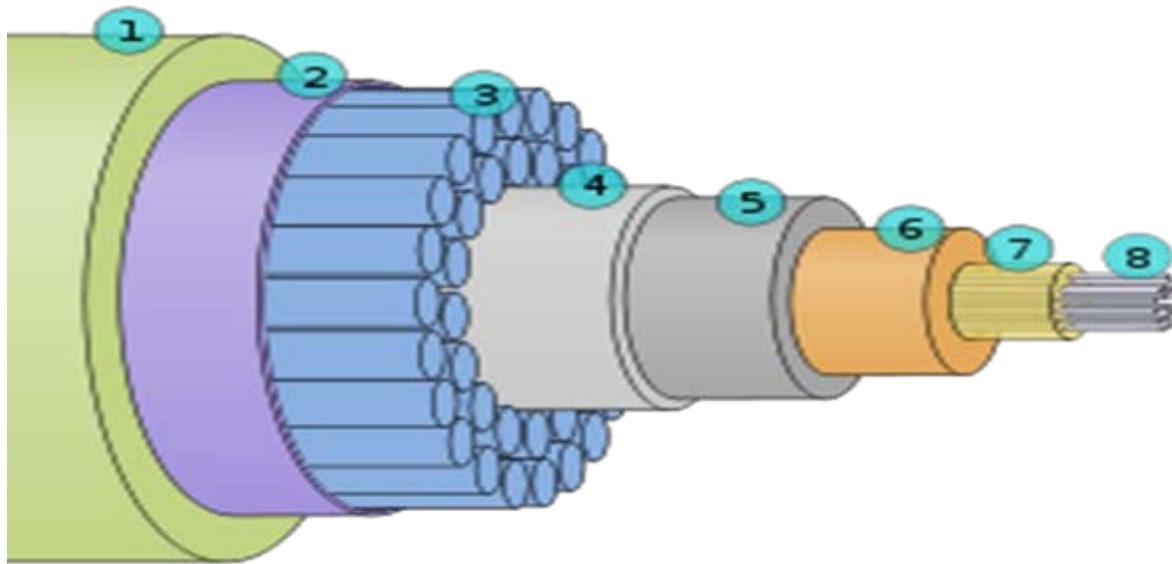
# What Are They

- > Facilities through which international traffic is sent/received
- > **Submarine Cable Landing Stations (SCLS)**
- > Satellite Earth Stations

# Typical Submarine Cable System



Source: U.K. Cable Protection Committee & Alcatel-Lucent Submarine Networks



*A cross section of a submarine communications cable.*

- 1 - Polyethylene*
- 2 - Mylar tape*
- 3 - Stranded steel wires*
- 4 - Aluminium water barrier*
- 5 - Polycarbonate*
- 6 - Copper or aluminium tube*
- 7 - Petroleum jelly*
- 8 - Optical fibers*

[http://en.wikipedia.org/wiki/Submarine\\_communications\\_cable](http://en.wikipedia.org/wiki/Submarine_communications_cable)

# Why Are They Important

- > Potential bottlenecks for conveyance of international telecommunication traffic
- > Traditionally monopolised by consortium of national/incumbent operators
  - More private cable systems nowadays
- > Exponential growth in demand for international capacity
  - Available Capacity for Singapore : 53 Gbps (1999) to 56 Tbps (2010) – more than a thousand times!

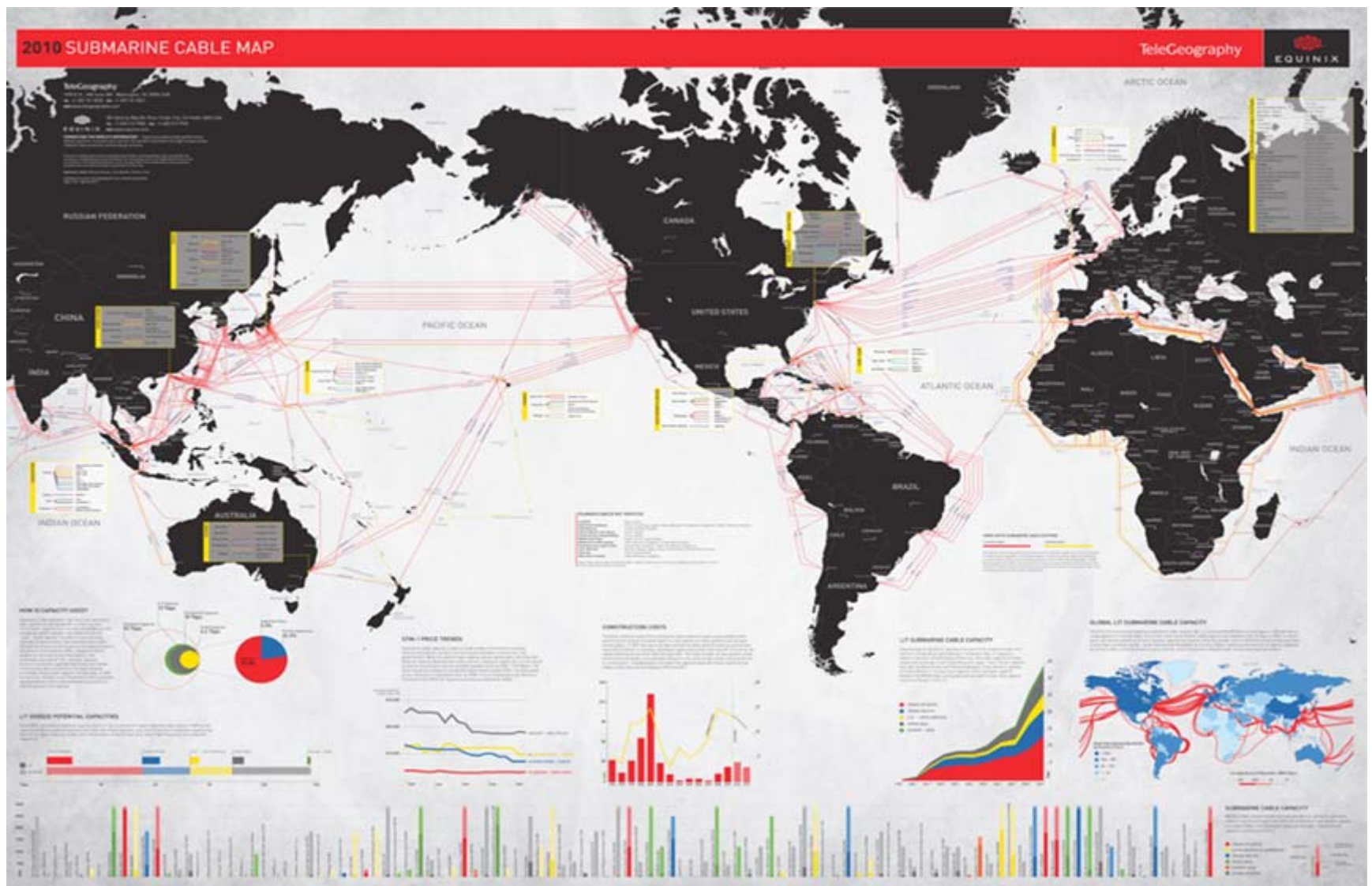
# Why Are They Important

<http://www.ntcalaska.com/boat.html>



<http://coconutwireless.wordpress.com/tag/o3b/>





[http://www.telegeography.com/product-info/map\\_cable/index.php](http://www.telegeography.com/product-info/map_cable/index.php)

