

# Carbon Footprint Study for the Asia to North America Intermodal Trade 2011

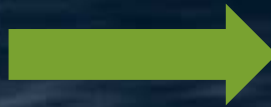


Port of Seattle  
Where a sustainable world is headed.™



# Overview

- Herbert Engineering Corp.
- Compares carbon emissions : Port of Seattle and other West and East coast ports
- Herbert study 2009



updated 2011

•Cargo movement from Asian Ports

•Key destinations

•Different vessels sizes

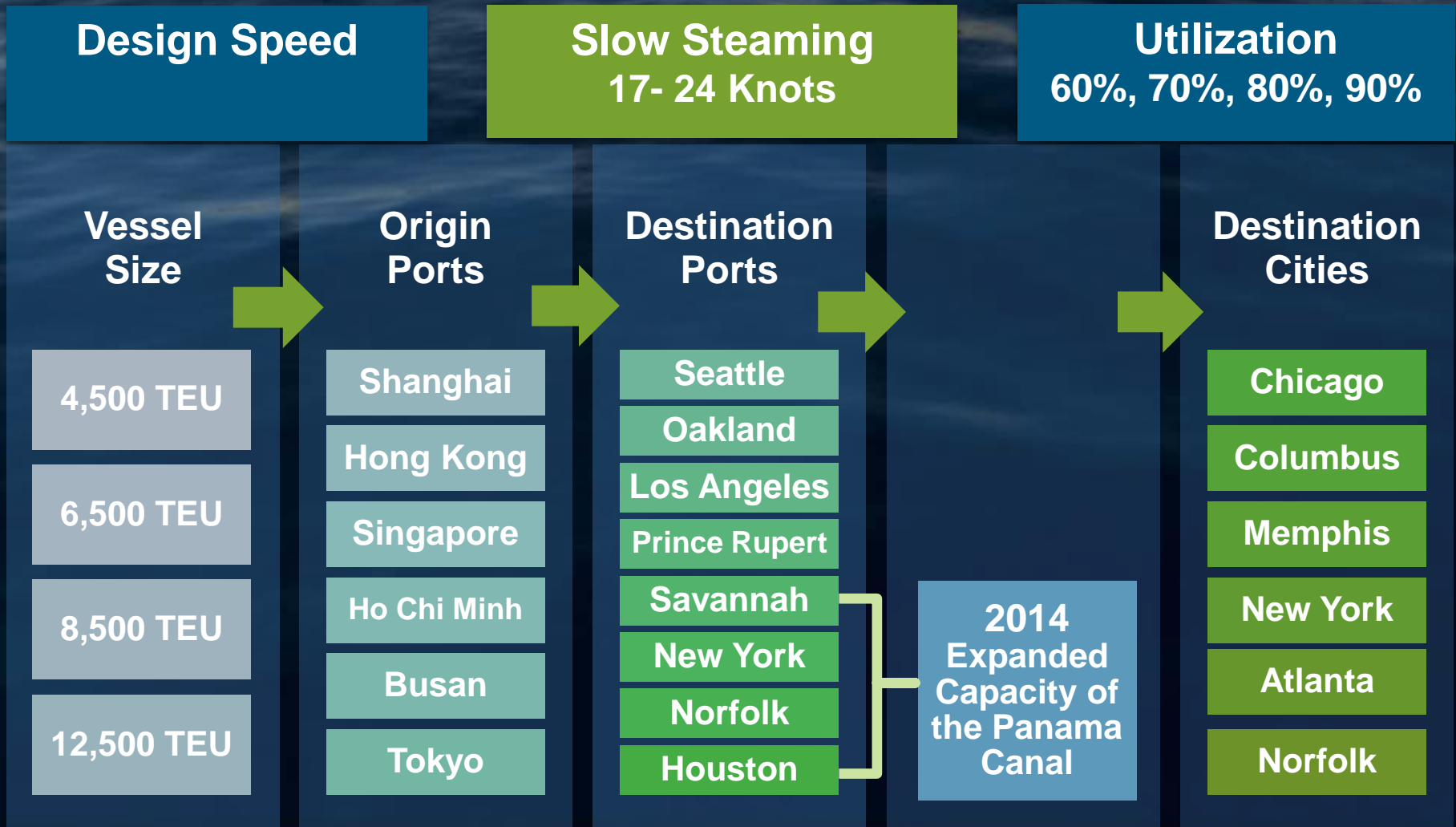
•Slow Steaming

•Additional origins and destinations

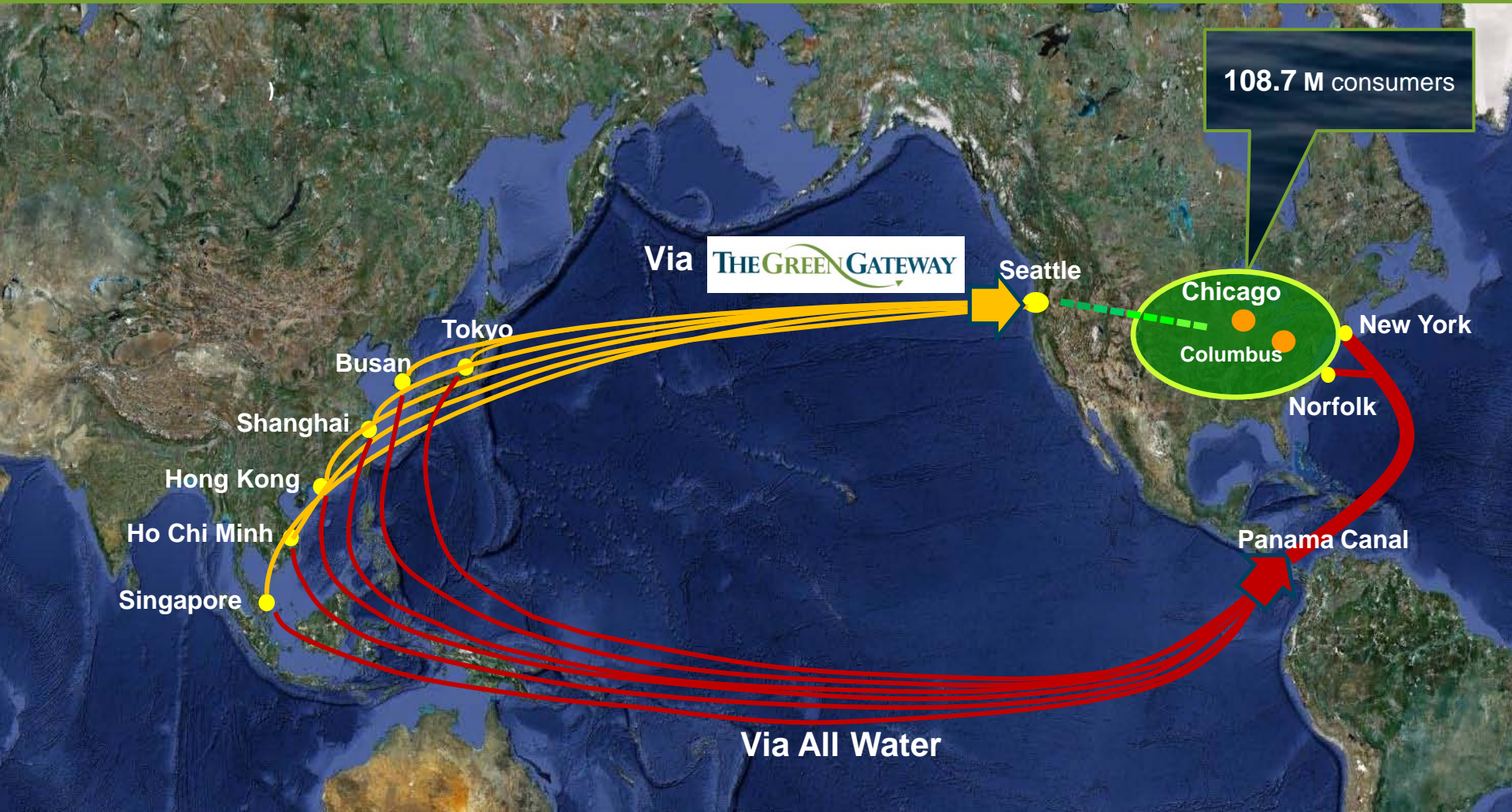
•Capacity Utilization

- Ship Parameters
- Routes
- Comparisons and Example
- Results
- Seattle Advantages
- Conclusion

