

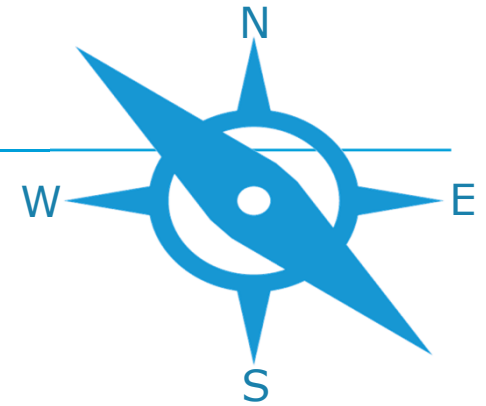


MARITIME

# Regelverk for miljøteknologi

**Linda Sigrid Hammer**

13 September 2017



**Background for cleaner shipping**

**Safety challenges**

**Development and status of regulatory framework**

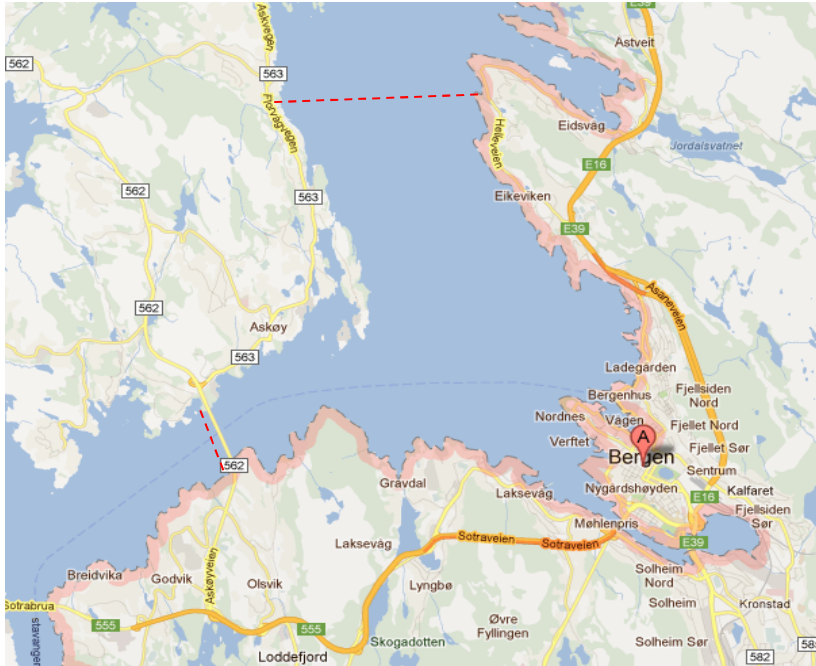
## Emissions from shipping

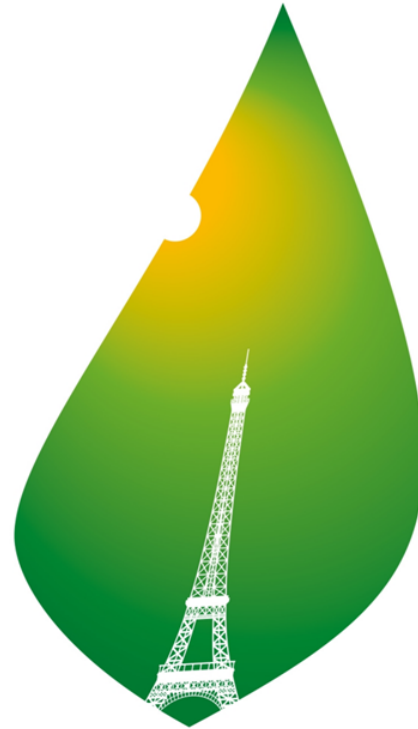
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- Exhaust gas emissions from shipping are significant contributors to climate change and air pollution problems.
- Sulphur oxides ( $\text{SO}_x$ )
- Nitrogen oxides ( $\text{NO}_x$ )
- Particulate matters (PM)
- Carbon dioxides ( $\text{CO}_2$ )



