CALCULATING A SUBSEA FOOTPRINT

BY KRISTIAN NIELSEN

Even though they contribute to climate change, the digital infrastructure industries are taking a role in leading the planet to net zero. Take for example, the iMasons Climate Accord established earlier this year, which brought together companies to take steps to reduce carbon emissions. Signed by hyperscalers like Meta, Google, and Microsoft as well as data center, infrastructure service, and software companies around the world, the accord commits to an open standard for reporting carbon in materials, products, and power. This includes standard carbon labels for products to measure carbon over their lifetime and for data center buildings to account for the carbon embodied in building materials and products housed in the center. To date, one hundred and fifty-six companies have signed up to collaborate on shortening the timeline for carbon neutrality.

Sharing information is crucial to creating change. While many subsea companies have been successful in collecting data, one way to compound these results is by sharing these results across the industry. Currently, there is no universal mechanism to measure carbon over the life of materials used to build, maintain, and repair subsea telecommunications infrastructure. Emissions reporting quickly becomes unreliable without consistent metrics. Arbitrary protocols make it easier to round and remove numbers, so comparisons across tasks and processes become difficult to evaluate. The industry has been largely wary of sharing data, but developing an open standard to model a carbon footprint is essential because regulation is increasingly required around the world. Companies operating in the state of California in the United States already must report emissions to the state as well as the Environmental Protection Agency (EPA). Australia uses a tool called the Emissions and Energy Reporting System to report their data under the National Greenhouse and Energy Reporting Scheme. Many more will follow in the years to come.

Competition among peer organizations also contributes to setting norms within the industry. Companies already share their data to third parties in order to publish sustainability reports. CDP has been helping companies leverage investor pressure to push for information disclosure on environmental impact for over twenty years. Corporate climate reporting has helped businesses and cities develop incentives and take action on climate change. Standards like ISO 14000 are another example of the results of decades of effort pushing in this direction. Advocating for specificity helps set regulatory guidelines that can take the industry into a sustainable future. Creating a data pool for subsea can help industry leaders inform environmental policy decisions and track their progress.

Measuring and reporting data may require additional work, yet it will be

increasingly necessary as companies and countries continue to work to reduce emissions. At the same time, sharing data across the industry is helpful from a business perspective. Knowing how facilities and processes contribute to the carbon footprint functions as an incentive to identify efficient strategies that can also be financially sustainable. The subsea industry can drive the conversation that broaches sustainability by sharing data across the supply chain. Carbon reporting has become increasingly required from suppliers by ICT companies in order to specify their own data collection efforts. It is in companies' best interest to be able to provide these numbers in order to stay competitive. Calculating the subsea footprint puts us in a position to create change in a way that will still be economically beneficial in the future.

AN INDUSTRY MODEL FOR COLLABORATION: THE UNIVERSAL JOINT

Universal Jointing (UJ) exemplifies the impact of industrial collaboration among the subsea industry and can help us to imagine what a universal carbon footprint model would look like. UJ is a method of connecting all types of submarine optical telecommunication cables with a common set of construction and equipment & methods. As a single technology with a common standard for training and qualification, UJ is cost efficient as both a capital and operating expense. For multi-supplier systems, there are increased options for sharing spare cable, and it provides a wider choice of service providers. Since its first installation in 1990, the UJ has been reliable because members of the industry have been able to share expertise and feedback, developing an optimized maintenance and a common philosophy and standard. The UJ Consortium (UJC) is a group of cable systems that use UJ for maintenance solutions to collectively advance knowledge of jointing by sharing data, technical, manufacturing, and engineering information. Members of the UJC focus on particular responsibilities on their own, but they work together to inform cable operators, manufacturers, and contractors on the technology itself.

The UJ's strategy is useful as an analogy for the work involved in trying to develop a model for carbon emissions in the subsea industry. In order to gain qualification status, the join or coupling must undergo a set of tests to determine its success. Doing so allows for the Consortium to gather pre-qualification and actual qualification information and store this information within a database that also collects test reports. Qualification Test Specifications (QTSs) are regularly reviewed and agreed upon by the Consortium in order to minimize the qualification tests for new cable combinations. The UJ strategy is effective because of the communication and relationship established among cable manufacturers and system purchasers. Increased cooperation among members allows for the scope of testing to be minimized and customer expenses to be reduced. This mindset of sharing information is similar to the work WFN Strategies and the Sustainable Subsea Networks research initiative are trying to achieve in developing a carbon model for emissions. These efforts can collectively develop a shared standard across the industry. Connecting different companies' climate data into a seamless network will help us chart a path to a more competitive and climate-friendly future.

