# Stakeholder meeting on monitoring, reporting and verification of greenhouse gas emissions from ships

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NASDAQ: SBLK

# Star Bulk: Our profile

- Global shipping company providing worldwide seaborne transportation solutions in the dry bulk sector
- Focuses mainly on Capesize and large Handymax and secondarily on Panamax vessels.
- Currently manages 14 owned and 3 third party vessels
- Combined carrying capacity of 1.5 million DWT

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# Why a voluntary MRV?

1. **Regulation:**
   - IMO global scheme: MBM decision by 2015
   - EU regional scheme: MRV legislation in 2013
2. **Cost Savings:**
   - Manage better the Energy invested for a given voyage
   - Best operating patterns
   - Select the most cost effective measures
3. **Performance:**
   - Improve Energy efficiency performance
4. **Commercial:**
   - Charterers
   - Energy Indexes (RightShip, ESI etc.)
5. **CSR:**
   - Banks, Shareholders, etc
   - Climate Change Disclosure

# MRV: Implementation Challenges

- Scope (voyages in EU/non EU, vessel type/age/hull condition, weather, type of emissions)
- Monitored Data (EPIs)
- Monitoring method (EEOI, speed, CO2 emissions, etc)
- Reporting procedure & format
- Set bench markings - Evaluate efficiency
- Transparent and accurate
- Cost-effective
- Minimum administrative burden / simple to implement
- Expertise required

**Approach: Collaboration with an Independent Service Provider**

# Star Bulk MRV: Monitoring

- **Scope:** All fleet, all voyages, $CO_2$
- **Source:** Noon report (current practice, all data included, cost-effective)
- **Monitored Data:** All energy efficiency related ($CO_2$, distance sailed, speed, cargo carried, weather, current, hull condition, etc.)
- **Monitoring Period:** Daily
- **Monitoring Method Tool:** currently EEOI (IMO)

# Star Bulk MRV: Monitoring

## Vessels' Energy Performance Monitoring Tool:

| Vessel | Monitoring Tool | Data Source | Method of transmitting, storing and retrieving data |
|---|---|---|---|
| **STAR AURORA** | **EEOI** | **Noon Report** | **Email / Electronic** |

## Vessels' Energy Performance Indicators (EPIs):

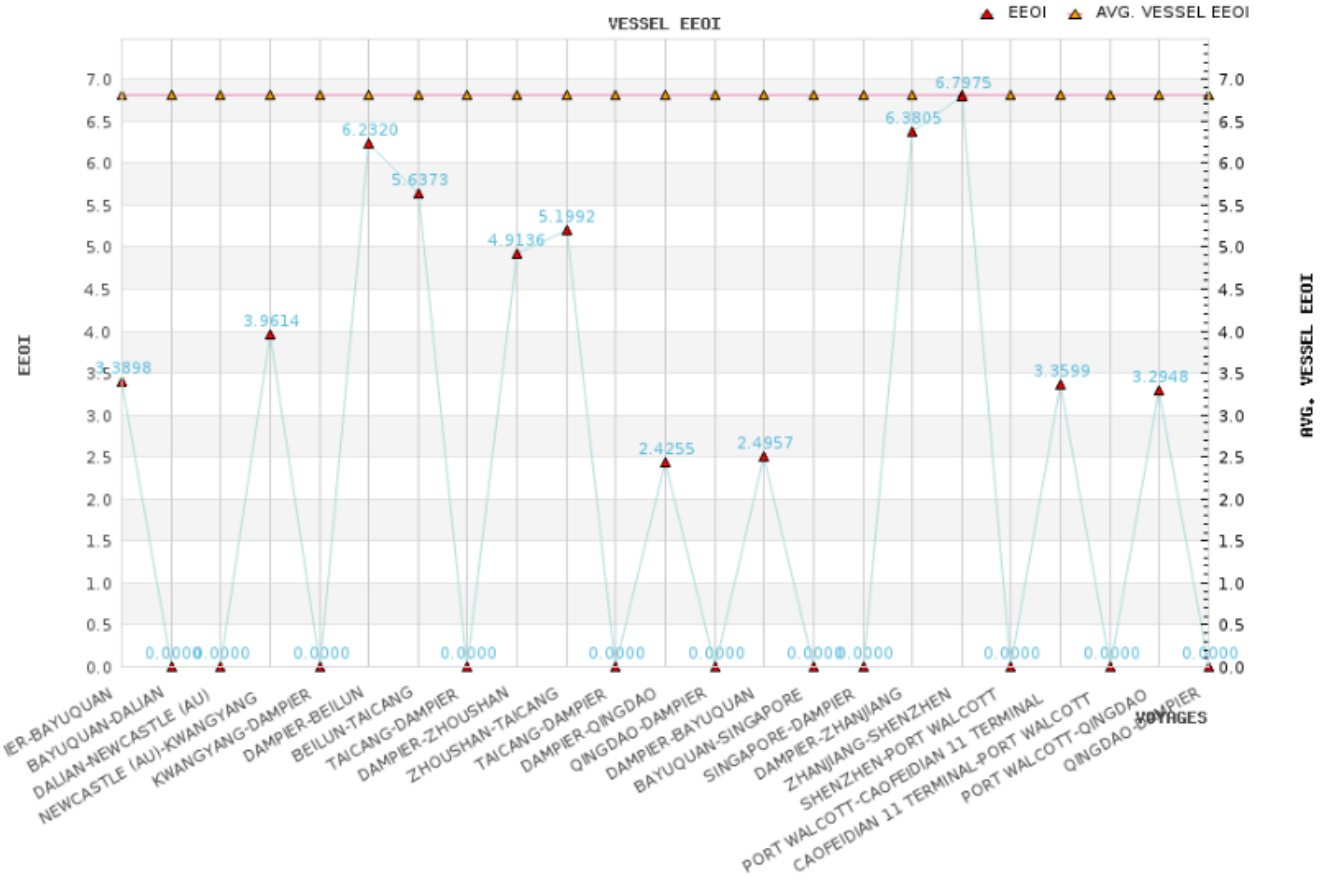
| Vessel | Monitoring Tool | Data Source | Method of transmitting, storing and retrieving data |
|---|---|---|---|
| **STAR AURORA** | EEOI | Noon Report / Estimation | Email / Electronic |
| | HFO consumption | Noon Report | Email / Electronic |
| | MDO consumption | Noon Report | Email / Electronic |
| | CO2 emissions | Noon Report / Estimation | Electronic (IMO Factors) |
| | Distance Sailed | Noon Report | Email / Electronic |
| | Cargo Carried | Noon Report | Email / Electronic |

