Deployment of Undersea Cables in Sri Lanka

Christie Alwis
B.Sc (Eng) Hons, FIE (SL), MIEE, C.Eng (Lond)
Chief Network Officer- Sri Lanka Telecom

Key points…

- Introduction
- Telecommunication Industry in Sri Lanka
- History of International connectivity of Sri Lanka
- Need for investment in undersea cables
- Growth rate of Data in each region
- Financial Risks of Investing in Undersea Cable Projects
- Foreseeable returns by investing in undersea cables
- Why SLT invested in Undersea Cable Projects?
- Conclusion

Sri Lanka Telecom

Sri Lanka

Sri Lanka Telecom

3

Sri Lanka

- Located in the Indian Ocean towards South of India.
- Independent island with 65,000 sqkm with population of 20 million people.
- Tea, rubber and coconut are main agricultural products.
- Foreign employment and free trade business and tourism are becoming major foreign exchange earnings in Sri Lanka.

Sri Lanka Telecom

4

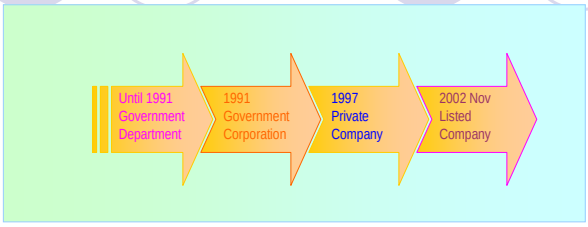
Telecommunication Industry in Sri Lanka

- 7 major operators providing fixed and mobile telephones
- Sri Lanka Telecom (incumbent operator with 35% shares to NTT Japan), Suntel (51% Telia Sweden), Lanka Bell (99% Milford Holdings Sri Lanka) providing well over 1 million fixed telephones while Dialog Telekom (87% owned by Telekom Malaysia), Celltel (100% Millicom), Mobitel (100% Sri Lanka Telecom) and Hutch (100% Hutchinson) providing well over 2 million mobile telephones.
- International telephone business is fully deregulated and presently there are around 30 External Gateway Operators who have been licensed.

Sri Lanka Telecom

5

Sri Lanka Telecom - SLT



- SLT is one of the country's most valuable blue chip companies with an annual turnover in excess of USD 300 Million.
- The company was awarded with BB- international rating Fitch.

Sri Lanka Telecom

6

SLT Domestic Network

- SLT as an incumbent operator has been responsible for providing both voice and data services, domestic as well as international.
- In the domestic network predominantly access services has been provided by copper pairs and recently by CDMA 2000 1x. The Transport network deploys optical fibers. All the Switches are digital and new switches will be based on NGN (Next Generation Networks).
- SLT has introduced ADSL service which has become very popular in Sri Lanka. The customers in rural areas where the copper access is difficult, high bit rate CDMA technology is deployed (EVDO - Evolution Data Only)
- Optical fiber rings already planned to provide Fiber Optic Super Highway interconnecting all the provinces of Sri Lanka. Part of this plan is implemented to provide connectivity to major cities of Sri Lanka.
- A large number of towers have been deployed by SLT to provide radio connectivity to rest of the SLT network.
- Recently SLT has rolled out the CDMA network in 800MHz to reach the customers in the rural areas and proved to be very successful.

Sri Lanka Telecom

7

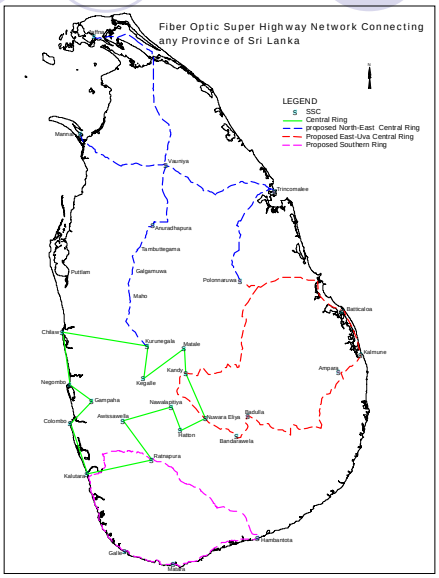
The role of Optical fibers in the domestic Network

- When a country develops the people will not be satisfied only with basic telephony. In Sri Lanka we experience the same. Provision of ADSL has led SLT customers to surf Internet much faster and the demand has been very much spread outside of Colombo.
- Hence SLT is now deploying ADSL network rollout to reach 100,000 ADSL customers.
- In addition IP VPN service and IPLC circuits are found to be very much in demand indicating the high demand for bandwidth.

