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The African Subsea Landscape

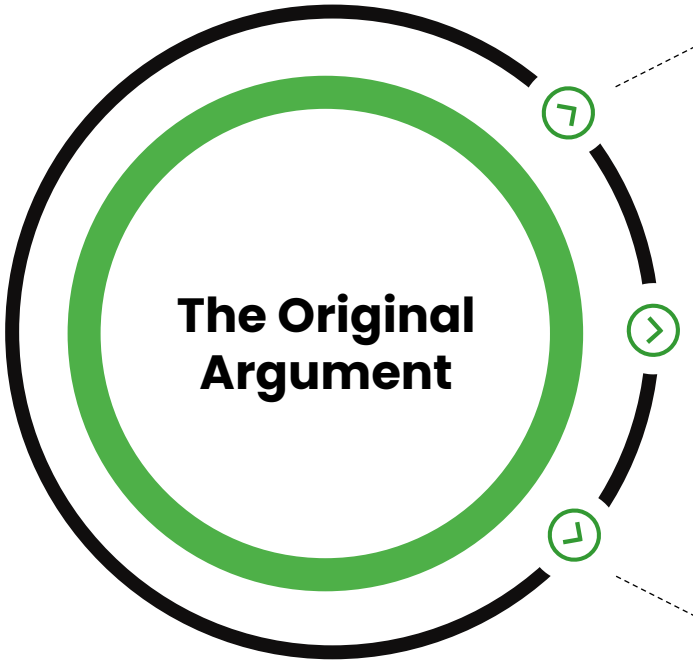
Past Sins & Future Challenges

A Critical Look At Subsea Cable Design, Landing-station Economics, Open Access, Capacity Risk And Regulatory Reform

RODERICK BECK

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Three Original Sins



Complacency

Policymakers assumed high-capacity international cables would automatically produce a flourishing digital ecosystem.

Corner Cutting

Early cable designs and deployments suffered basic engineering flaws, fragile backhaul and poor route choices

Commercial Lock-in

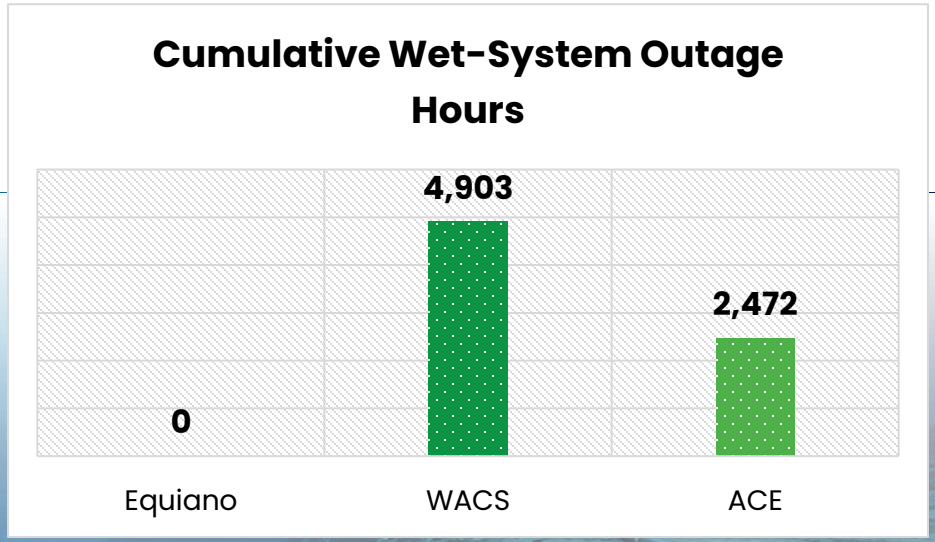
Consortium and cable-landing-station control enabled excessive cross-connect charges that could disadvantage competing carriers

Central Thesis: Resilience And Competition—not Capacity Alone—determine Whether Subsea Cables Support A Thriving Digital Economy.

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Outage Performance: Equiano Vs. WACS Vs. Ace

Cable	Ready For Service	Dry-system Outages / Note
Equiano	Feb 2023	Under 48 hours; downtime described as trivial
WACS	May 2012	140 dry-system outages; 4% of system life
ACE	Dec 2012	70 dry-system outages; 2% of system life



Standard service level commitments for subsea cables is 99% up time or better. So theses cables perform way below industry standards.

