Open Submarine Cables and SLTE:

What Does That Mean, And Why Should You Care?

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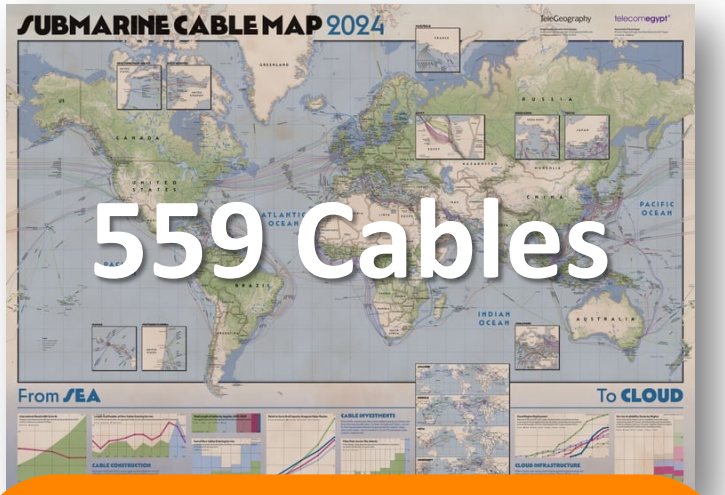
Submarine Cables Are Important …And *Vulnerable*



Telegeography's 2024 Cable Map shows 559 cables worldwide

> 99%

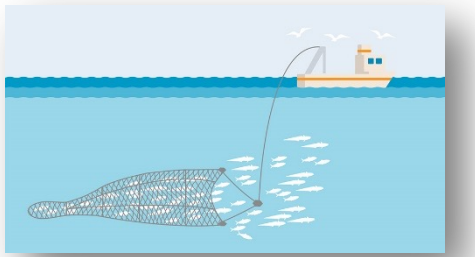
intercontinental traffic passes over submarine cables, not satellites

