calculated to amount to 455kg of carbon emissions each year, or 11.4tonnes over the 25-year life.

Paul Simmons of the council's regeneration group says: 'The group wanted to address the need for safety of park users in as sustainable a way as possible,' to which Steve Dolan, of Manchester Leisure, adds: 'Solar lights had been chosen due to the lack of power supply within the park, and their low maintenance and operating costs.'

Each of the 11 lighting units uses a Pathfinder luminaire with dual CFL tube 24W – maximum of 48W with 3,600lumen = 75lm/W – and high-frequency DC gear.

Due to its longish elliptical footprint, the unique refractor optics of the Pathfinder allows maximum spacing in narrow pathways such as found in the park, allowing fewer lights installed and extra cost savings.

At 29m spacing between units, the lighting report calculated an average illuminance of 6.4 lux, which complies with BS 5489, part 3, category 3/2 for subsidiary roads.

The lights were installed within two days without digging up the park, and a spokesman for Manchester council notes: 'We will be reviewing effectiveness of the scheme in the winter months with a view to introducing similar schemes across other parks in Manchester.'

So far, the lighting has worked well through the present winter period.

An exceptional on-site guarantee of six years eliminates all maintenance costs for the council during this period, with the exception of vandalism. Extra module protection on the front and rear sides greatly reduces the risk of damage through vandalism, while the luminaire bowl is made of vandal-resistant polycarbonate with an anti-breather labyrinth.

Since the park management required a lighting time of three hours after dusk, the light is run in winter with one 24W lamp, which is the maximum size for this energy demand. From March to October, both lamps are switched on to achieve full brightness at night.

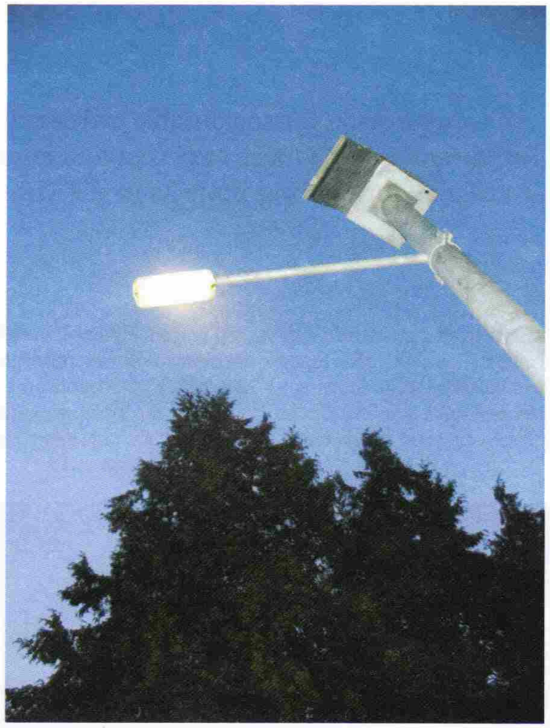
Grid-connected solar streetlighting differs from stand-alone technology. Here, the electricity is produced by a solar module with a built-in DC-AC inverter, which is mounted on the lighting column and energises the grid during the daytime. At night, a separate circuit takes energy from the grid to power the street lamp.

The cost of grid-connected solar technology is normally lower than of stand-alone technology because battery storage is not required. Moreover, there are no limitations with regard to the lamp output. Also, the photovoltaic module is optimised for summer operation and used to its full capacity since there is no need to match a specific load.

Stand-alone systems, however, are mostly optimised for winter operation and oversized for the summer. With grid-tied systems, the utility grid is energised at peak-time during the day and supplies off-peak electricity at night, which is beneficial with regard to energy cost and demand matching.

The solar module fitted to the top of the lighting column will produce between one-fifth and one-half of the annual energy needed to energise a specific light bulb. 'Green' savings for a grid-tied module of 100W will amount to 57kg of carbon emissions a year, for 100 units 5.7t/year, and during a useful life of 25 years, 143.5t of emissions.

If, as in other EU countries, the price for green energy per kWh could be regulated at two to three times the rate of energy produced by fossil fuel, the incentive to potential users of grid-tied solar lighting with regard to energy credits would increase greatly – and life-time cost would be the same or less than with normal lights.



**'Using natural power sources is not only "environmentally friendly", it also eliminates the need for cabling work'**

Another energy savings technology used increasingly in the UK gives 20-30% savings with grid-connected lighting. It applies magnetic control technology in two or three phases of the lighting circuit.

The technology is useful because streetlights must not be run at 230VAC for proper function, and safely reduces the input voltage to about 210VAC. This is sufficient to run most street lamps while keeping the visible light intensity at about the same level, increasing lamp life and reducing maintenance cost substantially.

One of the most promising developments in the last five years is the combination of the latest LEDs with photovoltaic technology for lighting applications, and particularly sign lighting.

White LEDs are now available with about 50lm/W and in a selection of beam angles, which makes them ideal for use as traffic and other sign lights without light spill. An LED sign light of 2W can now replace a fluorescent sign light of 16W, without compromising on brightness and required uniformity of illumination.

Moreover, a solar stand-alone LED sign light of acceptable size and cost can be operated all night in the UK, including winter. Consequently, any off-grid site in a community that could not install sign lighting due to exorbitant connection charges can now do so, and increase road safety with zero energy costs. The units are supplied with an average on-site guarantee of six years, so there are zero maintenance costs for this period, too.

When comparing a lighting scheme of 50 solar LED sign lights for traffic signs of 600x600 mm with EST grant funding of 50% with a conventional scheme, minimum savings of £30,000 can be achieved during a life-cycle of 25 years, due to lower maintenance and zero energy costs. Green saving will amount to 57.5t of carbon emissions over the same period.

Local government is not alone in investigating alternatives for public lighting. In March 2005, the Highways Agency completed a small project to install a solar and wind-powered road safety sign on the A1 near Peterborough at a cost of £19,500.

Graham Littlechild, the HA's route manager, says: 'Using natural power sources is not only "environmentally friendly", it also eliminates the need for cabling work and saves a considerable amount of money and keeps the length of the roadworks down to a minimum.'

It is a step in the right direction.

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