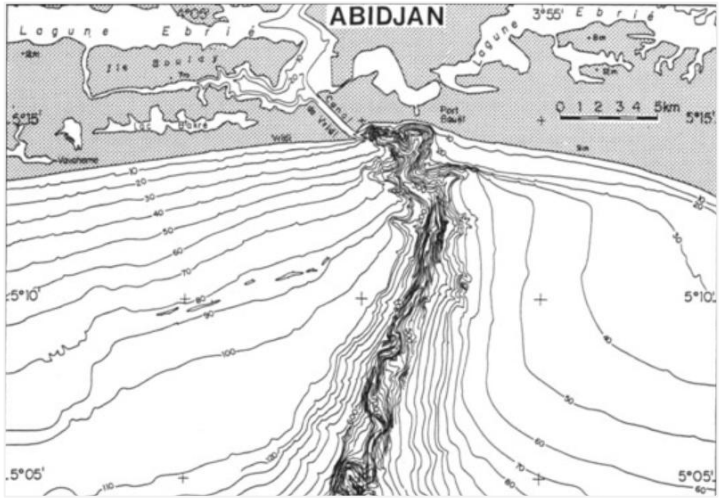
Important Caveat

Equiano's shorter operating history does not invalidate the comparison: it avoids the subsea canyons where ACE, WACS and MainOne outages have concentrated.

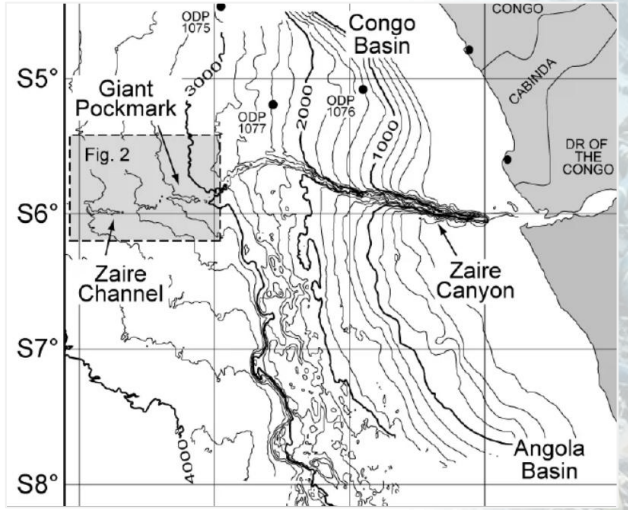
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Outages Cluster Around Hazardous Seabed Terrain

Le Trou Sans Fond Canyon • Abidjan



Congo Basin / Zaire Canyon



Shared-Risk Zones

A single debris or sediment slide can disable several cables at once when routes converge near canyon terrain.

Recent Outage Events

JAN 2020 **WACS + SAT-3**

Outage at the mouth of the Congo Basin

JAN 2023 **WACS + SAT-3**

Underwater mud / sediment slide in the Congo Basin or Canyon

MAR 2024 **WACS + SAT-3 +ACE + MainOne**

Debris slide off Abidjan knocked out connectivity along the West African coast.

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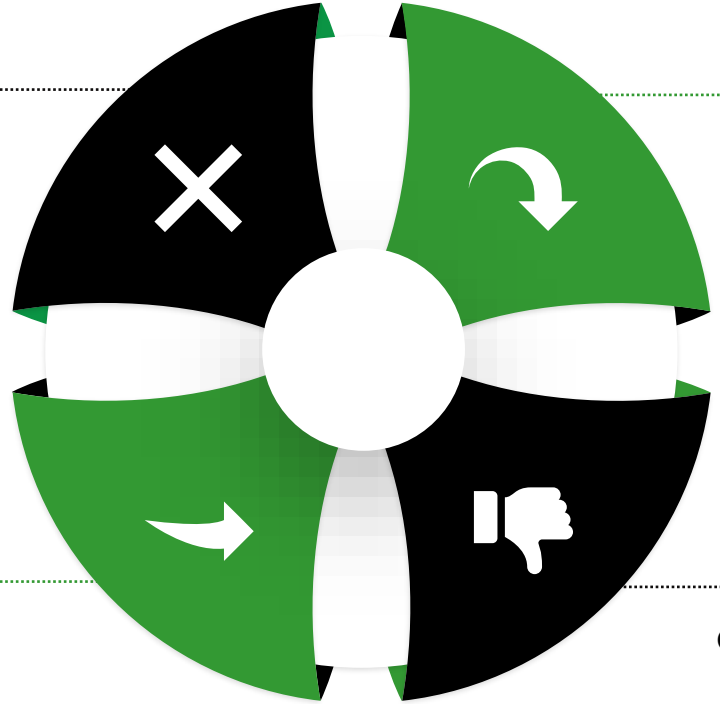
Four Design Flaws Amplified Outage Risk

