The S3 Wave Energy Converter represents a Paradigm Shift to reinvent Wave Energy Conversion

While the wave power available worldwide would in itself be sufficient to fulfil the planet’s electricity needs, successful attempts to harness energy from the ocean waves have remained elusive. Indeed conventional Wave Energy Converters (WEC) – referred to as Generation 1 devices – have inappropriate and bulky structures combined with complex Power Take-Off elements usually involving hydraulics, turbines and gearboxes. These hydraulic-based systems are inefficient and would require significant maintenance, which constrain their technical and economic viability.

Since 2009, SBM has been developing a new generation of breakthrough Wave Energy Converter, the S3, which addresses the limitations identified in Generation 1 Wave Energy devices. The S3 WEC features a direct energy conversion from waves to electricity using Electro Active Polymers (EAP) which offers numerous benefits.

2.1 TW is the average power waves alone can provide around the globe (source Gunn et al. 2012) - approximately equal to the total planet electricity demand

UN: 50% of the world’s population lives within 60 km of the sea – a natural match between the energy supply and demand

Wave energy is an immense and untapped resource - Attempts to harness wave energy have suffered from a lack of offshore expertise

Over $8 trillion is forecast to be invested in Renewable Energies over the next 25 years

This breakthrough concept builds upon the cost reduction potential of roll-to-roll manufacturing processes and the extensive operational feedback of the high voltage capacitor industry (EAP is similar to high voltage capacitors) to provide a Wave Energy system with reduced Capex and requiring minimum maintenance, resulting in a low LCOE (Levelized Cost Of Electricity). The floater and its mooring system have been successfully tested in the basin.
**SBM S3 Concept**
- Fully flexible tube with water, closed at both ends
- Multimodal response (standing waves)
- Energy conversion system = Electro-Active Polymers (EAP)

**EAP-based PTO embedded in the structure**
- Energy converted DIRECTLY from waves to electricity
- Distributed power generation
- EAP + roll-to-roll process

**For Wave Energy Generation 1 devices, conventional (rigid) systems are inherently limited**
- High structural costs
- Energy / stress concentration on Power Take-Off elements
- Mechanical Power Take-Off costly O&M
- Narrow & fixed absorption bandwidth

**Renewables Energy Market**
- Renewables market will be driven by concepts with an attractive LCOE
  Renewables are generally less mature than conventional energy sources, and still have a strong potential for further LCOE reduction
- WEC Technology is expected to be most attractive in the regions shown below