

**Docket #:** S23-201

# **Increasing energy efficiency in robotic systems**

Electric motors are widely used in robots but waste energy in many applications. This inefficiency leads to short battery life and hinders the adoption of new robotic technologies ranging from humanoids to exoskeletons. Researchers at Stanford have finally addressed this problem with a high-efficiency elastic energy-recycling actuator capable of reducing power consumption by 50-97%. These new actuators use controllable mechanical springs to store and release energy in tandem with an electric motor, reducing power consumption and offering increased performance for many robotic systems.

## **Stage of Development**

Prototype

## **Applications**

- Exoskeletons
- Robotic systems
- Mobile robots
- Prosthetic devices

## **Advantages**

- Reduced power consumption by 50-97%
- Increased efficiency
- Better ability to use in long-term tasks

## Publications

- Erez Krimsky, Steven H. Collins, "[Elastic energy-recycling actuators for efficient robots.](#)" *Sci. Robot.*9, (2024).
- Krimsky, E., & Collins, S. H. (2020, May). . In 2020 IEEE International Conference on Robotics and Automation (ICRA) (pp. 3559-3565). IEEE.

## Innovators

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