Sri Lanka Telecom

8

Optical Fiber Super Highway in Sri Lanka.



9

History of International connectivity of Sri Lanka

- 1976 First Satellite earth station (1A) commissioned
- 1985 First Submarine Cable Project –SEA-ME-WE 1 commissioned
- 1993 First Digital Earth Station (Std B) Satellite commissioned
- 1994 First Optical Submarine Cable Project SEA-ME-WE 2commissioned
- 1995 Digital Satellite Earth Station commissioned
- 1999 First WDM Optical Fiber Cable SEA-ME-WE 3 commissioned
- 2005 First DWDM Optical Fiber Cable SEA-ME-WE 4 commissioned

Sri Lanka Telecom

10

Evolution of undersea cables in Sri Lanka

- SLT had been a party to the SEA-ME-WE 1 project which was commissioned in 1985. This coaxial cable used analog technology with 8 parties. The cost was USD 386 Million.
- It is interesting to note that even the giant countries like India was not a party for SEA-ME-WE 1.
- SLT has been a party of SEA-ME-WE 2 project which was commissioned in 1985. This optical fiber cable used digital PDH technology with 52 parties, with 565 Mbps bandwidth. The cost was USD 800M.
- SLT is a party of SEA-ME-WE 3 project which was commissioned in 1998. This optical fiber cable uses digital SDH/WDM technology with 33 countries, with 70Gbps bandwidth. The cost was USD 1.5 billion.
- SLT is a party of SEA-ME-WE 4 project which was commissioned in 2005. This optical fiber cable uses digital DWDM technology with 16 parties, with 1.2 Tbps bandwidth. The cost was around USD 485 million.

Sri Lanka Telecom

11

Information Explosion Era

- We are living in an information explosion era. Any news from one corner of the world will reach the other corner with a matter of a second. Today the public communication mainly deploy satellite and other radio solutions to broadcast the news. No government can control the right of access to the information by any human in the respective countries.
- The explosion in the personal communication era is ongoing. Access to documents, movies, video clips, high fidelity music, people need to access at their will. This too by regulation cannot be stopped.
- Service providers, network operators should gear to provide this in a cost effective way.
- How to provide? The domestic network should have capability of provisioning of broadband services to customers. This broadband service needs to be extended to any country.
- To achieve the benefits of information explosion it is vital to deploy optical fiber cables as the only economical solution to achieve the bandwidth requirement. This will further lead to reduce the digital divide between rural to urban in a given country and finally to country to country.
- The world will be shrinking to a global village with use of optical fiber cables.

12

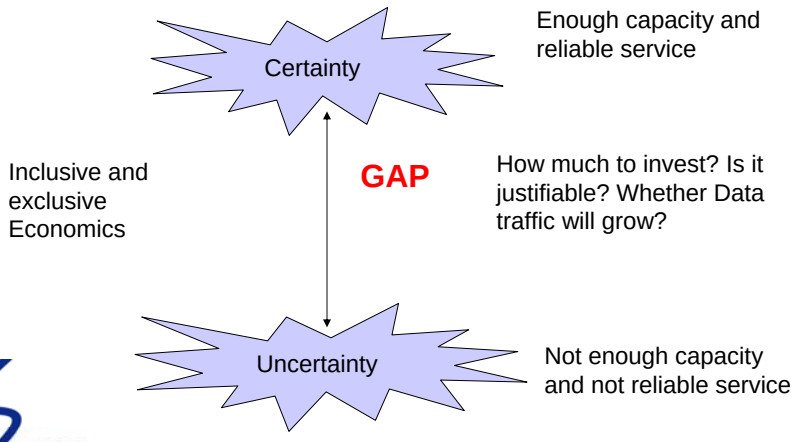
Need for investment in undersea cables

- Evolution of the services from voice to data
- Evolution of technology from electrical to optical.
- Future services are evolving from voice to multimedia demanding more bandwidth.
- To maintain a high service level requires a larger bandwidth.
- Need for global presence (POP – Point Of Presence)

Sri Lanka Telecom

13

Financial Risks of Investing in Undersea Cable Projects



Sri Lanka Telecom

14

GAP Analysis

- Inclusive Economics
  - More concern about NPV Value
- Exclusive Economics
  - More concern about IRR Value

Both IRR & NPV based on cash flows whereas NPV will show the absolute cash value.

