

# Flywheels: an old school solution to a new energy challenge?

Electric vehicles need both energy (to achieve range) and power (for acceleration and load following). Batteries can't always be optimised for both power and energy at the same time, so could an old technology provide a solution to this modern dilemma?



**Advisian**

WorleyParsons Group

## Addressing public transport concerns

### Battery vs. Flywheel

Compared to the alternative battery energy systems, flywheels offer:



Higher power densities and reliability



Longer cycle life without degradation



Reduced ambient temperature concerns



No environmental pollutants

## Lower operational costs

Flywheels can excel in high-power applications, **placing them closer in functionality to super-capacitors than batteries.**



For example, a buffer flywheel system for the London buses resulted in fuel savings of over

# 20%

The **0.4 kWh flywheel used** provides enough power to accelerate a bus from



# 0-50kph

recovering energy when braking

## Opening up light rail solutions

**Catenary-free trams are gaining prominence**, attracting more companies to market.



The technology enables transfer of electricity from infrastructure buried in the street to either:



**Power electric motors** in a vehicle



**Charge energy storage devices** such as batteries, super-capacitors or flywheels

## Supporting the uptake of new energy

It is possible we could see the **accelerated deployment of modern flywheels.**



Flywheels may offer a **cost-effective alternative** to renewing existing aging assets



Flywheels are **complimentary with** hybrid propulsion systems