# 4

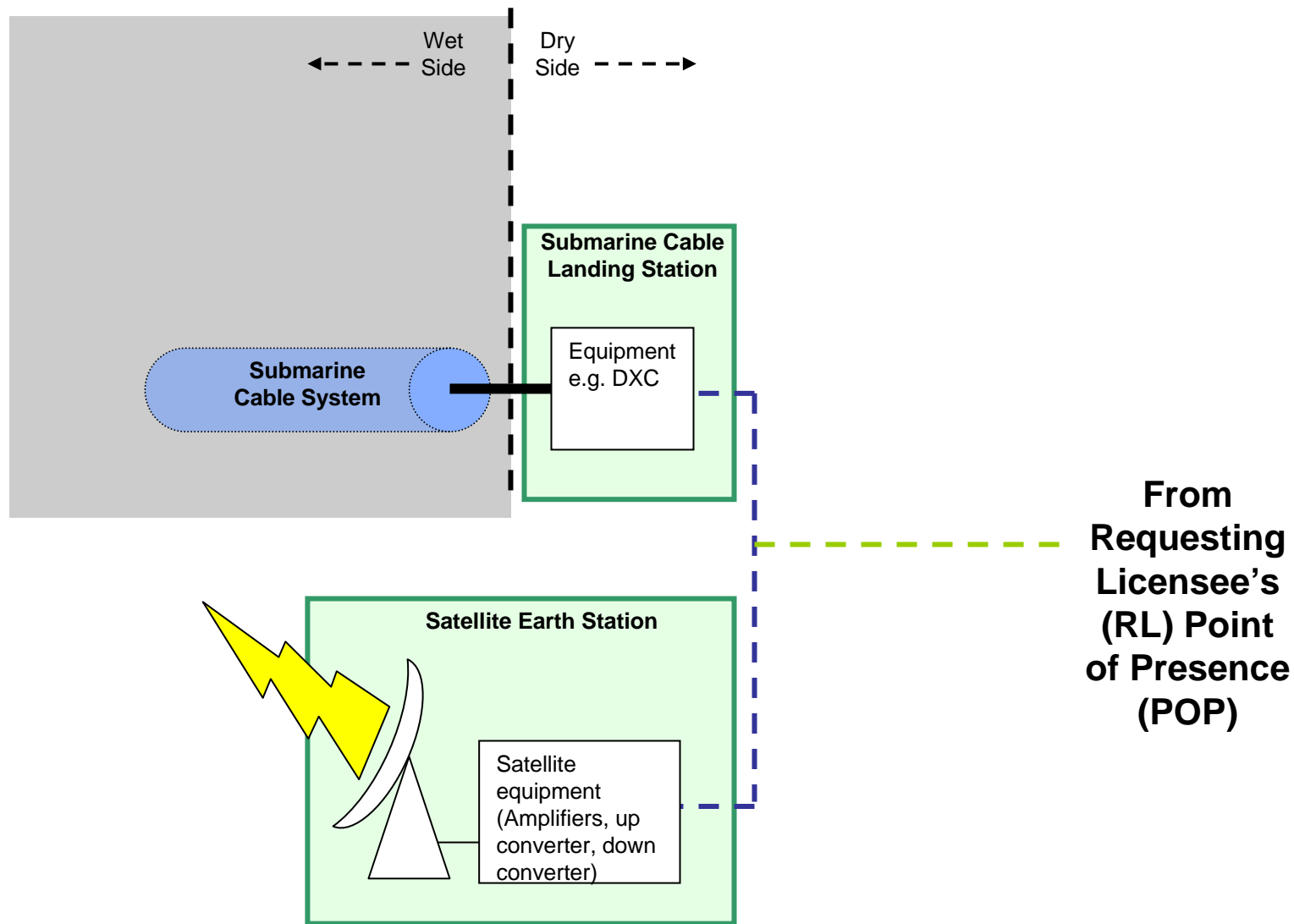
## **Regulating Access to IGW**

# Desired regulatory/policy outcomes

- > Vibrant international market, with multiple players landing in Singapore
- > Substantial increase in Singapore's international bandwidth capacity and diversity
- > Competitive IPLC rates (International Private Leased Circuits) and IDD rates



