



**To:** City Development

**From:** Adrian Davis

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**Subject:** Essential Evidence on a page: No 44 Electrically assisted Cycling

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Top line: The intensity of physical effort during cycling on an electrically assisted bicycle is sufficiently high to contribute to the physical activity guidelines for moderate-intensity health-enhancing physical activity for adults.

The concept of the electrically assisted bicycle (EAB) has been promoted at the margins of sustainable transport for more than a decade. Recent technological advances to increase EABs commercial viability have led to an increase in sales and interest potentially among those who would not otherwise be attracted to cycling. Electrical support reduces the intensity and exertion of cycling and could therefore take away barriers (eg hilly environments) for commuter cycling, which seems to discourage especially the least fit individuals. An early peer reviewed assessment of the health value of EABs has recently been published. The study assessed the potential of the EAB as a tool for meeting physical activity guidelines in terms of intensity.<sup>1</sup>

Twelve habitually active adult subjects were requested to cycle a track of 4.3 km at an intensity they would normally choose for commuter cycling, using three different support settings: no support (NO), eco support (ECO), and power support (POW). For estimating the intensity, the oxygen consumption was measured by using a portable gas-analyzing system, and heart rate was simultaneously measured. The bicycle was equipped to measure subjects' power output, pedaling rate, and the cycle velocity.

The results showed that the intensity of cycling on an EAB, in all three measured conditions, was sufficiently high to contribute to the moderate-intensity standard energy expenditure. This means that the physical activity guidelines for adults of moderate intensity physical activity were met. The intensity of cycling with electrical support was not high enough to meet the vigorous-intensity standard. Only cycling on an EAB without support showed a mean intensity at the top end of the moderate physical activity level. In this condition, half of the subjects cycled at a mean intensity that was at the top end of the moderate physical activity spectrum. In the ECO and POW conditions, 33% and 17%, respectively, met the vigorous intensity standard. To meet the current public health recommendation, moderate- and vigorous-intensity activities can be combined.

Mean heart rate was significantly higher in NO compared with that in ECO and POW. The cycling speed with electrical support settings was significantly higher than cycling in the NO condition. While the evidence from this small scale study found that the intensity of physical effort was sufficient to meet the current internationally accepted physical activity guidelines, further study is needed to conclude whether these results still hold when using the EAB in regular daily life and in subjects with other fitness levels. Subjects would also need to cycle the distance used in this study (4.3 km) at least four times a week per round trip when using the ECO or the POW mode to meet the combined recommendations for physical activity expenditure of a minimum of 5 x 30 minutes of moderate physical activity per week.

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<sup>1</sup> Simons, M., Van Es, E., Hendriksen, I. 2009 Electrically assisted Cycling: A new ode for meeting physical activity guidelines?, *Medicine and Science in Sports and Exercise*, 2097-2102.