Single Points of Failure

Multiple systems reused the same cable landing station. Abidjan's main CLS served SAT-3, WACS, ACE and MainOne

Insufficient Burial Depth

Cables were not buried deeply enough in exposed areas to limit damage from anchors and fishing vessels



Fragile Aerial Backhaul

Weak overland connections from the CLS created opportunities for vandalism and physical disruption

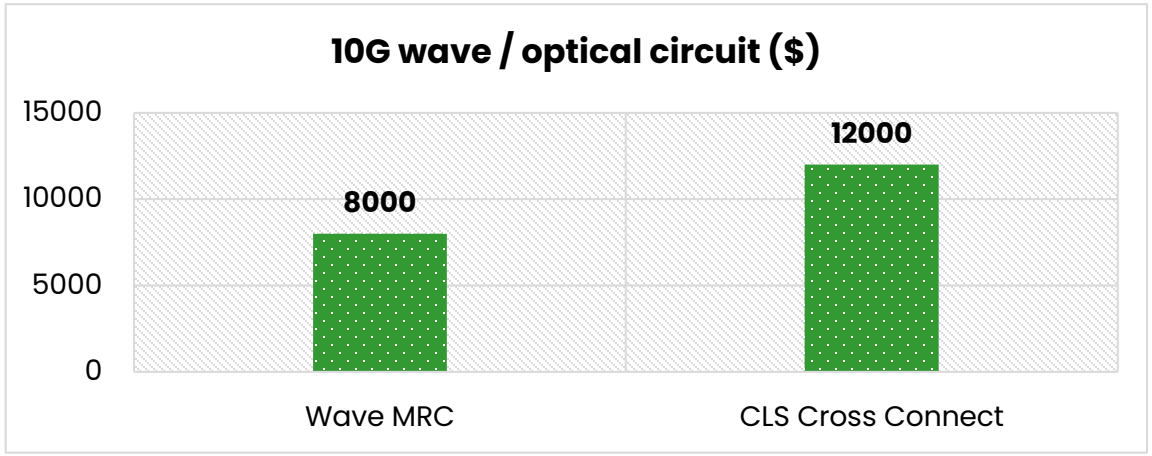
Unprofessional Landing-station Management

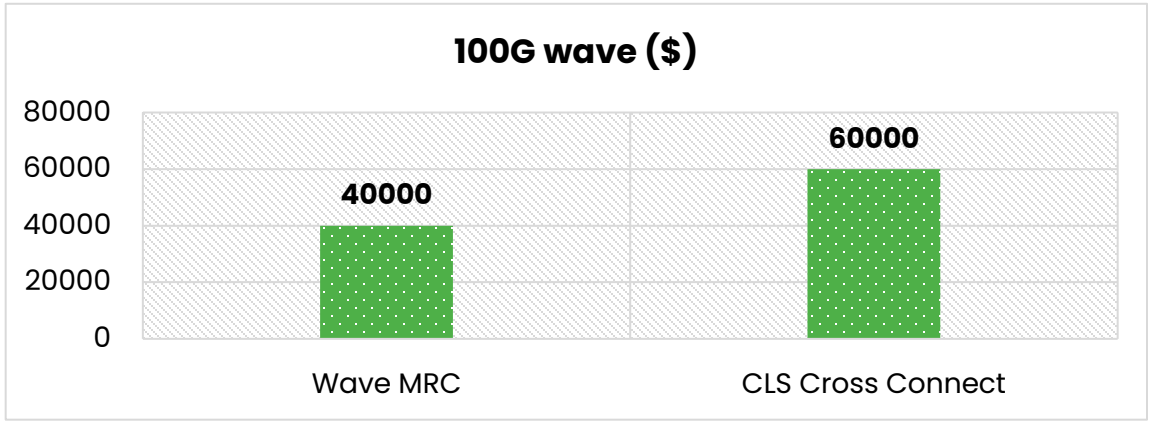
Operational practices at some CLS facilities further increased risk and weakened competition

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Cable Landing Stations: Pricing Choke Point

