

# The Benefits of Energy Recovery Systems for Electric Vehicles



Gearoid O Sullivan

K00270610

## Aim

The Aim of the project is to analyse the current energy recovery systems used to recharge electric vehicle batteries as they drive.

## Objectives

1. Carry out a critical literature review on relevant topics.
2. Explore in depth the use of the different technology in certain driving conditions.
3. Evaluate the efficiency of each charging method.
4. Select and review different case studies relevant to the topic.
5. Prepare a concept design.

## System Types

There are many different systems out there already such as regenerative braking, vibration recovery and solar charging as seen below.



Photo of Sona Sion solar charging car

## Survey

A survey was sent out to electric vehicle manufactures ranging from tesla and BYD for cars to Volvo and JCB for plant machinery. The graph below shows the answers to a question about what systems do they have on there vehicles.

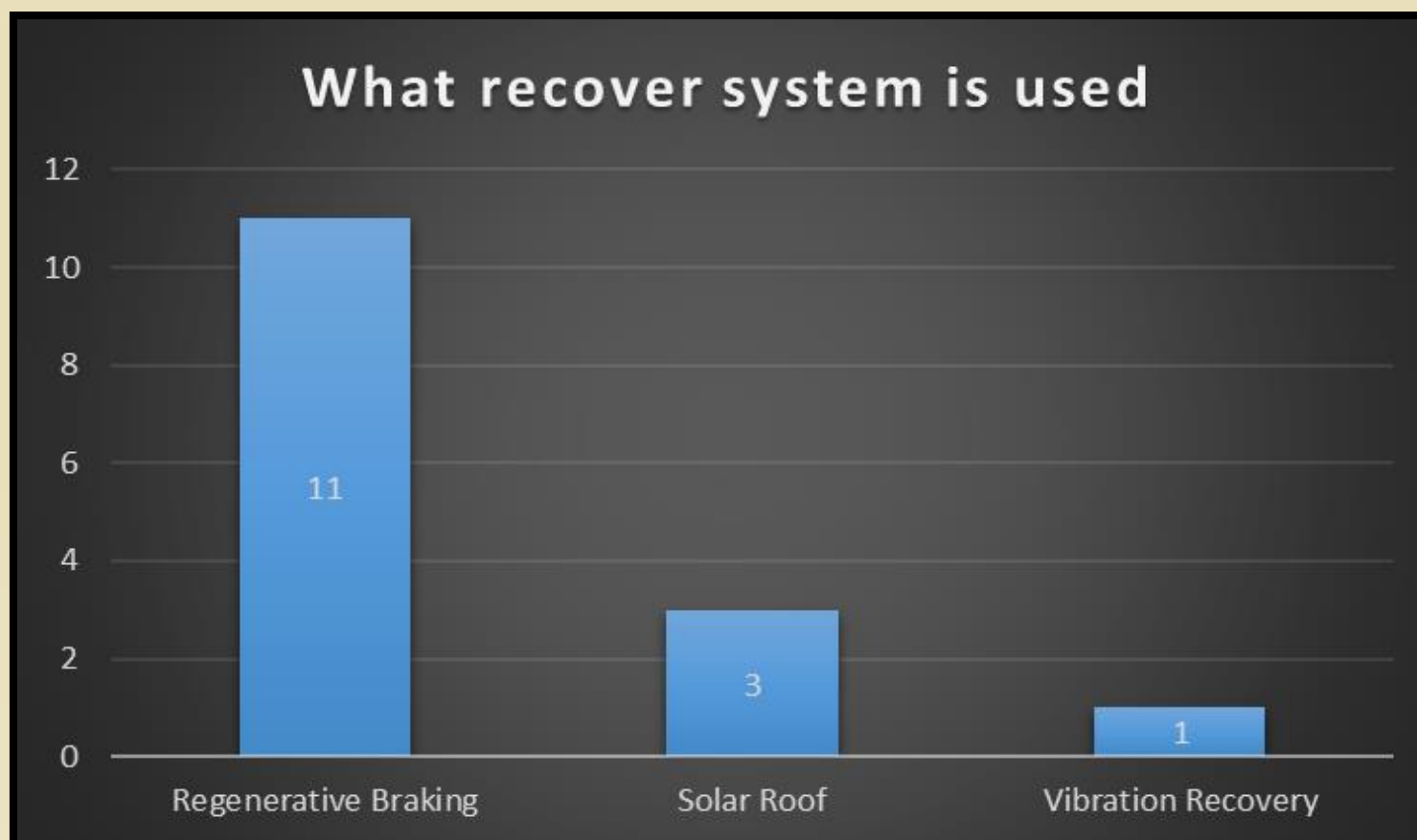


Figure 1: Shows the responses to question 2 of the survey

The graph in figure 1 shows that out of the 11 respondents that said they used an energy recovery system they all said they use regenerative braking on there vehicles. 4 of them use a combination of regenerative braking and another system.