# Local emissions

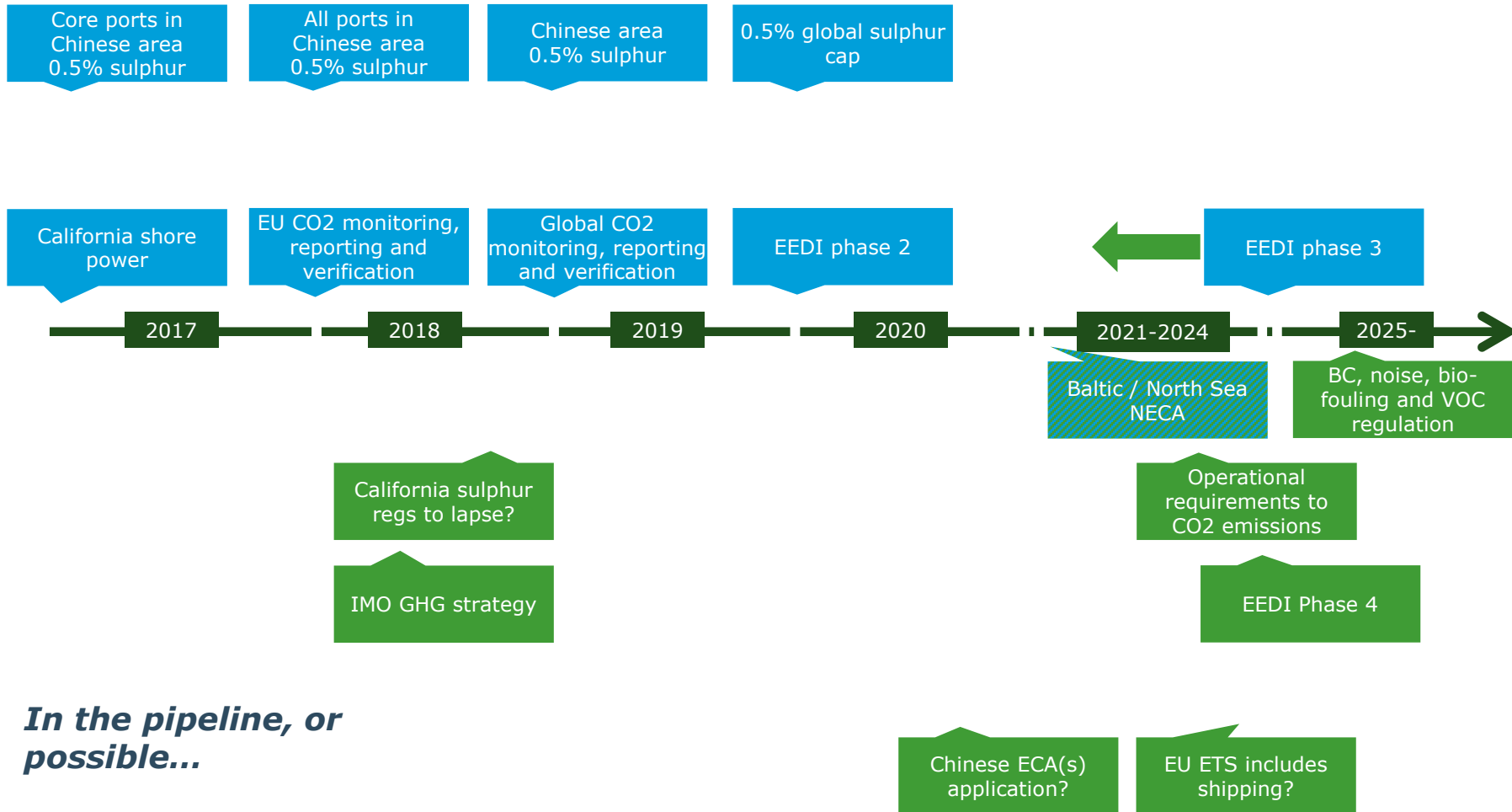




COP21 • CMP11  
**PARIS 2015**  
UN CLIMATE CHANGE CONFERENCE

# Environmental regulations - Timeline towards 2030

## Adopted



# Strategies for cleaner shipping



## Alternative fuels

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- **Liquefied Natural Gas (LNG)**
- **Methyl-/Ethyl- alcohol fuels**
- **Hydrogen**
- Liquefied Petroleum Gas (LPG)