$10 Trillion in financial transactions per day

150 Major cable faults per year

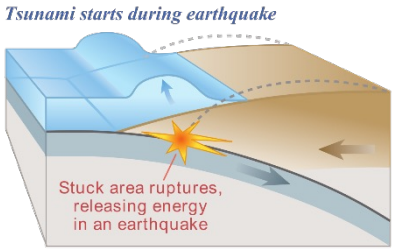
Source: ICPC

Fishing nets

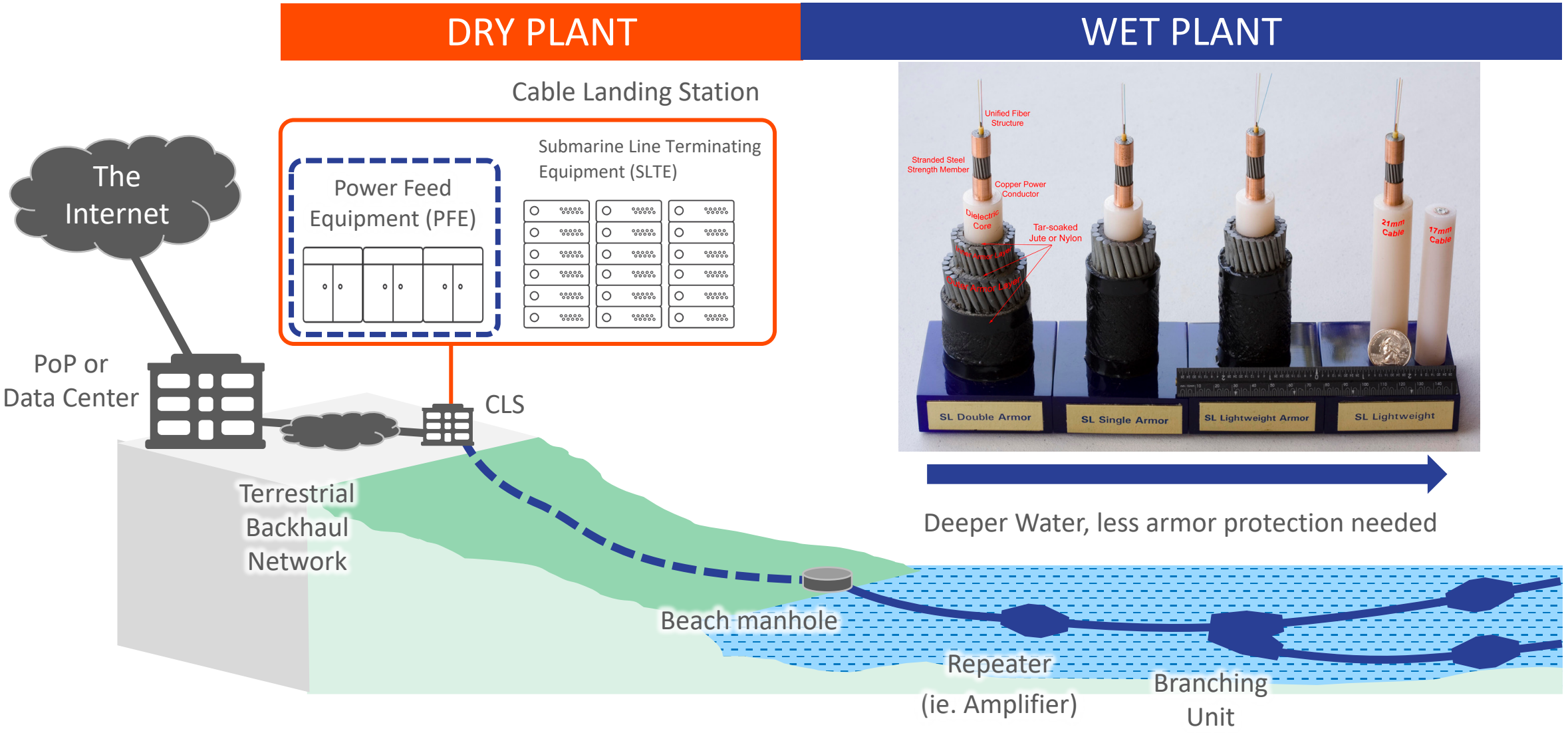


Anchors

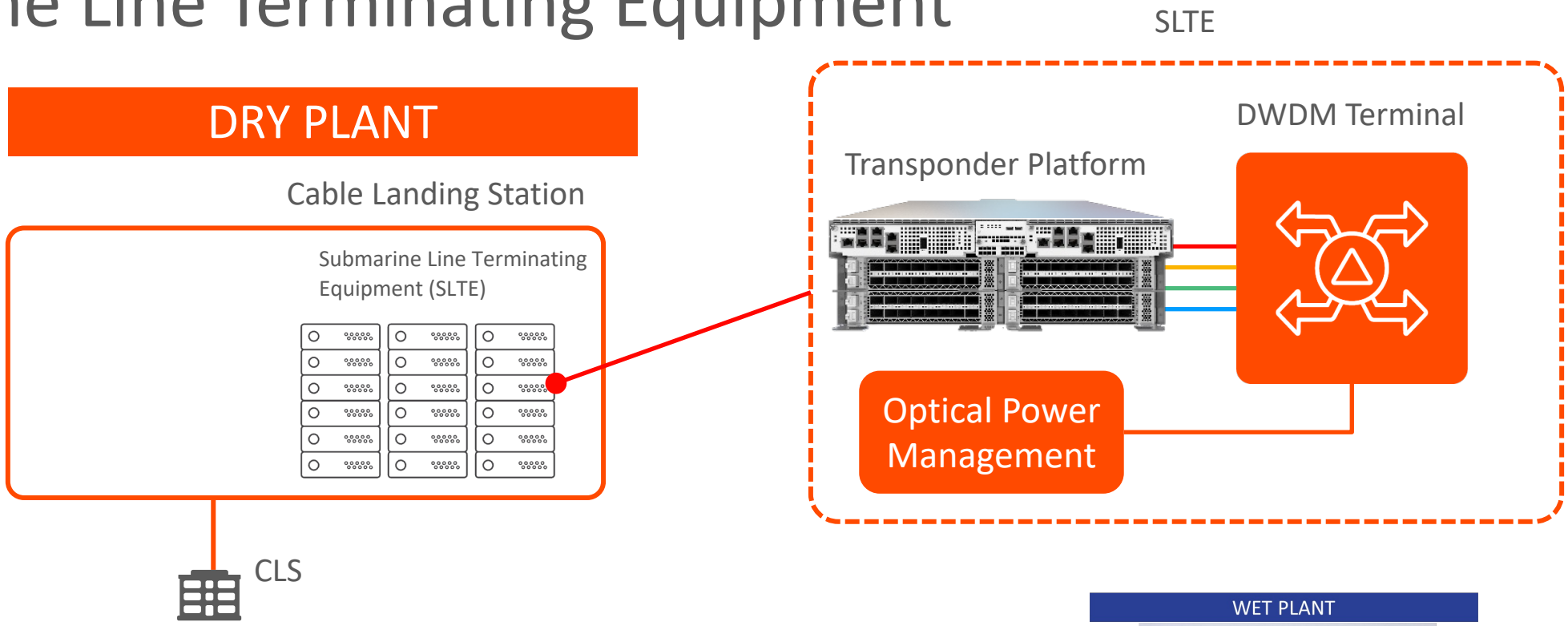
Earthquakes



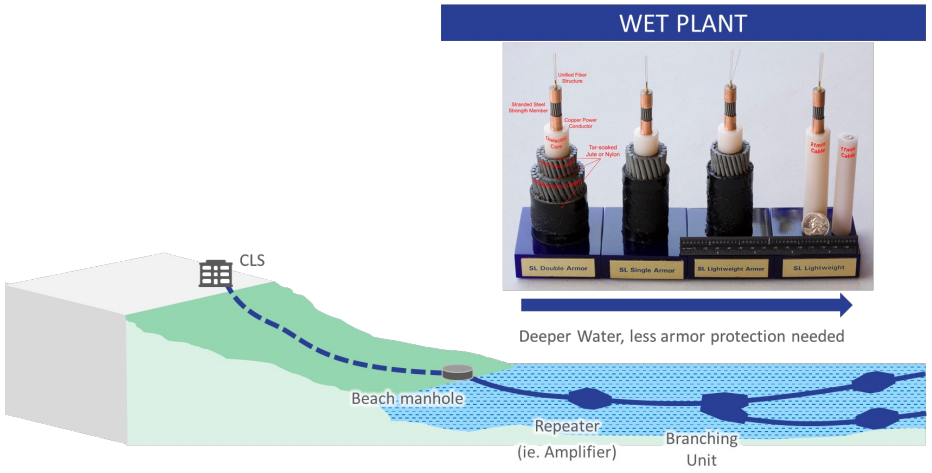
What Do These Cables Look Like?



