SUSTAINABLE SUBSEA NETWORKS

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1515-1615
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WHO WE ARE:

SUSTAINABLE SUBSEA NETWORKS

Suboptic Foundation

Internet Society Foundation

Enhancing the environmental sustainability of subsea telecommunication networks—
the global links of our digital world

PACIFIC TELECOMMUNICATIONS COUNCIL

PTC’23
15-18 JANUARY 2023 | HONOLULU, HAWAII

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OUR ACTIVITIES

• Catalogue best practices in the subsea industry

• Calculate the carbon footprint of a subsea cable

• Conduct site-specific renewable energy feasibility studies

• Investigate prospects for policy
BEST PRACTICES IN SUBSEA

• Extend Lifetime
  • The more years a cable is in operation, the more sustainable it generally is

• Increase Bandwidth
  • The more capacity, the more sustainable the network

With increasing traffic demands, early adoption of new technology results in material improvement towards sustainable outcomes.

From 2012 through the end of fiscal 2021, Ciena’s WaveLogic modern technology—which now includes WL5e 800G—allowed network operators to avoid over 4.5 million metric tons of CO2 emissions while still meeting capacity demands.

This is equivalent to:

- 2,013,070,657 liters of gasoline NOT consumed
- 2,371,824,751 kilograms of coal NOT burned
- 78,146,139 tree seedlings grown for 10 years
- 2,263,411 hectares of forests in one year

Within just 18 months of shipping, WL5e contributed to an additional 50 percent reduction in carbon dioxide emissions within an equivalent ten-year period.

Graphic courtesy of Ciena

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BEST PRACTICES IN SUBSEA

• **Connect to Green Energy**
  - Data centers and cable landings on green grids, purchasing carbon neutral power, and building renewable installations reduce carbon emissions

• **Aqua Comms**: Renewable energy powered in many locations
• **BT**: Network powered by 100% renewable
• **Bulk Infrastructure**: Renewable powered CLS (hydropower)
• **HMB-IX**: Worked with community partners toward local solar installation
• **Telecom Egypt**: Solar powered installations
• **NJFX**: Carbon neutral power
• **ASN & NEC**: Solar power at facilities
BEST PRACTICES IN SUBSEA

• **Energy Efficiency**
  - Owners of cable landing stations, factories, and ships have pursued energy efficiency to reduce both CO2 impact & electric costs
  - **Telxius**: Energy efficiency projects in 13 cable landing stations
  - **BT**: Improvements made at cable landing stations
  - **Solomon Islands Submarine Cable Company**: Developed an internal plan to act responsibly and save energy
  - **R&G Telecom**: Consultants for energy efficiency projects at CLS
  - **Global Marine & IT International Telecom**: Energy efficiency projects onboard and shoreside
BEST PRACTICES IN SUBSEA

• Plug into Shore Power
  • When cable ships plug into shore-side electric power, they do not have to burn CO2 emitting-fuel.
  • Global Marine, IT International Telecom, Orange Marine: Plugged into shore power at various ports.
BEST PRACTICES IN SUBSEA

• Offset emissions
  - **Red Penguin Marine**: Has developed a carbon offset program which will begin in 2023

• Account and Disclose
  - Companies track carbon emissions and disclose them to the public
  - **Bulk Infrastructure**: Measured emissions since 2020, publishing beginning 2022
  - **NEC**: Discloses environment-related information
BEST PRACTICES IN SUBSEA

• Meet Standards, Obtain Certifications, Commit to Targets
  
  • ASN, Bulk Infrastructure, Fugro, Red Penguin Marine, Telxius, WFN Strategies
  
  • ASN, Bulk Infrastructure, Fugro, NEC, WFN Strategies
  
  • Equinix
  
  • ASN, Orange Marine

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BEST PRACTICES IN SUBSEA

- Lend Cables to Science
  - Scientists use ocean observatories and SMART cables to monitor ocean and climate conditions
BEST PRACTICES IN SUBSEA

• Recycle Cables

  • Mertech Marine and Subsea Environmental Services return materials to the circular economy

<table>
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<th>Material</th>
<th>Mt</th>
<th>GHG Emissions Avoided (MtCO2e)</th>
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<tr>
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<td>Aluminum</td>
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<tr>
<td><strong>Total</strong></td>
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<td><strong>357514</strong></td>
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</table>
BEST PRACTICES IN SUBSEA

• Protect Cables
  • More repairs = More fuel burned
  • A well-protected cable leads to fewer repairs and less CO2 burned

• The Question of Armor?
  • Armor is a crucial component of cable protection, yet it is a substantial contributor to the cable’s carbon footprint
CARBON FOOTPRINT OF A SUBSEA CABLE

- Relative Impact of Different Stages of Life Cycle
  - Our research suggests that cable materials represent the largest source of emissions in the system lifetime.

![Total Emissions Chart]

- Meetings: 0.26%
- Route Survey and Clearing: 11.60%
- Materials: 11.60%
- Installation: 1.35%
- Lifetime Power Usage: 75.19%
• We estimate the overall carbon footprint of a typical cable system to be roughly **9.5 tonnes of CO\textsubscript{2}e per km/year**, equivalent to 85,192 tonnes for a 9,000 km system. This is comparable with private industry assessments that run as high as 11 tonnes CO\textsubscript{2}e/km/year.
CARBON FOOTPRINT OF A SUBSEA CABLE

**Graph:**
- **Y-axis:** kg of Embodied CO$_2$e/km of Cable Materials
- **X-axis:** kg Materials/km of Cable

**Legend:**
- Optical Fiber: 2.95 kg
- Outer Cladding (HDPE/LDPE): 141.66 kg
- Armour: (Steel): 440.72 kg
- (Aluminum): 881.44 kg
- (Copper): 31.48 kg
- Other (gel, accessory metals): 75.75 kg

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RENEWABLE ENERGY FEASIBILITY STUDY

• Multi-dimensional **Renewable Energy Feasibility Study** assesses:

  • Economic benefits of different models of installation
  • History of energy developments
  • Social context and local community responses
  • Policy context
  • Incentives
CONTRIBUTE TO SUSTAINABLE SUBSEA NETWORKS

• We gladly welcome:
  • Feedback
  • Information about your sustainable practices
  • Data for our carbon footprint model
  • Partnerships
  • Advisory members

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