2025 Layer 1 ACE Quote • African CLS To Lisbon Equinix • 4,200 Km





The Incentive Problem

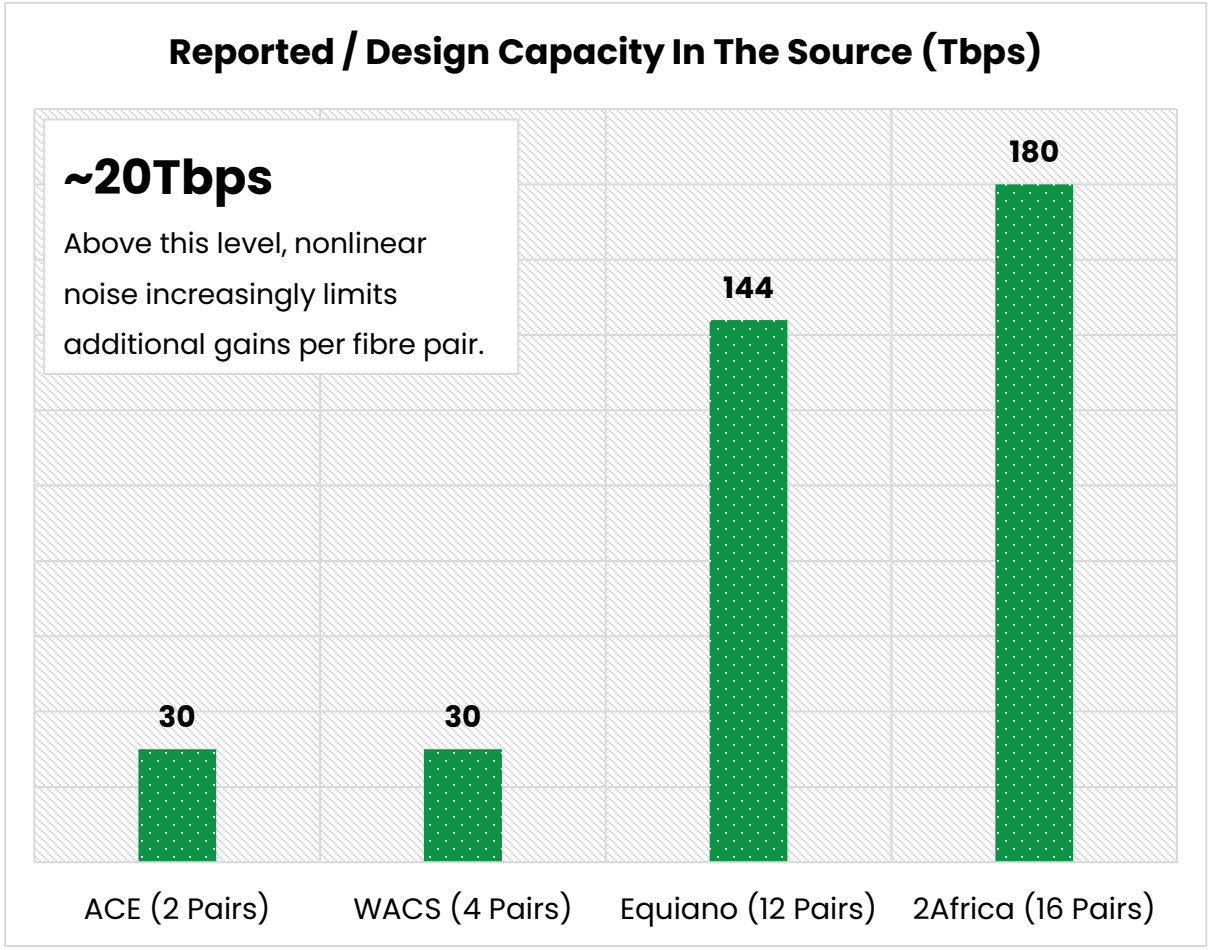
Charges could exceed real costs and disadvantage rivals. The host also pays the charge but receives the revenue—"out one pocket, in the other."

