

MARITIME

# MarPol Annex VI - ECA Compliance Options

USCG Sector Puget Sound

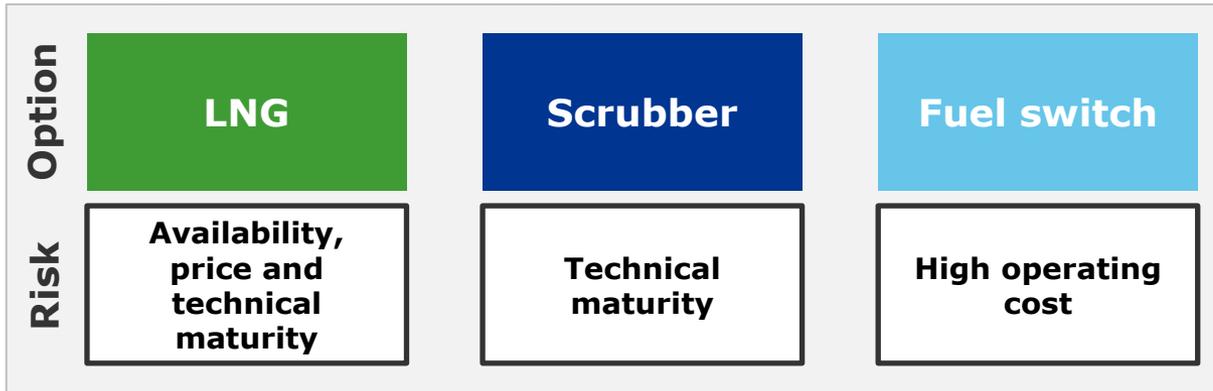
International Shipping Industry Forum

2014-10-09

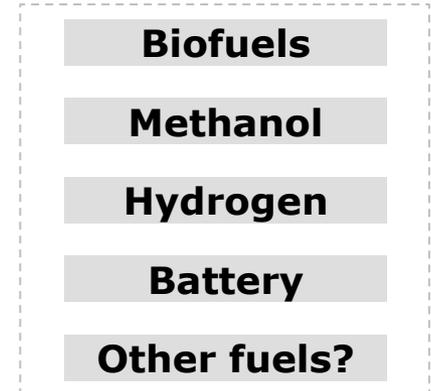
# **ECA Compliance Ship Retrofit Solutions**

# There are different options for dealing with ECAs, each with unique risk aspects making investment decisions difficult

## Main options for most ships:



## Alternative options:



The least expensive investment may be the most expensive option in the long run.

# LNG as fuel

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A proven and available solution

Reduces NO<sub>x</sub>, SO<sub>x</sub>, PM, CO<sub>2</sub>

Comply with EEDI

Particularly suitable for fixed trading routes

Can give supreme NPV

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Additional CAPEX needs

LNG tank steals space onboard

Inadequate LNG bunkering grid

Lagging 2-stroke market

Additional crew training and certificates

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LNG fuel prices?

De-coupling of LNG price from oil price?

Price pressure from land based LNG consumers?

Rate of bunker grid expansion

Development of space-efficient LNG tanks

Dual fuel vs mono fuel engines?

# Scrubber

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Often the most cost-effective solution

Very efficient SO<sub>x</sub> (and PM) removal under right conditions

No need for new fuel tanks, new fuel supply routines etc

Well established theory, long track record

Easier to refit than LNG

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Space requirements, structure & stability

Quite extensive integration with ship

Requires operator's attention and maintenance

Fuel penalty

Does not help meeting new NO<sub>x</sub> demands 2016 newbuilds

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Ability to perform in all operating modes ?

