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# Getting to zero (paper)

At the recent meeting of the IMO's MEPC 80, the use of electronic bunker delivery notes was nodded through.

**Steve Simms** of Simms Showers considers the evolution of this bunker 'record' and explains how an electronic version will better serve the industry

**O**n 10 July, the International Maritime Organization's (IMO) Marine Environment Protection Committee (MEPC 80) affirmed the use of electronic bunker delivery notes (eBDNs).<sup>1</sup>

This article addresses the legal considerations of using eBDNs and also,

as they become more widely used, the legal challenges to not using them.

These considerations and challenges are important for bunker sellers and buyers, not just for compliance but to successfully and profitably innovate. eBDNs are central to the increasing requirements for marine fuel carbon and other emission reduction, including accurate IMO regulation-required Energy Efficiency of Existing Ships (EEXI) and Carbon Intensity Indicator (CII) reporting, moving toward and beyond 2050.

onboard and local bunker authorities will receive the eBDN to confirm licence compliance.

The eBDN, its integrity assured by a robust blockchain system, confirms the fuel's origin with a molecular tracing system, the vessel's identity and bunkering location, fuel characteristics and quantity, and signatures for the supplier and vessel. The vessel operator uses its automated system to receive and combine the eBDN data with other data over the year, transmitting it securely to the

## SOMETIME AFTER 2050 . . .

Sometime after 2050, at least one reader now – and most coming after – will have just bunkered another vessel with green hydrogen, produced using nuclear-generated offshore power.

Almost instantly after fueling, the buyer and seller will receive or send their bill, confirmed by an eBDN. The receiving vessel will retain the eBDN



IMO's Data Collection System to report the vessel's gas emissions (or, lack of them).

Using the eBDN, after confirming integrity through a recognised third party, the seller or buyer will make an extra margin trading carbon credits bought by the decreasing numbers of fuel buyers. Those buyers will face an increasing price for credits, which they must buy to use higher carbon emission-generated (measured, well to wake) fuel.

Even if they (or their charterers) can afford carbon credits, owners operating low CII-rated vessels may find them increasingly difficult to charter. Most shippers refuse to book on vessels other than those verified (including through eBDNs) to be operating carbon neutral. Not so for the vessel just bunkered with green hydrogen. At that vessel's next call during the discharge and load of much cargo, port state authorities board the vessel. They quickly access the vessel's secure digital systems, confirm its eBDNs and through them the vessel's MARPOL VI Regulations compliance.

## IT CONTINUES WITH IMO MEPC 80

If this is the bunkering norm after 2050, it will be in significant part because MEPC 80 some 25 years or so earlier affirmed eBDN use.

It's nearly forgotten now that, when first signed in 1973, what is now mostly called MARPOL was formally the 'The International Convention for the Prevention of Pollution from Ships'. Much of that pollution, water and air, was (and still is) from marine fuel and the focus is on preventing that pollution. BDNs became a mandatory document under the revised MARPOL Annex VI Regulations, enacted in 2008 and entering into force on 1 January, 2010<sup>2</sup>. Before the MARPOL VI Regulations came into 2010 force, they usually were called bunker delivery receipts (BDRs), because that was mostly what they were – receipts for quantities of standard bunkers.

The pre-2010 standard was high sulphur fuel oil (HSFO), with no particular attention – other than from a vessel operational standpoint – to the amount of sulphur. MARPOL pre-2018 had enacted sulphur content limits for bunkers, but without mandatory BDNs reporting bunker sulphur content, there was no effective enforcement of the limits.

From 2010, the MEPC first required BDN use and specific BDN contents. MARPOL VI Regulation 18 made the BDN an integral part of marine pollution reduction enforcement. MEPC 80's 'Unified Interpretation' of MARPOL Annex VI Regulation 18<sup>3</sup> is:

2. The Bunker Delivery Note (BDN) required

by regulation 18.5 is acceptable in either hard copy or electronic format provided it contains at least the information specified in appendix V to MARPOL Annex VI and is retained and made available on board in accordance with regulation 18.6.

In addition, an electronic BDN should be protected from edits, modifications or revisions and authentication be possible by a verification method such as a tracking number, watermark, date and time stamp, QR code, GPS coordinates or other verification methods.'

A further MEPC 80 decision – for consideration at MEPC 81 in April 2024 and in force in September 2025 if (likely) adopted – amends MARPOL Annex V Regulation 2 to

**'From 2010, the MEPC first required BDN use and specific BDN contents. MARPOL VI Regulation 18 made the BDN an integral part of marine pollution reduction enforcement'**

define 'Fuel oil' to mean 'any fuel delivered to and intended for use on board a ship.'

