WasteECO – RADCOM SME from Romania – proposal for the Call WASTE-5-2015

The scope defined for the outcomes of the project is to diversify the wide range of the multidisciplinary approached methods of waste transport management. The human settlements represents one of the key stakeholder involvement that need to be assessed and studied as main impact of the results obtained by implementing the activities throughout the project life-cycle.

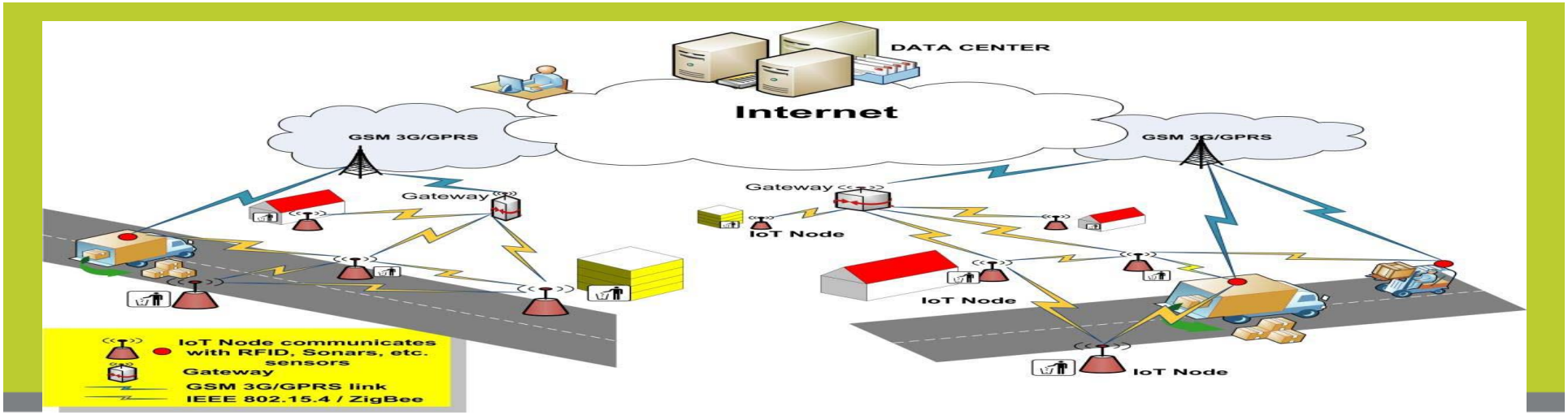
The main goal of the Eco-Smart project is to optimize the routes, traffics, procedures and management of the waste collection companies, in order to enhance the environmental protection impact and social awareness.

The consortium plans to obtain data from a deployed IoT – Internet of Things and embedded devices infrastructure with sensors (two main types: in the vehicle-embedded and on the containers / cans), RFID/NFC tags, IoT smart-objects and gateways within garbage collection company, in order to dynamically re-route garbage/waste vehicles in traffic. The main tasks from the data-flows of the solution consist of:

Collecting necessary info from the sensors, such as: cans and containers emptiness percentage; info from public smart recycling bins; clients-citizens/companies dynamic requests regarding waste pick-up; info about the garbage/waste selection pre-processing (glass, plastic, paper, etc.); vehicles fleet management and availability info (including the gas level – from the vehicle sensors); weather conditions (humidity, pollution, etc.) info for environment monitoring; snow level info on the streets for enhanced routing of the vehicles; etc. The data is collected from the IoT sensors through WSNs (Wireless Sensors Networks) using IoT gateways deployed near a set of containers or embedded/IoT devices deployed into vehicles.

Dynamically re-routing the garbage/waste vehicles in traffic (real time) based on the IoT collected data. The re-routing is based on optimized critical paths obtained according with the consortium's implemented mathematical models, which will take as input data collected from IoT sensors and it will integrate a telematics fleet-vehicles management system.

After the garbage/waste collection procedures are executed for the end-user (citizens and companies), it is necessary to offer the possibility to integrate a "pay as you throw" system, taking into account secure payment solutions available in the market. All the data collected from the sensors, it will ensure the prerequisites for an enhanced and optimized garbage collection selection process and management, for providing environmental protection mechanisms, as well as obtaining an environmental monitoring system (CO_2 emissions, pollution indicators, etc.).



As specific objectives, the consortium is taking into account the following:

- O1: Gas consumption optimization (CO_2 emissions reduction) for the waste collection vehicles due to the back-end efficient managed routes (and integration with vehicles-fleet management system), according with the information received from the heterogeneous sensors installed at containers/cans sites and vehicles. Received data within IoT infrastructure, will offer the possibility of changing, in real time, the critical optimal route of the garbage collection vehicle, and to remove some of the collecting points from the route.
- O2: Improvement of the procedures and decisions for waste collection companies within smart cities environment, as result for integrated fleet and resources management.
- O3: Obtaining an environment monitoring system.
- O4: Providing an open and interactive impact features:
    - a "pay as you throw" system for mass-market beneficiaries.
    - an Internet platform for the solution's services in IT Cloud SaaS
    - Mobile application and environment access for the solution services.
- O5: Offering prerequisites for smart recycling system integration with existing smart cities IoT solutions.
- O6: Ensuring garbage selection optimization in terms of glass, plastic, paper, etc.
- O7: Increasing the social responsibility regarding the waste/garbage collection.
- O8: Disseminating the research results.