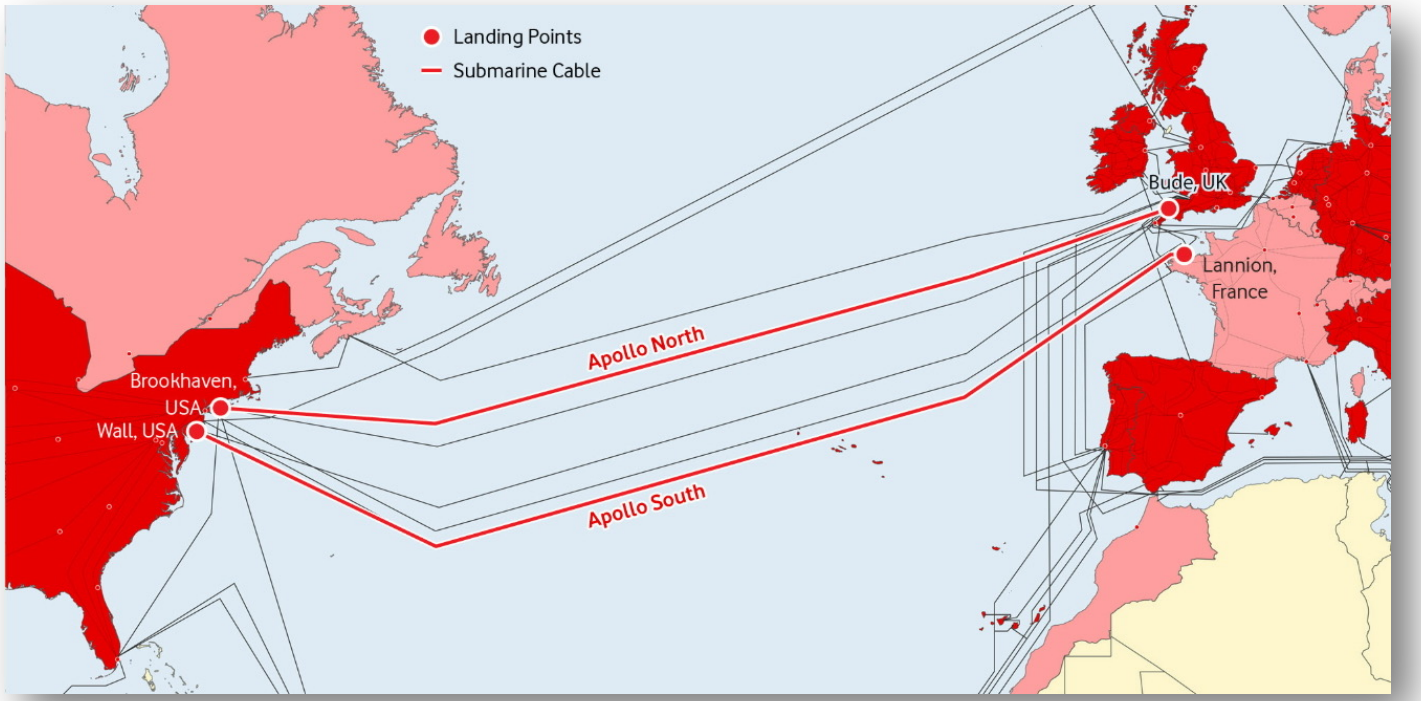
Submarine Line Terminating Equipment



During the 25 year engineering life of the Wet Plant part of the cable, the only thing you can upgrade to extend the economic life is the SLTE



Example: Apollo Transatlantic Cable System



RFS Feb 2003

Apollo North: 6,200 km

Apollo South: 7,000 km

4 fiber pairs on each cable

Designed for 10 Gb/s transponders

2003 Design Capacity per Fiber Pair

800 Gb/s

2009 Gen 1 Coherent Upgrade

3,200 Gb/s

2015 Gen 2 Coherent Upgrade

8,000 Gb/s

2022 Gen 5 Coherent Upgrade

10,000 Gb/s

Apollo is a dispersion-managed cable

Which means that it has a high nonlinear penalty that limits the capacity we can achieve with coherent transponders

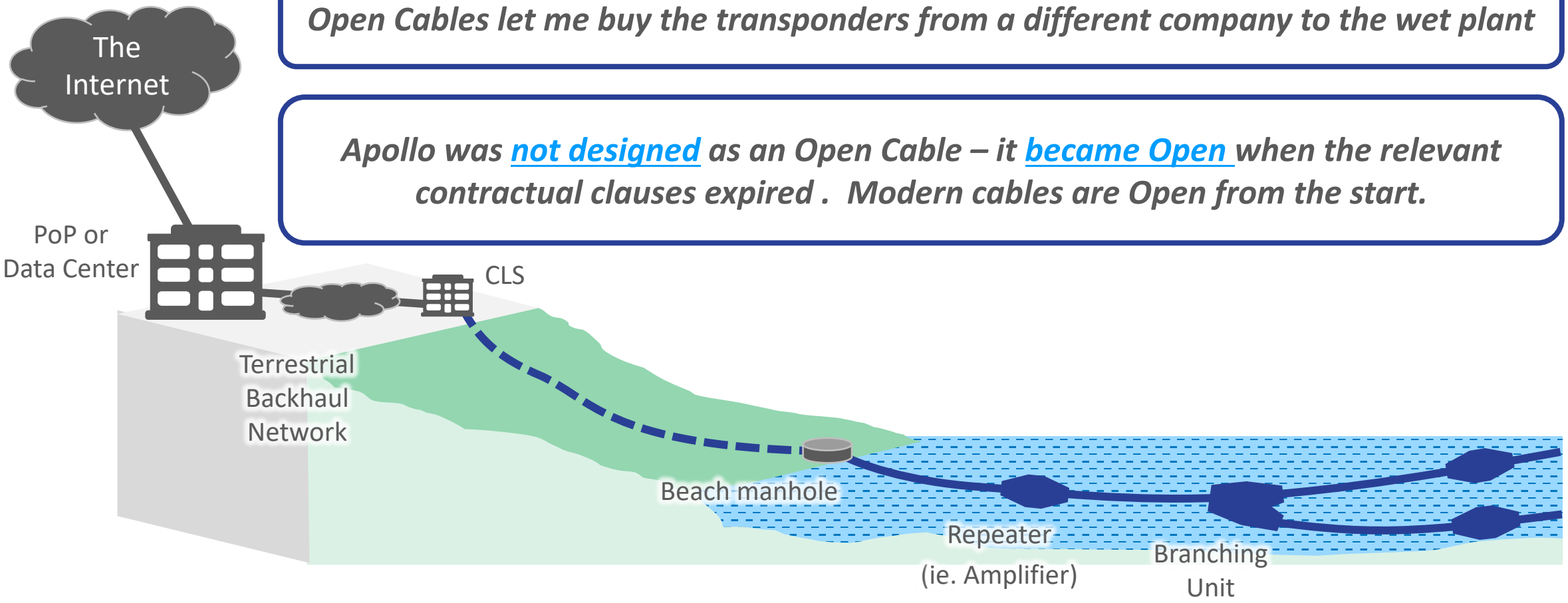
Nevertheless…the latest transponders deliver a significant capacity upgrade to keep the cable economically viable

What Is An “Open Cable”?