Put this together with the BDN-requiring Regulation 18.5 and this means that a BDN must as of September 2025 be issued for every covered ship fuel delivery (as before, vessels 400 gross tons (GT) or over otherwise subject to MARPOL Annex VI-ratifying states), from gas to solid.

The proposal for MEPC 81 is to further amend Regulation 18.5 clarifying that BDNs for gas or low-flashpoint fuels must include density that a test method for the fuel confirms along with temperature at testing and delivery. The draft also requires the BDN to state that the fuel's sulphur content when so tested is less than 0.001% m/m.

One might ask why MEPC 80's 'electronic' interpretation ever was needed. The original MARPOL Annex VI Regulation 18.5 says nothing about 'hard copy' or electronic copy; it only provides for BDNs<sup>4</sup> as follows:

(3) For each ship subject to regulations 5

and 6 of this Annex [which in general is vessels over 400 tons], details of fuel oil for combustion purposes delivered to and used on board shall be recorded by means of a bunker delivery note which shall contain at least the information specified in appendix V to this Annex.

(4) The bunker delivery note shall be kept on board the ship in such a place as to be readily available for inspection at all reasonable times. It shall be retained for a period of three years after the fuel oil has been delivered on board.

(5)(a) The competent authority of the Government of a Party to the Protocol of 1997 may inspect the bunker delivery notes on board any ship to which this Annex applies while the ship is in its port or offshore terminal, may make a copy of each delivery note, and may require the master or person in charge of the ship to certify that each copy is a true copy of such bunker delivery note. The competent authority may also verify the contents of each note through consultations with the port where the note was issued.

(b) The inspection of the bunker delivery notes and the taking of certified copies by the competent authority under this paragraph shall be performed as expeditiously as possible without causing the ship to be unduly delayed.

(6) The bunker delivery note shall be accompanied by a representative sample of the fuel oil delivered, taking into account guidelines to be developed by the Organization. The sample is to be sealed and signed by the supplier's representative and the master or officer in charge of the bunker operation on completion of bunkering operations and retained under the ship's control until the fuel oil is substantially consumed, but in any case for a period of not less than 12 months from the time of delivery.

(7) Parties to the Protocol of 1997 undertake to ensure that appropriate authorities designated by them:

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(b) require local suppliers to provide the bunker delivery note and sample as required by this regulation, certified by the fuel oil supplier that the fuel oil meets the requirements of regulations 14 and 18 of this Annex;

(c) require local suppliers to retain a copy of the bunker delivery note for at least three years for inspection and verification by the port State as necessary;

(d) take action as appropriate against fuel oil suppliers that have been found to deliver fuel oil that does not comply with that stated on the bunker delivery note;

(e) inform the Administration of any ship receiving fuel oil found to be non-compliant with the requirements of regulations 14 or 18 of this Annex; and

(f) inform the Organization for transmission to Parties to the Protocol of 1997 of all cases where fuel oil suppliers have failed to meet the requirements specified in regulations 14 or 18 of this Annex.

(8) In connection with port State inspections carried out by Parties to the Protocol of 1997, the Parties further undertake to:

(a) inform the Party or non-Party under whose jurisdiction a bunker delivery note was issued of cases of delivery of noncompliant fuel oil, giving all relevant information; and

(b) ensure that remedial action as appropriate is taken to bring noncompliant fuel oil discovered into compliance.

MARPOL Annex VI Regulation 18's 'Appendix V' – "Information to be Included

in the Bunker Delivery Note' – also does not specify the BDN recording medium but (and Appendix V has been amended several times since 2008)<sup>5</sup> but presently requires:<sup>6</sup>

1. Name and IMO Number of receiving ship
2. Port
3. Date of commencement of delivery
4. Name, address, and telephone number of marine fuel oil supplier
5. Product name(s)
6. Quantity in metric tons
7. Density at 15°C (kg/m<sup>3</sup>) footnote
8. Sulphur content (%m/m) footnote
9. A declaration signed and certified by the fuel oil supplier's representative that the fuel oil supplied is in conformity with regulation 18.3 of this Annex and that the sulphur content of the fuel oil supplied does not exceed:
  - the limit value given by regulation 14.1 of this Annex;
  - the limit value given by regulation 14.4 of this Annex; or
  - the purchaser's specified limit value of \_\_\_\_\_ (% m/m), as completed by the fuel

oil supplier's representative and on the basis of the purchaser's notification that the fuel oil is intended to be used:

.1 in combination with an equivalent means of compliance in accordance with regulation 4 of this Annex; or

.2 is subject to a relevant exemption for a ship to conduct trials for sulphur oxides emission reduction and control technology research in accordance with regulation 3.2 of this Annex.

