



Whitelee Green Energy Wind Farm

**A LOCALLY SOURCED, SUSTAINABLE FOR A
RENEWABLE ENERGY CONSTRUCTION PROJECT**

The challenge

Whitelee wind farm, near Glasgow, was developed by Scottish Power through principal contractors Morrison Balfour Kilpatrick. The objective was to find a locally sourced cementitious solution and a sustainable product with lower embodied CO₂ for a construction project focused on providing renewable energy. The product also had to be suitable for large concrete pours required for the foundations and bases of 215 wind turbines on the 5,300 hectare site, an area roughly the size of Aberdeen.

Our solution

Phoenix cement is made using low carbon fly ash. Tarmac's joint venture with ScottishPower, ScotAsh, manufactures the fly ash with cementitious properties required for Phoenix at its site in Longannet using the by-products from coal-fired power generation. Phoenix cement is made at Tarmac's Scottish plant in Dunbar by replacing some of the clinker with fly ash, which reduces the amount of primary aggregate used to make clinker and therefore CO₂ emitted during cement production - making it a greener alternative to ordinary Portland cements.

Results and benefits

Tarmac has been working with Scottish Power for many years, using fly ash in cement to produce greener alternatives for the construction industry, which require lower energy in production. Specifying Phoenix, an environmentally friendly material, to produce a renewable energy source was an obvious partnership. On the Whitelee wind farm project, Phoenix's lower heat of hydration generation also provided considerable benefits, as it kept heat levels in the concrete turbine bases low during the concrete pours, reducing the risk of early-age thermal cracking.

“We had the choice of using several ordinary Portland cements for this project – but Phoenix® cement stood out, for ticking both technical and environmental considerations. Most importantly, a wind farm is a sustainable development, within a sensitive habitat – so using a sustainable building product like Phoenix® was an obvious choice.” Ian Smart, managing materials engineer, Morrison Construction.

For more details visit: [tarmac.com](https://www.tarmac.com)

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