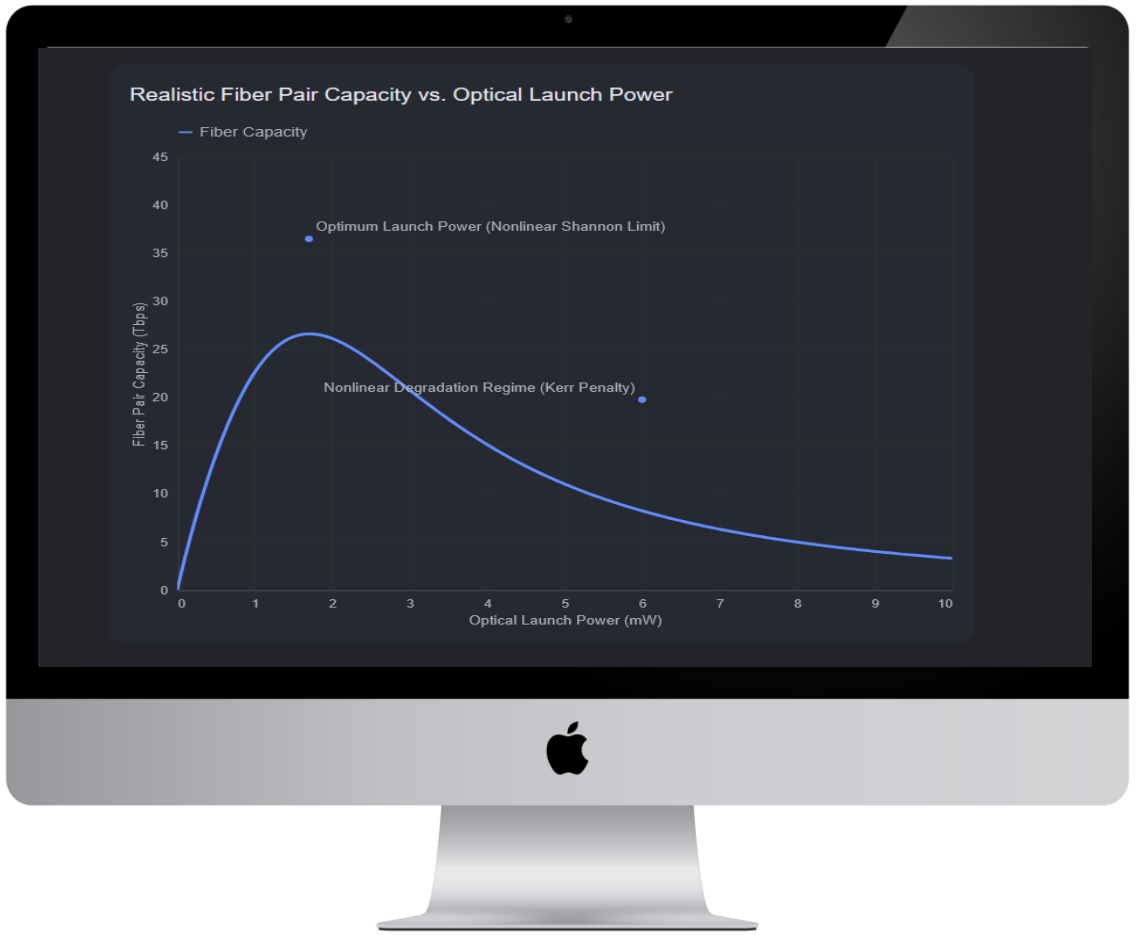
Economic Consequences

High access costs can stunt ISP growth and give the CLS operator an unfair advantage—weakening incentives to invest in competing fibre infrastructure.