The declaration shall be completed by the fuel oil supplier's representative by marking the applicable box(es) with a cross (x).

MEPC 80's 'Interpretation' requires for eBDNs more integrity than 'hard' (paper) BDNs, so that:

- they are 'protected from edits, modifications or revisions' (paper is not so protected);
- 'authentication be possible by a verification method such as a tracking number' (paper BDNs do have tracking numbers, but – including on scanned copies – those can be changed);
- they bear 'watermark, date and

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time stamp' (again, these can be changed on scanned copy);

- they carry 'QR code, GPS coordinates or other verification methods [ ]' (which are not part of paper BDNs).

Consequently, per the MEPC 80 'Interpretation', eBDNs are to be 'harder' than 'hard copy' – more protected from changes, with more information. eBDNs as discussed below in fact are more capable of the compliance certification and general usefulness that the original MARPOL Article VI Regulation 18.5 contemplates – and that further IMO regulations and industry practice embody for the use of BDNs. To appreciate this, and the trajectory for the use of eBDNs, we go back to how some of the terms the maritime industry uses now, including for bunker delivery, originated and evolved to present use.

## HOW A RECEIPT BECAME A NOTE, AND SHOULD BECOME AN EBDN

When sailing ship captains wanted to know how fast their vessel was moving, they threw out a 'common log.' At first, it was the most common log: wooden, from a tree.

Eventually, sailors (that is, people crewing a ship with sails) figured out that the log was more accurate sliced into a pie shape (but still called a log. They threw it overboard attached to a rope with evenly spaced knots. A count of the knots between the ship and the log gave a basis to estimate the vessel speed. Officers reported speed (knots) and then gradually more information on paper in the ship's 'log'. The actual log long gone, the ship's 'log' and, with engines, also the engine log) became documentation critical to confirming vessel performance and in investigations involving the vessel.

In the mid-19th century, coal overtook wind as the means, initially with steam engines, to propel ships. An innovation of the British Admiralty was for each vessel to keep a 'coal account' including the date, time, and quantity of coal loaded aboard. The 'coal account' – noted on paper – became a note (or receipt) of coal delivery aboard ship, stored in bunkers.

Coal as ship fuel had problems: dust, bulk, and relatively few places with enough space to pile and load enough (often physically on the backs of 'men who stuff cargo' – *estivadores* (Portuguese) or *estibadores* (Spanish), and, later in English, *stevedores*) sack by sack, into the bunkers. Oil, pumped into shipboard tanks (not into bunkers) relatively quickly replaced coal – but, aboard ship,

fuel oil was still 'bunkers'. Oil suppliers issued bunker delivery receipts – still, on paper.

Shipboard records (now usually electronic) are still 'logs'. 'Knots' (no rope) read from a ship's gauge remain a ship speed figure. Stevedores (women and men) no longer just stuff cargo and cranes save their backs; most cargo vessels lack sails but not sailors and their fuel, whether gas or solid, is still 'bunkers'.

But, until the introduction of the first eBDN system, in about 2017<sup>7</sup>, the only medium of bunker delivery notes (BDNs) – or receipts (BDRs) – was still paper. The only innovation was in the late 1950s-early '60's, with the 'NCR carbonless' (replacing carbon paper – remember that?) multiple-part form from the U.S.' National Cash Register company (which now develops software). Many BDNs/BDRs that the bunkering industry still uses – now a half century later – are a version of the early '60s NCR paper forms.

By MARPOL Annex VI in 1997, paper BDRs had become an inherent part of the bunkering (oil) business. The standard bunkering transaction: an inquiry, then quote, confirmation, and bunker delivery to the vessel, BDN/BDR issue confirming quantity signed by the master or chief engineer, then billing from the BDN/BDR. But the paper of the receipt hadn't changed since the British Admiralty's coal receipt.

**'It's not unusual to see pre-2019 BDN paper forms still being used in 2023 – even though the form is (at best) invalid under the current Regulation 18.5. It may be that where there is licensing, bunker suppliers are more careful about using current BDN paper forms and disposing of noncompliant ones'**

So the most involved part of the 2010 move to mandatory BDNs with specific content, by MARPOL Annex VI Regulation 18, was some training to fill out the forms, but mostly it involved reprinting existing paper BDRs to be compliant and physically distributing the reprints to bunker barge and other delivery personnel. This reprinting and distribution of paper had to happen again in advance of 2019's requirement of the use of 0.10% sulphur fuels in Emission Control Areas (ECAs) and 2020's global 0.50% sulphur mandate, which required tick boxes confirming the use of exhaust gas cleaning systems (scrubbers) in conjunction with the continuing use of HSFO.