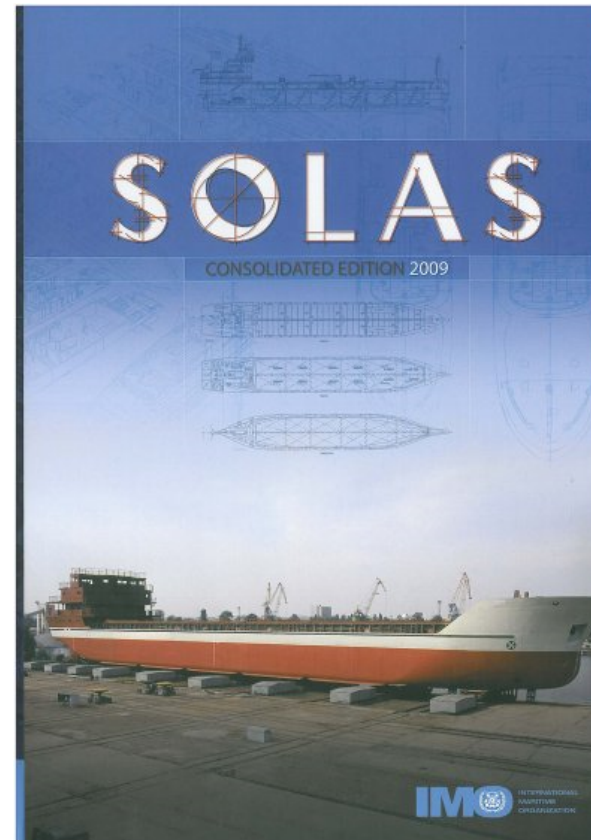
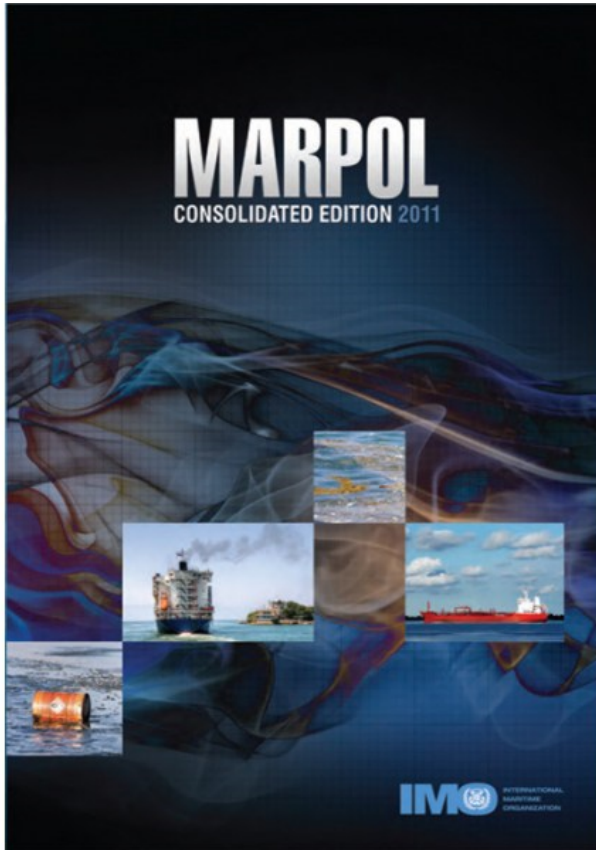


# Safety challenges



# Development and status of regulatory framework

# International conventions

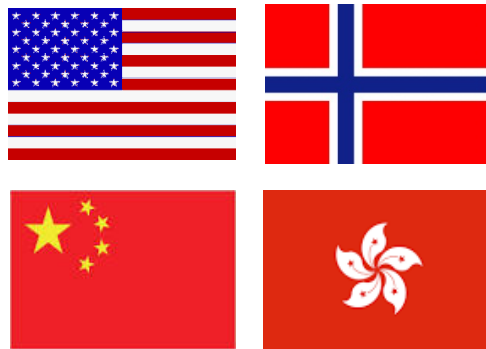


# Regulatory framework

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International regulations



National/regional regulations



Class rules

## National regulations for gas fuelled ships



- **January 2000: Car ferry Glutra delivered**
  - Political push for use of LNG in Norway
  - Road Directorate wanted to test the use of clean LNG fuel
  
- **How to approve this novel design?**
  - Draft national regulations
  - Applied applicable parts of rules for Liquefied Gas Carriers, e.g. piping, tank certification etc.
  - Used class notes and certification notes for gas fuelled engines



# Class rules for gas fuelled ships



Source: Eidesvik (Brand Central, origin 2010-11-23)



