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### “Life Expectancy Analysis and Optimization of Electric Vehicle Traction Motors”

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# **“Life Expectancy Analysis and Optimization of Electric Vehicle Traction Motors”**

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The development of electric vehicles (EVs) is a technological advancement that builds upon the momentous milestones achieved in the personal transportation industry throughout the last century. The vehicles of this era have been driven through the power of internal combustion engines (ICE). In the most recent decades the drawbacks of running fossil fuel based vehicles has become quite apparent. The effect of emissions on both the environment and public health has become a major cause of concern for policy makers and the general population. Additionally, fossil fuel commodities have been utilized as a political and economic weapon, giving producers extreme amounts of power and hurting consumers who have been at the mercy of large market fluctuations [1].

These challenges have provided the perfect conditions for the rise of electrical vehicles as an alternative method of transportation. Electric vehicles give humanity an opportunity to reduce global emissions and preserve the current climate. Reduced emissions also mean higher air quality for breathing, creating a healthier population and reducing burden on medical systems. Electric vehicles are also quieter, require less maintenance, and provide better handling than traditional vehicles. However, consumers will not be able to take full advantage of these benefits without engineers first overcoming major challenges. Currently electrically powered vehicles are disadvantaged by problems including lack of charging infrastructure, poor battery range, expensive batteries, and limited promotion by industry amongst many others. The success of electric vehicles depends on these issues being solved or their impacts dramatically lessened.

A significant area of concern and a topic where further optimizations can be made is in the life expectancy of the electric motors that propel electric vehicles. The ideal electric vehicle will have an extremely long lasting motor that performs consistently well in all conditions over the full period of its use. The University of Windsor already has a significant foothold in this area through the work done at the Centre for Hybrid Automotive Research and Green Energy (CHARGE) laboratory. Industrial collaborations including those with Ford Motor Company and Magna International have provided significant opportunities for testing electric motors and their life expectancy.

The proposed conference topic will utilize data gathered from electric motor tests and through significant analysis provide informative conclusions about methods to improve electric vehicle traction motor life expectancy. Several key factors identified as having significant impact on motor life expectancy will be studied. This includes factors such as temperature, humidity, voltage disturbances, insulation weakness, and vibrations. Gathered data will be organized into constructive outputs such as graphs and tables that will allow for easy observation of key conclusions. Overall, the proposed topic will allow the opportunity to inform conference attendees of how electric motor testing done by local researchers in collaboration with industry partners is improving upon electric motor life expectancy, overall electric vehicle performance and thus in turn society which receives the aforementioned environmental and health benefits that come with electric vehicle adoption.

## References

[1] World Economic Forum (WEF), "8 Reasons Why the Politics of Oil Have Changed," Katinka Barysch , 2016.