

Chapter 14

Production and Use of Electric Vehicle Batteries

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ABSTRACT

Electromobility is considered the technology of the future due to its ecological and environmental advantages. Modern society relies on the movement of goods and people, but current transport systems have adverse effects on human health and the environment. There are also studies showing that the manufacture of batteries used in electric vehicles can also have a significant environmental impact. How large this environmental impact is affected by which batteries are used and their capacity, among other effects. At the same time, rapid development is taking place in the region, and information on environmental impact risks are rapidly becoming out of date. It is essential for lawmakers to provide up-to-date data on the environmental impact of the manufacture and charging of batteries and how infrastructure design affects the system. For the case study, an electric pickup truck belonging to a chain market in Turkey was used, and emissions from battery production and energy consumption were presented.

INTRODUCTION

On August 27, 1859, the world changed forever. After Edward L. Drake, a miner drilled the first oil well with machinery in Titusville, Pennsylvania, the oil mining industry began to develop rapidly (Christopher L. Liner & T. A. McGilvery, 2019; Ekejiuba, 2020). The oiled city grew rapidly, and everyone wanted to make a

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fortune in black gold. The first American oil company was founded in 1854 as the Pennsylvania Oil Company. In 1859, when Colonel Drake found oil at 21 meters, many wells were drilled in the same area and production increased rapidly (Ekejiuba, 2020). In this way, the price of oil per barrel fell from \$2 in 1859 to 10 \$cents in 1862. Petroleum has started to play an important role in determining the economic and political conditions since it was produced for commercial purposes. Oil represented a seemingly inexhaustible source of energy that, along with a host of other innovations, sent man into the industrial revolution at rocket speed.

Day by day, the world has become more dependent on oil than ever before (Yu et al., 2020). Everything from the transportation sector to the energy sector was consuming more and more oil without considering the consequences. But the first data reports on the global climate began to be published and the results were shocking. The burning of more and more oil has resulted in an increase in the amount of greenhouse gases in the atmosphere, which has contributed to the greenhouse effect. The effect is an increase in temperature on the earth's surface. The infrared rays emitted by the sun reach the earth after a journey of millions of kilometers. Some of these rays hit the earth and heat the land and seas, while some of them are reflected to space after hitting the earth. However, greenhouse gases in the air absorb some of the infrared radiation, preventing them from escaping from the atmosphere. The more greenhouse gases in the atmosphere, the more heat is retained. As a result, the average temperature of the Earth rises. In recent years, climate research has made great strides forward, proving at times that the climate issue is something to be taken seriously. Especially with the signing of the Paris agreement (Paris agreement, 2015), most people agree that the world needs to reduce its dependence on oil to reduce greenhouse gas emissions and thus slow global warming.

Transport activities account for approximately 25% of the world's energy usage (Rodrigue, 2020). Emissions from fuels used for transportation activities as a whole account for approximately 20% of global greenhouse gases. Among the modes of transport, road accounts for 70% of global emissions, airlines 12%, sea lines 11%, and railway lines 2% (Civelekoglu & Biyik, 2018). Despite strict regulations on emissions in new vehicles and manufacturers' restrictions on internal combustion engines; the vast majority of vehicle manufacturers agree that the internal combustion engine has reached its maximum potential in terms of carbon dioxide emissions. Therefore, new technologies are needed for the transport industry. One of the technologies that have shown the most promise in recent years is electric vehicles (EVs). In order to drive these electric motors, batteries are thus required that can efficiently store large amounts of electrical energy. As a result, the world's vehicle manufacturers are facing one of the biggest changes ever (Rajaeifar et al., 2022).

Battery production is a technology-intensive and complex process that has seen constant improvements and innovations in recent decades (Nurdiawati & Agrawal,

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