# IDA's 2001 View of Access to SCLS/SES

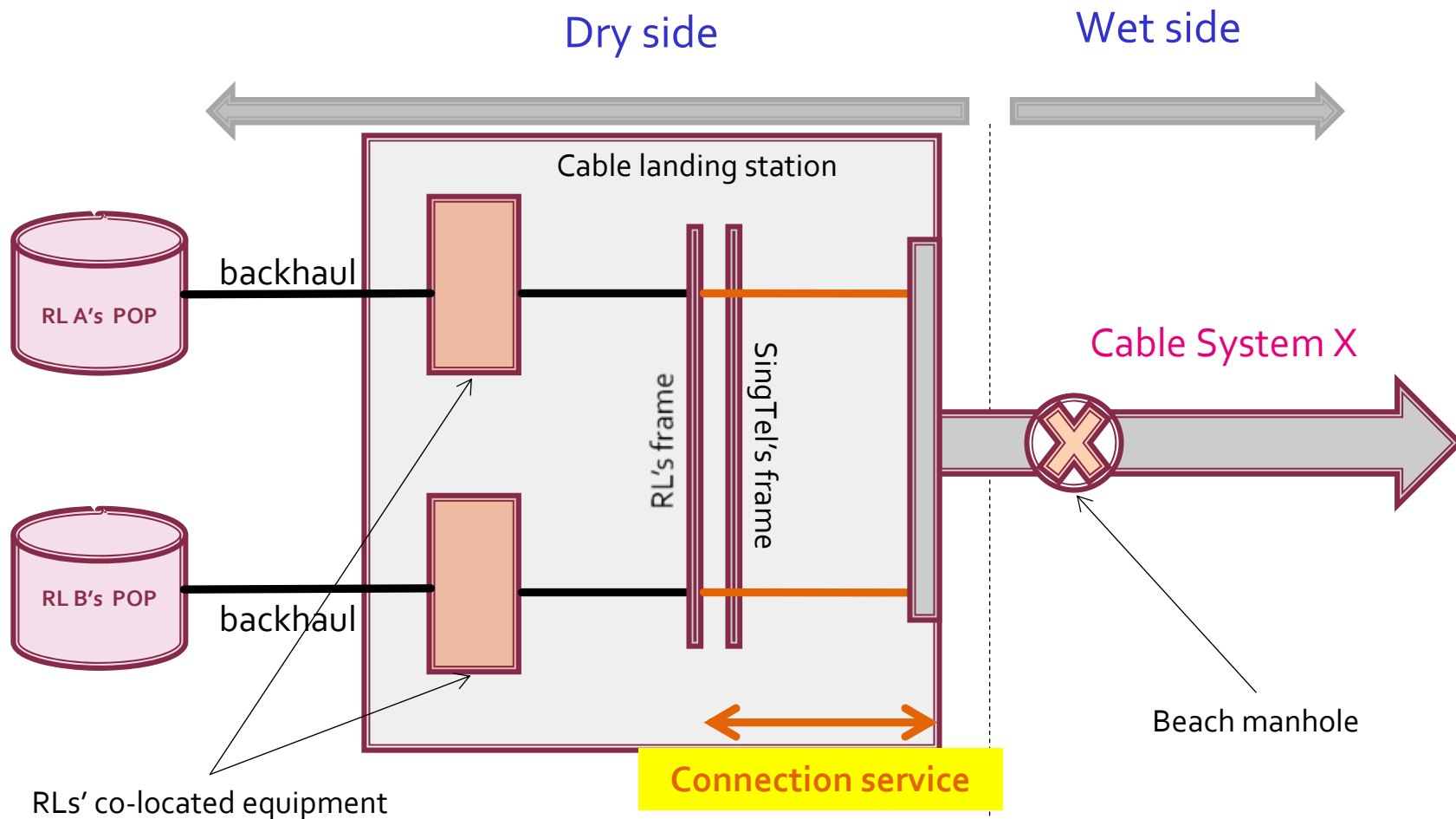


# Co-location

## > **Mandate co-location at Dominant Licensee's SCLS**

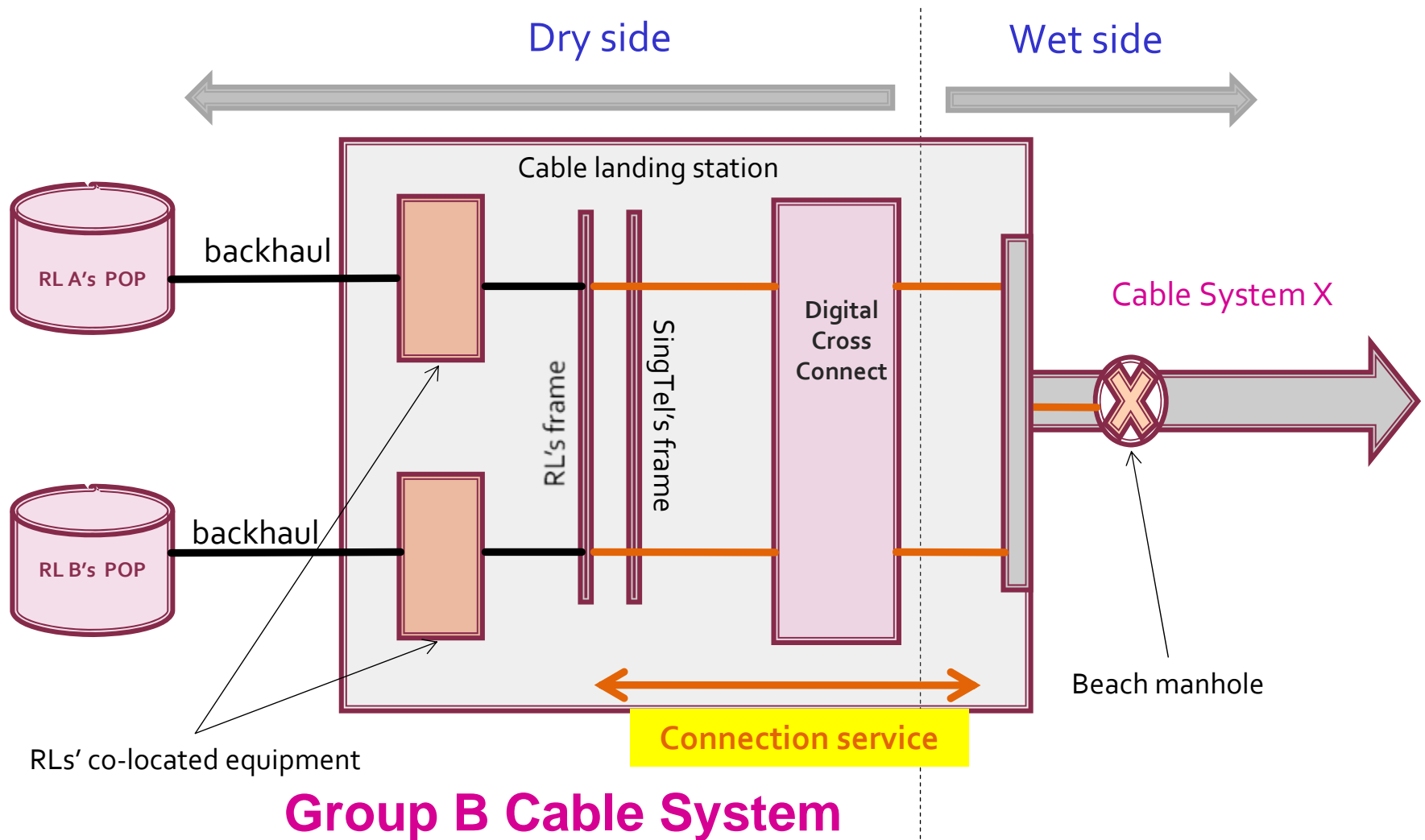
- Dominant licensee must allow any operator who owns capacity in a submarine cable system landed at Dominant Licensee's SCLS to obtain co- location space.
- Terms and Conditions in Reference Interconnection Offer approved by IDA
  - Provisioning timeframes, service level guarantees, etc
- Cost-based Co-location prices determined by IDA, using Forward-looking Economic Costs (FLEC)/Long Run Average Incremental Cost (LRAIC)
- Reduces timeframe for interconnection negotiations and expedites market entry

# IDA's 2002 View of Access to SCLS



## Group A Cable System

# IDA's 2002 View of Access to SCLS





*Interior of beach manhole*

# Connection Service

## > **Mandate Connection Services**

- A missing piece!
- Connection Services found to be a bottleneck.
- Required Dominant Licensee to provide Connection Services under the RIO and at cost-based prices determined by IDA.

