

## THE COPENHAGEN WHEEL



### MIT's SENSEable City Lab

*The Copenhagen Wheel transforms ordinary bicycles quickly into hybrid e-bikes that also function as mobile sensing units. It allows you to capture the energy dissipated while cycling and braking and save it for when you need a bit of a boost. It also maps pollution levels, traffic congestion, and road conditions in real-time.*

The Copenhagen Wheel turns the bike you already own, quickly and easily into an electric bike with regeneration and real-time environmental sensing capabilities. The wheel harvests the energy you input while braking and cycling and stores it for when you need a bit of a boost. At the same time, sensors in the wheel are collecting information about air and noise pollution, congestion and road conditions.

The Copenhagen Wheel differs from other electric bikes in that all components are elegantly packaged into one hub. There is no external wiring or bulky battery packs, making it retrofittable into any bike. Inside the hub, we have arranged a motor, 3-speed internal hub gear, batteries, a torque sensor, GPRS and a sensor kit that monitors CO, NOx, noise (db), relative humidity and temperature. In the future, you will be able to spec out your wheel according to your riding habits and needs.

Live in San Francisco? Add more battery power.

Interested in real-time applications? Increase the number of sensors.

Lastly, the wheel is controlled through your Smart Phone and becomes a natural extension of your everyday life. Simply place your phone on the handlebars, and its Bluetooth module syncs with the Bluetooth module in the hub of the Copenhagen Wheel. You can then use your phone and our Copenhagen Wheel Application to unlock and lock your bike, change gears, select how much the motor assists you and for viewing relevant real-time information.

It is expected that the wheel will go into production next year, with a tag price competitive with that of a standard electric bike. According to [Claus Juhl](#), CEO of Copenhagen, the city might place the first order and use bicycles retrofitted with the Copenhagen Wheel as a substitution for city employee cars as part of the city's goal to become the world's first carbon-neutral capital by 2025.

The Copenhagen Wheel team at [MIT](#) is composed of Christine Outram, Project Leader, Rex Britter, Andrea Cassi, Xiaoji Chen, Jennifer Dunnam, Paula Echeverri, Myshkin Ingawale, Ari Kardasis, E Roon Kang, Sey Min, Assaf Biderman and Carlo Ratti.

The [Copenhagen Wheel](#), has been unveiled on December 15 at the COP15 United Nations Climate Conference. The project was conceived and developed by the MIT's [SENSEable City Lab](#) for the [Kobenhavns Kommune](#). The prototype bikes were realized with the help of our technical partner [Ducati Energia](#) and funding from the Italian Ministry for the Environment. [Progical Solutions LLC](#) provided technical support for the iphone control of the bikes.