A further change to BDN content is both MARPOL VI Regulation 18 amendments at MEPC 79 (December, 2022) – enter-

ing into force May 1, 2024 – and amendments to Regulation 4.2.1 of Chapter II-2 of the International Convention for Safety of Life at Sea ('SOLAS'), entering into force on 1 January 2026. MEPC 79 decided that BDNs must include 'fuel oil' flashpoint or state flashpoint measurement at or above 70°C. The SOLAS amendments similarly require:

1. A declaration signed by the bunker supplier that the bunkers conform with Regulation 4.2.1, Chapter II-2 of SOLAS – governing flashpoint – and the test method used for determining the flashpoint; and
2. A bunker delivery note that either specifies the flashpoint of the bunkers; or states that the flashpoint has been measured at or above 70°C.<sup>8</sup>

SOLAS contracting states must take 'appropriate action' against bunker suppliers which supply bunkers below a flashpoint of 60°C – and notify the IMO and other contracting states.

Where there is supplier licensing, in Singapore and being further implemented in Rotterdam, for example, that could mean fines and licence revocation – on top of other potential reasons for licence action, such as issuing an improper or incomplete BDN.

It's not unusual to see pre-2019 BDN paper forms still being used in 2023 – even

though the form is (at best) invalid under the current Regulation 18.5. It may be that where there is licensing, bunker suppliers are more careful about using current BDN paper forms and disposing of noncompliant ones. But even where there isn't bunker licensing there is Port State Control inspection. Under MARPOL VI, Regulation 18, port states are to keep lists of bunker suppliers and assure that they maintain BDN copies for three years.

Vessels must also maintain their own BDN genuine copies and produce them to Port State Control on inspection. There is at best, if Port State Control does the full inspection, a problem where a customer's vessel has received a non-compliant BDN and Port State Control notes that as a vessel deficiency.

Even if it doesn't come up to licensing or

Port State authorities, a non-compliant BDN still can be a problem if there is a bunker quality dispute. Did the BDN properly report the quality, including sulphur content if for use aboard an EGCS-equipped vessel? What if the BDN was a pre-2019 form without 'tick' boxes?

When one adds in that the expanded definition of 'fuel oil' is to mandate BDN use for all marine fuels – each with different qualities – and the increasing information that a BDN must include and to which a bunker supplier must certify, then the burden of printing, destroying old printed paper, re-distributing (and the consequence of failing that burden), plus the cost of all of those operations, will increase for bunker suppliers clinging to paper BDNs.

So cost saving is one reason to move to an eBDN, which remains among the last of shipboard and related records to be paper-based. Many ships' logs and a range of certificates area now widely and officially accepted (and encouraged to be in) electronic form – usually in paper.<sup>9</sup> However, there are also other reasons, focusing on legal considerations, which overall support implementing eBDNs now.

## LEGAL BENEFITS AND RISKS OF EBDNS

If you've read to this point in the article, and especially if you've had any involvement with bunker delivery notes, you have been reminded again about the quantity of information on a BDN that must be accurate. It must be verifiable. If it's changed, it could mean loss of life and property. Furthermore, certification on a bunker delivery note has legal significance if false. When there is an issue with a BDN, certifications and figures must be confirmed as well as the identities of the persons making and recording them.

Moving toward decarbonisation, an ever-increasing consideration for bunker suppliers will be how their fuel affects vessel Energy Efficiency of Existing Ships (EEXI) and Carbon Intensity Indicator (CII) reporting. In each of the EEXI and CII regimes from the IMO, BDNs are an essential part of record keeping, reporting and confirmation.

Alongside this, is the European Union's FuelEU Maritime regulation, expected to be in force on 1 January 2025, where most marine fuel supply contracts must:

include provisions laying down the fuel supplier's liability to compensate the company or commercial operator for the payment of penalties [from, essentially, carbon emissions and other noncompliance] referred to in this Article, if fuels were not delivered according to the agreed terms.<sup>10</sup>

What were the 'agreed terms' and the exact qualities of the fuel delivered? A BDN will confirm this – an eBDN conforming, at minimum to MEPC 80's Interpretation, should confirm that with even greater reliability.

An eBDN system conforming to MEPC 80's Interpretation provides improved compliance monitoring capabilities. A supplier or customer can quickly access, process and report eBDN figures (rather than risking error or delay or manual re-entry) for CII and EEXI reporting and confirmation.

**'With fuels where there are particular safety concerns around handling, such as LNG (temperature during transfer) or ammonia (personnel exposure), an eBDN also can include documentation of compliance and even video or photos of the operation'**

If the eBDN data must be proved, the time of its entry – as well as the identities (including digital photos) of the person making the entries, certifications and signing the eBDN – is protected, particularly with the use of blockchain technology but also because multiple copies are, when the eBDN is fully signed, transmitted to the seller, buyer and, as required, to authorities.