# 2004 – A Further Review

## > Allow operators who have deployed to SCLS:

- to provide backhaul service for any third party's capacity on any submarine cable system landing at that SCLS
- to provide transit service to enable a third party to transit traffic between submarine cable systems landed in Singapore.
- Irrespective of whether the operator owns capacity in the submarine cable system which it seeks to provide backhaul and transit services

# Price Determination

## > Overview

- **Identify** the network elements
- **Review** the network components which make up the network elements/IRS, and obtain the design parameters or average size/capacity of each component
- **Obtain** latest quotations on the cost of installing various network components from vendors and suppliers, or review the latest costs incurred
  - Modern Equivalent Asset (MEA) values



# Price Determination

## > Overview

- **Estimate** the trend of network component costs by reviewing industry and overseas observations, past trends, etc
- **Project** the capital costs of network component to encompass the period for which the interconnection charges are applicable
- **Annualise** the capital cost based on economic asset life and a reasonable cost of capital (pre-tax WACC)

# Price Determination

## > Overview

- **Estimate** operating costs based on a percentage on the capital cost of network components
- **Divide** the annualised cost (capital and operating) by the capacity of the network components to obtain a unit cost
- **Aggregate** the unit costs of various network elements to determine the pricing for each IRS

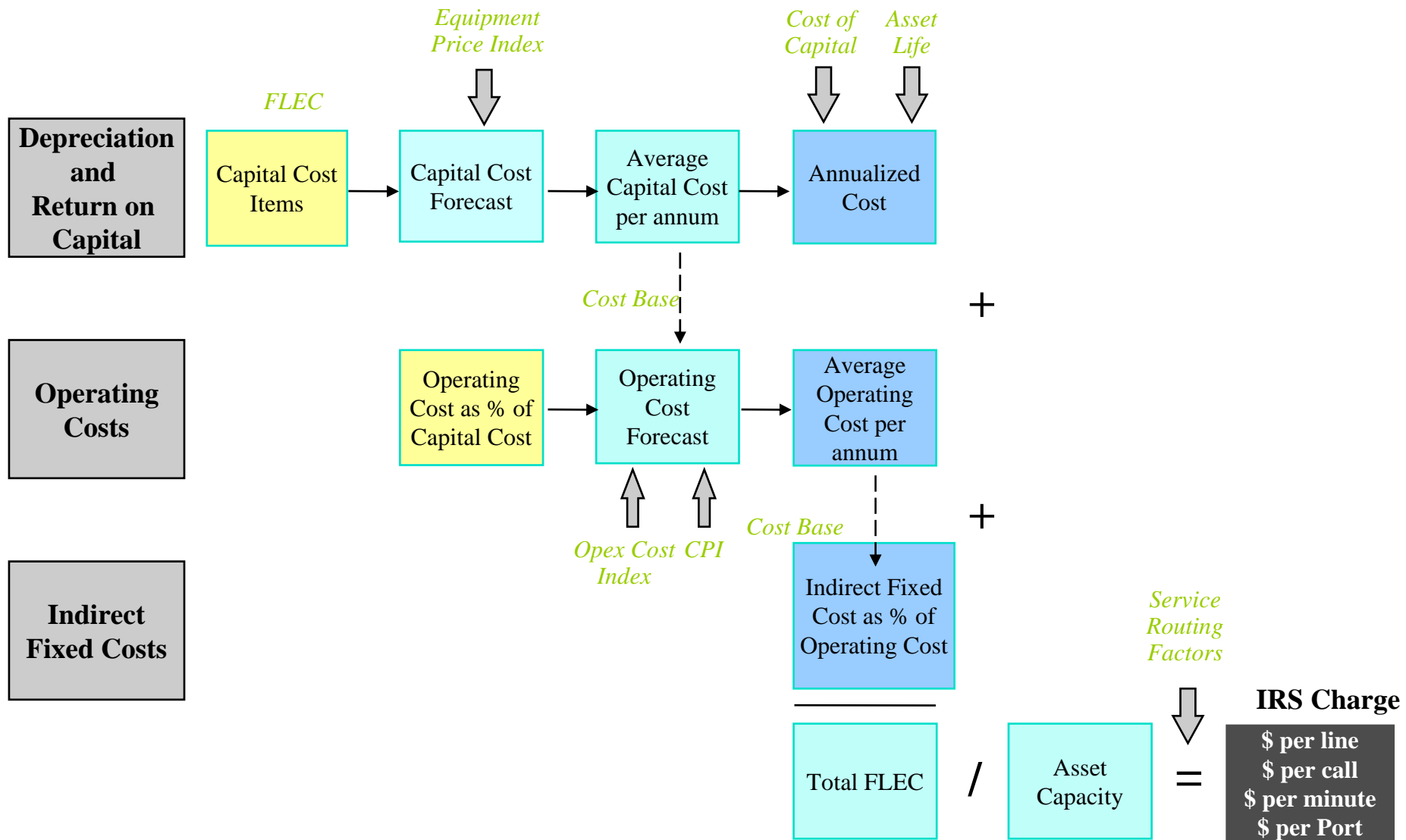
# Price Determination

## > Co-location

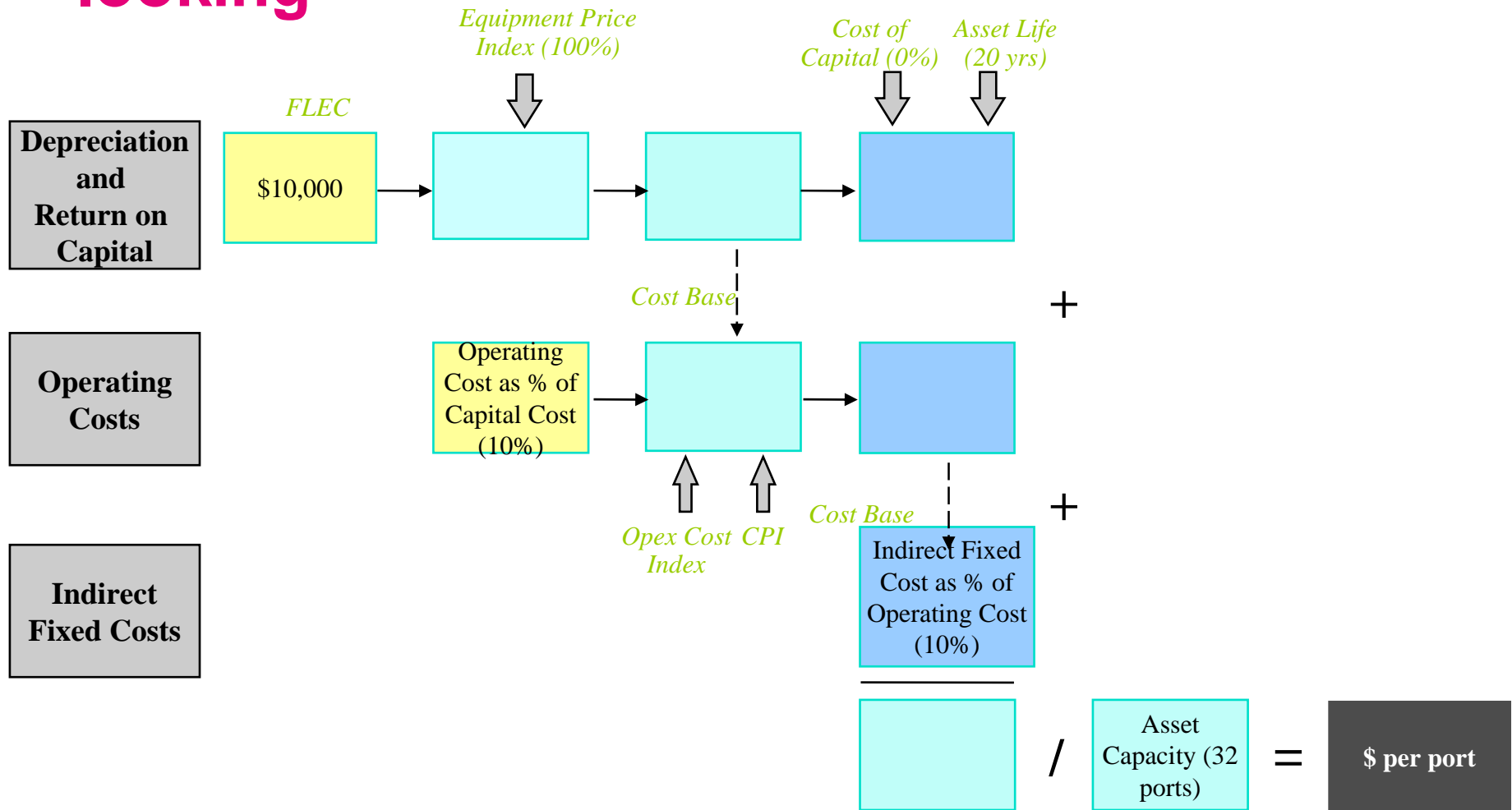
- Key Elements:
  - Costs of Land
  - Costs of Buildings