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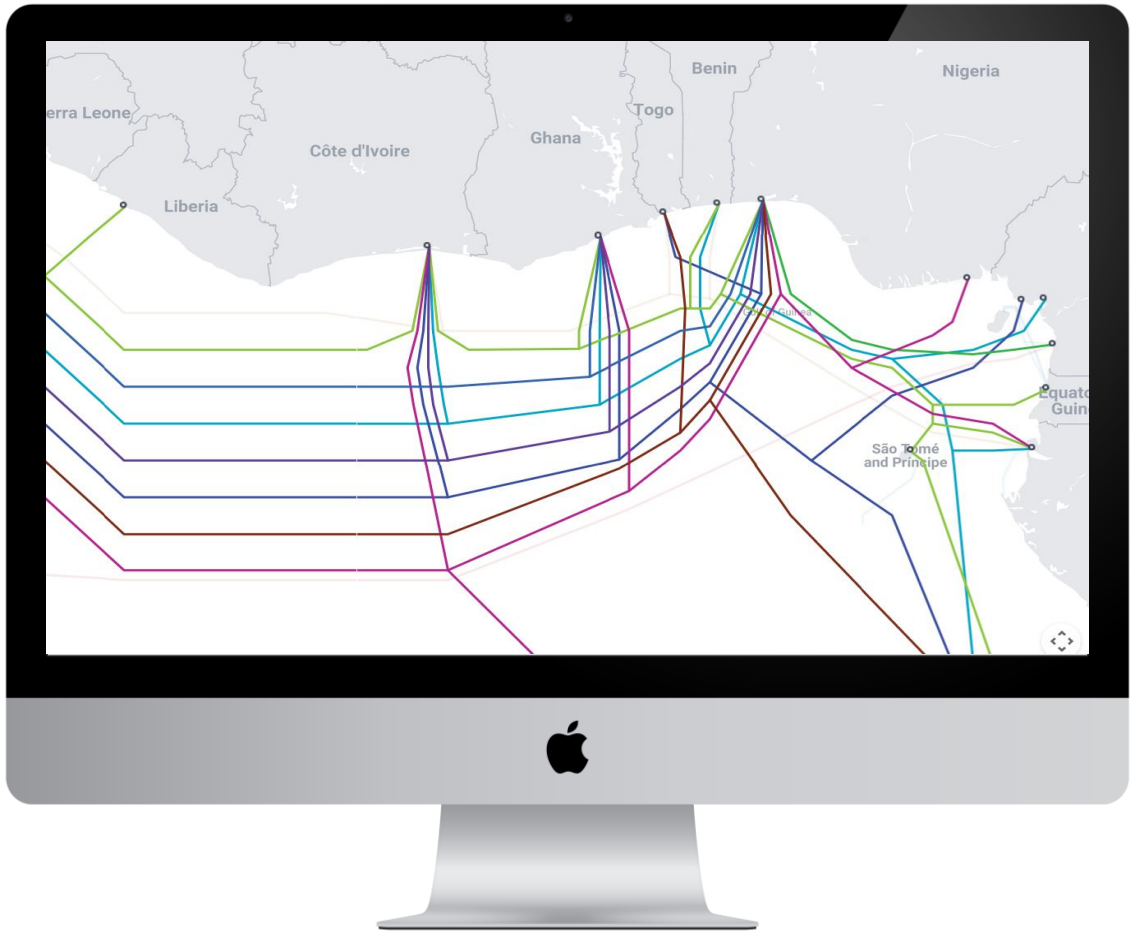
Spatial Division Multiplexing Changed The Capacity Equation





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Better-Designed Subsea Networks Reduce Failure Exposure



- Burial Depth: 1.5–2 metres in water depths of 1,000 metres or less.
- Longer branching segments keep the main trunk in deeper water.
- Physical Separation: low overlap on land / sea; new CLSs often placed far from legacy facilities.
- 2Africa is described as the only cable with two Nigerian landings.
- Diverse fibre routes from CLS facilities to carrier-neutral data centres.
- Avoid geological hotspots such as the Congo Canyon and Le Trou Sans Fond.