RULES FOR  
CLASSIFICATION OF

**SHIPS**

NEWBUILDINGS

SPECIAL EQUIPMENT AND SYSTEMS  
ADDITIONAL CLASS

PART 6 CHAPTER 13

## **GAS FUELLED ENGINE INSTALLATIONS**

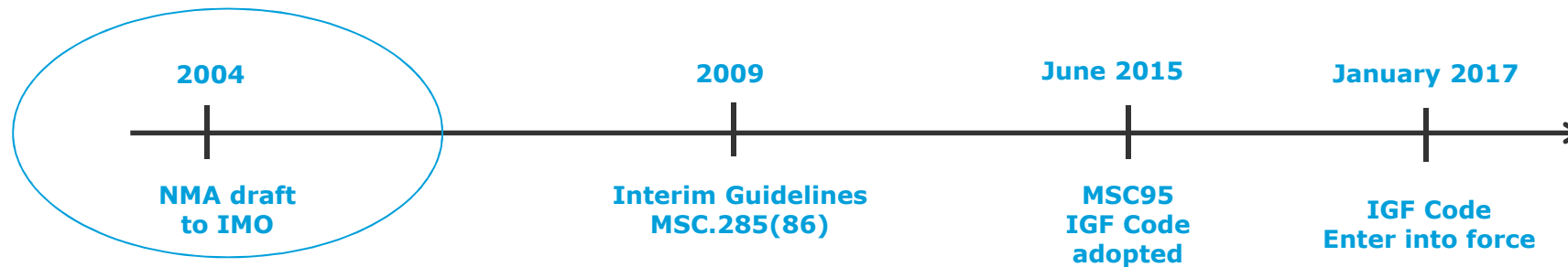
JANUARY 2001

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## Development of international regulations

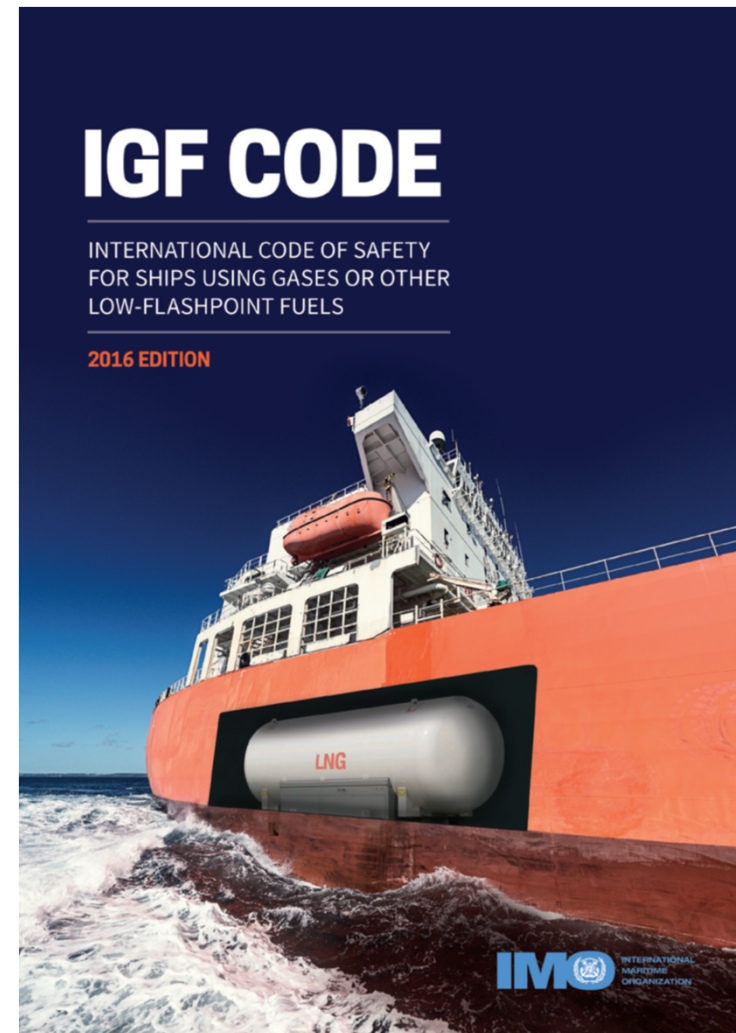


- The process for development of an International Code for gas fuelled ships in IMO was initiated by the Norwegian Maritime Authority (NMA) in 2004

