

# Non-Road Mobile Machinery (NRMM) Directive and implication to the inland shipping Challenges, solutions & outlook for different technologies

Vienna, 7 March 2019

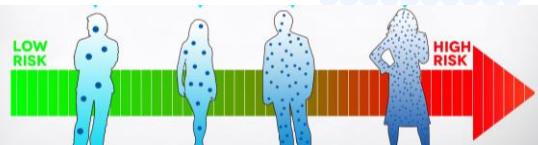
European Inland Barging Innovation Platform (EIBIP)



# NRMM Stage V: Regulations



# NRMM Stage V: The Task



IWP, IWA engines		Reg (EU) 2016/1628					
emissions in g/kWh		CO	NOx	HC	PM	PN	A
19-75 kW	5,0	$\Sigma: 4,7$	0,3	-	-	6,0	
75-130 kW	5,0	$\Sigma: 5,4$	0,14	-	-	6,0	
130-300 kW	3,5	2,1	1,00	0,1	-	6,0	
>300 kW	3,5	1,8	0,19	0,015	$1 \times 10^{-12}$	6,0	

# NRMM Stage V: IWW Engines



Authorized engines for inland navigation  
- IWP en IWA  
- NRE  
- EURO VI

Source EC presentation

# NRMM Stage V: Reference Fuels

Fuels for testing compression-ignition engines:

- Diesel (non-road gas-oil)
- Ethanol for dedicated compression ignition engines (ED95)

Fuels for testing spark ignition engines:

- Petrol (E10)
- Ethanol (E85)

Gaseous fuels for single-fuel and dual-fuel engines:

- LPG
- Natural Gas/ Biomethane

# NRMM Stage V: Transition Periode

## Engines of categories IWP & IWA

(1)  $\geq 300 \text{ kW}$  one year later  
(2) inclusive of after-treatment (if applicable)

	Prior Stage		Stage V		
		2018 <sup>(1)</sup>	2019 <sup>(1)</sup>	2020 <sup>(1)</sup>	2021 <sup>(1)</sup>
Engine	Non-transition engine - production and placing on the market <sup>(2)</sup>				
	Transition engine - production <sup>(2)</sup>				
	Transition engine - placing on the market				
Vessel	Vessel with non-transition engine - production and placing on the market				
	Vessel with transition engine - production				
	Vessel with transition engine - placing on the market				

Source FAQ CESNI/PT

# NRMM Stage V: In Practice



## NRE marinisation



Rules for classification

# NRMM Stage V: In Practice

## EURO VI marinisation

ms. Noord  
2 x MX11-210 kW propulsion  
Installed April- 2017



ms. IJmeer  
2 x MX 11 -240 kW Propulsion  
Installed March 2018



ms. Liane  
1 x MX11 – 240 Propulsion  
Installed April 2018



ms. Wantij  
2 x MX13 – 355 kW Propulsion  
Installed June 2018



ms. Airstet  
2 x MX 11 – 240 propulsion  
2 x MX 11 – 270 pump drive  
1 x MX 11 – 320 generator  
Installed July 2018



TNO



RDW

# NRMM Stage V: In Practice

IWP/IWA



ENGINE PRODUCT & SERVICE ANNOUNCEMENTS

## CATERPILLAR MARINE ANNOUNCES DEVELOPMENT OF NEW IWW SOLUTIONS FOR EU STAGE V

PRODUCT & SERVICE NEWS

See the latest product and engine announcements from Caterpillar.

CATERPILLAR MARINE TO DEVELOP NEW SOLUTIONS FOR EU V INLAND WATERWAY VESSELS

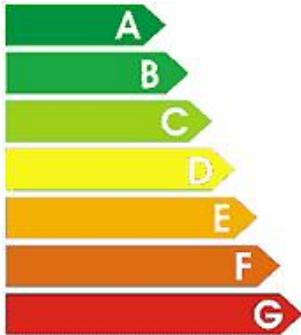
# NRMM Stage V: Meet (not Comply)

IWP/IWA



# NRMM Stage V: Performance Label

Performance Label: Air&Climate for the existing the fleet  
Onboard Monitoring / Meriodic Measurements



**GREEN AWARDS**



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Khalid Tachi

Phone: +31 10 798 98 30

E-mail: [info@eibip.eu](mailto:info@eibip.eu)

[www.eibip.eu](http://www.eibip.eu)