## > Connection Services

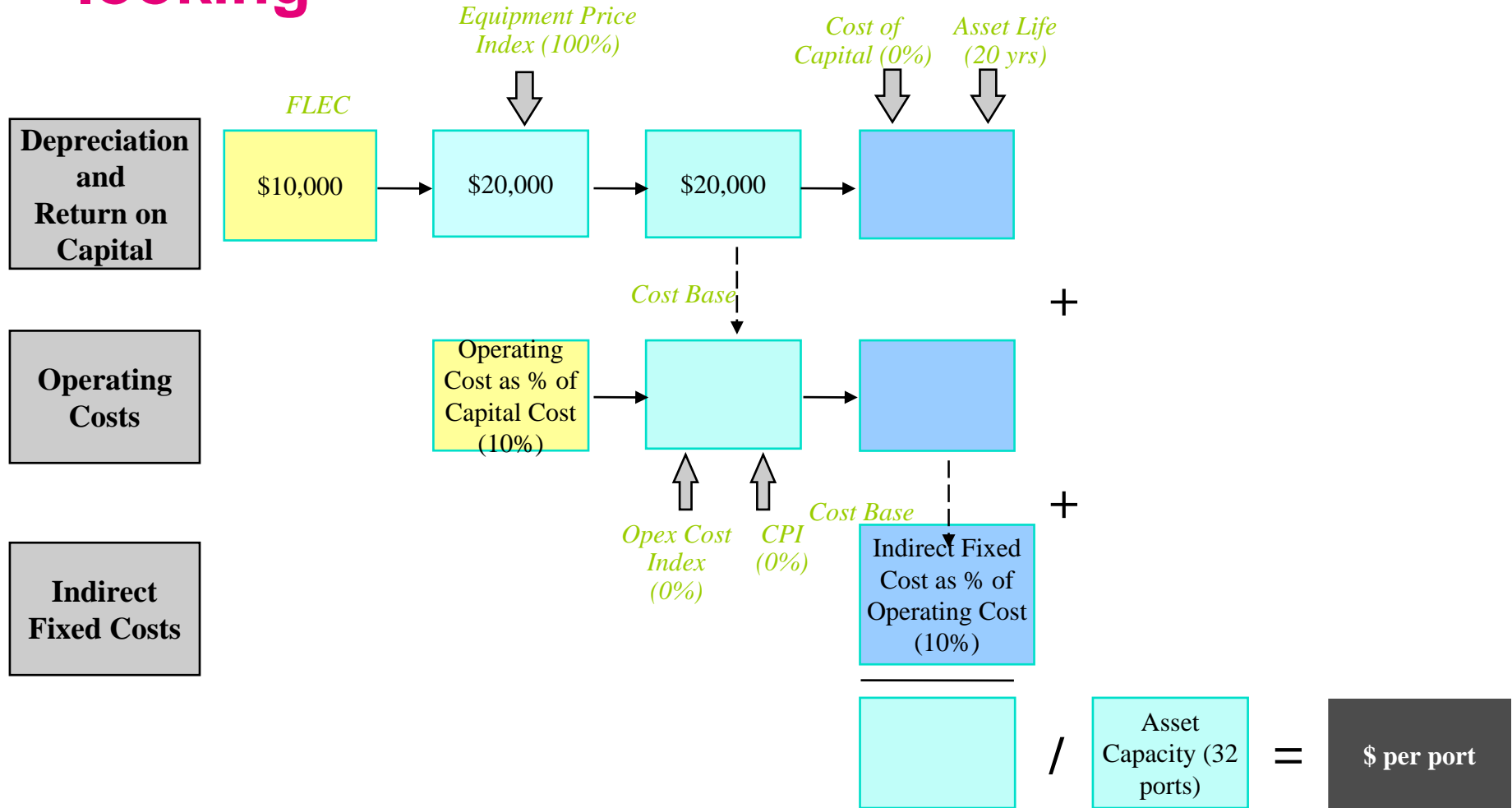
- Key Elements:
  - Digital Cross Connect (DXC) Equipment
  - Fibre/Digital Distribution Frame
  - Tie Cables



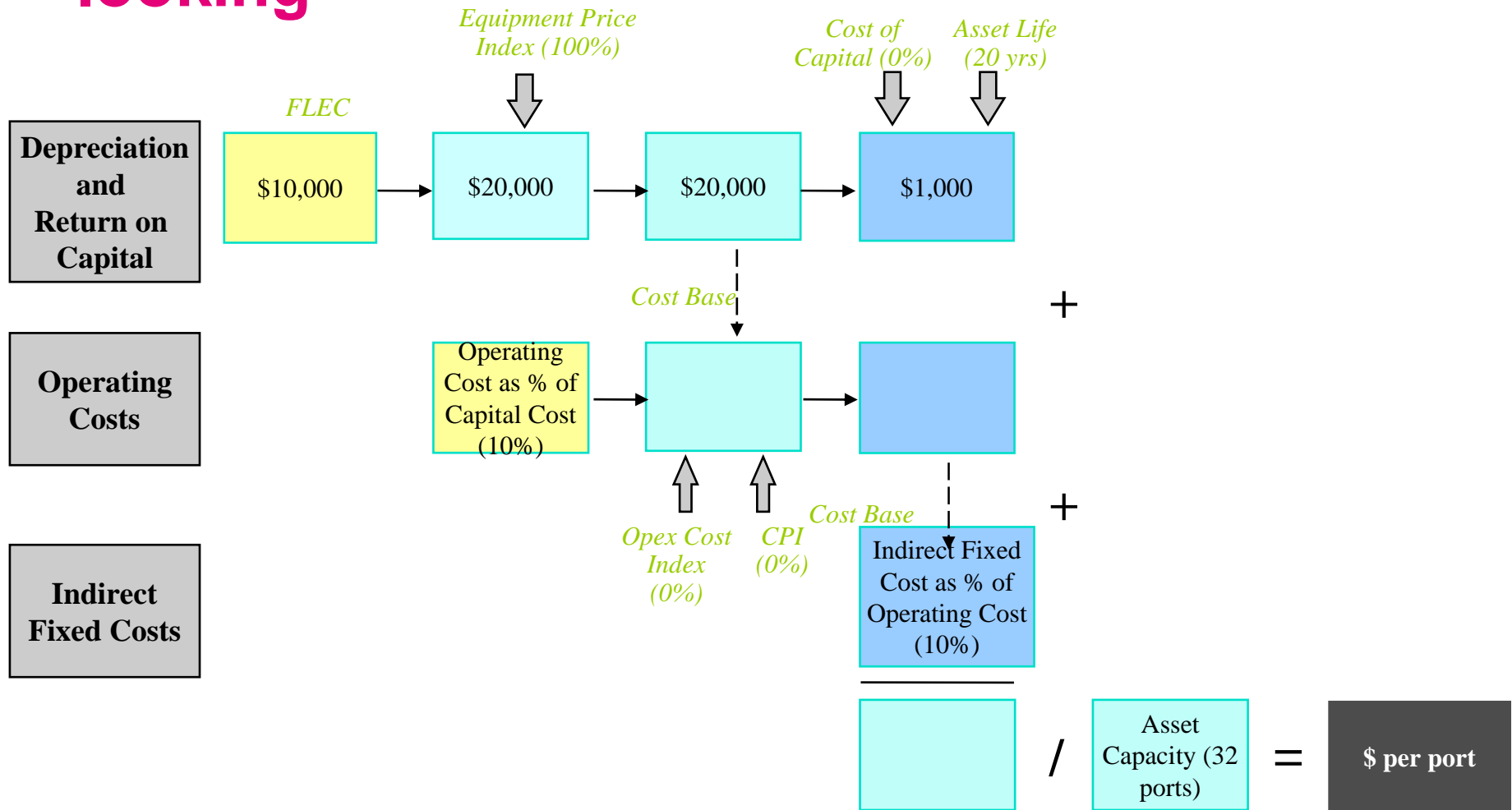
# A Worked Example (ODF) - 1 year forward looking



