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## AUTOMOTIVE RECYCLING: A CIRCULAR ECONOMY CENTRE

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### Abstract

Every year 93 billion tonnes of raw materials are consumed, but only 9% of them are reused: a potential of about 3 trillion dollars worldwide, 88 billion in Italy, according to *Growth Within: A Circular Economy Vision for a Competitive Europe* by Ellen MacArthur Foundation with McKinsey.

A vehicle is potentially recoverable, in its components for more than 95%, an industrialised process of treatment of end-life vehicles (ELVs). Optimising raw material recovery is currently possible and advantageous.

The aim of this work is to increase the knowledge regarding the ideal dimensioning of an automotive recycling plant. Indeed, it is possible to find out the maximum capacity of both the number of the incoming vehicles to handle and the amount of produced and treatable waste material through a correct division of space of a plant for the end-of-life vehicles. Therefore, it is possible to foresee and programme the typology of the outgoing waste materials and the secondary raw materials that can be obtained from these.

The questions based on this document are: (1) Is it possible to have guidelines for the creation and the correct dimensioning of an automotive recycling plant that would allow reaching European circular economy goals? (2) Is it possible to know the treatment capacity of an automotive recycling plant? (3) Is it possible to create a calculation method for the correct dimensioning of a plant for ELVs treatment?

The authors were able to create the formula for the ideal dimensioning of a automotive recycling plant by using the data analysis of the “Guidelines on the treatment of end-of-life vehicles. Technological and managing aspects” (“Linee guida sul trattamento dei veicoli fuori uso. Aspetti tecnologici e gestionali”) developed by the High Institute for the Protection and the Environmental Research (ISPRA–Istituto Superiore per la Protezione e la Ricerca Ambientale).

The correct dimensioning of a plant of this kind is configurated as base to carry out the optimisation of working processes within a plant, guaranteeing the complete traceability of the vehicle, subject of process, from the initial stage of acceptance to the complete recover-disposal of all its parts, the advanced education of the sector operators in mechanical, logistical, and warehouse competence, the certification of quality, environment and security process.

**Keywords:** automotive recycling, circular economy, end-of-life vehicles (ELVs), treatment plant

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