

[Exploring Circular Economy and Sustainable Energy to Address the Environmental Impacts of State-of-the-Art Combustion Engines Using Life Cycle Analysis]
[Aurobay]

Exploring Circular Economy and Sustainable Energy to Address the Environmental Impacts of State-of-the-Art Combustion Engines Using Life Cycle Analysis

Context

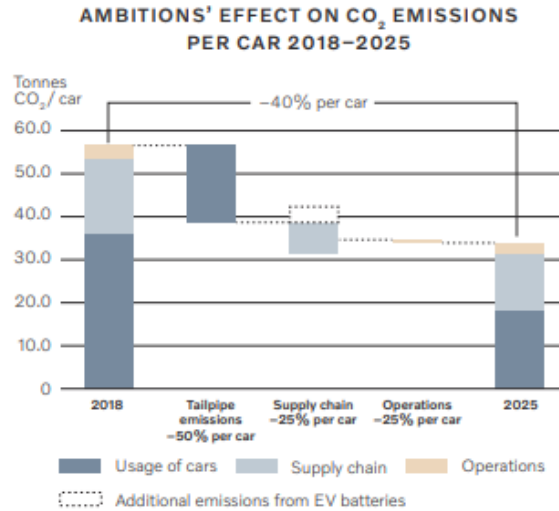
The automotive industry is responsible for approximately 9% of the global GHG emissions. In addition, global consumption of resources is unsustainable. Significant reductions in GHG emissions and primary material consumption are needed to reach the Paris Agreement and prevent material scarcity.

Aurobay strives to be carbon neutral by 2040 by applying circular economy principles and sustainable energy. Already today our engines contain up to 44% recycled material. We can do better.

Primary metals in the product have a high specific GHG footprint. Aurobay aims to increase secondary metal content and be a circular business by 2040. Plastic materials in the product are a key concern where increased knowledge is needed. Aurobay's target is to have 25% recycled plastics by 2025.

What about sustainable energy? For example biofuels offer a significant net GHG reduction, putting combustion engine vehicles on par with battery-electric vehicles throughout the complete life cycle.

[Exploring Circular Economy and Sustainable Energy to Address the Environmental Impacts of State-of-the-Art Combustion Engines Using Life Cycle Analysis]
[Aurobay]



Objectives

1. Create a baseline LCA on the latest generation mild-hybrid petrol engine
2. Identify potential reductions in the life cycle environmental impact and prioritise them

Main Activities

- Define the scope for the LCA.
- Identify state of the art when it comes to metal and plastic recycling, and reduction of CO₂ from component production
- Identify state of the art when it comes to sustainable fuels for specific markets
- Calculate the baseline life cycle GHG emissions and resource use for a VEP MP Gen3 Miller with EU6d aftertreatment
- Draw conclusions, prioritise and suggest ways forward to reduce the life cycle GHG emissions and resource use

Key Deliverables

LCA study on a modern gasoline engine using sustainable fuel, and prioritisation/roadmap for all "green" part production, system improvements and fuel selection.

[Exploring Circular Economy and Sustainable Energy to Address the Environmental Impacts of State-of-the-Art Combustion Engines Using Life Cycle Analysis]
[Aurobay]

Study Topic

Environmental

Engineering

Data Analysis

Sustainability

Transport

Materials

Contact: Joshua Dudley, joshua.dudley@volvocars.com

Academic Supervisor : Matty Janssen, mathias.janssen@chalmers.se