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Attachments: E-bike-Potential-Paper-05_15_19-Final.pdf

FOCUS- Bicycle as an alternative means of transportation

The bicycle is a tremendously efficient means of transportation. In fact cycling is more efficient than any other method of travel-- including walking!

In 2017, The League of American Bicyclists report ranked Hawaii as #49 out of 50 as a Bicycle Friendly States.

Maui does have the best climate and topography in the world for bike commuting, but people of Maui don't do it.

The number one and most prominent reason people depend exclusively on the automobile and do not cycle, as an alternative, is the *fear and intimidation of the traffic on the roads.*

The first step to change this is implementation of the Hawaii Bike Plan proposed facilities and create a safe separated path that can be used by resident and visitor alike as alternative mode of transport to the automobile.

Cause to do so for the public good;

Cycling for health and fitness

It only takes two to four hours a week to achieve a general improvement to your health. Cycling is:

- Low impact – it causes less strain and injuries than most other forms of exercise.
- A good muscle workout – cycling uses all of the major muscle groups as you pedal.
- Easy – unlike some other sports, cycling does not require high levels of physical skill. Most people know how to ride a bike and, once you learn, you don't forget.
- Good for strength and stamina – cycling increases stamina, strength and aerobic fitness.
- As intense as you want – cycling can be done at very low intensity to begin with, if recovering from injury or illness, but can be built up to a demanding physical workout.
- A fun way to get fit – the adventure and buzz you get from coasting down hills and being outdoors means you are more likely to continue to cycle regularly, compared to other physical activities that keep you indoors or require special times or places.
- Time-efficient – as a mode of transport, cycling replaces sedentary (sitting) time spent driving motor vehicles or using trams, trains or buses with healthy exercise.

Health benefits of regular cycling

Cycling is mainly an aerobic activity, which means that your heart, blood vessels and lungs all get a workout. You will breathe deeper, perspire and experience increased body temperature, which will improve your overall fitness level.

The health benefits of regular cycling include:

- increased cardiovascular fitness
- increased muscle strength and flexibility
- improved joint mobility
- decreased stress levels
- improved posture and coordination
- strengthened bones
- decreased body fat levels
- prevention or management of disease
- reduced anxiety and depression.

Can't ride a conventional bike---Consider the E-Bike

Conventional cycling is a good solution, though its uptake has slowed in recent years in several cities, despite the implementation of greenways, bikeshare, and bike lines (Anderson and McLeod 2017). Electric bicycles (e-bikes) could be an effective new part of the solution to combat mode shift stagnation. The e-bike is a recently introduced mode of travel that is rapidly gaining in popularity throughout the United States. The e-bike can offer a cheaper alternative to car travel (Popovich et al. 2014) and can provide users with an adequate level of physical activity intensity necessary to enhance health (Fishman and Cherry 2016). Riding an e-bike is rewarding and fun, is freeing for users with limited ability and mobility, and can even lead to a car-free household (Popovich et al. 2014;

MacArthur et al. 2017, 2018; Jones, Harms, and Heinen 2016). It can be a useful tool to reduce CO2 emissions, urban noise and air pollution, and inner city traffic (Weiss et al. 2015). Lastly, e-bikes encourage users to cycle farther and more often than conventional bicycles (MacArthur et al. 2018), meaning that they offer the opportunity to multiply the benefits already available through conventional cycling. This white paper explores the potential e-bike effect on person miles traveled (PMT) and greenhouse gas emissions (GHG) in terms of CO2 for varying levels of e-bike mode share replacement. A model for PMT shift and GHG reduction potential is created for Portland, Oregon. Portland was selected for analysis because of the availability of regional transportation data, the extensiveness of the city's bike network that would lend itself to e-bike uptake, and the authors' familiarity with the city

See White Paper Attached.