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## **Impact Assessment of Orchard Tractor Electrification: Carbon Footprint comparison of different powertrain configurations**

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In a world where population growth requires new agricultural machines and techniques to increase farming productivity, the amount of pollutant emissions from these machines is expected to grow as well to meet food demand. For this reason, agricultural machines need also to achieve better fuel efficiency in terms of emissions for unit of production. Electrification is currently one of the most promising options to both increase machine efficiency and productivity thanks to the possibility of introducing electric systems with higher levels of controllability. However, from the powertrain point of view, there are several ways to introduce the contribution of an electric system. In this paper, a comparison of different hybrid electric configurations of an orchard tractor is performed to highlight which could produce the higher environmental benefits with the lower impact on performance. The numerical analysis starts with load scenarios measured during field activities, to have the achievement of mission profile as minimum requirement of the powertrain architecture.

**Autore principale:** MOCERA, FRANCESCO (POLITECNICO DI TORINO)

**Coautore:** Prof. SOMA', AURELIO; Dr. MARTELLI, SALVATORE (POLITECNICO DI TORINO); Dr. MARTINI, VALERIO (POLITECNICO DI TORINO)

**Relatore:** MOCERA, FRANCESCO (POLITECNICO DI TORINO)

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