1. CLIMATE CHANGE AND MARITIME TRANSPORT CONTEXT

2. STM – AREAS OF ENVIRONMENTAL IMPACT REDUCTION

3. STM EMISSIONS VALIDATION METHOD AND SCENARIOS
   - Just-in-Time Arrivals Case

4. CONCLUSIONS
DEEP DIVE ENVIRONMENT

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CLIMATE CHANGE AND MARITIME TRANSPORT CONTEXT

- 2016 warmest year on record since 1880
- 2017 fastest Artic sea ice melt down
- Sea level increases at a rate of 3.4 mm/year, the highest in 2,000 years
- 21.5 million people displaced since 2008 due to climate change
- Earth’s yearly resources are progressively consumed early (October in 2001, August in 2017).


Source: NASA
CLIMATE CHANGE AND MARITIME TRANSPORT CONTEXT

- Maritime transport emits around 1,000 million tonnes of CO₂ annually and is responsible for about 2.5% of global greenhouse gas emissions (3rd IMO GHG study).

- Shipping emissions are predicted to increase between 50% and 250% by 2050 – depending on future economic and energy developments.

World cargo fleet fuel consumption, 2017. Source: DNV GL
In April 2018, IMO's Marine Environment Protection Committee (MEPC) adopted an initial strategy on the reduction of greenhouse gas emissions from ships, setting out a vision to reduce GHG emissions from international shipping and phase them out, as soon as possible in this century.

The initial strategy envisages for the first time a reduction in total GHG emissions from international shipping to reduce the total annual GHG emissions by at least 50% by 2050 compared to 2008, while, at the same time, pursuing efforts towards phasing them out entirely.
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STM Areas of Environmental Improvement

- Fuel Consumption
- GHG and Pollutant Emissions
- Marine Pollution
- Environmentally Sensitive Areas
1. CLIMATE CHANGE AND MARITIME TRANSPORT CONTEXT

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1. Collection of AIS reported data of 36 selected STM Ships (1st June 2017 – 31st May 2018)

2. Development of tailor-made scripts to process AIS data
   - Distances
   - Turnaround times
   - Navigation phases

3. Calculation of GHG and pollutant emissions following the ICCT Methodology*

4. Results Obtained:
   - Calculation of navigation and port operations times
   - Estimates of Fuel Consumption
   - Estimations of GHG Emissions

DEEP DIVE ENVIRONMENT

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JUST IN TIME ARRIVALS CASE

Just in Time Arrivals – Current Situation

Waiting time during navigation  Anchorage time  Waiting time until departure
JUST IN TIME ARRIVALS CASE

SCENARIO 1

Port Call Synchronisation (early stage)

NEW ETA

RTA (Recommended Time of Arrival)

ETA

Speed adjustment

Reduced waiting time during navigation

Reduced anchorage time

Waiting time until departure

7.63% CO₂

9.24% NOₓ

10.86% SO₂

10.86% PM

*% Reduction compared to 2018 values
JUST IN TIME ARRIVALS CASE

SCENARIO 2

Port Call Synchronization (full stage) + Port Call Optimisation (early stage)

NEW ETA

RTA (Recommended Time of Arrival)

ETA

Port Call Synchronisation

Reduced waiting time until departure

19.04 %  20.86 %  20.24 %  20.66 %

CO₂  NOₓ  SOₓ  PM

*% Reduction compared to 2018 values
JUST IN TIME ARRIVALS CASE

SCENARIO 3
Port Call Synchronization (full stage) + Port Call Optimization (full stage)

NEW ETA

RTA (Recommended Time of Arrival)

ETA

Port Call Synchronization

20.45 %
CO₂

22.13 %
NOₓ

20.94 %
SOₓ

21.46 %
PM

Port Call Optimization

*% Reduction compared to 2018 values
DEEP DIVE ENVIRONMENT

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4. CONCLUSIONS
CONCLUSIONS - DEEP DIVE ENVIRONMENT

SCENARIO 1
- CO₂: 7.63%
- SOₓ: 10.86%

SCENARIO 2
- CO₂: 19.04%
- SOₓ: 20.24%

SCENARIO 3
- CO₂: 20.45%
- SOₓ: 20.94%

GHG (2008): 50%