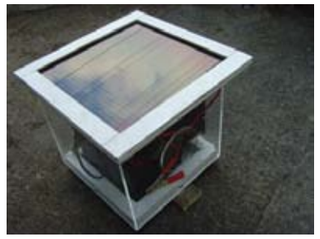
The Bicycology Stroud Energy Cube.


The Pedal-Generator system is based around a second-hand and slightly battered Dawes touring bike, which is used to carry all the kit when needed, and as a primary means of transport the rest of the time (ideally, everything would fit on the pannier rack on the back of the bike, but at present some items are carried either in a trailer or rucksack).

The system works by hoisting the bike off the ground using an old Training Stand (/'Turbo Trainer'). These stands are used by racing cyclists to train when weather forces them indoors. Bicycology Stroud obtained one from Freecycle (they are available second-hand from Ebay for around £50 including postage), or you could build one yourself. The advantage of the stand we use is that it can be folded up and attached to the pannier rack with a bungee cord, allowing us to cycle around and then set the system up quite quickly when we stop.

Once the bike is off the ground the rear wheel can be used to turn a dynamo to produce electricity. Different Pedal-Generator systems use different dynamos. The Bicycology Stroud system uses an old Boat Dynamo (rescued from a skip), which was easy to fit to the old mounts for the friction unit of the training stand. Most pedal-generators seem to use small motors which will produce electricity if they are spun in the direction opposite to that which they turn when they use electricity (for instance, the Magnificent Revolution use 24 Volt DC electric scooter motors, which cost ~£30 on Ebay). Usually such motors have a thin spindle that rotates, and it can be difficult attaching something larger to this which will work nicely with the rear wheel of the bike. On the boat dynamo we use, the casing of the motor itself spins and this provides a nice large area for the rear wheel to run on.



The dynamo is 24 Volt AC, which means we need some extra parts between it and the appliances we want to run (on either 12 V DC or 240 V AC). The first of these is a Bridge Rectifier (under £5). This converts the AC Voltage into DC. If you had a DC motor/dynamo you'd want a Diode here instead, to prevent current from travelling into the motor and making it spin (~£2). The rectifier is the small grey box in the pictures above (most clear in the central picture).

Electrical appliances generally like to receive a steady current, but a pedal-generator will produce varying amounts, not to mention spikes. To smooth the voltage out we use an old Car Battery (a new one will cost upwards of £50). This works OK for what we do, but isn't ideal. It's heavy, has much more capacity than we need, and must not be tipped over, otherwise acid will spill, or short-circuited (a direct link between the positive and negative terminals), which would make it explode. It's also important not to overcharge such batteries.

To prevent over-charging or draining the battery, we use a standard *Multimeter* (~£10 from Maplin and similar), set to measure Volts, which gives an indication of whether the battery is well-charged, charging, draining, or badly drained (whether you need to pedal slower, faster, or stop everything!). We haven't yet wired up a second Multimeter to show current, and thus either how much electricity you are actually generating or whether this is less or more than what is being used at any igven moment, but we will...

Lots of appliances run at 12 Volts - in particular, those designed for 'in-car' use. The Bicycology Stroud system has a Cigarette Lighter Socket that clips onto the Battery Terminals and provides the standard socket for in-car devices, which we have used to run a 12 Volt DVD player.

Other car related devices can be run wired directly to the battery, such as old headlights. The Bicycology Stroud system runs a new Car Radio-Cassette (£30 for a cheap model, second-hand ones without anti-theft codes which are a pain seem to be hard to find but you might be lucky at a car-boot or freecycle, £50+ for a new one with a mini-jack input).

The Bicycology Stroud system has new Car Speakers (~£35) to match the impedance of the car amp (you might find second-hand ones). We drilled large holes to fit the speakers into some suitably sized old boxes. These hang on the pannier rack using a not particularly pretty or efficient system of plumber's copper piping stays.

Most electrical appliances you come across are designed to run on Mains 240 Volt AC electric, from a 3-point plug (even though many will turn this voltage into something else, often 12 Volt DC...). We have a 600 Watt Invertor, which clips onto the battery and converts the 12 Volt DC electric into 240 Volt AC. As you won't be getting more than 100 watts from your generator over a sustained period of time, you can use a 300 watt invertor, which would be lighter. These are easily available, from Maplin, for instance. The invertor powers a standard DVD Player and our Projector.

Our Pedal-Powered Cinema is dependent on a low energy *LED Projector* (a Samsung SP-P310ME. £310 including postage from Ebay). Toshiba also made a model but at the moment, only unbranded versions are available - I haven't seen these working but their spec usually seems to be lower. At present we run this from the Invertor, but as it actually runs on 14 Volt DC, we're looking into getting a DC:DC Convertor, so we'll be able to run the cinema without any mains electricity, thus making the system safer, and more efficient.

Then there's a few standard cables to wire everything together...

And that's it... If you have any questions or would like to arrange a pedal-powered film showing or something similar please email:

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