A part of the IMO's shipboard certificate regulations has given rise to entities which verify and authenticate certificates and eBDNs following MEPC 80's Interpretation must have similar verification which includes confirmation that the eBDN hasn't been modified.

The addition of a 'tracking number, watermark, date and time stamp, QR code, GPS coordinates or other verification methods' to an eBDN is also straightforward when using a well-designed eBDN system. Using that in a paper system with manual entry would be at best cumbersome and difficult to prove as reliable.

EBDN systems also facilitate efficient

record-keeping and retrieval of BDNs. Digital records are easily searchable, retrievable, and can be stored in a well-organised manner. This simplifies the process – and lowers the time and cost – of locating and presenting relevant documentation in legal proceedings or audits, further reducing potential legal risks.

EBDN systems further provide improved auditability and transparency. They provide a clear audit trail, documenting the history of BDNs and associated transactions. This transparency can enhance the credibility and accuracy of records, mitigating legal risks and disputes arising from conflicting or disputed information.

This also relates to required MARPOL fuel samples (depending on the fuel). If samples must be kept (as with all liquid, petroleum-derived bunkers), they must be labeled, numbered and the label numbers recorded on the eBDN. There is always the possibility that samples might be tampered with, but eBDN systems also can include provisions for video and/or photos of the sampling and sealing – as well as generate the sample labels.

With fuels where there are particular safety concerns around handling, such as LNG (temperature during transfer) or ammonia (personnel exposure), an eBDN also can include documentation of compliance and even video or photos of the operation.

When there is a dispute, eBDNs can contribute to faster and more efficient resolution, first, by removing the question of whether the eBDN is an authentic record. Many bunker disputes stall in resolution over questions arising because of hand notations on a paper BDN copy that one party has, and that another party never has seen. The availability of accurate, time-stamped, and digitally signed eBDNs can help resolve disputes more effectively. If a dispute arises, eBDNs can be easily accessed, shared, and analysed to determine the facts and reach a resolution.

The accelerating legal requirements that de-carbonisation is placing on bunker suppliers, particularly as suppliers deal in more types of fuels, also allows suppliers and their customers to more quickly align with evolving legal frameworks and industry standards. When there is a change or upcoming change, it's a matter of downloading a revised program template for data entry, and using that for training in advance, rather than reprinting paper forms, distributing them and making sure the invalid ones are physically destroyed.

An overall emphasis of the maritime industry now is digitalisation – already prevalent in most other areas of the industry – besides bunkering. With digitisation the norm, accelerated by 'getting to zero' market and legal demands,

digital records set aside paper ones and are already accepted in many legal forums, including arbitration proceedings, as more credible.

In fact, if the EU's FuelEU Maritime focus on bunker supplier liability is a bellwether for future disputes that bunker suppliers should expect – and liabilities to avoid – then eBDNs are particularly critical. The battles will be pitched over whether a particular fuel supplied contributed to some inaccurate report of an emission, to some downgrade of a vessel's CII and generally to expenses suffered by a bunker supplier's customer. BIMCO's CII charterparty's clause, for example, puts the burden on charterers of complying with owners' charterparty requirements for emissions, and a part of measuring that compliance is what the BDN records.

If a bunker supplier finds itself in dispute over whether its fuel somehow has caused a charterparty breach, the supplier will want to have at hand an eBDN which will confirm that the fuel supply did not cause the breach. Included in the eBDN records will be the identities of those making and certifying the eBDN if they must be called as witnesses. The same is the case for disputes where Port State Control accuses a customer of carrying non-compliant fuel, or a bunker supplier licensing authority accuses the supplier of selling it.

eBDN users, though, must also make sure that they continue to comply with local and international legal and regulatory requirements. Failure to comply with electronic signature laws, data protection regulations (such as the EU's General Data Protection Regulation (EU GDPR), or certain fuel industry-specific guidelines can lead to legal liabilities, fines, or penalties. It is essential to maintain sound 'cyber health' practices to avoid data breaches or viruses, and introducing those to customers' shipboard or

authorities' (or the supplier's own) systems. eBDN users consequently should have as a part of their overall cyber security practices (which include assuring the basics of knowing their customer, not introducing unknown media to a digital system, etc.) a robust virus and intrusion protection system and regular audits of that system, as well as training of personnel to spot and avoid cyber threats.<sup>11</sup>

MARPOL VI Regulation 18 also will continue to require each vessel and supplier to retain eBDN copies for at least three years. So, it's essential that there is robust shipboard and supplier-side storage systems, not subject to hacking or tampering, where eBDNs may be stored safely. This also argues for robust and protected off-site backup storage for those systems. An argument for paper aboard a vessel is that it's not easily removed, but a failed shipboard digital storage facility immediately raises questions, about failing requirements for keeping onboard BDNs.