- Large and small countries and their inter-dependency
- Chicken and egg situation

Analysis of Present Global Bandwidth Bottleneck

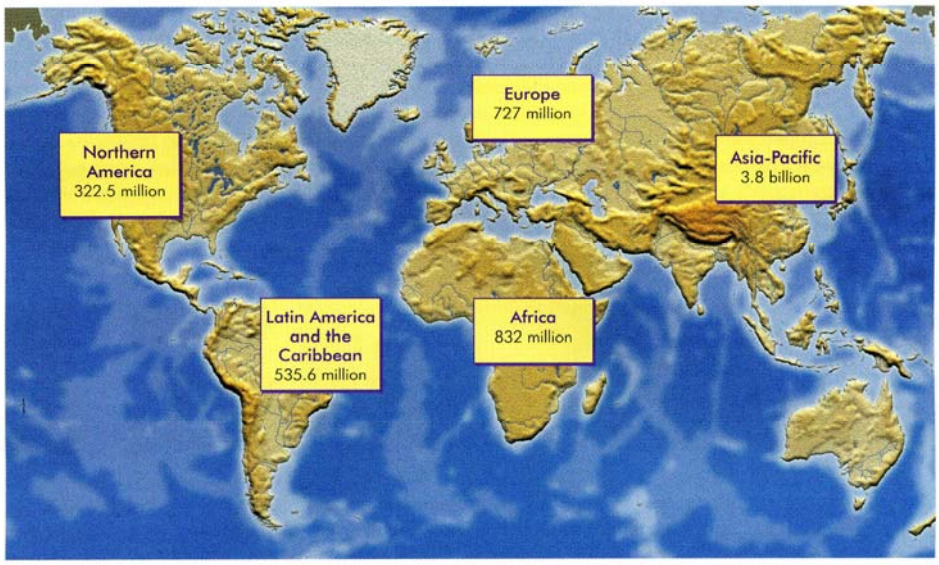
- Population Distribution
- Present Data Trends
- Analysis of the Bandwidth Bottleneck

16

World population, 6.2 billion (2003)

