

Evaluation of the Solid and Hazardous Wastes Generated by the Automotive Industry in Turkey

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Abstract

Development of the automotive industry not only facilitated our daily lives, but also introduced environmental stress. The automotive industry consists of both the original equipment manufacturers (OEMs), and a great variety of suppliers that support this industry. Most of the published studies focus on the environmental impacts of the OEMs; the impacts of suppliers were generally neglected. The objective of this study was to evaluate the types and amounts of solid and hazardous wastes generated by the automotive industry especially in relation to the supplier companies supporting the automotive manufacturers in Turkey. A survey was conducted with representative numbers of automotive manufacturers and suppliers located in Bursa, Turkey to obtain data on resource usage, waste types, and waste amounts generated. One hundred and five different parts of an automobile were examined in the framework of the study. Interviews were also conducted with the suppliers about the details on each item produced. Resource usage, solid and hazardous waste generation during the production of each component of an automobile were calculated. The environmental burden of the automotive industry in Turkey was roughly calculated in terms of waste generation and resource usage based on energy and water. It was seen that of the items constituting an automobile, which are provided by the suppliers, 47% is made of plastics, 31% is made of textile, and 21% is made of metals. The amounts of water and electricity used for all the items by the suppliers were found as 0.60 m³/vehicle and 190 kWh/vehicle, respectively. Water and electricity usage by OEMs were 3.47 m³/vehicle and 1763 kWh/vehicle, respectively. Solid and hazardous waste generated by OEMs were found as 48.97 kg/vehicle and 7.04 kg/vehicle, respectively, and by suppliers were 5.71 kg/vehicle and 0.6 kg/vehicle, respectively.

Keywords: *OEM, supplier companies, questionnaire, automobile components*

1. Introduction

The fact that automobiles are indispensable in our modern daily lives led the automotive industry to become a large and influential industry. Steel, plastic, rubber, and other industries for raw materials were stimulated by the development of the automotive industry [1]. As a result, the management practices of automotive industry started to have an influence on many other business sectors [2].

Development of the automotive industry not only facilitated our daily lives, but also introduced environmental pressures [2]. Liu,

Liu and Chen [1] conducted a life cycle assessment (LCA) to assess the environmental impacts at the manufacturing and consumption stages of Chinese automotive industry, and reported that the automotive industry significantly impacts the environment in China. The researchers also stated that the indirect impacts at the manufacturing stage and direct impacts at the consumption stage dominate the total environmental impacts [1].

The automotive industry is known as the most resource intensive industry of all major industries [3]. Especially the acquisition and processing of virgin resources to be used as raw material in the manufacturing stage is reported to include substantial consumption of material and energy [3]. Energy consumption is substantial in heating, cooling, and production of raw materials

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