With this too is the need for redundancy if the primary eBDN system fails. As anyone using computers knows, they can fail, and so an eBDN system (right down to the hardware used for recording and producing the eBDN) must have backup and replacements ready if there is failure, as well as the means for recording, subject to verification, when there is a system failure, including data loss, and its circumstances. Sometimes, for example, eBDN data can't immediately be transmitted once finally entered. One way that some eBDN providers address this is to provide a means for storing the data (again subject to systems which do not permit alteration after final signing) on devices used for entry, and then transferring the data when the means becomes available.

Where a bunker supplier expects a requirement to call on its eBDN, the supplier also

should consult with competent legal counsel about whether the eBDN as designed, recorded and kept is legally valid and admissible as evidence in those jurisdictions and proceedings. Some jurisdictions still require authenticated paper 'originals'; the eBDN system should have means – including available persons to give testimony as required – to confirm that 'originals' printed from an eBDN onto paper are authentic and reliable. In general, in any jurisdiction establishing proper digital signature mechanisms, secure storage, and maintaining data integrity are vital for maintaining the legal validity of digital BDNs.

Ultimately, a legally reliable, verified, MEPC 80 Interpretation-compliant eBDN system requires good training of the people who use it. Inaccurate data input means an inaccurate record. Until (and probably even after) mass flow meters (MFM) come widely into use, those MFM output figures will be fed directly into the eBDN system and therefore each eBDN's accuracy will turn on the care of the people trained to use the eBDN system. Entries must be transferred accurately from MFM or bunker survey readings, and a record must be made of signatures and the identities of those signing.

This relates as well to the industry standards for eBDNs. That is, paper BDNs are pretty standard, as is their use, and the experience of use: Pull out the paper from a box, get out a ballpoint pen, bear down on the NCR form and make the notations that go to all copies, send it up in a bucket to the chief engineer (who wasn't interested in coming down to the barge during bunkering) and have it, hopefully, returned relatively dry and with the ship's (rubber) stamp not running too much. The paper BDN then comes back to the office, it is then converted to a pdf and sent some days later with the



'Some jurisdictions still require authenticated paper "originals"; the eBDN system should have means – including available persons to give testimony as required – to confirm that "originals" printed from an eBDN onto paper are authentic and reliable'



bill. Hopefully, the customer then pays and doesn't question whether the BDN figures were changed or the .pdf somehow altered.

If there's a dispute, perhaps the master, weeks later and in mid-ocean, takes a photo of the shipboard BDN, which (somehow, usually if there's a dispute) differs from the top (original) copy the bunker supplier has. Or somehow a copy is 'lost' of one of the NCR forms near the last didn't clearly record the data or stamp. And frequently with paper BDNs, where there's a dispute, the problems go on.

EBDNs also have their 'standards' challenges – and not simply about what to call them. That is, when working with a trader, must each bunker supplier and their barge or truck use a different eBDN system? Presently, suppliers use their own paper BDNs. This argues for supplier-based eBDNs – or a national system like India's (see the initial footnote to this article) which produces eBDNs with suppliers accessing the system. Or it argues for a traders' system which utilises some combination of template which can be uploaded on a computer tablet or mobile phone.

However, the availability of eBDNs raises competitive opportunities. The more easy to use and secure the system, the more information about the bunkering it can capture and store, the more will be a supplier's or trader's competitive advantage – especially again with the requirements for EEXI and CII reporting and proof – and advancement into bunkering transactions of carbon credit trading starting with the European Union's Emission Trading System.<sup>12</sup>

Sometime after 2050, the BDN, which began life as with British Admiralty for coal, may just be known as that, a BDN, with the 'E' presumed just as the 'P' for paper has always been.

1. So far, eBDNs have several names. 'E-BDN®' and 'Digital Bunker®' are trademarks registered on the U.S. and international trademark registries since 2017, licensed to eBDN developer Vortex Development Group (Vortex) – [www.vortexdevelopmentgroup.com/](http://www.vortexdevelopmentgroup.com/) (the author also serves as legal advisor to Vortex; the author's views herein are not necessarily those of Vortex).