Distribution by region

Middle-East and Asia Region Population grouping

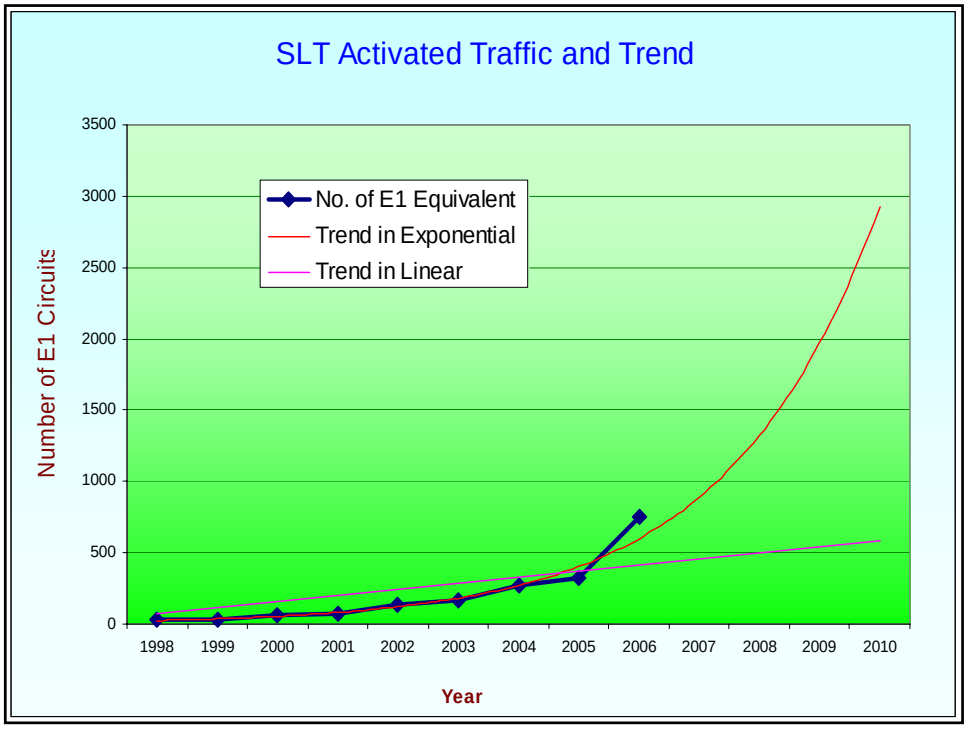


Source: Adapted from the United Nations (http://unstats.un.org/unsd/demographic/products/vistats/serATab1.pdf).

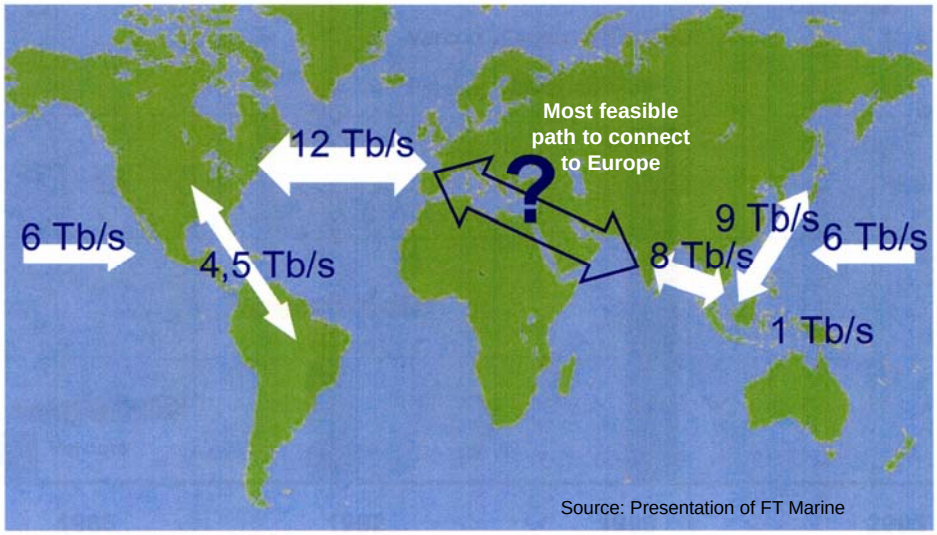
WORLD INTERNET USAGE AND POPULATION STATISTICS

World Regions	Population (2006 Est.)	Population % of World	Internet Usage, Latest Data	% Population (Penetration)	Usage % of World	Usage Growth 2000-2005
Africa	915,210,928	14.1 %	23,649,000	2.6 %	2.3 %	423.9 %
Asia	3,667,774,066	56.4 %	364,270,713	9.9 %	35.6 %	218.7 %
Europe	807,289,020	12.4 %	291,600,898	36.1 %	28.5 %	177.5 %
Middle East	190,084,161	2.9 %	18,203,500	9.6 %	1.8 %	454.2 %
North America	331,473,276	5.1 %	227,303,680	68.6 %	22.2 %	110.3 %
Latin America/Caribbean	553,908,632	8.5 %	79,962,809	14.4 %	7.8 %	342.5 %
Oceania / Australia	33,956,977	0.5 %	17,872,707	52.6 %	1.7 %	134.6 %
WORLD TOTAL	6,499,697,060	100.0 %	1,022,863,307	15.7 %	100.0 %	183.4 %

NOTES: (1) Internet Usage and World Population Statistics were updated for March 31, 2006. (2) CLICK on each world region for detailed regional information. (3) Demographic (Population) numbers are based on data contained in the world-gazetteer website. (4) Internet usage information comes from data published by Nielsen//NetRatings, by the International Telecommunications Union, by local NICs, and other other reliable sources. (5) For definitions, disclaimer, and navigation help, see the Site Surfing Guide. (6) Information from this site may be cited, giving due credit and establishing an active link back to www.internetworldstats.com. ©Copyright 2006, Miniwatts Marketing Group. All rights reserved.