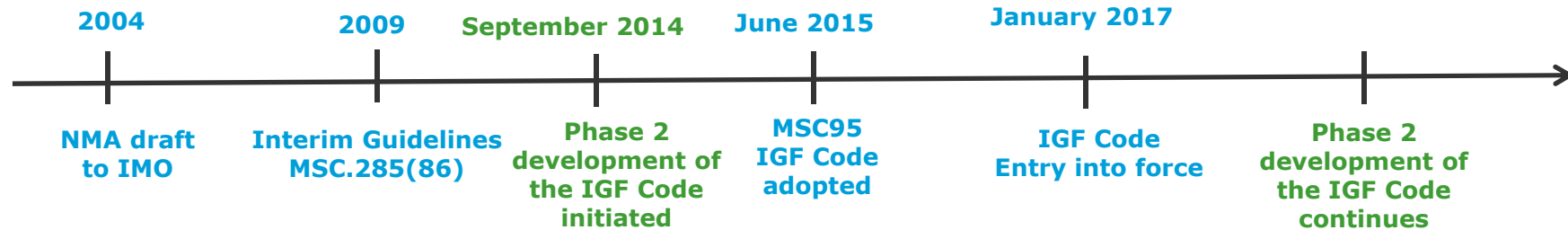


## International Regulations

- The IGF Code entered into force 1 January 2017
- Mandatory for all ships using gas and other low flashpoint fuels
- Detail requirements for natural gas (LNG, CNG)
- Other low flashpoint fuels allowed, approval based on alternative design approach



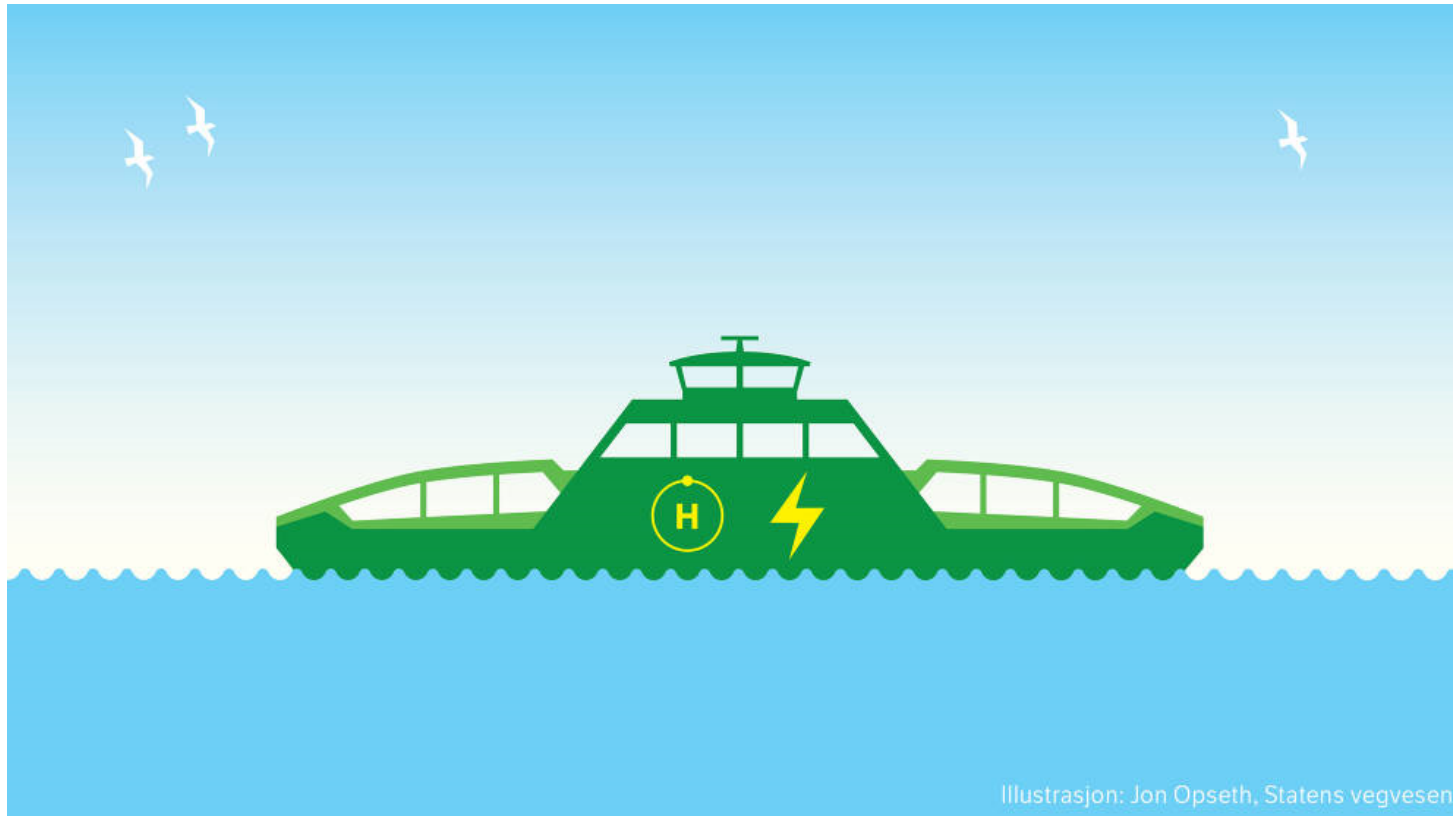
## Development of international regulations