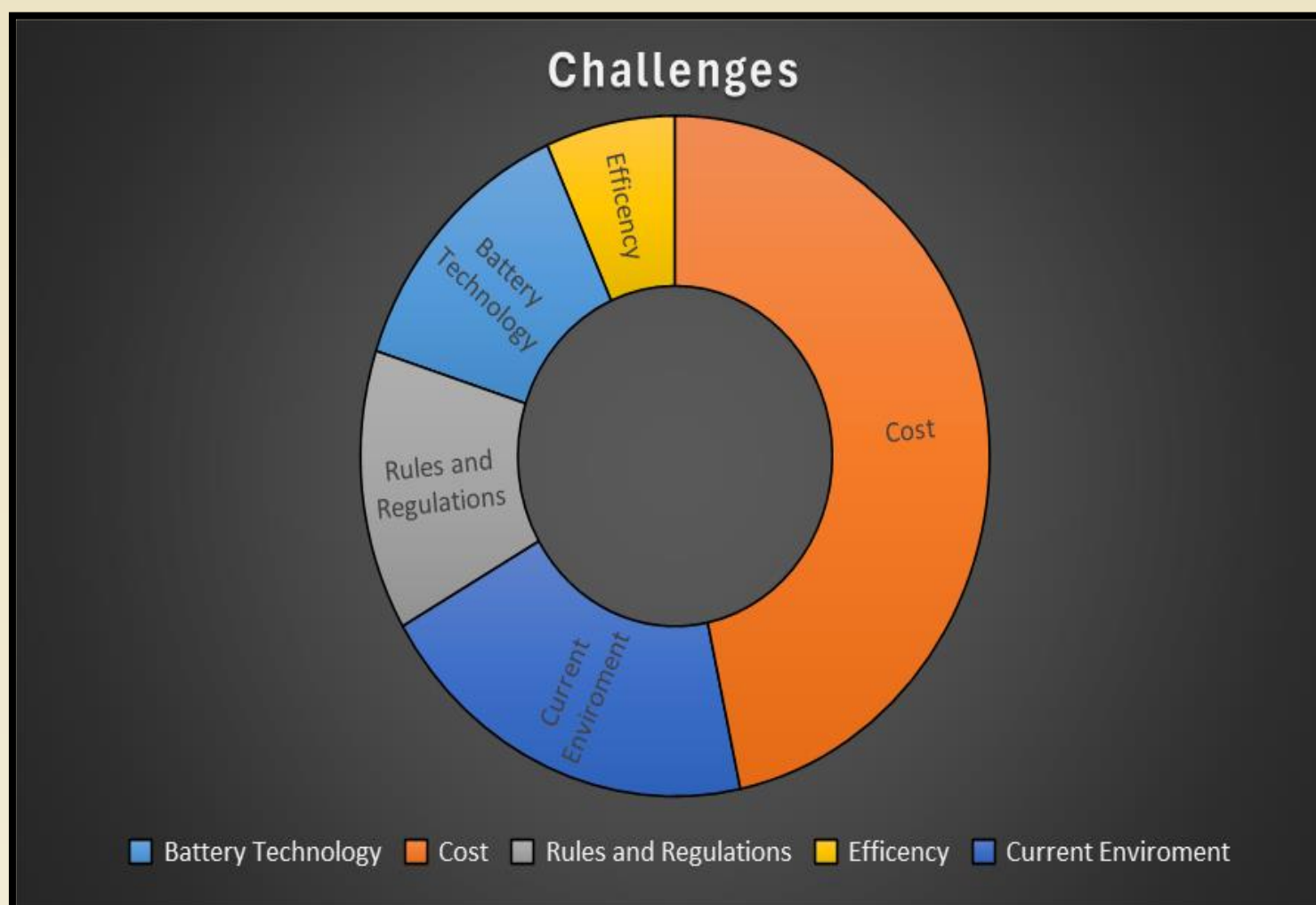


Figure 2: Shows the challenges in developing new technologies

The chart in figure 2 shows that 47% of the companies said that cost is the issue that prevents new systems being developed while current environment such as the Irish weather is an issue that 20% of the participants said is an issue with developing new technologies.

## Concept Design

The concept design involves the use of a flywheel and clutch to overcome the initial startup of a generator in an electric vehicle. This resistance can consume up to 75% of the power produced by the generator at startup.



Photo of an alternator mounted on the wheel of a bike

The idea stemmed from reading about a person who charged the battery of an e-bike by attaching an alternator to the wheel of the bike. Following on from this there was a case study done on a person where a ring gear was mounted on the inside of the rim to turn a shaft going to a generator.

## References

<https://www.pinterest.com/pin/649644315013488793/>.  
*Solar on Every Vehicle | Sono Motors.*  
<https://sonomotors.com/>.