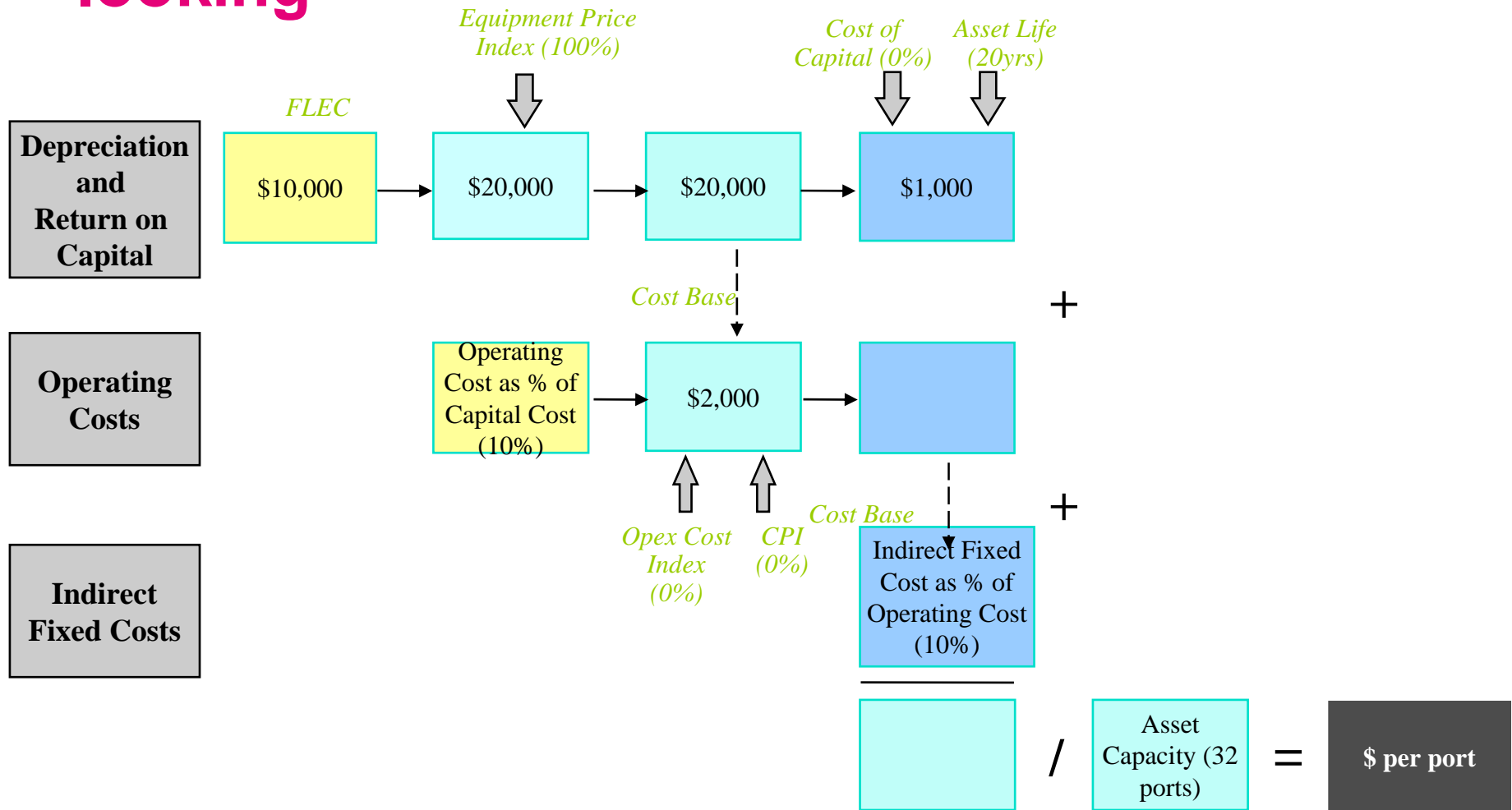
# A Worked Example (ODF) – 1 year forward looking



