Electric Bike Sharing on UT-Knoxville Campus—Research and Education

Overview

Bike sharing is an exciting new model of public-private transportation provision that has quickly emerged in recent years. Shared electric bikes could provide an even higher level of service compared to regular bike share systems. Although there is little empirical evidence, electric bike sharing could be feasible, depending on demand and battery management. Pilot tests will be important and allow empirical evaluation of electric bike sharing systems performance.

Challenges Unique to Shared Electric Bikes:
- Electric-powered ride
- Recharging protocol
- Bike: battery check-and-check-out

Expected Benefits of Electric Bike Sharing:
- Improve utility of existing bike sharing systems
- Increase ridership by those not normally riding a bike
- Reduce number of motor vehicle trips

Research Questions and Objectives:
- Develop theoretical and operational concepts (battery, recharging, solar)
- Investigate physical activity impacts
- Investigate environmental impacts and energy efficiency
- Investigate the effects of small riders between bike and e-bike
- Investigate willingness to pay as a function of trip length, terrain, etc.

Project Goals:
- Introduce the technology of electric bikes
- Improve utility of existing bike sharing systems
- Increase ridership by those not normally riding a bike

Conclusion and Next Steps:
- Electric bike sharing combines two emerging technologies and attracts a new class of users by overcoming traditional barriers to cycling.
- This project will be the first of its kind and will provide valuable data on electric versus traditional bicycle use and demand.
- The concepts here are being incorporated into a proof-of-concept pilot test to develop a joint bike sharing system on the UT campus launching this year.
- A robust and replicable bike sharing model will be developed to be integrated with other bike sharing systems.
- Shared electric bikes could find a significant role in our transportation system that reduces energy use and emissions while moving more individuals toward active transport modes.
- The initial infrastructure will serve as a test bed for future research and industry providing a rich dataset of user-specific data.

Expected Benefits of Electric Bike Sharing:
- Increased ridership by those not normally riding a bike
- Reduce number of motor vehicle trips
- Evaluate willingness to pay

Research Questions and Objectives:
- Investigate willingness to pay as a function of trip length, terrain, etc.
- Investigate incidents of unsafe behavior between bike and e-bike
- Investigate environmental impacts and energy efficiency
- Investigate travel demand and displaced mode

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