In what appears to be the first national standard electronic BDN system, in January 2023, India's Directorate of General Shipping (DGS) – to collect data for MARPOL-required Energy Efficiency of Existing Ships (EEXI) and Carbon Intensity Indicator (CII) regulations – requires that bunker suppliers in India must generate and submit bunker delivery notes for each delivery: [www.dgshipping.gov.in/writereaddata/ShippingNotices/202301200616440801897DGSCircular04of2023.pdf](http://www.dgshipping.gov.in/writereaddata/ShippingNotices/202301200616440801897DGSCircular04of2023.pdf) – user manual at [www.adaniports.com/-/media/Project/Ports/PortsAndTerminals/Kattupalli-Port-Documents/Public-Notices/TC-03-of-2023-DGS-Circular-No-4-of-2023-Collection-of-data-from-all-Indian-Ships-for-implementation.pdf](http://www.adaniports.com/-/media/Project/Ports/PortsAndTerminals/Kattupalli-Port-Documents/Public-Notices/TC-03-of-2023-DGS-Circular-No-4-of-2023-Collection-of-data-from-all-Indian-Ships-for-implementation.pdf). A DGS-sponsored online system issues the eBDN. The DGS Directive and system manual refers to the document, trademark registration notwithstanding, as an 'E-BDN'.

Since 2021, Minerva has offered an eBDN through its Advanced Delivery Platform (ADP), [www.minervabunkering.com/advanced-delivery-platform](http://www.minervabunkering.com/advanced-delivery-platform). Ze-

roNorth, which in 2022 acquired digital bunkering pioneer Clearlynx, offers an 'eBDN' – <https://zeronorth.com/increasing-trust-and-transparency-with-the-new-electronic-bunker-delivery>. Singapore's Maritime & Port Authority (MPA) has encouraged eBDNs (see [www.mpa.gov.sg/maritime-singapore/innovation-and-r-d/mint-fund-call-for-proposals/digital-bunkering](http://www.mpa.gov.sg/maritime-singapore/innovation-and-r-d/mint-fund-call-for-proposals/digital-bunkering)), with Singapore-based provider, Ascenz Maroka (<https://ascenzmaroka.com/electronic-bunker-delivery-management/>) also offering an 'eBDN'.

In February 2023, KPI OceanConnect, Pacific International Lines and Bunker One completed a digitized bunkering transaction for Togo very low sulphur fuel oil (VLSFO) delivery, Lesley Bankes-Hughes, *Global Trio Announces First SGTrex Digital Bunker Transaction Outside Singapore*, *Bunkerspot*, Feb. 23, 2023 at [www.bunkerspot.com/news-archive?view=article&id=58419:global-trio-announces-first-sgtrdex-digital-bunker-transaction-outside-singapore&catid=14](http://www.bunkerspot.com/news-archive?view=article&id=58419:global-trio-announces-first-sgtrdex-digital-bunker-transaction-outside-singapore&catid=14); the reference overall is to a 'digitized' transaction.

There are other eBDN solutions developing, likely enhanced by MEPC 80 which refers to the eBDN as 'electronic BDN'. Perhaps a standard name will evolve; this article's author notes that the current lack of a standard is a challenge ahead to solve. For all of the present and developing solutions, though each its own approach, the author refers to them as (and this term, not a registered trademark) eBDNs.

2. Resolution MEPC.176(58), Adopted on 10 October 2008, Amendments to the Annex of the Protocol of 1997 To Amend the International Convention for the Prevention of the Pollution from Ships, 1973 as modified by the Protocol of 1978 Relation Thereto (Revised MARPOL Annex VI), at [www.classnk.or.jp/hp/pdf/activities/statutory/soxpm/resmepc176-58.pdf](http://www.classnk.or.jp/hp/pdf/activities/statutory/soxpm/resmepc176-58.pdf)

3. MARPOL Annex VI, Regulation 18 – 'Fuel oil availability and quality' – requires the use, and specifies the content of bunker delivery notes or receipts (BDN/BDR). The MEPC on 10 July 2023 directed the IMO Secretariat to issue MEPC.1/Circ.795/Rev.8 – Unified interpretations to Regulations 18.5 and 18.6 of MARPOL Annex VI.

4. See MARPOL Annex VI, Regulation 18, at [www.marpoltraining.com/MMSKOREAN/MARPOL/Annex\\_VI/r18.htm](http://www.marpoltraining.com/MMSKOREAN/MARPOL/Annex_VI/r18.htm).

5. See this author's article, *Bunker Delivery Notes (BDNs): Thinking Outside the Box*, *Bunkerspot*, Feb. – March 2018, copy at <https://static1.squarespace.com/static/5ab17346c258b4cb7b854fe6/t/5ec2e840a170291f46ad5608/1589831747674/2018+Bunkerspot+Feb+March+BDNs+01012019.pdf>, summary <https://www.simsshowers.com/news/2020/5/18/thinking-outside-the-box>.

6. MARPOL Annex VI Regulation 18 "Appendix V", current version at <https://www.imorules.com/GUID-44195EB8-3777-4B5D-BDA3-FCBE70A915F3.html>.

