



# com<sup>®</sup>charge

A robust and portable solar-powered mobile phone charging station. Capable of charging up to four phones at a time. Easily adaptable to suit your needs.

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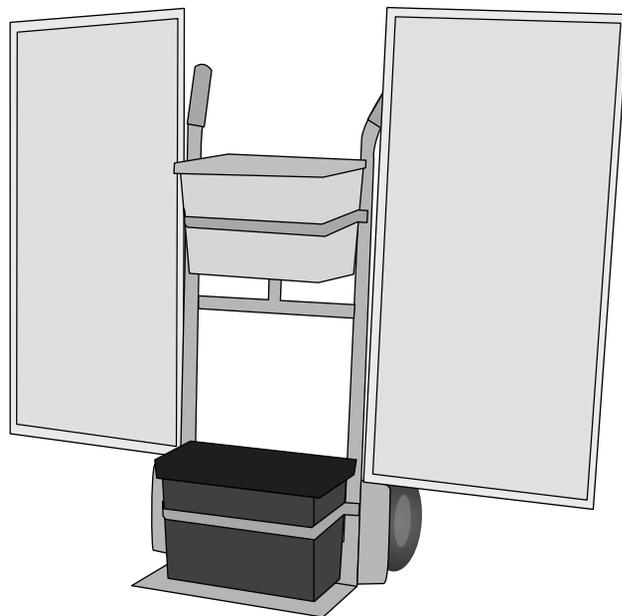
## main components

sack trolley with pneumatic wheels  
deep cycle battery (1 × 12V)  
solar panels (2 × 60W)  
solar charge regulator  
wiring and bolts; brackets; plastic boxes

**total cost: £350 (approximate)**

## sourcing suggestions

- the sack trolley needs to be strong enough to hold two solar panels and up to two car batteries
- the solar regulator is essential to allow the charge generated by the panels to recharge the batteries without overcharging; it also prevents the batteries from being completely drained, which would damage them
- small plastic boxes are used to protect components from water, making the station resistant to light rain showers, but drill holes in the bases so any water that does get in will drain
- a standard 12V (cigarette lighter) socket is used for attaching chargers to the solar regulator



## building com-charge

The steps here are a general guide, as the types of components available to you will vary with location. Com-Charge is a flexible design, and can be adjusted to suit your requirements. For example, you might find that using two batteries is more suitable, or that smaller solar panels are adequate for your needs. Remember to share your improvements!

1) Attach the batteries to the trolley using metal brackets. Place the batteries as low as possible on the trolley to keep the centre of gravity low – this is important as the trolley must often be moved over rough ground. To facilitate smooth movement, a trolley with pneumatic tyres is essential. For water resistance, use a plastic box to hold the battery in place, but make sure to drill drainage and ventilation holes in the bottom of the container.

2) Add two protruding bolts to one side of each solar panel to allow the panel to be connected to the trolley. On each side of the trolley, drill two sets of holes which allow the panels to be attached in parallel to, or perpendicular to, the direction of transport. Hinges are an option here, but can be less durable, and harder to securely attach to the panel. In the standard design, panels are attached by placing their bolts through the holes and securing with a wing nut.

3) Attach a sealable plastic storage box high on the trolley using pop rivets, then connect the components together inside this box to protect from dust and moisture. All electrical connections should be made using standard 2-core cable and screw connection blocks, to allow faulty components to be swapped easily. Electrically, the batteries are connected in parallel onto the 'battery' terminals of the regulator. Panels are connected to the 'input' terminals of the regulator. It is important that panels are only attached after the battery has been connected to the regulator to prevent the regulator from becoming damaged. Attach the 12v socket to the 'load' terminals of the regulator. This socket will charge either a cellular handset, or a portable computer or tablet. A 'splitter' socket will allow charging up to four devices at a time.

## using com-charge

When the trolley is being moved, the panels are attached in parallel to the direction of movement. This strengthens the trolley and keeps it narrow, allowing it to pass through doorways. When the trolley is stationary, panels are placed in the perpendicular position, maximising the surface area for solar collection. While charging, the chargers, socket, handsets and computers can all be placed in the upper plastic box to protect them from adverse environmental conditions.

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