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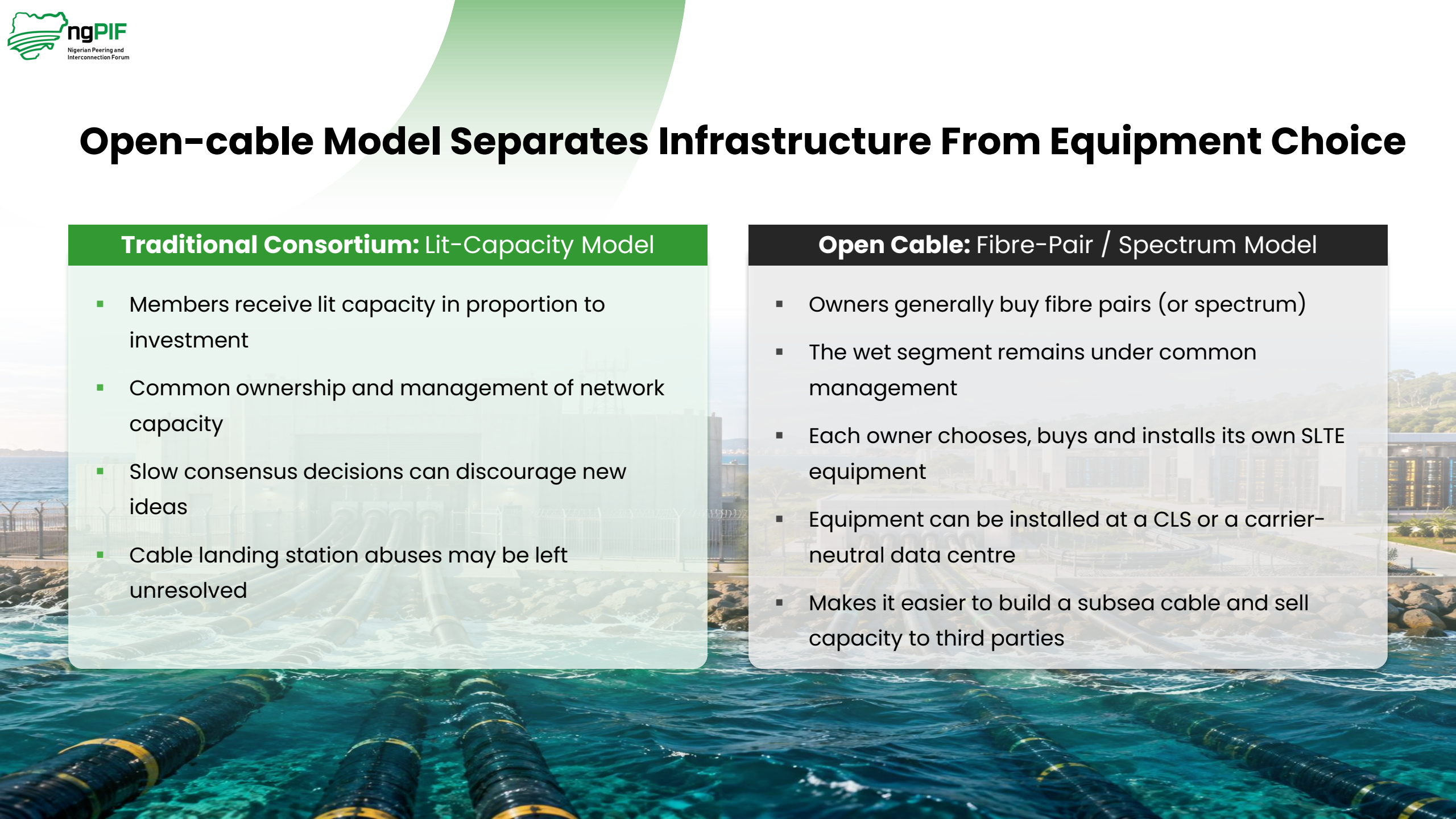
Open-cable Model Separates Infrastructure From Equipment Choice

Traditional Consortium: Lit-Capacity Model

- Members receive lit capacity in proportion to investment
- Common ownership and management of network capacity
- Slow consensus decisions can discourage new ideas
- Cable landing station abuses may be left unresolved

Open Cable: Fibre-Pair / Spectrum Model

- Owners generally buy fibre pairs (or spectrum)
- The wet segment remains under common management
- Each owner chooses, buys and installs its own SLTE equipment
- Equipment can be installed at a CLS or a carrier-neutral data centre
- Makes it easier to build a subsea cable and sell capacity to third parties



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Equiano Challenged The Traditional Cable Landing Station

Equiano Approach

- Simple prefabricated power-feed huts at the coast.
- SLTEs installed in carrier-neutral data centres; fibre pairs terminate in owners' cages or racks.
- Google viewed standalone CLS buildings as redundant: a good carrier-neutral Tier 2 data centre could serve the function.

Traditional Cable Landing Station

- Standalone facilities could cost **$15m–$25m** each
- The source lists four fibre entrances, diverse power, batteries, fire suppression and generator fuel for up to a week



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Open Cable Economics Lowered The Cost of Capacity

>$50K — 100G Pricing Before Equiano Being Paid by Nigerian ISP & Carriers

<$20K — 100G Equiano Waves

$20–30K — 100G Market Range

Reported Ecosystem Effects

- Lower costs are helping the Nigerian ISP and telecom ecosystem grow and flourish.
- Content delivery networks such as Akamai are now in Lagos and upgrading their capacity as global content transit becomes cheaper.

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Future Risk: Demand May Outpace New Cable Supply

3+ Years

Typical New-Cable Timeline

Source's Planning Assumption

5 Years

2Africa Development

Illustrative major-project timeline

3–5 Years

Likely Wait For New Capacity

Paper's Outlook at Time of Writing

Pipeline Uncertainty

The paper says no new fully funded cables had been announced. Medusa and Orange were discussing projects, but the cited announcements did not show full funding.

IRU Reluctance

An Indefeasible Right of Use (IRU) commits capacity for 10–20 years, usually with millions paid upfront. Owners of Equiano and 2Africa capacity were described as reluctant to sell IRUs.