7. See the author's article, *Put the Paper in the Trash! Digital bunker delivery notes – it's time for the bunker industry to tidy up its paperwork*, *Bunker Bulletin*, September 2017, copy at <https://static1.squarespace.com/static/5ab17346c258b4cb7b854fe6/t/5ec2ed542a96966fa9d8e585/1589833045583/Summer-2017-Digital-BDRS-Article11787.pdf>.

8. For further information on flashpoint and SOLAS requirements relating to bunker supply and developments including in the MEPC, see *MSC completes work on fuel oil safety with another SOLAS amendment*, *IBIA News*, July 13, 2023, at <https://ibia.net/msc-completes-work-on-fuel-oil-safety-with-another-solas-amendment/> and IBIA's Resolution to the IMO's Maritime Safety Committee, Development of further measures to enhance the safety of ships relating to the use of fuel oil. Unified interpretation of SOLAS regulation II-2/4.6 concerning flashpoint documentation, March 28, 2023, at <https://ibia.net/wp-content/uploads/2023/05/MS-C-107-6-2-Unified-interpretation-of-SOLAS-regulation-II-2-4.6-concerning-flashpoint-documentation-IBIA.pdf>.


9. An eBDN is not a ship's certificate with independent legal significance, for example, showing the ship's compliance with SOLAS or other international treat-

ies, but as set out herein still can and should have similar integrity, acceptance and verification. See *IMO sub-committee accepts use of electronic BDNs after long discussion*, *IBIA News*, May 3, 2023, at <https://ibia.net/imo-sub-committee-accepts-use-of-electronic-bdns-after-long-discussion>; see also Resolution MEPC.312(74) – Guidelines for the Use of Electronic Record Books Under MARPOL – (adopted on 17 May 2019) at [https://imorules.com/MEPCRES\\_312.74.html](https://imorules.com/MEPCRES_312.74.html) and see also the U.S. Coast Guard's Circular referencing and implementing FAL.5/Circ.39 Rev.2 "Guidelines for the Use of Electronic Certificates," at [www.dco.uscg.mil/Portals/9/OCSNCOE/References/Policy-Letters/HQ/CVC/CG-CVC-PL-17-09.pdf?ver=7MHbuL5ToseuJovNsgYyIQ%3D%3D#:~:text=This%20policy%20letter%20provides%20guidance,subject%20to%20Port%20State%20Control](http://www.dco.uscg.mil/Portals/9/OCSNCOE/References/Policy-Letters/HQ/CVC/CG-CVC-PL-17-09.pdf?ver=7MHbuL5ToseuJovNsgYyIQ%3D%3D#:~:text=This%20policy%20letter%20provides%20guidance,subject%20to%20Port%20State%20Control)

10. The entire text the regulation governing marine fuel supplier contracting, for Fuel EU Maritime Article 20, paragraph 3 c (new) (Amendment 129), is at [www.europa.eu/doceo/document/A-9-2022-0233\\_EN.html](http://www.europa.eu/doceo/document/A-9-2022-0233_EN.html). For a detailed examination of the importance of Fuel EU Maritime to bunker suppliers, see the author's recent article, *Facing Up to Fuel EU Maritime*, *Bunkerspot* April-May 2023, copy at <https://static1.squarespace.com/static/5ab17346c258b4cb7b854fe6/t/646aa5711d907662f19ca89f/1684710769976/Facing+up+to+FuelEU+Maritime.pdf>.

11. For a detail about bunker providers' cyber security, and for their customers, see the author's article, *Unseen Enemy – Cyber Security*, *Bunkerspot* April/May 2020, at <https://static1.squarespace.com/static/5ab17346c258b4cb7b854fe6/t/5ec2e5b6f2a1a93da4d5092e/1589831096407/Bunkerspot+2020+Apr+il+May+Cybersecurity.pdf>, summary at [www.simsshowers.com/news/2020/5/18/unseen-enemy](http://www.simsshowers.com/news/2020/5/18/unseen-enemy)

12. See the author's article, *Setting Off to Offsets*, *Bunkerspot* April/May 2022, at <https://static1.squarespace.com/static/5ab17346c258b4cb7b854fe6/t/62c9d3202acfc6c18d7f03836/1657393954584/Setting+off+to+offsets.pdf>, summary at [www.simsshowers.com/news/2022/7/9/setting-off-to-offsets](http://www.simsshowers.com/news/2022/7/9/setting-off-to-offsets) – discussing carbon emissions trading and in particular the EU-ETS for bunker suppliers and traders.

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The opinions and recommendations of this article are his and not necessarily also those of IBIA or SEA-LNG, except if identified specifically as such.

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