

# Making Monterrey an Example of Sustainable Mobility Based on Electric Bicycles

**José Ignacio Huertas**

School of Science and Engineering  
Tecnologico de Monterrey  
Monterrey, NL 64849, México  
[jhuertas@tec.mx](mailto:jhuertas@tec.mx)

**David Mastrascusa**

School of Science and Engineering  
Tecnologico de Monterrey  
Monterrey, NL 64849, México  
[d.mastra@tec.mx](mailto:d.mastra@tec.mx)

## Abstract

The use of bicycles has increased 221% since March 2020, creating a positive outlook in the adoption of bicycles as a sustainable means of transportation. The use of bicycles represents a direct impact on environmental management. Likewise, it is important to mention that the impact of the bicycle is conditioned to the physical capacity of the cyclist and the ability to provide the energetic effort required to reach the destination. Therefore, technological developments have allowed the creation of different proposals of models that fit according to the needs of users presented above, creating a positive outlook in the introduction of electric bicycles within the framework of citizen mobility. Two commercial electric bicycles, one with a front wheel and one with a rear wheel, were evaluated to compare the energy consumption in different static and dynamic conditions. The energy consumption was similar for all conditions except for the conditions where there was traffic and inclination, the bicycle with front wheel had the lowest energy consumption due to traction system. Additionally, the design of a BLCD type electric wheel-motor is proposed. It was found that the energy performance of the bicycle with the front wheel is 15% lower when developing circuits with traffic compared to bicycles with rear wheel. When comparing the bicycles in other circuits, no significant difference in energy performance was found. As further work remains to evaluate these same characteristics with the motor-wheel designed in this work.

## Keywords

Electric bikes, BLCD motors, Energy performance.

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## Biographies

**José Ignacio Huertas** is a professor of the Mechanical engineering department at Tecnológico de Monterrey, Mexico. Researcher of the Energy and Climate Change Research Group. Member of the Mexican Academy of Science and of the National System of Researchers. A mechanical engineer from Los Andes University, Colombia (1988). Master in Mechanical engineering from Los Andes University (1990) and from Washington, St. Louis, USA (1994). Doctor of Science from Washington University (1997). Associate professor at Los Andes University until 2002. Since then, a full-time professor at Tecnológico de Monterrey, Mexico. Works leading a team of the Energy and Climate Change Research Group of the School of Science and Engineering at Tecnológico de Monterrey. Currently. Is a member of the national system of researchers in both Mexico (SNI 2) and Colombia (Senior).

**David Mastrascusa** is a mechanical and mechatronic engineer from the Universidad Tecnológica de Bolívar (2018). Master's in science of Engineering from Tecnológico de Monterrey (2020). He has worked four years in many energy efficiency and design projects for Tecnológico de Monterrey. Since 2021 he has worked in mobility and smart cities topics combining many actors in the deployment of electromobility initiatives in Monterrey.