# Star Bulk MRV: Reporting

- **Reporting Data:** $CO_2$ and fuel consumption
- **Procedure:** Electronic automated procedure
- **Emission Report:** Standardized across the fleet
- **Format:** Easy to present to stakeholders (charterers, shareholders, brokers, finance, etc.)
- **Structure:** Information reported in a manageable and easy to handle way.

# Star Bulk MRV: Reporting

## EEOI



# Star Bulk MRV: Reporting

| State of Departure | State of Arrival | Emissions per Fuel type (t $CO_2$) | | TOTAL (t $CO_2$) |
|---|---|---|---|---|
| | | Diesel / Gas Oil | Heavy Fuel Oil (HFO) | |
| CHINA | AUSTRALIA | 9.81036 | 1,684.081 | 1,693.891 |
| AUSTRALIA | CHINA | 10.9004 | 1,950.237 | 1,961.138 |
| CHINA | AUSTRALIA | 8.9768 | 1,756.522 | 1,765.498 |
| AUSTRALIA | CHINA | 12.1828 | 2,145.822 | 2,158.004 |
| CHINA | AUSTRALIA | 8.6562 | 1,184.095 | 1,192.751 |
| CHINA | CHINA | 0.9618 | 133.9192 | 134.881 |
| AUSTRALIA | CHINA | 10.2592 | 1,177.866 | 1,188.125 |
| SINGAPORE | AUSTRALIA | 5.7708 | 660.8757 | 666.6465 |
| CHINA | SINGAPORE | 27.251 | 1,015.917 | 1,043.168 |
| AUSTRALIA | CHINA | 12.824 | 1,613.882 | 1,626.706 |
| CHINA | AUSTRALIA | 28.2128 | 1,356.944 | 1,385.157 |
| AUSTRALIA | CHINA | 12.824 | 1,446.016 | 1,458.84 |
| CHINA | AUSTRALIA | 11.221 | 1,213.059 | 1,224.28 |
| CHINA | CHINA | 0.3206 | 49.8304 | 50.151 |
| AUSTRALIA | CHINA | 12.1828 | 1,270.675 | 1,282.858 |
| CHINA | AUSTRALIA | 9.2974 | 1,526.99 | 1,536.288 |
| CHINA | CHINA | 0.6412 | 48.2732 | 48.9144 |
| AUSTRALIA | CHINA | 9.2974 | 1,639.732 | 1,649.029 |
| SOUTH KOREA | AUSTRALIA | 10.2592 | 1,631.946 | 1,642.205 |
| AUSTRALIA | SOUTH KOREA | 13.4652 | 2,394.974 | 2,408.439 |
| CHINA | AUSTRALIA | 14.1064 | 2,166.377 | 2,180.483 |
| CHINA | CHINA | 0.9618 | 94.9892 | 95.951 |
| AUSTRALIA | CHINA | 43.9222 | 2,137.413 | 2,181.335 |
| | | | | |
| **Aggregated $CO_2$ emissions from all voyages at third countries:** | | **274.305** | **30,300.43** | **30,574.735** |

# Star Bulk MRV: Verification

## Data validation, "ship CO2 status"

- Ship type, age, last drydock (time /paints), time at anchor.
- Speed & % of ballast time(current shipping market).
- Low speed ➔reduced CO2 but higher NOx
- IMO formula: handymax in ballast is better from a capesize with full cargo. How much is the EEOI of a "mother ship" (STS transfer)?
- Need to work in a way that will not have any negative impact to the environment and the industry.

# Thank You