## **Objectives / Expected results**

To develop **engines able to switch between fuels**, whilst operating in the most cost effective way and complying with the regulations in all sailing regions. WP Leader: Andreas Schmid DWP leader: Kaj Portin

- **Development** of a **fuel injection system** for multi fuel purposes
- Demonstration of fuel flexible engine operation

WP 1



## **Results & Achievements of Past Period Month 30-35**

- Commissioning of Injection test rig finished with water
- Detailed safety concept ready for ethanol testing: Currently under evaluation
- First tests with injectors performed with water: The injectors proved to work as expected
- Deliverable D1.3 "Multi-fuel injection system" submitted







Amsterdam 14th March 2018

### **Results & Achievements of Past Period Month 30-35**





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#### **Results & Achievements of Past Period Month 30-35**







## **Future Work**

<ul> <li>Further testing and optimisation of the injector</li> </ul>	(M35)
<ul> <li>Fuels variation tests on Spray Combustion Chamber</li> </ul>	(M35)
<ul> <li>Installation of new injection equipment on the test engine</li> </ul>	(M36)
<ul> <li>Commissioning and validation of engine with fuel flexible injection system</li> </ul>	(M37)



# **Objectives of Work Package**

• To develop **engines able to switch between fuels**, whilst operating in the most cost effective way and complying with the regulations in all sailing regions. DWP Leader: Kaj Portin

#### How

<u>Measurement technology for intermediate</u> <u>combustion products</u> formed inside the combustion chamber will be developed and tested.

The impact of <u>switching between different</u> <u>fuels</u> on possible after-treatment devices and engine components will be part of the investigations.

## **Expected Results**

A fully fuel flexible <u>optical injection and</u> <u>ignition test platform</u> for low-speed Diesel engines will also be produced. A fully <u>optical medium-speed multi-fuel engine</u> will be developed and tested for the first time.

Partners:



# Main results achieved during Months 30-35

- Wärtsilä Finland
- Gas online measurement equipment installed
- at Toftlund power plant. Data gathering started in October 2017
- •Master thesis started in January 2018.
- Alternative supplier tested in February in

laboratory with different gas mixes.



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## Main results achieved during Months 30-35

- In-cylinder combustion studies at VEBIC on a Wärtsilä 4L20 for Deliverable 1.8.
- The fuels tested are LFO, circulation-origin MGO, Kerosene, and a blend of renewable naphtha and LFO
- Performance and emissions measurements are conducted, also including the particulate numbers.







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## Deliverables

• Deliverable 1.8. In-cylinder combustions studies with potential new fuels to be reported in May 2018



## **Future Work**

• Finalization of the deliverable 1.8 and final reporting on the project to be done.

