

## **ABSTRACT**

### **PUBLIC TRANSPORT ELECTRIFICATION: ELECTRIC BUS LIFE CYCLE COST AND GHG EMISSION ANALYSES IN KUALA LUMPUR AND KRISTIANSAND**

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Electric buses can assist communities in addressing air quality issues and lowering greenhouse gas emissions (along with a clean grid). However, the switch to e-buses has been accompanied with growing pains as businesses and governments work to develop the budding e-bus market. In optimizing the carbon emission reduction potential of electric buses, cities first need to address the main problem with electric bus's deployment; high acquisition cost. To move beyond acquisition cost, a total life cycle assessment (LCA) of both cost and carbon emission benefits are necessary. In the electrification transition of urban mass transport, understanding the difference capabilities of cities in developed and developing countries are crucial in building local and mobilizing global and national support. This study carries out a LCA in the form of total cost of ownership (TCO) and GHG emission of electric bus and diesel bus, comparing their operations in Kuala Lumpur, Malaysia and Kristiansand in Agder, Norway. It is found that in both cities, BEBs are yet to achieve cost competitiveness. It will take an additional annual expense of €47,555.4 and €37,146.8 to achieve carbon emission reduction of 76.78  $tCO_2$  and 41.14  $tCO_2$  by switching a unit of diesel bus to electric in Kristiansand and Kuala Lumpur, respectively.

**Keywords:** Electric buses, greenhouse gas emissions, life cycle assessment, total cost of ownership, carbon emission reduction, urban mass transport