DRY PLANT | WET PLANT

Open Cables let me buy the transponders from a different company to the wet plant

Apollo was not designed as an Open Cable – it became Open when the relevant contractual clauses expired . Modern cables are Open from the start.



Why Should You Care About Open Cables?

Since Apollo was deployed…back in 2003

2 or 3

Generations of
direct detect
transponders

and

6

Generations of
coherent
transponders

Open Cables give the option to choose the Best of Breed transponder throughout the life of the cable

The Submarine Cable Market

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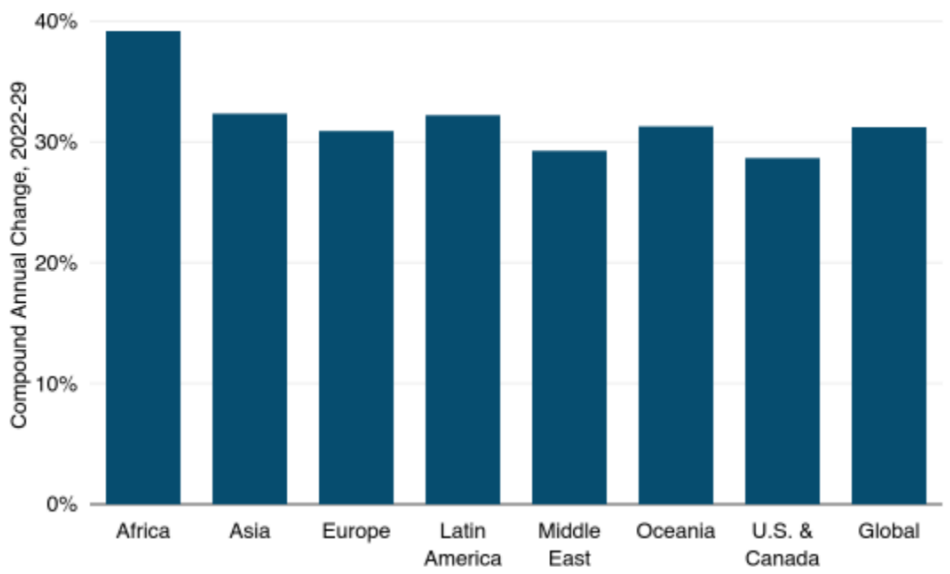
Demand Growth And Future Investment

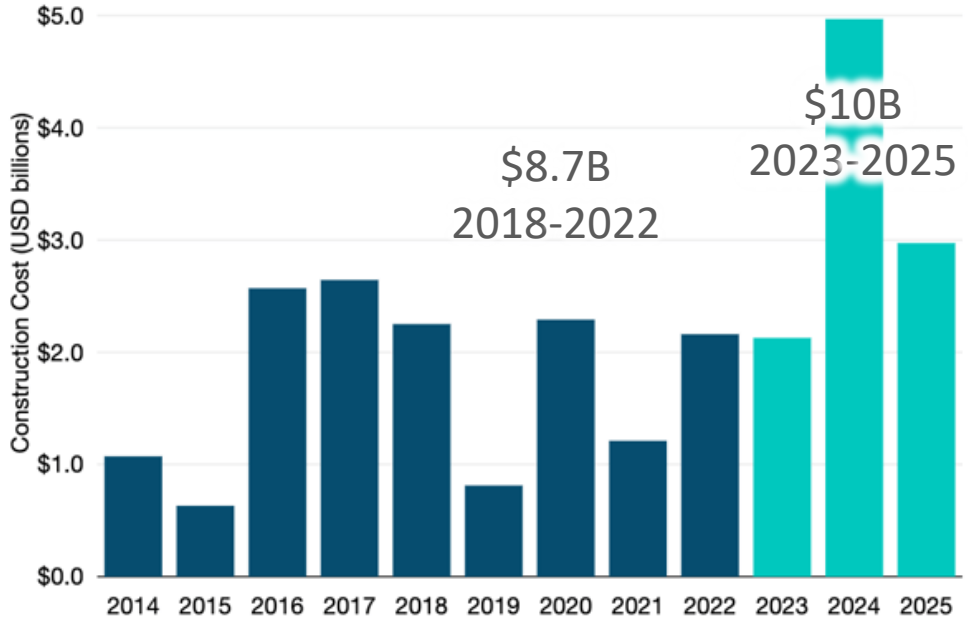
USED INTERNATIONAL BANDWIDTH GROWING



- 31% CAGR (2022-2029) for INTL bandwidth
- Doubling every 2.5 years
- ***Africa strong growth from smaller base***

