

## Quarries environmental footprint in the framework of sustainable development: the case study of Milos Island

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### ABSTRACT

The installation and operation of a quarry contains complex, difficult, and sometimes unsafe processes (such as explosive) that may affect public health as well as the whole environment and the sustainable development in general in the area which guest the quarry. This paper focuses on the Environmental Footprint from quarries activities located in the island of Milos (Greece), where bentonite, perlite, and pozzolan (type 1 and 2) are mined and extracted. Results indicated that energy consumption is considered to be higher for bentonite than perlite, while pozzolan presented with limited consumption per ton of product. More specific for the production of bentonite 1.81 L/t of oil is needed, 6.15 kWh electricity as well as 7.21 kg of production needs 1 m<sup>2</sup> area. Regarding the production of perlite 2.86 L/t of oil is needed, 16.38 kWh electricity, while 7.43 kg required 1 m<sup>2</sup> production areas. Pozzolan type 1 consumed 0.71 L/t of oil, 0.87 kWh electricity, and 0.01 kg explosives and 2 m<sup>2</sup> of production area are needed, while for the production of pozzolan type 2, 0.87 l/t of oil, 0.76 kWh electricity are needed as well as an area of 10 m<sup>2</sup> is required. Concerning the waste generation (which mainly includes rock materials) is 0.83 m<sup>3</sup>/t for bentonite, 0.39 m<sup>3</sup>/t for perlite, while in the case of pozzolan 1 and 2 are zero due to the fact that both materials are homogenized. Gaseous emissions were calculated as equivalence of CO<sub>2</sub> and for the bentonite was 1.52%, for perlite was 2.18% per production ton of final product.

*Keywords:* Quarries; Environmental footprint; Greenhouses gas emissions; Ecological footprint; Carbon footprint; Mining activities

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