

# **THE ENVIRONMENTAL AND ECONOMIC APPRAISAL OF SECONDARY LIGHTWEIGHT SLATE AGGREGATES**

BY

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## **SUMMARY**

In recent years the European Union have set legislations and targets which countries and companies have to meet concerning their environmental impact. Two large commercial sectors which have substantial environmental impacts are the concrete industry and mining. Manufacturing aggregates, especially lightweight aggregates, produces large amounts of CO<sub>2</sub>, so reducing these emissions are important. The quarry industry is an energy intensive process, in particular the slate sector. The extraction of slate is a wasteful process with up to 93% of extracted slate discarded as waste. With the introduction of an aggregate levy and increase in taxes on primary aggregates an opportunity has arisen to utilise this waste slate to produce secondary lightweight aggregates.

This research has proven that slate aggregates can compete with other lightweight aggregates both in individual aggregate strengths and strengths in concrete cubes. Therefore an environmental and economical appraisal in the form of a life cycle analysis and a market report respectively were undertaken to see how slate aggregate would compare to other lightweight aggregates.

The environmental analysis will help understand the product in more detail. It will show the energy inputs and the CO<sub>2</sub> outputs of making the slate aggregates. It has been shown that the energy and CO<sub>2</sub> production amounts were the same as other aggregates. However other harmful gases including SO<sub>2</sub> were reduced.

For slate aggregates to succeed, a market analysis was needed to highlight the financial risks involved in this type of venture and to show there was the supply and demand for the material and the slate aggregate. The risks of concern are the same for any secondary aggregate company therefore they are no additional risks to slate aggregate manufacturing. From the research there is the material available for sustainable production and there is the demand for slate aggregates in the current market.