Bandwidth bottleneck



Growth rate of Data in each region

- High growth rate experienced in Middle-East and Asia
- Developed countries demand satisfied.
- More cables within Middle-East and Asia required
- More cables to interlink Middle-East and Asia to Europe and America.

Sri Lanka Telecom

Risk of Investment on Undersea Cables

- Financial

  Whether the investment improves the shareholders' wealth
- Technical

  Whether we are selecting appropriate technology
- Management

  Can we manage the system to reach the required goals through the lifetime anticipated.

Sri Lanka Telecom

22

Mitigating the Risks of Undersea Cable Projects

- The Need for undersea cable system
- Convincing the necessity for investment in relation to the high bandwidth demand with respective to Sri Lanka at large to the region (SEA-ME)
- Identifying the costs & revenues with a suitable Business Model

23

Why business model ?

- Services – to identify the services that can be supported,
- Pricing – cost to the customer of such services,
- Revenues – expected revenues over a period of time (typically 10 years)
- Costs – to identify all costs of the whole project including supporting facilities
- Efficiency – NPV, IRR and the cost recovery year (Payback) to ensure its financial viability

Services

- Nowadays services are the most critical factor to motivate any investment on Submarine Cable Systems
- This is very significant as broadband services are becoming very popular
- However the revenues from traditional voice services (PSTN) still can be expected for next few years
- Restoration services to other cable systems brings good revenue

Pricing of Services

- Broadband services can be priced taking the following network components into consideration;
  - Cost of the submarine cable systems and its apportioned bandwidth
  - Cost of the domestic IP broadband network and associated IP core networks and its apportioned portions
- Restoration prices need to be competitive with other cable systems and it shall be half circuit and full circuit basis
- Pricing of all these services shall vary year to year based on the demand and competitiveness

Expected Revenues

- Revenues can be forecasted based on the volumes of services expected in each year
- These revenues need to be depreciated based on a standard discount rate applicable to that particular country
- These revenues shall be more conservative if investments are required to be less risky
- Revenue Categories
  - International Private Leased Circuits
  - International Voice and Telex
  - Cable Interconnection
  - IRU sales etc

Cost Analysis

- Costs of a submarine cable system shall include;
  - Terminal Station Equipment costs
  - Submersible Plant costs
  - Land cable and land cable plant costs
  - Building costs and its apportionment
  - Land Costs and its apportionment
  - Power and AC costs
  - Costs of supporting facilities and meeting
- Operation and Maintenance Costs

Breakeven Point

- All the costs incurred in each year shall be reduced from the expected revenues in each year
- The resulting figures shall be accumulated towards the future
- The year where the resulting figure will be positive is considered as the breakeven point

Sri Lanka Telecom

Case Study

Why SLT invested in SEA-ME-WE 4 project?

Sri Lanka Telecom

30

Areas considered…

- Financial analysis
- Operational considerations
- Increased Network Resilience/ availability
- Corporate goals of SLT
- Other aspects

Sri Lanka Telecom

31

Financial Analysis

- Analysis of Financial returns of SEA-ME-WE 3
- NPV and IRR calculations for SEA-ME-WE 4
- Sensitivity Analysis
- Analysis of Sources of Finance