Source: Telegeography

SUBSEA CABLE INVESTMENTS GROWING

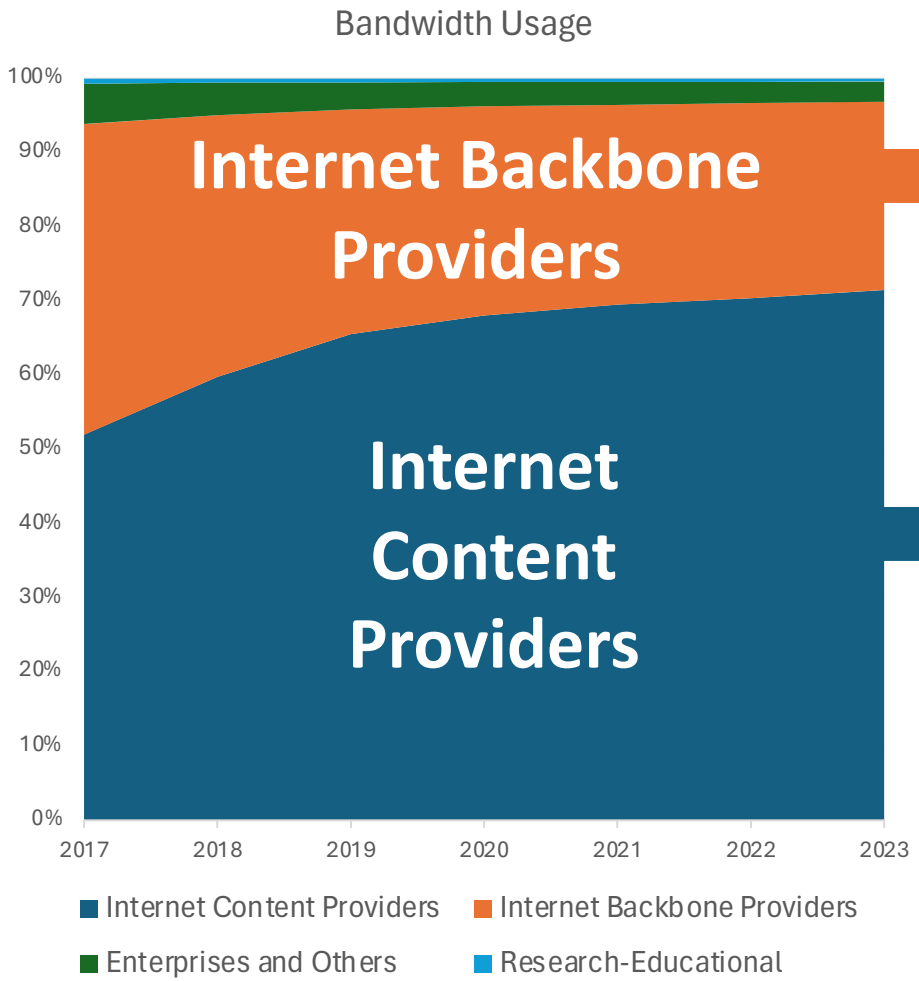


- International Bandwidth Reached 3.8 Pb/s (2022)
- 75% of capacity used by ICPs
- ***59 New Cables Planned for Service in Next-3 Years***

Source: Telegeography

STRONG BANDWIDTH DEMAND AND INVESTMENTS

Who Uses Submarine Network capacity?



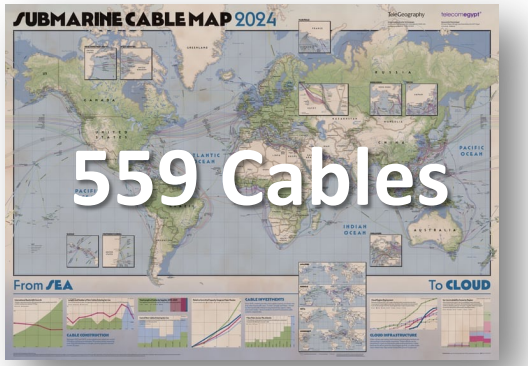
Some fraction of this traffic will be used by ICPs

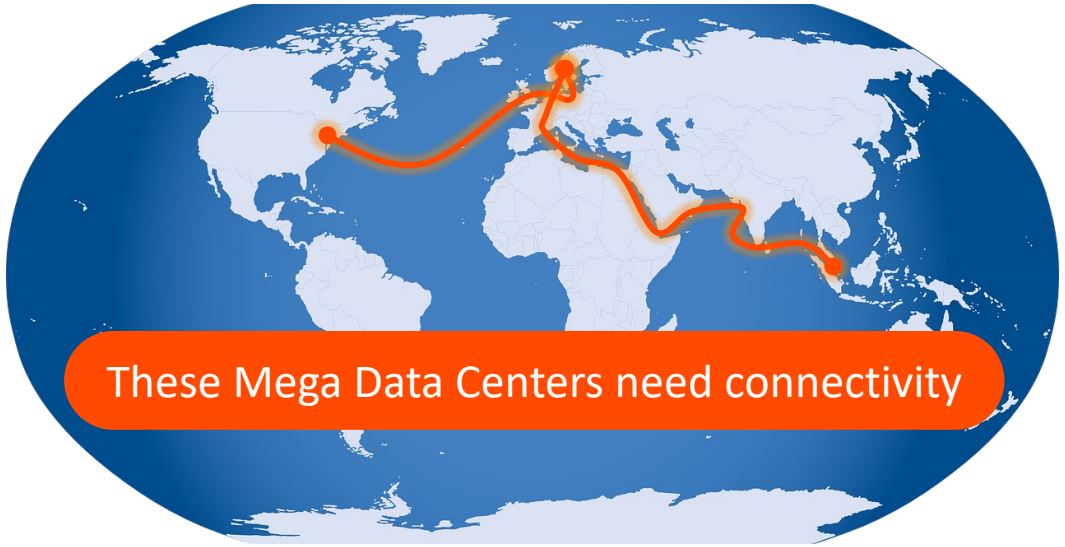
Google and Meta account for almost all ICP subsea capacity

