ENERGETICS

DENERG - Solutions for motorised access and mobility in geofenced urban areas with low environmental impact, local and global: from calculation to test fields

Funded By	Dipartimento DENERG BLUE ENGINEERING S.R.L. [P.iva/CF:06791840017]
Supervisor	DALLA CHIARA BRUNO - bruno.dallachiara@polito.it
Contact	FERRARI ALESSANDRO - alessandro.ferrari@polito.it SPESSA EZIO - ezio.spessa@polito.it
Context of the research activity	Trasporti - Transport systems. Among the technological development trajectories of national priority defined in the SNSI ("Strategia Nazionale di Specializzazione Intelligente") there is coherence with that of point 5.5.6 Digital Agenda, Smart Communities, intelligent mobility systems and in particular "Intelligent urban mobility systems for logistics and people" and "Systems for the safety of the urban environment, environmental monitoring and the prevention of critical events or risks". Consistency is also shown with the scope of NRP 5.5. CLIMATE, ENERGY, SUSTAINABLE MOBILITY - 5.5.1 Sustainable mobility; Art. 2. Accessible, environmentally friendly, smart and safe, resilient, efficient mobility infrastructure'.
Objectives	The aim of the research is to define - from the technological and industrial point of view of transport on the one hand, energy consumption and environmental protection on the other - a methodology and an ITS (Intelligent Transport System) solution that will enable the valid implementation of both the regulations on vehicle emissions and Directive 50/2008 on the concentration of pollutants in the most densely inhabited and used areas, as well as the resolution of the European Parliament (2023) on the abatement of CO2 emissions. To this goal, the research intends to focus both on numerical analysis and on the experimentation of technologies to manage access to urban areas, by means of geofencing, capable of ensuring a low environmental impact - distinct between local and global - by road vehicles (conventional with or without biofuels, hybrid or electric). By relying on already existing technologies for access control, it is intended to identify all the elements (quantitative and qualitative physical quantities) that will be necessary to make access choices in protected areas. It is intended to take into account the local emissions that the vehicle is able to guarantee within the defined area as well as the global emissions for

	which the vehicle is responsible during design, construction and transport, and the impacts on externalities (accidents, health, environment and economy). It is intended to adopt development techniques such as robust design for the vehicle-infrastructure communication architecture, and life cycle analysis (LC) for the calculation of global emissions. Finally, it is intended to conduct experiments with a vehicle that can put the system, thus defined, to the test.

Skills and competencies for the development of the activity	Master Degree or Master of Science in either Mechanical Engineering or Civil Engineering or Energy and Nuclear energy, possibly with specialisation in the Transport systems domain, either within companies or at University.