DOW, INC.
Autonomous Vehicles in the Motor Carrier Industry

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Dow, Inc. is the third largest chemical manufacturing company in the world. In 2018, Dow generated $49.7 billion in net sales across Industrial Intermediates & Infrastructure, Performance Materials & Coatings, and Packaging & Specialty Plastics. Dow spends over $500 million on road logistics annually. The company is interested in adopting leading-edge technology and approaches to improve its supply chain. To support this effort, the Tauber team was tasked with analyzing the state of the autonomous motor carrier industry and developing an entrance strategy to adopt autonomous trucks in Dow's supply chain. Dow is interested in using this new technology to improve the safety, cost, environmental impacts, and customer experience attributes of its supply chain. Furthermore, challenges facing the trucking industry, such as the driver shortage, result in increased costs and reduced quality of service for Dow and its customers. The Tauber team demonstrates the ability of autonomous trucking technology to combat trucking industry challenges and improve supply chain attributes.

The Tauber team conducted interviews with internal stakeholders, researchers, and industry experts to gather information about Dow's supply chain, the trucking industry, and autonomous trucking technology. Based on these conversations, the Tauber team analyzed specific freight routes which were identified as potential applications for autonomy. These included movements on public roads as well as movements completely or partially on Dow sites. Next, the team engaged external experts and companies, including companies involved in the development of autonomous trucking software, to further understand the effects of the technology and to identify the potential for trials using autonomous trucks for Dow's freight.

To show the effect autonomous trucking technology will have for Dow, the team broke Dow's truck freight into long-haul and short-haul. Using this breakdown, the team partitioned Dow's truck freight into long-haul and short- haul. Using this breakdown, the team modelled the reduction in the operating cost between 2024 and 2045 that could be realized if Dow switched to on-highway automation and subsequently fully autonomous trucking. To motivate recommendations for near-term adoption of autonomy, the team performed a comparative analysis of the companies that Dow could implement autonomy with.

Based on Dow's non-hazardous freight over the past year, the team's analysis indicates that long-haul driverless- on-highway automation could result in annual savings for Dow and its shipping partners of more than $4.4 million for just standard trailers and $6.8 million for all trailer types including tanker trucks. For completely automated trucking applied to all inter-site movements, annual operating costs for Dow's freight could potentially be reduced by more than $29.8 million. Associated with these savings would be reductions of Dow's annual transportation carbon footprint by approximately 4.6 million lbs of CO_2 for long-haul standard trailers, 7.3 million lbs for all trailer types, and 11.9 million lbs for full driverless trucking. In the on-site case, each scenario requires a custom solution, however the savings in a specific solution the Tauber team analyzed would result in $1.25 million in annual savings shared with Dow's logistics providers.

These benefits, along with issues facing the trucking industry, demonstrate that autonomy is an integral part of remaining competitive in logistics. Consequently, the Tauber team recommends that Dow begin partnering with companies exploring autonomy in the very near future to best capitalize on the autonomous revolution.