Google
Meta
Microsoft → Azure
amazon → aws
→ iCloud

Source: Omdia 2024

Submarine Cables And Data Centers: A Symbiotic Relationship





The Internet

All of these subsea cables needs to be terminated somewhere

PoP or Data Center

CLS

Terrestrial Backhaul Network

Beach manhole

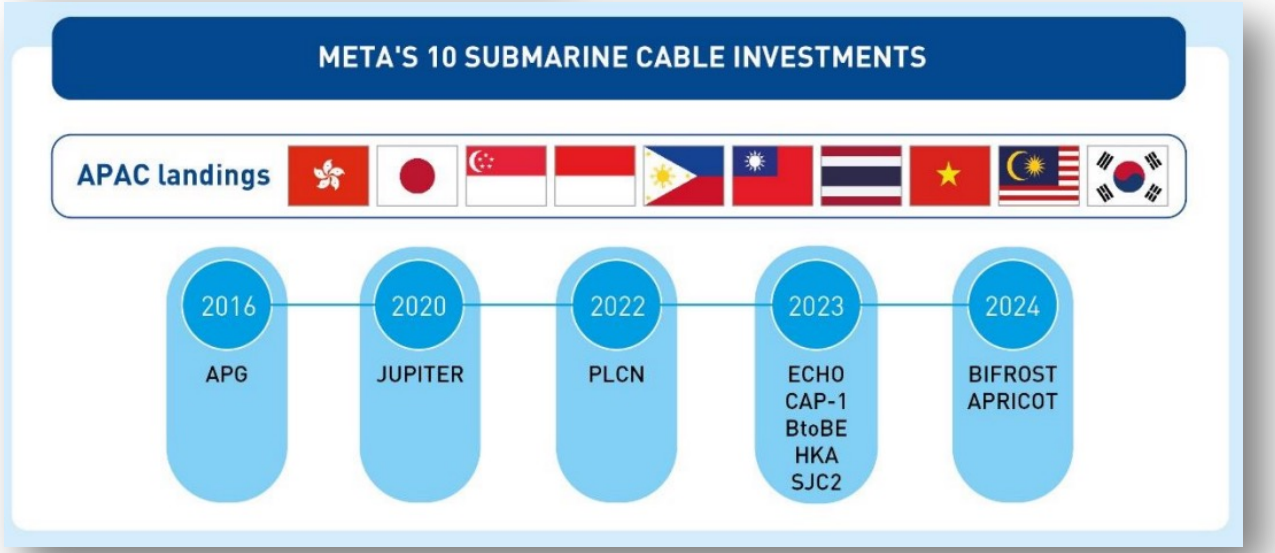
Repeater (ie. Amplifier)