# A Worked Example (ODF) – 1 year forward looking

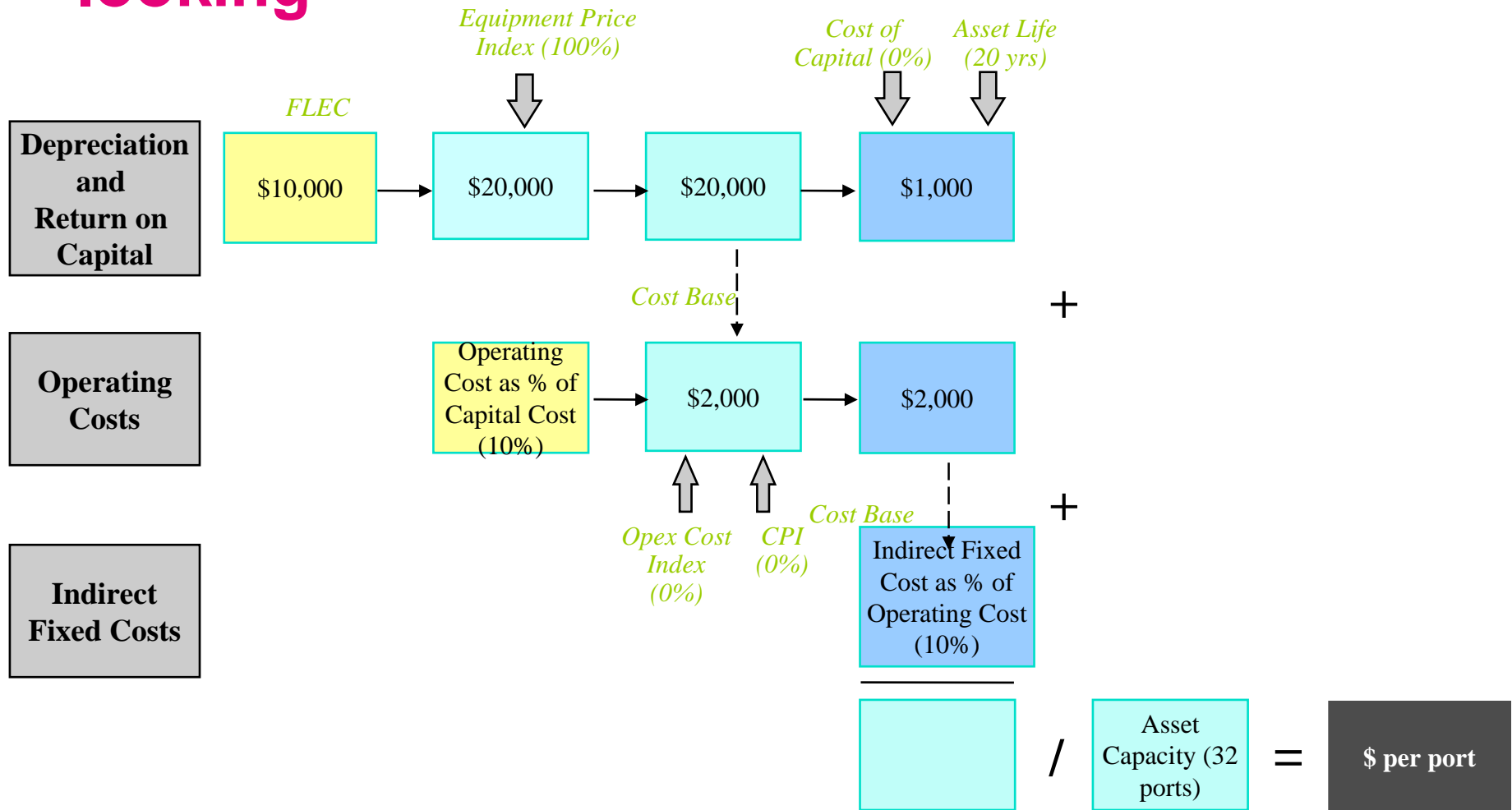


# A Worked Example (ODF) – 1 year forward looking

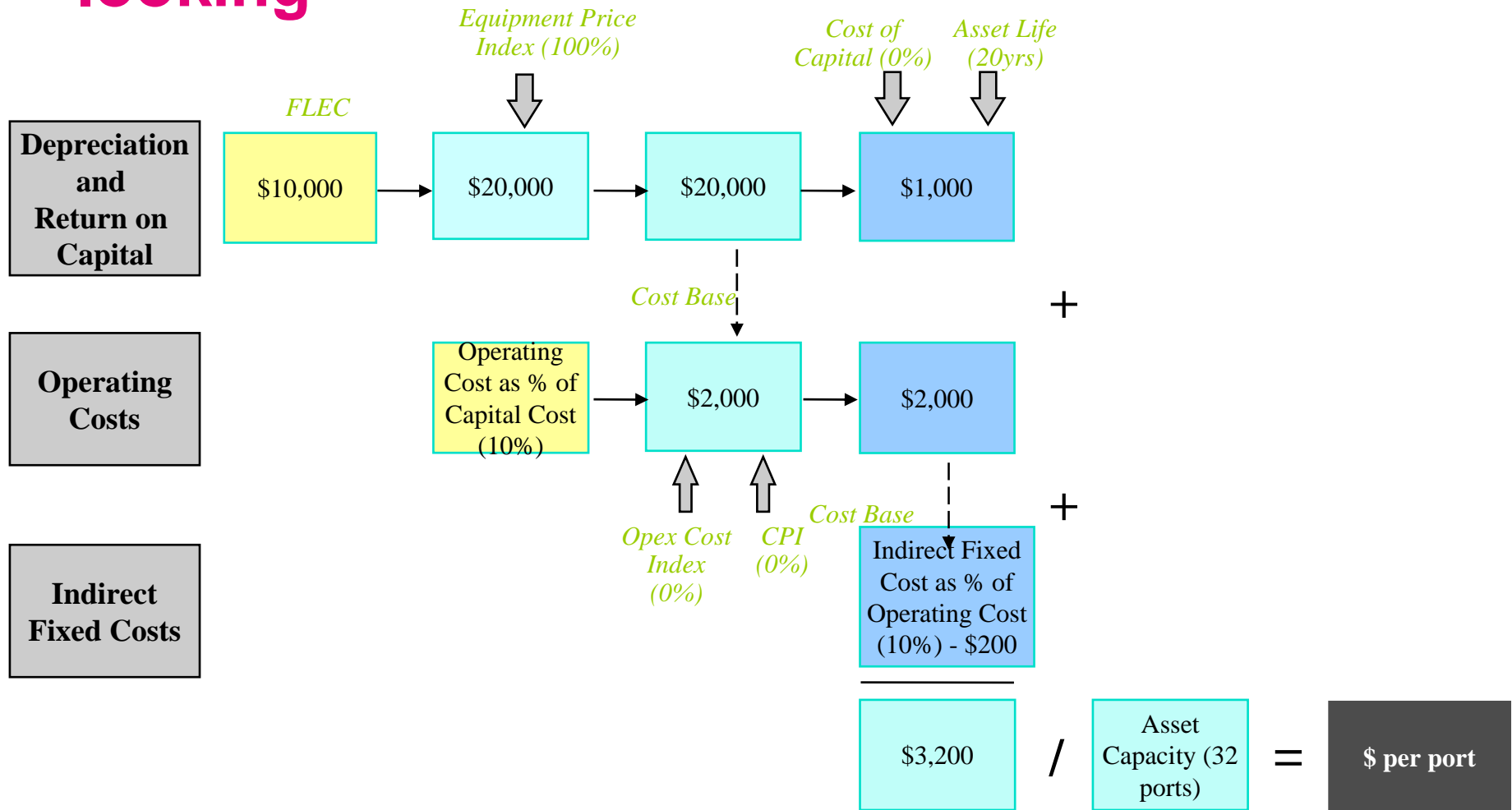




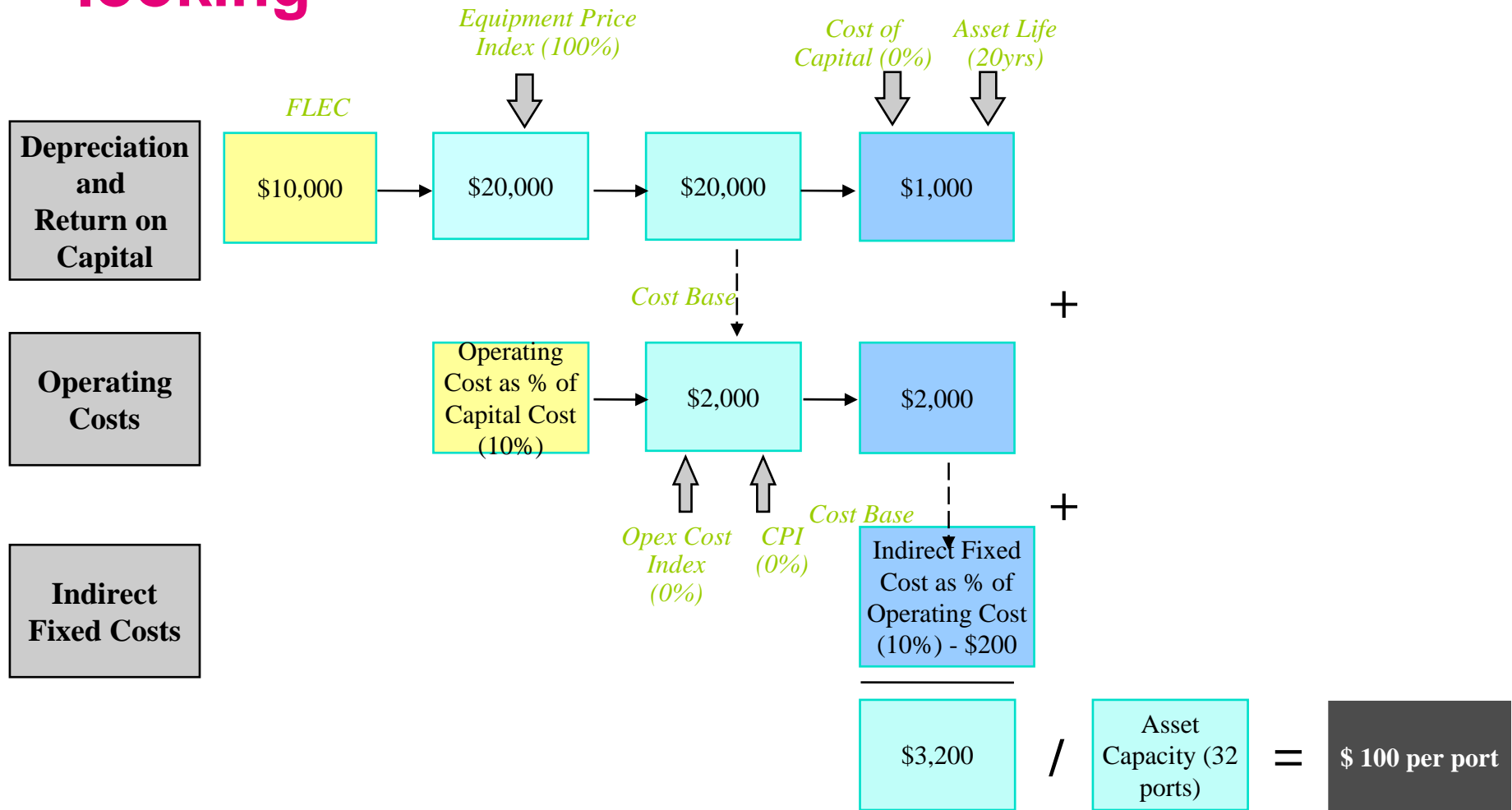
# A Worked Example (ODF) – 1 year forward looking



# A Worked Example (ODF) – 1 year forward looking



# A Worked Example (ODF) – 1 year forward looking



# 5 Lessons

# Results Overview

<b>Total Submarine Cable Bandwidth Capacity</b>	<b>53Gbps (1999) to 56 Tbps (2010)</b>
<b>No. of Submarine Cable Landing Stations</b>	<b>7</b>
<b>No. of Backhaul Providers</b>	<b>9</b>
<b>IPLC Rates (International Private Leased Circuits)</b>	<b>Dropped &gt;90%</b>
<b>IDD Rates</b>	<b>Dropped &gt;90%</b>
<b>No of Outgoing International Telephone Minutes per month</b>	<b>64 million (1999) to 1 billion (2010)</b>
<b>No of ISPs</b>	<b>&gt;10 (1999) to &gt;95 (2010)</b>
<b>Broadband Penetration (Households)</b>	<b>&lt;5% (1999) to 80% (2009)</b>

# Cable Capacity

## Singapore: Global Traffic Hub

	Cable Systems	Max (Tbps)	Lit (Tbps)
Singapore	14	56	7.9

★ **56.11 Tbps**

2011/2012

Upcoming Cable Systems
Asia-Pacific Gateway cable system
Southeast Asia Japan cable system
West Asia Crossing cable system ("WAC")

Active Cable System
APCN
APCN2
EAC2-C2C
TGN-IA
I2I
Tata-Indicom (TIC)
SMW3
SMW4
MIC-1
MCS
BSCS
AAG
Jakabare
TIS

# Lessons

- > IGW competition needs a lot **nurturing** by regulator in the early days
- > There are many potential '**bottlenecks**' – regulator needs to uncover and address them quickly and effectively
- > **Consultation** with industry is crucial
- > Following a consultative rulemaking methodology helps to spot problems early and minimise them

