Chapter 19
Sustainable Automotive Engineering:
Empowering the Next Generation of Eco-Conscious Engineers

Osama A. S. Ismail
Van Hool NV, Belgium

ABSTRACT

Sustainable automotive engineering (SAE) is essential for the automobile industry to decrease the environmental impact caused by greenhouse gases as well as conserve natural resources. The present chapter assesses the title topic. It has been assessed that the main approach applied to teaching students for this subject is the incorporation of principles of sustainable engineering and promoting participation in working projects relating to the same. By considering the significance of SAE, it becomes very significant for educational institutions to implement unique strategies and techniques regarding this topic, by which students can get to know the importance of sustainability in general and its importance in the machines they use daily such as cars and buses in precise. The upcoming decade is considered one of the most important periods in green driving as studies are held to bring fascinating possibilities including lightweight components advanced engines and connected transportation.

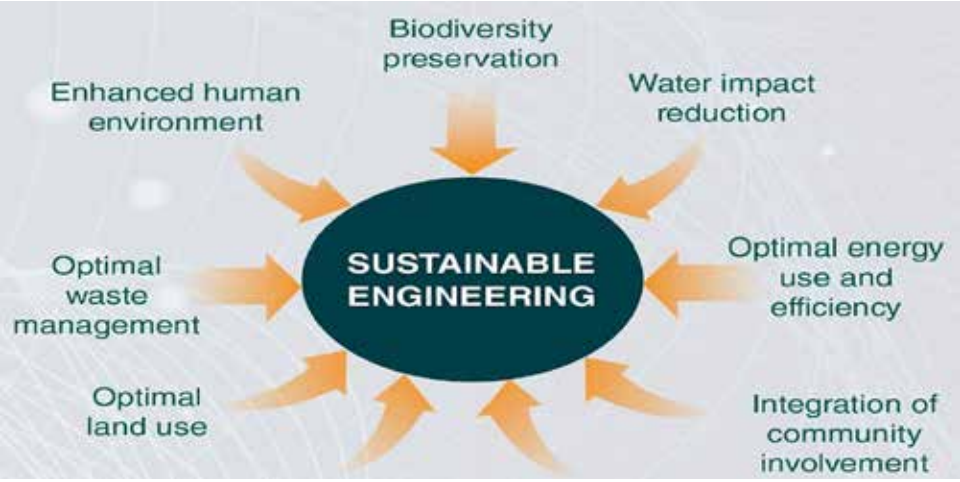
INTRODUCTION

The automotive industry has a significant impact on the environment and compliance with sustainable engineering practices helps in mitigating adverse impacts to a significant extent. A report by Forbes states that the automotive industry accounted

DOI: 10.4018/979-8-3693-2987-0.ch019

for 9% of global greenhouse gas emissions in the year 2018 (Pohl, 2021). The specified reports assert that the absence of major initiatives taken for promoting and adopting sustainable practices majorly contributes to the carbon footprint. However, now shift has been assessed towards sustainable practices by focusing on many factors including those mentioned in Figure 1 below; which is a positive move and it is expected that in the future automobile sector will have a reduced environmental impact. The current topic i.e. Sustainable Automotive Engineering: Empowering the Next Generation of Eco-Conscious Engineers focuses on educational strategies and approaches applied to teaching sustainable automotive engineering. Solutions and recommendations have been discussed relating to learning approaches in the context of sustainable automotive engineering. Lastly, future research directions have been specified relating to the potential of technology in advanced sustainable automotive design along with emerging trends and educational needs for the same.

Figure 1. Principles of sustainable engineering



(Hernández-de-Menéndez et al, 2019)

Sustainable automotive engineering is essential as it contributes to reducing environmental impact, developing a safe environment and shrinking the use of natural resources to a significant extent (González-Pérez and Ramírez-Montoya, 2022). Universities and educational organizations play a vital role in promoting the significance and relevance of sustainable automotive engineering. The main teaching approaches applied at high school and for vocational students include the incorporation of principles of sustainable engineering in their curriculum by adding topics i.e. recyclable materials, energy-efficient vehicles, alternative fuels