# Ship Parameters



# Asian ports to the Midwest through Seattle and the Panama Canal

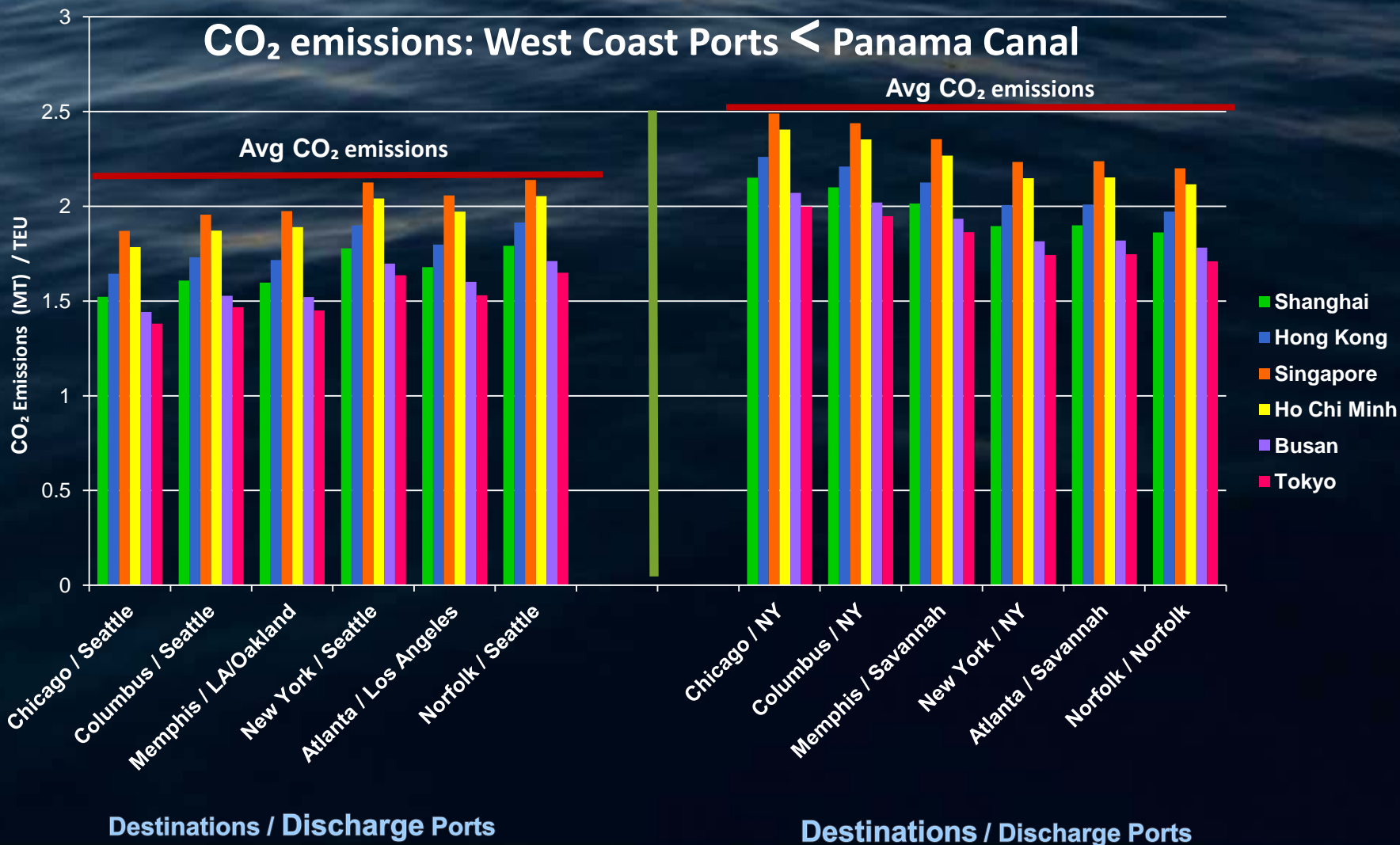


# West Coast Ports and Panama Canal Performance 8,500 TEU Container Ship

Via WEST COAST

Via PANAMA CANAL

## CO<sub>2</sub> emissions: West Coast Ports < Panama Canal



# Seattle and Panama Canal Performance

## 8,500 TEU Container Ship

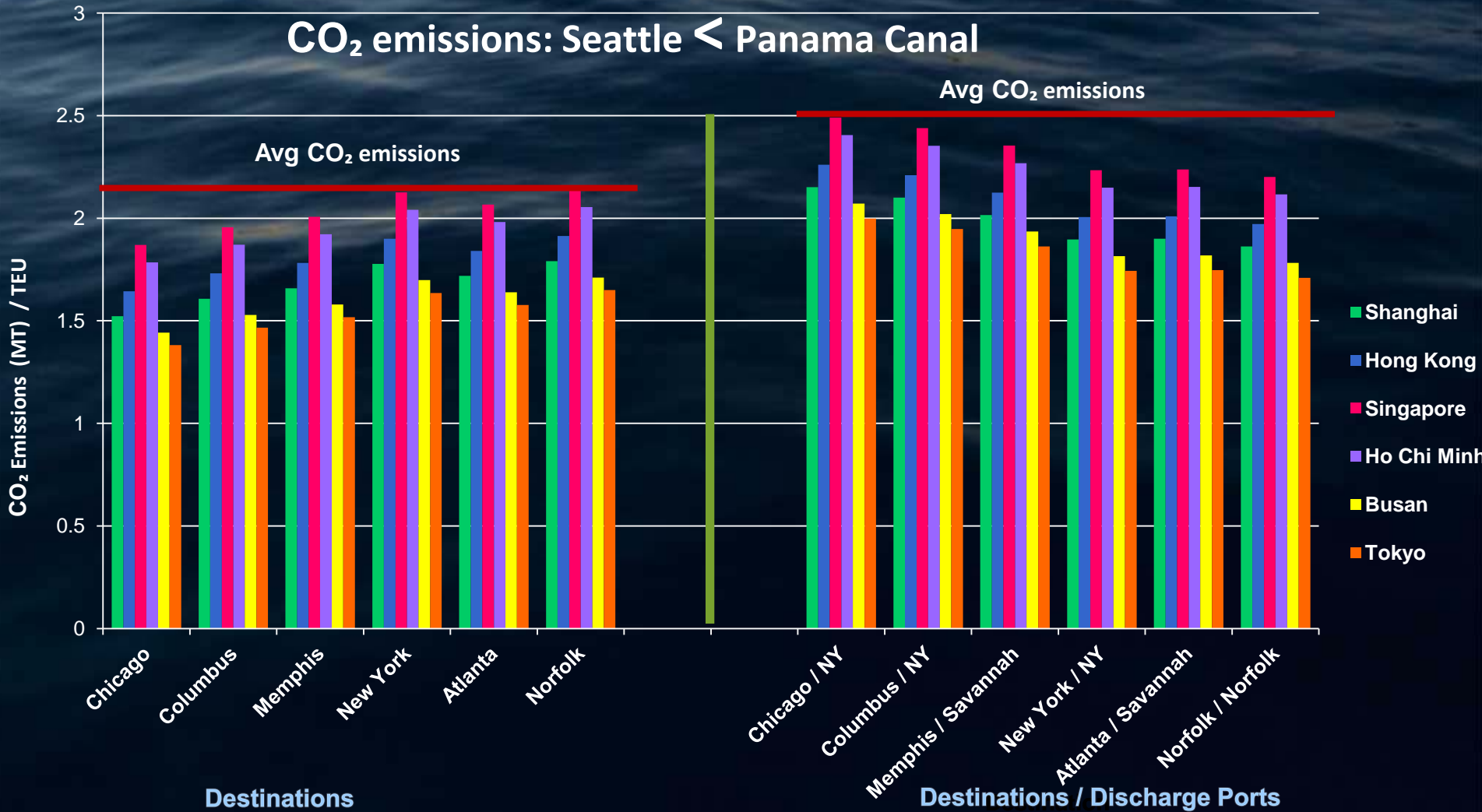
Via SEATTLE

Via PANAMA CANAL

CO<sub>2</sub> emissions: Seattle < Panama Canal

Avg CO<sub>2</sub> emissions

Avg CO<sub>2</sub> emissions

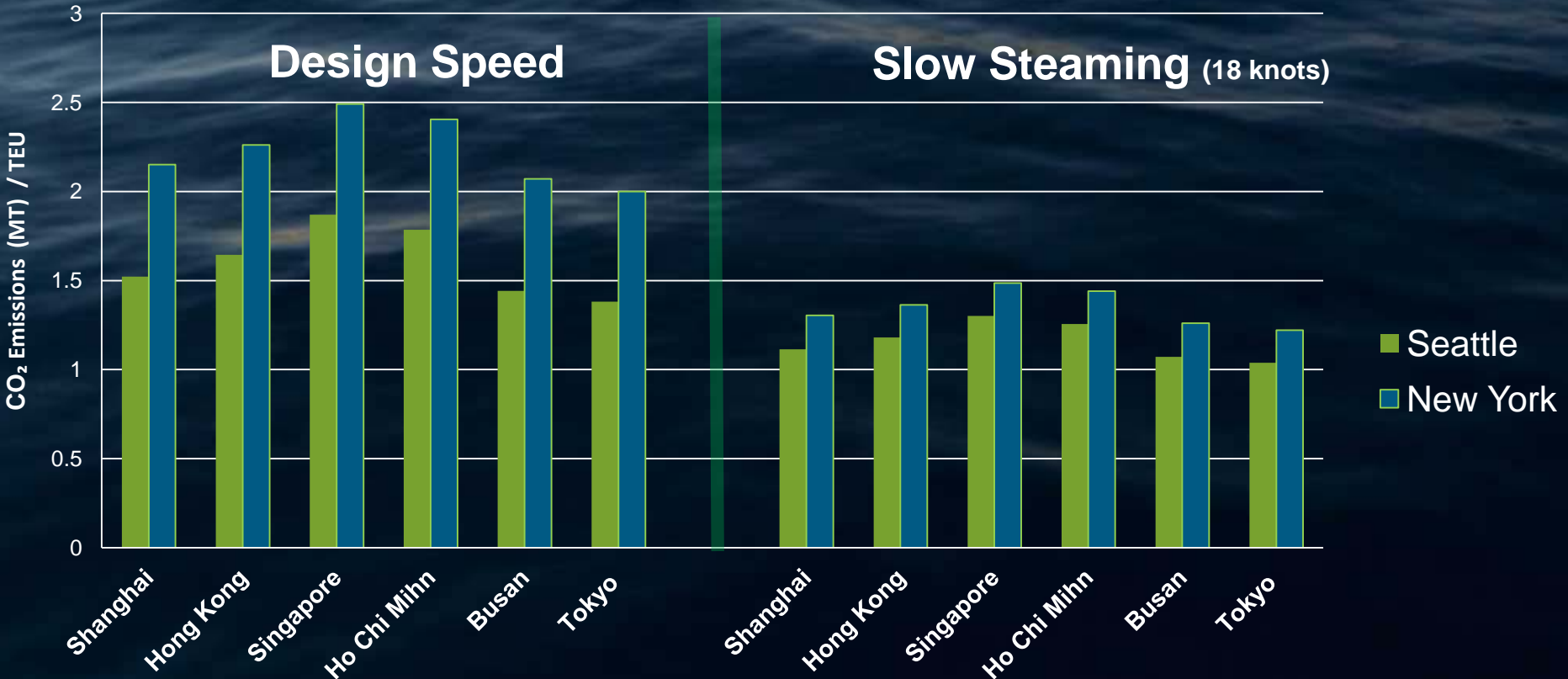


# Asian Ports to Chicago via Seattle and New York through Panama Canal

8,500 TEU Container Ship

Design Speed

Slow Steaming (18 knots)



Origin Ports to Chicago

# General Results

Travelling at design speed / 8,500 TEU

## West Coast Ports have significant carbon footprint advantages

| Origin Port | Destination | Lowest Emission     |
|-------------|-------------|---------------------|