- The development of international regulations for low flashpoint fuels continues in IMO by a phase 2 development of the IGF Code.
- More detailed provisions for **methyl/ethyl alcohol fuels** and **fuel cells** is currently under development in IMO correspondence group reporting to IMO Subcommittee CCC.

## Next step: Hydrogen as fuel

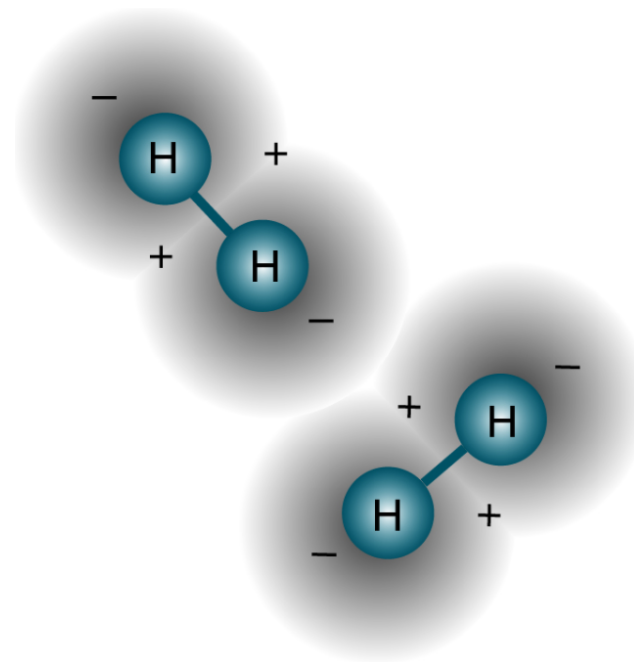
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## Regulatory status – hydrogen as fuel

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- The IGF Code does not provide specific design requirements for fuels other than natural gas (LNG, CNG).
- When e.g. hydrogen is used as fuel, the **IGF Code Part A** requires that an “**Alternative design**” approach is followed.



## IGF-Code Part A:

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### **Functional requirements**

- The safety, reliability and dependability of the systems shall be equivalent to that achieved with new and comparable conventional oil-fuelled main and auxiliary machinery.
- 17 additional functional requirements follow, which shall be fulfilled through the ship design.
  - It is emphasized that operation procedures shall not replace safety barriers through the ship design.

## IGF-Code Part A:

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- **Risk assessment:**

- A risk assessment shall be conducted to ensure that risks arising from the alternative design are addressed.
- It is important to note that safety barriers that are acknowledged for natural gas, might not be accepted for use for hydrogen as fuel.

- **Limitation of explosion consequences**

- There are requirements to the consequences of explosions in the rooms that contain leakage points.

# Class rules – preparing for a more complex fuel mix in the future

DNV-GL	DNV-GL	DNV-GL	DNV-GL	DNV-GL
<p><b>RULES FOR CLASSIFICATION</b></p> <p>Ships</p> <p>Edition January 2017</p>	<p><b>RULES FOR CLASSIFICATION</b></p> <p>Ships</p> <p>Edition January 2017</p>	<p><b>RULES FOR CLASSIFICATION</b></p> <p>Ships</p> <p>Edition January 2017</p>	<p><b>RULES FOR CLASSIFICATION</b></p> <p>Ships</p> <p>Edition January 2017</p>	<p><b>RULES FOR CLASSIFICATION</b></p> <p>Ships</p> <p>Edition January 2017</p>
<b>Main Class</b>	<b>Gas Fuelled</b>	<b>LFL Fuelled</b>	<b>Fuel Cells (FC)</b>	<b>Battery Power</b>
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<p>Heavy fuel oil</p> <p>Marine diesel oil</p> <p>Low sulphur diesel</p>	<p>LNG</p> <p>CNG</p> <p>LPG</p> <p>Hydrogen</p>	<p>Methanol</p> <p>Ethanol</p> <p>Low flashpoint oil fuels</p>		

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