

**SUS07**

## **Analysis of emission reduction strategies for bulk shipping**

Ching-Chih Chang, Ming-Lin Huang, Chien-Hsing Li  
National Cheng Kung University, Tainan, Tainan, Taiwan

### **Abstract**

The study analyzes emission reduction strategies based on current scenarios and the use of alternative fuels. It examines the lifecycle greenhouse gas emissions of four types of bulk carriers from 2025 to 2050, aiming to achieve the IMO (2023) targets of reducing emissions by 20% and 70% by 2030 and 2040, respectively, compared to 2008 levels, and reaching net zero emissions by 2050. According to the results, scenario two generates lower emissions compared to scenarios one and the baseline scenario. From a lifecycle perspective, the emissions in 2030, 2040, and 2050 under scenario two are as follows (in million tonnes of CO<sub>2</sub>e): Handysize 76.18, 47.71, 29.53; Supramax 146.74, 89.71, 60.22; Panamax 90.16, 55.91, 36.8; Capesize 129.14, 78.77, 53.07. Additionally, cost analysis shows that paying for natural carbon sinks is more cost-effective than solely paying for carbon permits. In the scenario with the lowest greenhouse gas emissions (scenario two), the costs for natural carbon sinks (seagrass) in 2030, 2040, and 2050 are 17.57, 13.87, and 12.31 billion US\$, respectively, which are lower than those in scenario one and the baseline scenario. The results of this study demonstrate the importance of promptly adopting alternative fuels and the cost-effectiveness of using blue carbon for marine conservation and reducing greenhouse gas emissions.

### **Conference Track**

Sustainability Issues in Decision Making