| Shanghai    | Chicago     | Seattle             |
|             | Columbus    | Seattle             |
|             | Memphis     | Los Angeles         |
|             | New York    | Seattle             |
|             | Atlanta     | Los Angeles         |
|             | Norfolk     | Seattle             |
| Hong Kong   | Chicago     | Seattle             |
|             | Columbus    | Seattle             |
|             | Memphis     | Los Angeles         |
|             | New York    | Seattle             |
|             | Atlanta     | Los Angeles         |
|             | Norfolk     | Seattle             |
| Singapore   | Chicago     | Seattle             |
|             | Columbus    | Seattle             |
|             | Memphis     | Oakland             |
|             | New York    | New York/Suez Canal |
|             | Atlanta     | Savannah/Suez Canal |
|             | Norfolk     | Norfolk/Suez Canal  |

| Origin Port | Destination | Lowest Emission     |
|-------------|-------------|---------------------|
| Ho Chi Minh | Chicago     | Seattle             |
|             | Columbus    | Seattle             |
|             | Memphis     | Oakland             |
|             | New York    | New York/Suez Canal |
|             | Atlanta     | Los Angeles         |
|             | Norfolk     | Norfolk/Suez Canal  |
| Busan       | Chicago     | Seattle             |
|             | Columbus    | Seattle             |
|             | Memphis     | Los Angeles         |
|             | New York    | Seattle             |
|             | Atlanta     | Los Angeles         |
|             | Norfolk     | Seattle             |
| Tokyo       | Chicago     | Seattle             |
|             | Columbus    | Seattle             |
|             | Memphis     | Los Angeles         |
|             | New York    | Seattle             |
|             | Atlanta     | Los Angeles         |
|             | Norfolk     | Seattle             |