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Make Fibre Deployment Easier And Reduce Barriers To Entry

1 Enable Dark Fibre

- No special telecom licence for dark-fibre networks in North America or Europe
- Use standard construction permits
- Remove public-land right-of-way fees
- Cap fees for private-land access

2 Protect Diverse Routes

- Reserve public / utility rights-of-way for fibre
- Clearly mark and protect routes
- Use routes separate from existing fibre
- Consider canals, railways, pipelines, utility poles and high-voltage lines

3 Remove ISP Licensing

- Eliminate ISP licensing requirements
- Canada, the US and Europe are examples of developed markets without ISP licensing
- In Nigeria, licensing is described as costly and delaying company formation

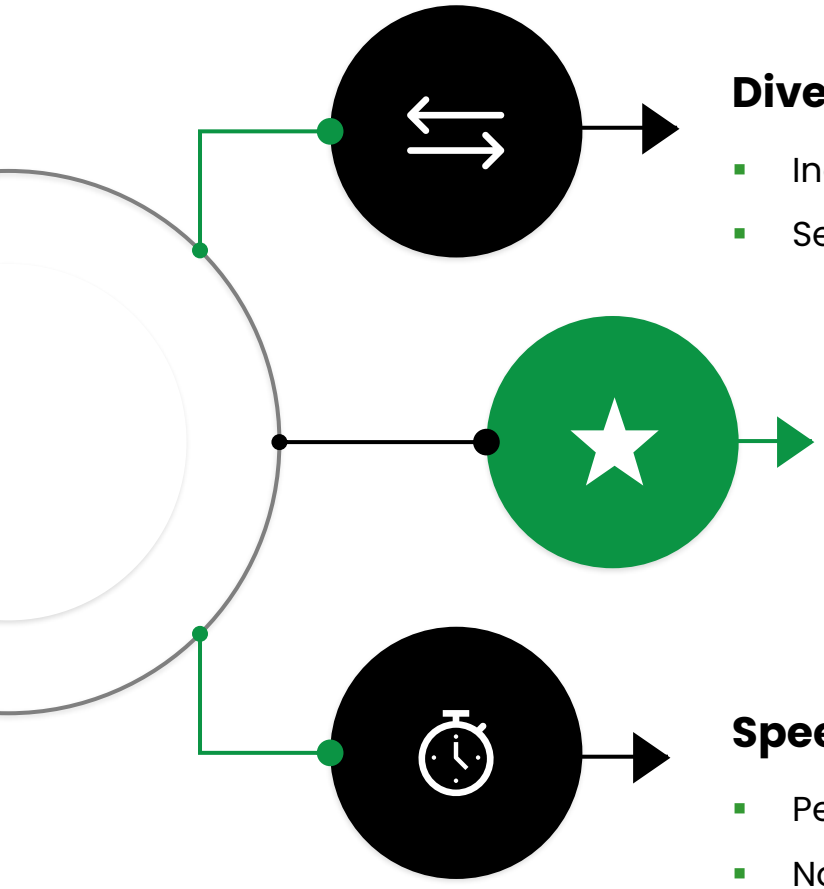
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Lagos is Effectively A Subsea-Cable Single Point of Failure

Area / Neighborhood	Cable system(s)	Landing station / operator
Victoria Island / Ikoyi	MainOne; NCSCS	MainOne CLS, Victoria Island; hosts the NCSCS landing
Lekki (Ilasan / Mayegun)	Equiano (Google)	OADC Lagos Data Centre (LOS1), carrier-neutral facility
Lekki (Eti-Osa axis)	WACS	WACS CLS / MTN Nigeria, off the Lekki beachfront
Lekki (Mopo-Onibeju)	2Africa	Bayobab (formerly MTN GlobalConnect); deeper Lekki / Ilbeju-Lekki corridor
Lekki (general axis)	Glo-1; ACE	Globacom CLS; Dolphin Telecom / MTN CLS
Lagos Island / foreshore	SAT-3/WASC	Natcom (Nitel) Landing Station

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Resilience Requires Diverse Sites, Dependable Power & Fast Repairs



Diversify Infrastructure

- Incentivise diverse cable landings
- Set decision deadlines for local permits
- Allow national authorities to unblock delayed projects
- Encourage geographic spread of data centres

Strengthen Energy Resilience

- Telecom resilience depends on reliable, diverse power supplies
- Well-designed power grids are essential

Speed Up Cable Repairs

- Per-incident repair permits create avoidable delays
- Northwestern Europe is cited as a model: Repair vessels operate under standing rules rather than seeking a separate permit each time

Physical Capacity is Only The Starting Point.

Sustainable Impact Depends On The Design, Economics And Policy Around The Cable.

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Thank You For Your Time & Attention