

## Moving ahead Reducing our carbon footprint



*Our renovation of King's Cross station in central London is scheduled to include renewable energy features.*

*The station was designed by Lewis Cubitt and built in 1851 on the site of a smallpox hospital. It is now both a Grade I listed building, and a busy transport interchange with around 120,000 passengers passing through every day.*

A major renovation programme is underway to update the station for the 21st century and to meet growing passenger demand. The work includes complete refurbishment of the offices on either side of the station, a new platform, a new ticket hall to the western side and restoration of the square at the front of the station.

To meet the requirements of the Mayor of London's Energy Strategy, 10 per cent of the refurbished station's energy demand must be supplied by renewable energy sources. We considered several types for King's Cross.

We discounted wind turbines as the 1850s masonry would not be able to withstand the additional load, and the surrounding buildings would cause the wind to gust and reduce the turbine efficiency. Geothermal piles were also unsuitable because the subsurface space under King's Cross is already heavily congested with underground railway lines and access tunnels.

We ultimately settled on photovoltaic cells – which use semi-conductor technology to convert sunlight into electrical energy – as the best option for the aesthetics and structure of this famous building.

We identified a number of potential locations for the photovoltaic cells; to achieve maximum sunlight and minimum interference with the appearance of the station, we decided to sit the cells along the apex of the two main train shed roof lanterns. The cells will cover 2,500m<sup>2</sup> on the roof and will generate 189,000kWh per year, about 10 per cent of the station's energy requirements. The design of the cells was approved by the London Borough of Camden and English Heritage.

To generate the maximum amount of electricity, we will use high output crystalline photovoltaic cells. We tested numerous cell permutations and settled on the 'beer mat' design because it will still allow light to penetrate to the platforms below.

It has taken a lot of trial and experiment, but we think we have integrated contemporary engineering and celebrated architecture in a way in which Cubitt himself would have approved.

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