7.4.5 Assistance to low-carbon innovation

Provide assistance for start-ups that foster and support a low-carbon economy or technology

GO-KART ELECTRICAL SYSTEM DESIGN CHALLENGE FOR A LOW-CARBON ECONOMY

This project focuses on the development of an advanced **low-carbon electric go-kart propulsion system**, centered around a **5 kW Hybrid Synchronous Reluctance Motor (HSRM).** Team Brainiacs Racing, from the Department of Mechatronics Engineering, Sri Krishna College of Engineering and Technology, works towards developing sustainable electric mobility solutions. By integrating electric propulsion technology with hands-on engineering practices, the initiative promotes the adoption and understanding of low-carbon electric mobility technologies.

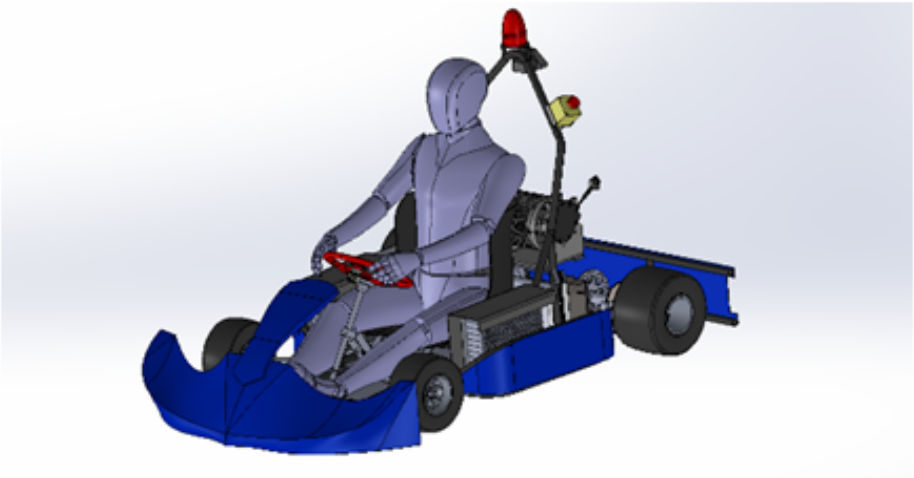
The project will promote **clean, energy-efficient transportation,** strengthen technical skills in green technologies, and encourage innovation contributing to a low-carbon economy.

Electric Go-Kart System Design Challenge

The project involves the design and development of the **electrical propulsion system of an electric go-kart using a 5 kW HSRM motor**. The development will emphasize:

- High-efficiency drivetrain design
- Battery and power electronics optimization
- Low-carbon lifecycle considerations
- Intelligent motor control (FOC, regenerative braking, thermal management)
- Safety, sustainability, and real-world engineering practices

This project functions as a practical platform for **low-carbon innovation**, guiding students through the design, fabrication, and testing of electric mobility systems.



Low-Carbon Technology Justification

The **5 kW Hybrid Synchronous Reluctance Motor** is an electric motor technology used for efficient electric propulsion. Its key attributes relevant to low-carbon innovation include:

High Energy Efficiency

- Hybrid synchronous reluctance motor technology supports **efficient electrical-to-mechanical energy conversion.**
- Efficient motor operation helps reduce power consumption and environmental impact.

High Torque-to-Weight Ratio

- Supports suitable torque characteristics for vehicle acceleration and performance.
- Enables compact powertrain design and contributes to efficient vehicle development.

Precise Speed and Torque Control

- Supports advanced motor control strategies for **energy optimization**, regenerative braking, and efficient battery utilization.

Brushless, Low-Maintenance Operation

- Brushless construction reduces mechanical wear and maintenance requirements.
- Reduced wear can contribute to a longer product lifecycle and minimized waste generation.

Environmentally Friendly

- Zero tailpipe emissions
- Reduced dependence on conventional fuel-powered propulsion
- Suitable for renewable-powered charging systems

Overall, the 5 kW Hybrid Synchronous Reluctance Motor supports the development of energy-efficient electric vehicle technology while contributing to sustainability goals and next-generation electric mobility research.



Electrical propulsion system of an electric go-kart using a 5 kW Hybrid Synchronous Reluctance Motor (HSRM).