



3b. *How to:* Generate your own power

Why is it important?

The burning of fossil fuels for energy has a detrimental impact on the environment and dental practices consume a substantial amount of energy.

However there are a number of systems dental practices could consider to generate their own energy. The benefits include making use of secure and local resources, reducing dependence on non-renewable energy, helping to reduce the production of greenhouse gases and other pollution and reducing your energy bills. It is also possible to generate income by selling your surplus energy back to your energy provider in some cases.

The most common small-scale energy generating systems available are:

Solar water heating (solar thermal): This is the most cost efficient option with pay back times for a £4000 system as little as 7.5 years. (This estimate is based on numbers provided from the Energy Saving Trust for a domestic household size of 6 where the solar thermal would be replacing a gas heating system).

Solar energy directly heats fluid in the tubes or panels which in turn heats water for use in sinks or showers within the practice. This is generally used in combination with a boiler which can top up the water temperature as necessary. A dual coil hot water tank is required (the system is not suitable for use with an on-demand 'combi' boiler).

Solar Photovoltaic systems (solar panels): The most common system is a 4kW generation capacity and can be installed without special permission. The current cost would be approx. £6000-£11000, with an inverter needing to be replaced every 10 years. This would suit practices who spend more than £10 per week on electricity, with a pay-back period on the solar panels in around 10-12 years.

Biomass systems: these are wood-fuelled, burning wood pellets, chips or logs to provide warmth in a single room or to power central heating and hot water boilers. Biomass heating of a practice can be sustainable if the Carbon dioxide emissions generated is taken up by forests or trees at the same rate as it is burnt. These would only be suitable for large practices, probably in rural areas with access to biomass products, and space to store them. Boilers can be expensive with installation costs of £6000-12000 and hardware around £5000-£12000.

Ground source heat pumps (GSHPs): use pipes buried in the ground to extract heat and transfer it for water or underfloor or warm air heating systems. A heat pump costs around £5000.



Why is it so important? *continued*

Wind Turbines: A dental practice could consider a 1KW-2KW wind turbine, however it would need to be sited away from buildings, trees etc. There may also be noise restrictions for their use, as well as planning regulations if the turbines are bigger than 1KW. Costs are around £2000 for a 1KW turbine.

Hydro technology: uses running water to generate electricity e.g. from a stream or river. This is very site specific and the site needs a professional assessment



What does a Sustainable Practice look like?

Real life example:

East Kent Hospitals University Trust installed a solar panel system on the roof of their Heart Centre to supply energy for WC facilities. The implementation cost was estimated at £8-10K and the life cost payback was anticipated to be within 10-12 years. *Crispin & Borst* were appointed as the lead contractor for the design and build project.

Modelled example:

Natalie works as a Practice Manager at a mixed NHS/private practice. 6 months ago the practice had a solar panel system installed on the roof. As well as lower electricity bills which have been cut by approximately one third, they are part of the Government's 'Feed-in Tariff scheme' and the practice is receiving money each month for the electricity generated.

This money is being used to save for the installation of a ground source heat pump which the practice hope to install in 1 years time. An assessment of the grounds behind the practice has been carried out for this by a reputable installer.



Actions

KEY:

Implementation: Easy = 😊😊😊 Less Easy = 😊

Investment Cost: Low = 💷 High = 💷💷💷

Financial return on Investment (ROI): Low = 🐷 High = 🐷🐷🐷

Environmental benefit: Small = 🌍 Large = 🌍🌍🌍

- Get a site assessment for renewable power options 😊😊💷🐷🌍
- Find a reputable installer* and discuss the options available to your practice 😊💷🐷🌍
- Find out if you need planning permission from your local planning department 😊💷🐷🌍
- Find out if you could benefit from the Government's 'Feed-in Tariff scheme' which pays you for the electricity you generate, even if you use it. (See Links) 😊💷🐷🐷🌍
- Install solar thermal and/or photovoltaics. 😊💷💷💷🐷🐷🌍🌍🌍

*Installers certified under the 'Microgeneration Certification Scheme (MCS) and who use MCS-certified products are recommended by the Energy Saving Trust

You can calculate both the money saved and carbon saved

•**Money saved:** compare costs of waste collection fees and purchasing of goods costs each month before and after implementation

•**Carbon saved:** Carbon calculator
<http://c.environmentalpaper.org/home>



Resources

Case studies:

East Kent Hospitals University Trust

<http://map.sustainablehealthcare.org.uk/east-kent-hospitals-university-trust/solar-panel-domestic-hot-water-dhw-services-wc-facilities-h>

More links:

Generating your own power guide:

<http://www.greenerscotland.org/home-energy/generating-your-own-power>

Electricity Guide:

<http://www.electricity-guide.org.uk/home-power-generation.html>

Energy Saving Trust installation information:

<http://www.energysavingtrust.org.uk/renewable-energy/installation>

Energy Saving Trust: Government Feed In Tariffs (FITs):

<http://www.energysavingtrust.org.uk/renewable-energy/electricity/solar-panels/feed-tariffs>

Duane. B, Ramasubbu. D, Harford. S, Steinbach. I, Stancliffe. R, Croasdale. K, Pasdeki-Clewer. E. (in press). Environmentally sustainable Dentistry: Energy use within the dental practice. British Dental Journal.

Dental Susnet, online network for improving the sustainability of dental services:

<https://networks.sustainablehealthcare.org.uk/dental-susnet>