The subsea industry has been operating in a specific way for a long time. The technology has changed throughout the centuries, but the measures and procedures have not followed as quickly. Calculating a subsea footprint considers the environment in an impactful way. The Leif Erikson cable system will be the first to use only hydropower on either side of the system. Looking forward to a future where sustainable practices will be increasingly required, Bulk Infrastructure did not only consider safety and risk mitigation but also a sustainability profile that will likely be the future norm. The subsea industry is in a unique position to collaborate across sectors and address sustainability in a way that is both financially and environmentally sound.

THE SUBSEA CARBON FOOTPRINT

Beyond industry-wide deliberations, a subsea carbon footprint can also help individual firms better assess their environmental impacts, opening up many different courses of action. But, before they can act, they first must calculate. This is often achieved through working with consultants. As a cable consultancy, WFN Strategies has been investing in sustainability through their data acquisition and research in order to build a better, cleaner, and forward-looking industry. The first step to doing this is by tracking emissions for customers, which is possible across each step of the process using a custom-built dashboard. Because ICT climate impacts are hard to determine and subsea has been omitted from calculations of footprint studies, WFN is working to build a system to organize the collected data.

WFN has been asked for sustainable opportunities for a cable system in the course of their activities in subsea cable consulting. They have identified five primary interventions from a commercial perspective: 1) systems design and engineering, 2) survey, 3) system manufacture and installation, 4) operations, and 5) life cycle. The first four are the most significant in the process of building a cable, and they each have particular strategies that can reduce emissions.

In planning the route of the cable system, the biggest source of emissions comes from traveling for meetings. Most of this part can be done virtually, a practice that has become more common since the start of the pandemic. This is a simple solution that can have an impact on savings (see for more information the last article in the Sustainable Subsea column, "Flying the Skies to Wire the Seas").

Secondly, when surveying the cable route by ship, companies are usually focused on completing this in the fastest time, which often results in increased carbon emissions. Reducing the distance traveled and optimizing fuel consumption offers a solution that can get the job done with sustainability in mind.

Thirdly, in terms of emissions generated during the manufacturing stage, the cables themselves have the most significant impact with the fibers being almost negligible in their calculation. Thus, using less armor through the optimization of lightweight cables could be helpful. Similar to the survey, optimizing fuel consumption can be useful during the installation phase. Less burial with strategic plowing can also reduce the amount of equivalent tons of CO2, as there are considerable methane emissions associated with disturbing coastal sediment.

Fourthly, there are the emissions associated with the operations of the cable system. These have the highest carbon impacts of the whole process, even if cable landing stations' use electricity from grids that are powered by natural gas (rather than obviously dirty sources like coal). Using green energy to power these stations, ideally with hydroelectric fuels, would be significant for sustainable investment.

Fifth and finally, there is the end of life of a cable system, which in this case is assumed to include the two cable landing stations for twenty-five years. Seeking alternative energy sources would decrease CO2 emissions at this stage. Taking into account all of these processes will be useful in creating an initial model for carbon emissions in a cable system.

Taking sustainability into account can reduce environmental impacts and increase margins. In the case of the Leif Erikson system, using a hydroelectric solution resulted in savings in the overall expenses in the system. Manufacturing a cable uses energy, but there are different ways to get the job done across the supply chain. Sharing data across the industry will make that nexus easier to locate and optimize. It might be difficult to change the power consumption in a landing station, but thinking about changes across the supply chain can help use power more efficiently. More data will make these benefits more apparent.

CONCLUSION

Calculating a subsea footprint will require that the industry collaborate by sharing data with one another. Initiatives like the iMasons Climate Accord and the UJ consortium model the type of shared practice that can help us move toward a carbon neutral future. The Carbon Call has also been a significant contributor to collaborative data collection towards net zero. Many companies have taken the call and joined the initiative to report emissions transparently, regularly, and comprehensively. They believe that interoperability helps make data more reliable. In order to understand the progress in emissions reduction, companies need to incorporate not just more comprehensive data but share that information to collectively close the gap.

The subsea industry can drive the conversations necessary for financial and environmental sustainability. Approaching our footprint through the manufacturing of a cable system puts us in a position to think practically about this issue and take steps to work together towards a better future. WFN Strategies and Sustainable Subsea Networks are working together to develop an industry-wide model for emissions. A shared, basic footprinting model can help us assess the merits of building new cable systems and build a sustainable internet. STF

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