

# **Final Report**

**Project acronym: *GreenCOAT***

**Project number: *4153***

**M-ERA.NET Call 2016**

**Period covered: 01/08/2017 to 31/12/2020**

## **Publishable project summary**

GreenCOAT project focuses on the *design of a novel high-performance green DLC coating contact interface, enabled through new advanced DLC coatings deposition technology, tailored for harmless ionic liquid lubrication technology that satisfies strict requirements on greenhouse emissions* and is indispensably required for future heavy-loaded lubricated mechanical components in transportation and industrial systems. Namely, current UN, EU, and national emission legislations already restrict some of today's key lubricants, but new solutions are not yet available. If new green interface lubrication is not developed soon - before implementation of regulation, the machinery performance will greatly deteriorate and cause massive technical, economic, and social consequences. In this project, we thus developed innovative DLC coatings tailored for chemical activity with the ionic liquids, employ unique *in-situ* ionic liquid-DLC adsorption and simultaneous tribological study, establish the boundary film adsorption kinetics, reveal their electrochemical and tribocorrosion behaviour, perform detailed (sub)nano-scale surface characterisation and full-scale green interface validation in the heavy-duty fluid-power hydraulics system.

---

### **3.1. Summary of main results and conclusions**

#### *Summaries the results and main conclusions achieved during the whole project duration*

The beneficial operation of lubricants strongly depends on their ability to form protective layers, achieved by lubricant additives, which should comply with tough UN, EU, and national restrictions related to greenhouse-gas emissions. Diamond-like-carbon (DLC) coatings constitute very prosperous solutions for providing anti-wear and low-friction properties in many applications.