

Modular PTO for Wave Energy Converters (MP-WAVE)

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Project aims

- Produce an optimized design of a modular integrated power electronics and permanent magnet generator topology
- The design and fabrication of integrated modules
- The production data which will feed into an LCOE & O&M analysis.
- Investigate modern materials and manufacturing processes

Generator modelling and build

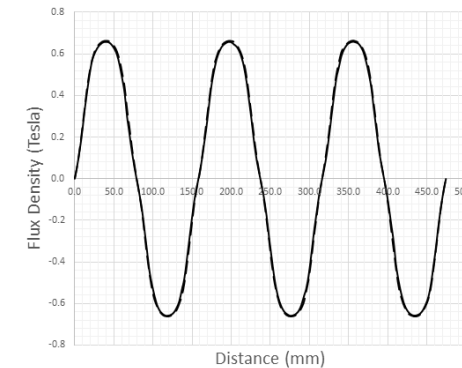


Figure 1: Airgap Flux density plot

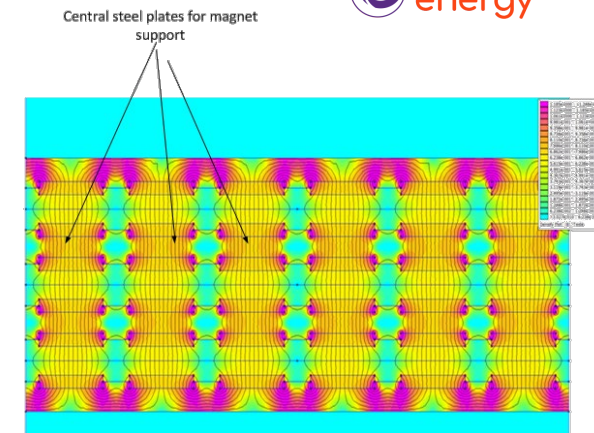


Figure 2: Generator flux density distribution



Figure 3: Fabricated single coil

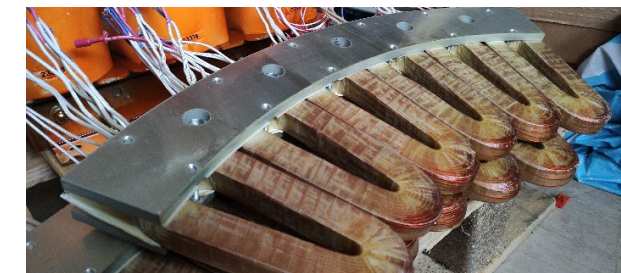
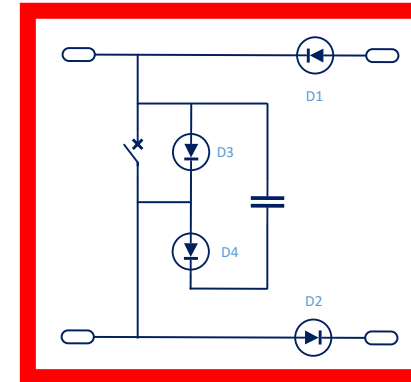
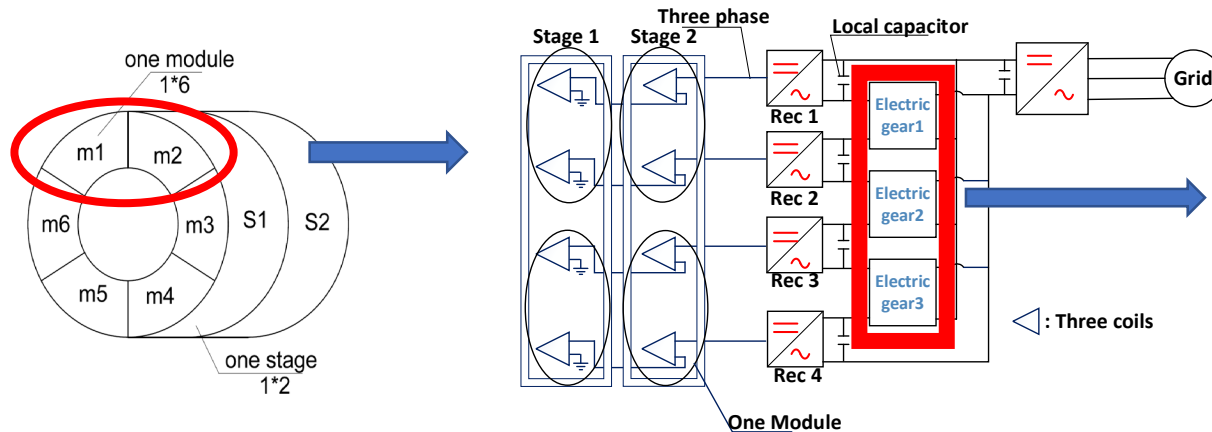


Figure 4: Six-coil blade module

Power electronics modelling and build



- High modulation index over wide speed range
- Lower ITDH
- Lower power losses
- Higher efficiency

Module material protection

Manufacturing Techniques

- Injection moulding holds significant promise → very high initial cost

Material Options

- Polypropylene (PP) → most promising all round material

Modelling Outcomes

- Polyphenylene sulphide provides best support to the blade

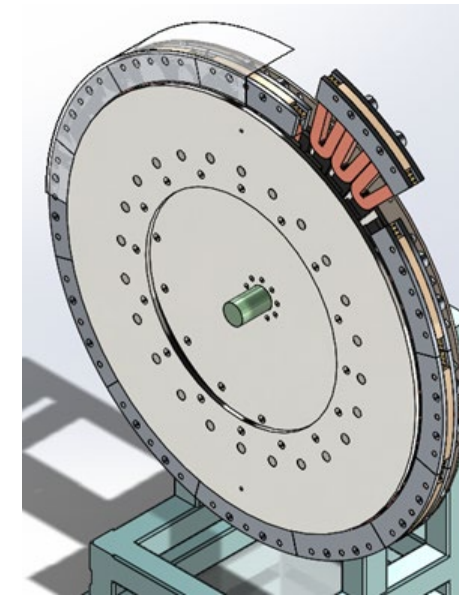


Figure 5: Integrated generator design

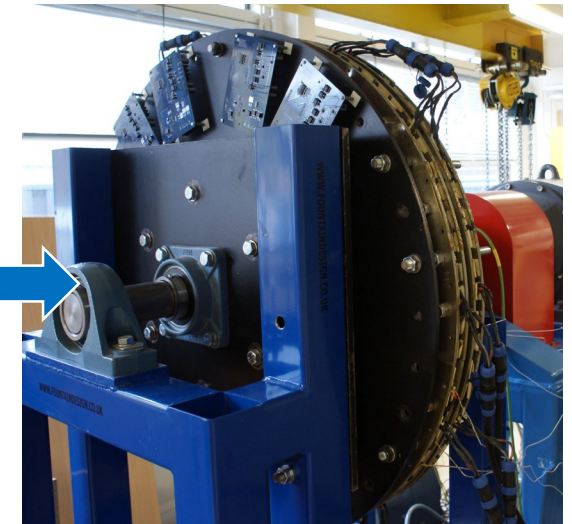


Figure 6: Assembled prototype