



Engine test bed



## Environmental standards

The EU has recently adopted emission limit requirements for internal combustion engines for non-road mobile machinery (Directive 97/98 / EC, 01/2017) and sets stricter emission limits for waterways. An urgent need has emerged to make emissions from ships less polluting due to environmental standards. Replacing the region's aging fleet with RIVER technology offers the potential for emission reduction.

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<http://www.nweurope.eu/projects/project-search/river-non-carbon-river-boat-powered-by-combustion-engines/>

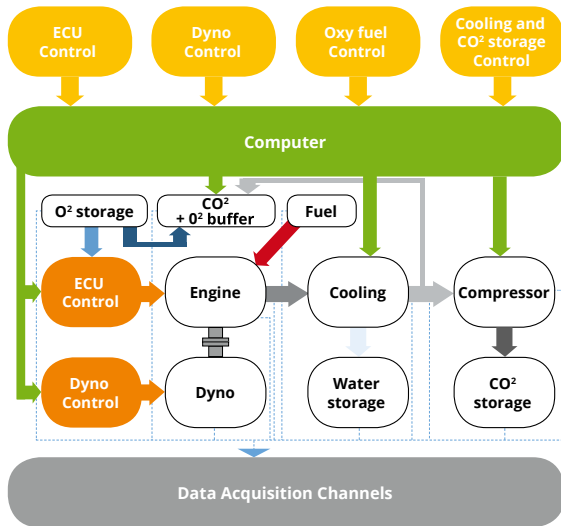
# Interreg North-West Europe RIVER



European Regional Development Fund



## Non-carbon river boat powered by combustion engine



Technical drawing

## Goal

The goal of RIVER is to reduce or eliminate pollutants from engines. 6.600 engines on existing ships will have to be replaced in 2018-2050 and 2.400 ships will come into service. RIVER aims to apply a so-called technology Oxygen fuel combustion for diesel engines and completely eliminates NOx (GHG share). It captures and stores virtually all CO<sub>2</sub> emissions with control that reduces fuel consumption by 15%.

## Aims

The project comprises 9 partners from 5 member states and 5 associated partners experienced in the capture, storage, treatment of CO<sub>2</sub> and waterways. Partners will use the research into engine control from the Interreg 2 Seas project SCODECE and results on IWT from PROMINENT EU project to support their work in RIVER.

This technology will then be tested, demonstrated and shipped on an existing boat operating in the UK. A lab. on a small scale transforming CO<sub>2</sub> into a bio-solvent will be put in place. At the end of the project, the NOx of the equipped vessel will be reduced by 99% (194kg / year), 24 t / y of CO<sub>2</sub> will be avoided and the fuel consumption will be reduced by 1.500l / year. Ten years later, a European campaign through the network linked to this technology will involve waterways operators, National authorities and engine manufacturers aiming for hundreds of boat renovations. The renovation of 300 medium-sized boats is expected, resulting in the reduction of 21.000 t / year CO<sub>2</sub> generating hundreds of direct and indirect jobs.

## Long-term effects

- **When the project ends**
  - CO<sub>2</sub> emissions avoided per year 27 tons
  - NOx emissions avoided per year 194Kg (reduces rates of asthma and other respiratory issues)
  - Saving fuel consumption 1.500 l / year
  - Stored CO<sub>2</sub> is transformed to obtain bio-solvent
  - 1 feasibility study of this technology for large vessels (110m).
- **5 years after the project ends**
  - 15-25 medium size river boats (71 tons of CO<sub>2</sub>/year, 513 kg NOx/year) which will be powered by this technology
  - Will save 1.062 - 1.770 tons of CO<sub>2</sub> emissions per year, with similar engine efficiency
  - NOx emissions avoided per year 8-13 tons
  - 15-25 direct and indirect jobs : retrofitting the boats.
- **10 years after the project ends**
  - At least 300 various size ships/boats will be equipped with the technology, then saving up to 20.000 tons CO<sub>2</sub> emissions annually. This technology can be applied to other sectors : heavy duty vehicles, with appropriate space for a tank and oxyfuel combustion for power generation plants.