Sri Lanka Telecom

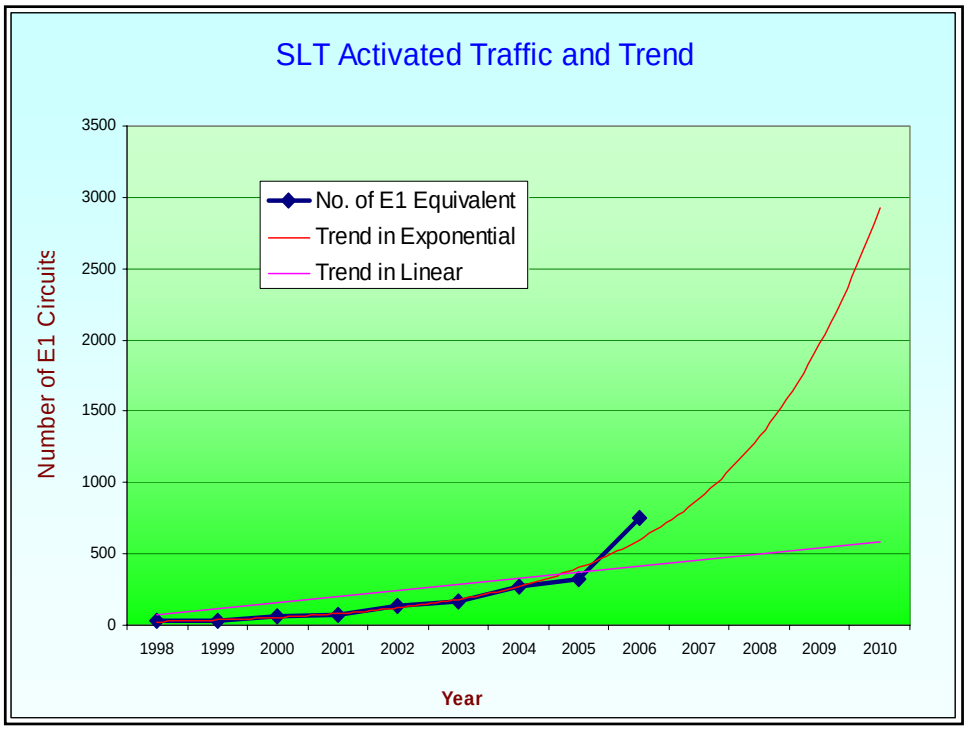
32

Operational considerations

- Traffic Trend
- Limitations of SEA-ME-WE 3 capacity
- Access to non SEA-ME-WE 3 destinations
- Preparation for SEA-ME-WE 2 retirement

Sri Lanka Telecom

33



Recent Observations…

- Around 33% circuit activation in SEA-ME-WE 3 is in the year 2005
- The trend appears to be exponential
- Investing in the consortium cable can reach many countries in very cost effective way
- Being a party to a consortium cable attracts other neighbors to have partnerships
- Increase market value of SLT

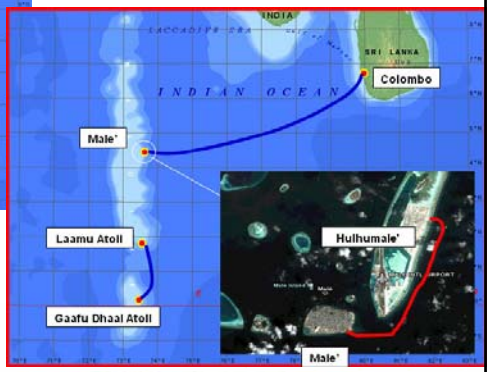
Sri Lanka Telecom

35

Latest Projects

Bharat-Lanka Cable System

Dhiraagu-SLT Cable System



Sri Lanka Telecom

Increased Network Resilience/ availability

- Improvement on International Network Reliability with diversified systems
  - Having more than one media access to a given country
- International Network restoration
  - Identify traffic nodes
  - Identify the cable systems to provide such traffic
  - Identify the probable high risk areas which causes disruption to traffic
  - Identify the restorable paths to cover probable failure

Sri Lanka Telecom

37

Importance of Cable Diversity

- Prior to SEA-ME-WE 4 SLT depended mainly on SEA-ME-WE 3 Cable.
- Branch of SEA-ME-WE 3 to Sri Lanka was damaged due to ship anchoring in August 2004
- Uproar of customers and government pressure
- Still unable to legally proceed to recovery of damage
- The need of another cable or re-route the traffic the case of cable breakdown.

Sri Lanka Telecom

38

Other Aspects

- Driving SLT to facilitate neighboring countries to achieve international connectivity.
- Building the brand image of SLT
- Increase global presence
- opportunity to involving with latest technology like DWDM
- Increase business opportunities with giant operators
- To avoid the loss of opportunity

Sri Lanka Telecom

39

Conclusions

- The modern trend is to provide high bandwidth both domestic and international.
- No country will be able to isolate from above concept through any other forces
- Customers expectations will be fulfilled with high bandwidth either from the existing copper network or optical fiber to home network.
- Most cost effective way of achieving international high bandwidth is to commission many undersea cables wherever demand is justified.
- Provisioning of high bandwidth and demand is similar to chicken and egg scenario where provisioning will create more demand.

Sri Lanka Telecom

40

Thanks for your Attention