Information from the Internet. (Carbon Trust)

Energy payback period

Assumptions and data:

- The majority of primary energy used in steel manufacturing is a fossil fuel, which is used for heating, and there is relatively little direct electricity usage.
- The fossil fuel will vary but is assumed to be coal, which has a carbon emissions factor of 0.30 tCO2/MWh [4], and the efficiency of conversion to heat 90% = 0.33 is assumed to be 90%. This gives emissions of 0.30 tCO2/MWh tCO2/MWh, the reciprocal of which is 3.0 MWh/tCO2.
- 0.33 MWh of grid electricity is consumed per tonne of steel , and the associated emissions are 0.43 tCO2/MWh [4]. This product of these gives 0.14 tCO2/tonne steel due to electricity. Assuming a generation efficiency of 35%, the primary energy input due to electricity is 0.94 MWh/tonne steel, (0.33 MWh/tonne steel / 35%).
- Given total emissions of 1.75 tCO2/tonne steel (as above), 1.61 tCO2/tonne steel is due to heat input (1.75 – 0.14 tCO2/tonne steel). The primary energy 1.61 tCO2/tonne steel = 4.82 input due to heat is therefore 3.0 MWh/tCO2 MWh/tonne steel.
- The total energy intensity of steel manufacturing is therefore 0.94 + 4.82 = 5.77 MWh/tonne steel.

Energy used to produce the steel for the wave energy device:
665 tonnes steel x 5.77 MWh/tonne steel = 3840 MWh = 3.84 GWh

Energy payback period:

$$\frac{3.84\ \text{GWh}}{2.3\ \text{GWh/year}} = 1.7\ \text{years} = 20\ \text{months}$$

Note : Using the Reusa-Can system the payback period is immediate. If you don't manufacture it you don't produce CO2 emissions! As you can see they are quoting energy use to the ingot stage, a lot of energy is used between this and making a can. Transport cost etc is phenominal and distances can exceed a 16,000 miles in a round trip from the UK to China and back. There is no coke pollution with Reusa-Can.