# Lessons

## > Establish a one-stop shop to facilitate submarine cable landings

- Landing of cables require close coordination with multiple government agencies (URA, MPA, SLA). IDA facilitates the process as a “one-stop point” to interface with all relevant agencies.
- Involves guiding licensees on steps and processes necessary to land the cables so as to reduce administrative inconvenience.
- Role of coordinator to resolve any issues that arise from licensee’ application.



# Other Jurisdictions' Practices

## > Australia

- No specific regulations from ACCC
- Access to SCLS subject to commercial negotiations

## > India

- SCLS owners (BSNL, VSNL) mandated to provide access
- Terms, conditions and prices approved by TRAI

## > Hong Kong SAR

- OFTA issued guidelines, requiring access and co-location at SCLS
- Terms and conditions for access to be commercially negotiated, with possible intervention by OFTA

# Other Jurisdictions' Practices

## > Malaysia

- MCMC publishes Access List of services – one operator must provide to another upon request
- Access List includes co-location and connection services at SCLS
- Terms and conditions for access to be commercially negotiated

## > UK

- Regulation on international facilities lifted in 2003
- Terms and conditions for access to be commercially negotiated

# Thank you

[www.ida.gov.sg](http://www.ida.gov.sg)

Contact Details:

email: [liau\\_chie\\_kiong@ida.gov.sg](mailto:liau_chie_kiong@ida.gov.sg)

Tel: +65-62111878

# SINGAPORE: AN INTELLIGENT NATION, A GLOBAL CITY POWERED BY INFOCOMM

[www.ida.gov.sg](http://www.ida.gov.sg)  
[www.infocommsingapore.sg](http://www.infocommsingapore.sg)