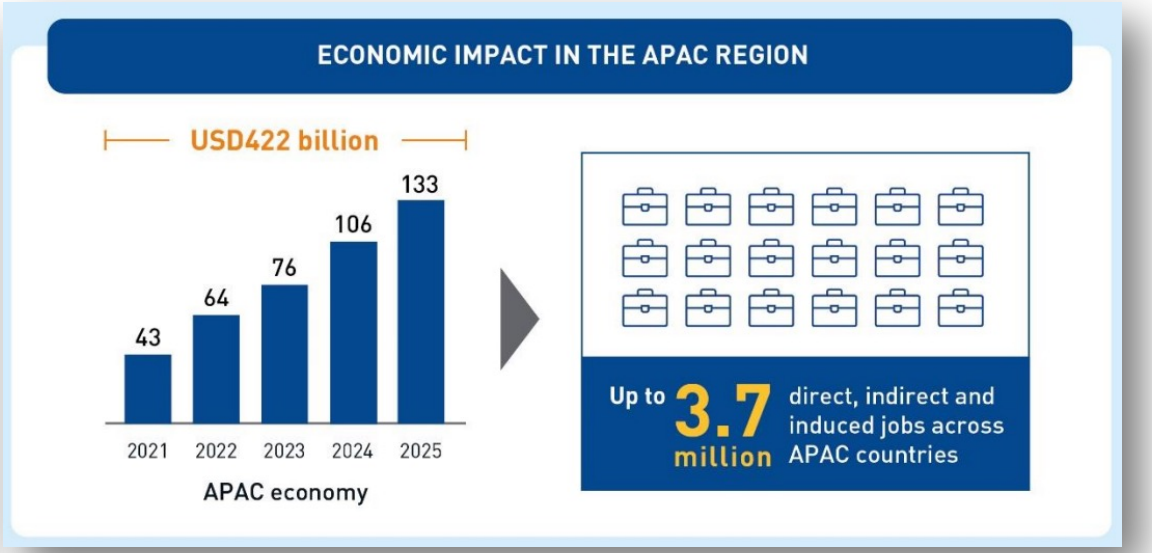
Branching Unit

Example: Meta Submarine Cable Investment In APac

$422 billion boost to APac GDP between 2021 and 2025

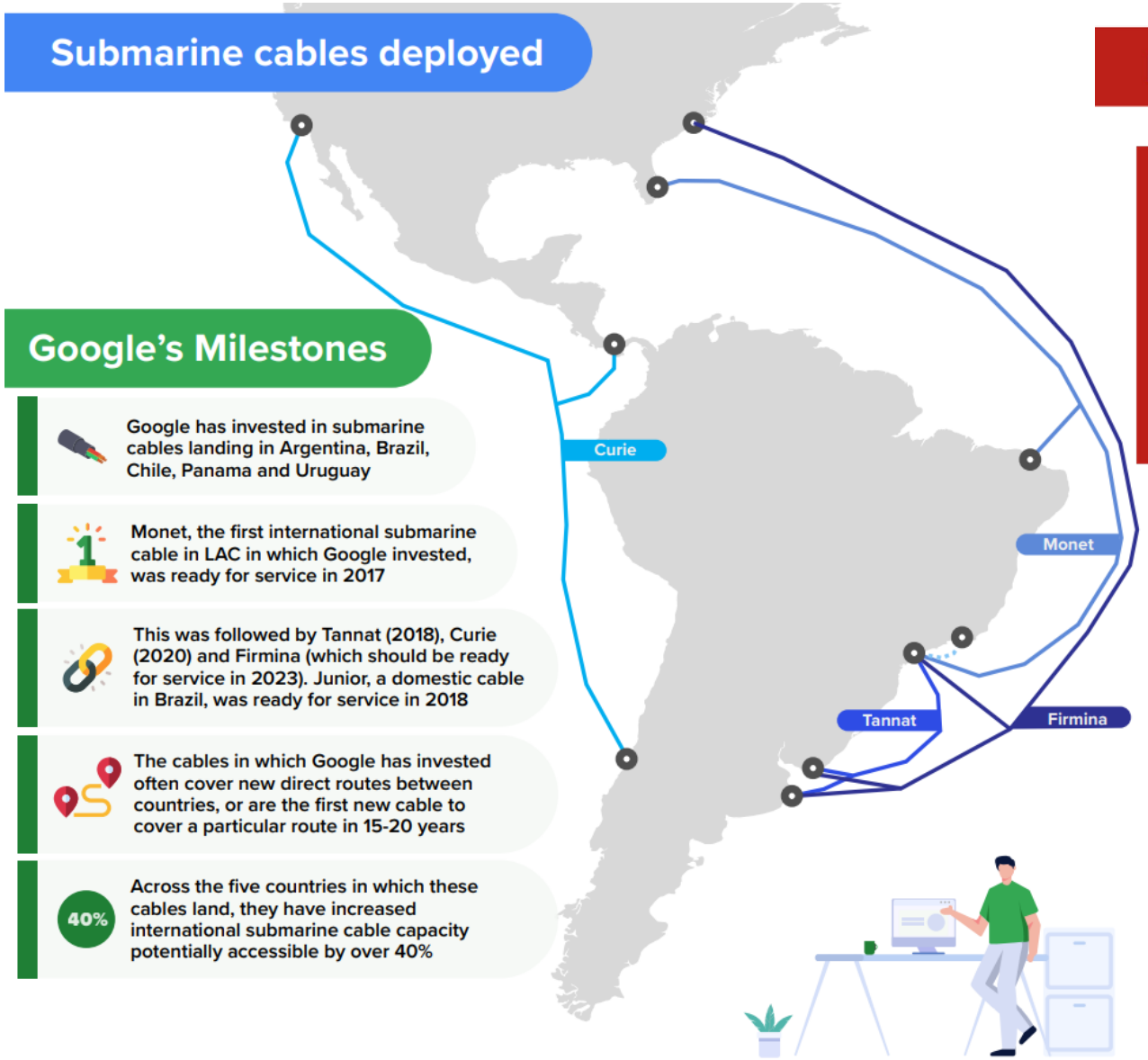
Source: Analysis Mason 2023





Example: Google Submarine Cable Investment In LAC

Submarine cables deployed



Google's Milestones

- Google has invested in submarine cables landing in Argentina, Brazil, Chile, Panama and Uruguay
- Monet, the first international submarine cable in LAC in which Google invested, was ready for service in 2017
- This was followed by Tannat (2018), Curie (2020) and Firmina (which should be ready for service in 2023). Junior, a domestic cable in Brazil, was ready for service in 2018
- The cables in which Google has invested often cover new direct routes between countries, or are the first new cable to cover a particular route in 15-20 years
- 40% Across the five countries in which these cables land, they have increased international submarine cable capacity potentially accessible by over 40%

Economic Impact

Better connectivity supply unlocks greater demand

for internet access and data consumption, which help increase annual GDP in 2027 by

1.08% or USD30.9 billion

(at 2021 prices)

Between 2017 and 2027, Curie, Monet, Tannat and Firmina will cumulatively unlock

USD178 billion *(at 2021 prices)*

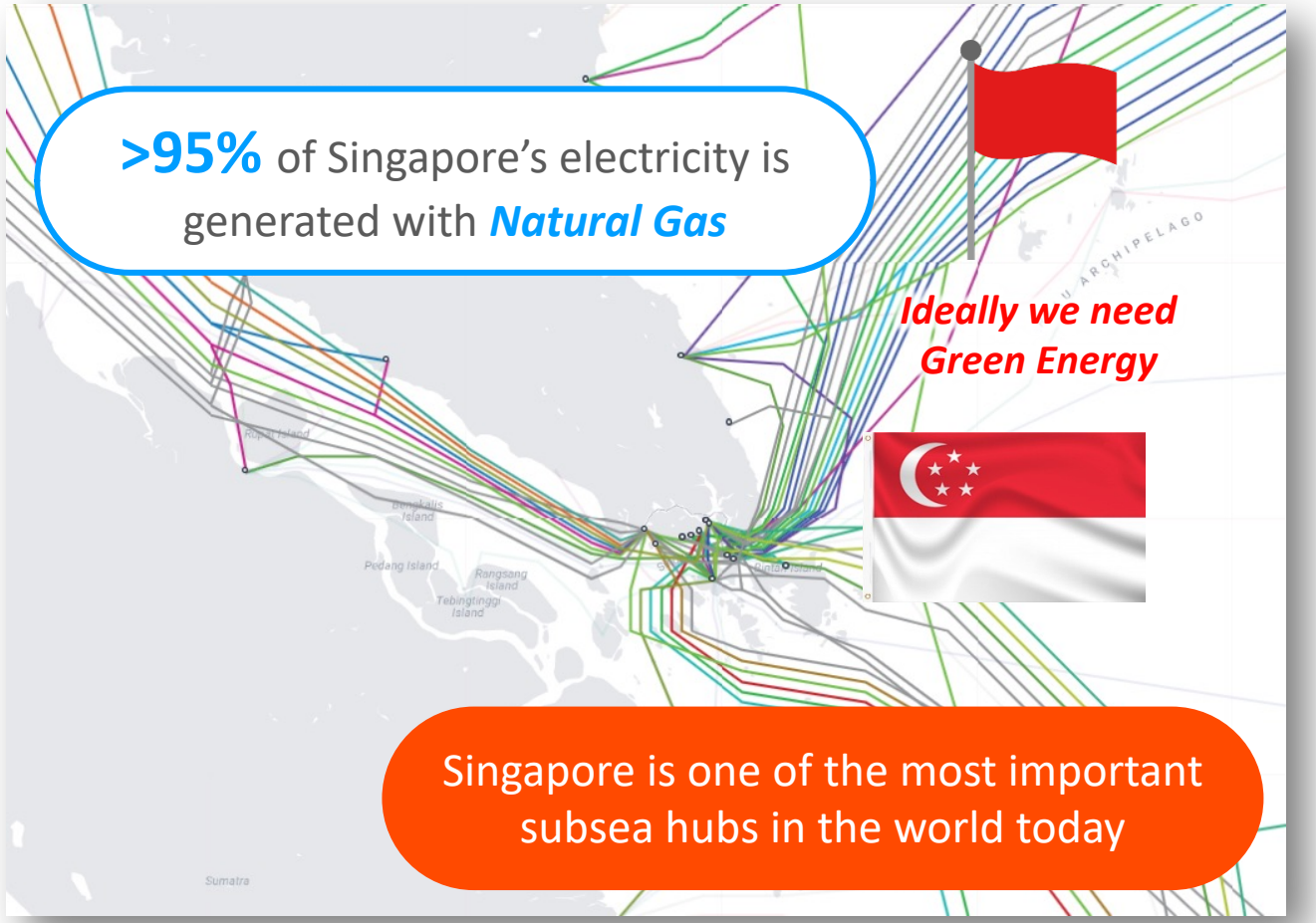
in GDP, supporting the creation of around