Capability of operating in series with NO<sub>x</sub> abatement technology and exhaust gas boilers

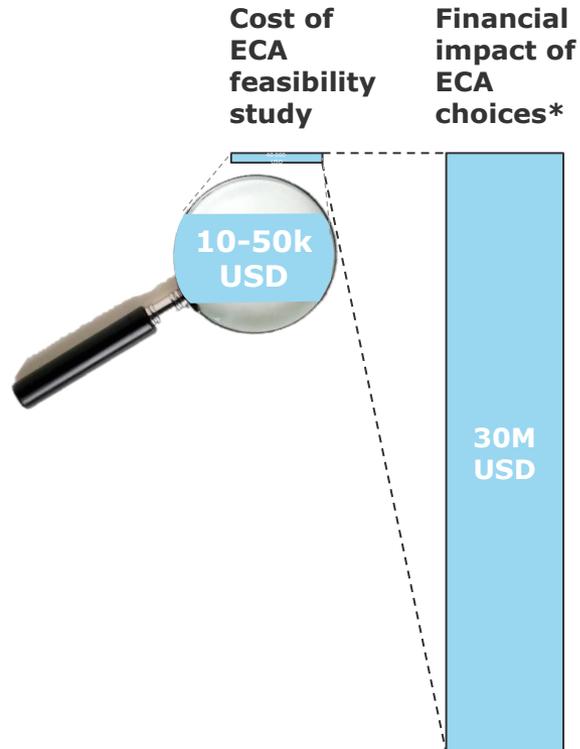
Sludge production and disposal, Port State Controls in this regard

How to prove compliance (air/sea) ?

Manufacturer and installation capacity?

# An ECA decision support study will help you make the right choice

## Cost of study compared to cost of making the wrong choice



**\*NPV of costs over 15 years operation for a container ship**

DNV GL strongly recommends clients to perform an ECA decision support study for all relevant chartered or owned ships

## Why involve DNV GL in such a study?

- An independent opinion
- Technical and financial insight
- Insight on scrubber technology and costs obtained through detailed technology qualification studies for suppliers and end users
- Competence and network on LNG as fuel, both technical solutions, performance, operational experience, and LNG availability and pricing
- Financial decision support tool for comparing the attractiveness of ECA compliance solutions

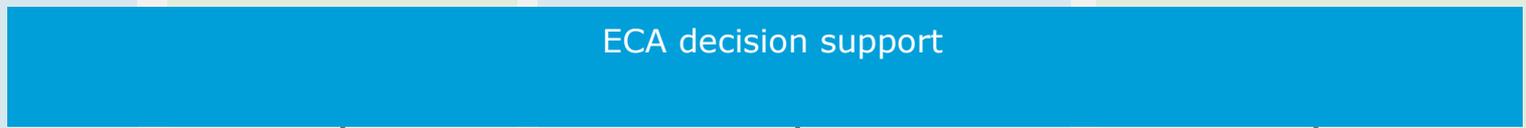
**MGO**

**Scrubber**

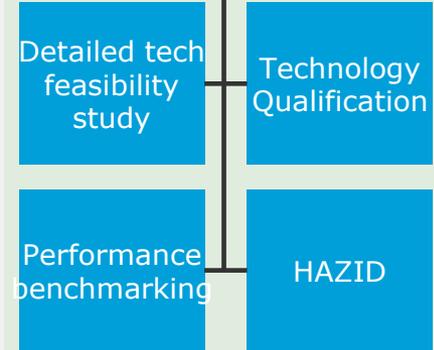
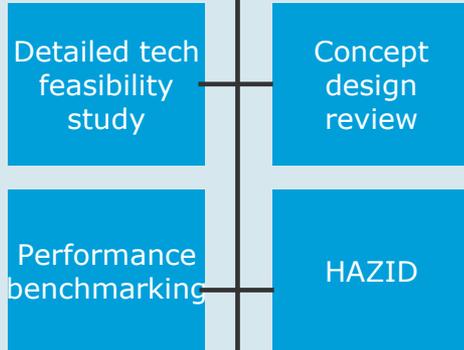
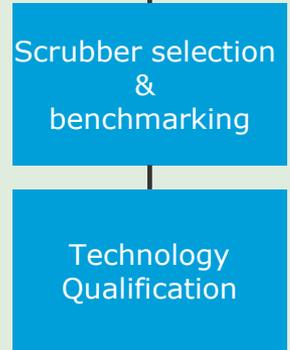
**LNG**  
(LNG Ready service)

**Other**  
(Methanol, Battery  
++)

Strategy -  
Fuel decision



Concept  
& Technology



Initial design



Risk  
assessment



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