740 000 jobs by 2027

Source: Analysis Mason 2023

These cables represent a **40%** increase in capacity into the LAC region

Take Singapore As An Example



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Operational Submarine Cables

3

Major Cable Landing Stations

Ideally we need more diversity

87 Data Center facilities with **6,933,008 ft²** and consuming **1,026 MegaWatts**

Singapore And Power – Challenges And Opportunities

2019

Singapore issues moratorium on new Data Center builds because of power shortages

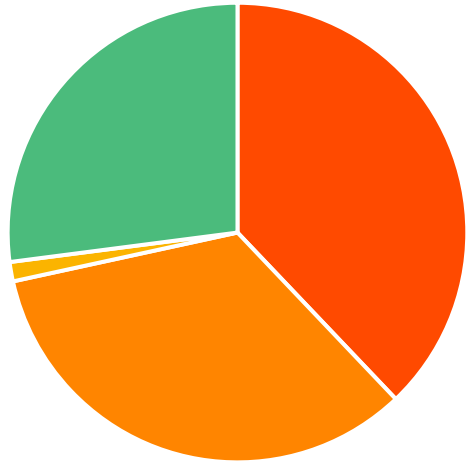
Singapore is trying to recover momentum

As a result…

Johor Bahru may become the largest DC market in SE Asia in the next 2 years

DC growth in Malaysia while international traffic is moved over the Straits of Johor

Malaysia Generation Mix 2023



Malaysia has a goal to boost Renewables from 27% to 37% by 2030

What can we learn from Singapore?

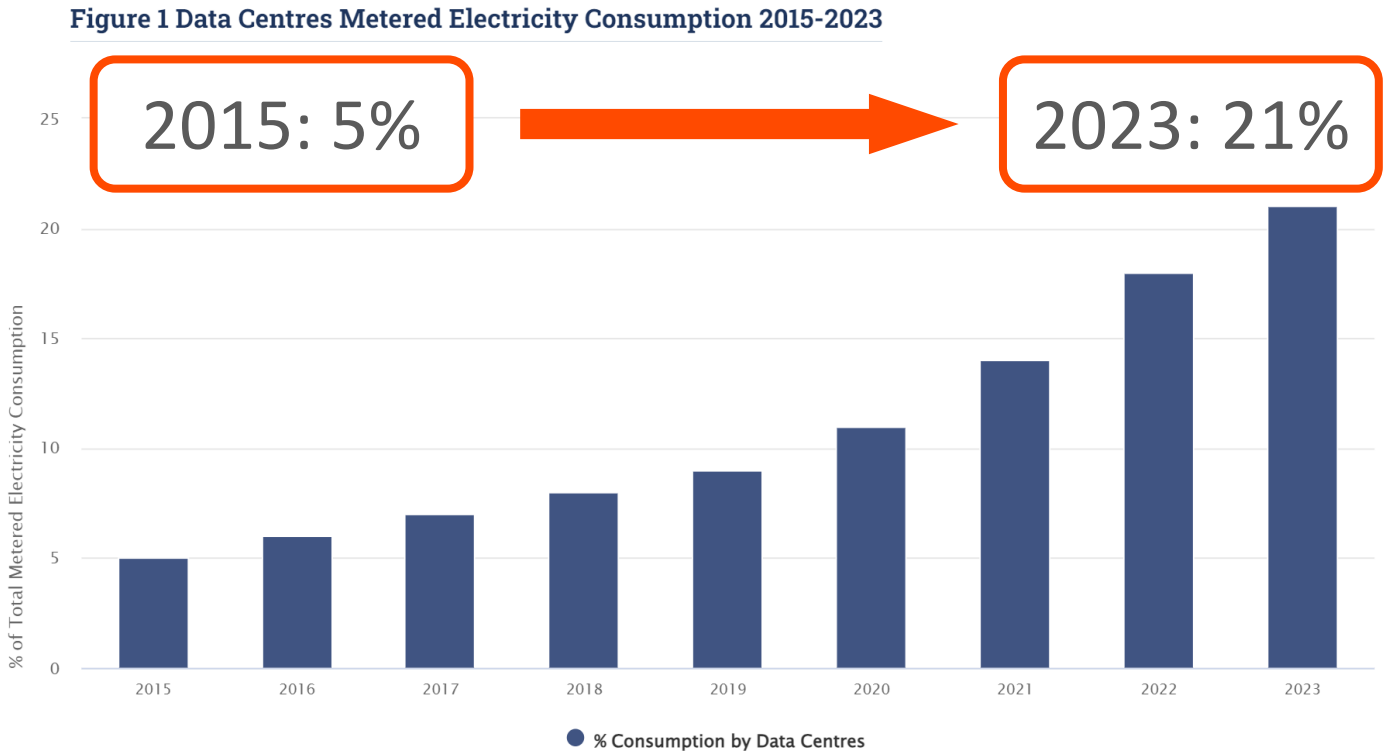
For Malaysia

- Plentiful (Green) Power is essential
- Proximity to a Hub may be useful
- Don’t become complacent

Ireland – The Next Singapore?

Data Centres account for 21% of Ireland's electrical consumption - predicted to rise to one third by 2026

Source: CSO



total telecom

Google's planned Dublin data centre rejected amid energy concerns

Posted by Georgia Sweeting | Aug 29, 2024 | TECHNOLOGY, INFRASTRUCTURE, COMPANY NEWS, Data Centres, Europe, News

>50% of Ireland's electricity still generated by fossil fuels

In Conclusion

- Open submarine cables allow the cable operator to extend the economic life of the cable by upgrading the SLTE
- Submarine cables are highly synergistic with Data Centers
- And Data Centers bring significant wealth into an economy
- But Data Centers need increasing amounts of green energy

Thank You!

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