Solutions for Charging Phones in Areas with Poor Electricity

In many of the locations we work, there is limited to no power - or at least a reliable source of power. In these situations, here are a few recommendations:

NOTE: *these are just some that we have seen used before, always look for local solutions first as they will be the cheapest and ultimately best options.*

Solar Solutions:

- There are a number of solar panel providers that have small solutions for cell phones
    - D-Light- in addition to larger manufactures and DIYers had solar power cell phone chargers.
    - Nuru- has solar powered lights that can also charge mobile phones.
    - SunTransfer lamps - seem to work better as they have much more powerful batters (sealed lead). Can sometimes be found locally
    - Sun King - great low cost option that are both lamps and chargers
        - **Recommended** The Sun King Pro (currently in deployment in Mozambique with success).
        - The Sun King Pro 2 is deployed in Myanmar. During rainy season, it takes a bit less than 2 full days to charge its 3000mAh@3.3V battery. A 100% charge of the Sun King Pro 2 charges around 50% of the 2300mAh@3.8V battery of the Huawei G730-C00 smartphone (and it goes pretty linearly : 50% of the SKP2 charges 25% of the phone battery).
    - mPowerPad - multi-function power charger with built-in reading light and radio.
    - BBox - Solar powered kits that range from "charge lots of usb things" to basic DC power, all the way up to powering laptops and beyond
        - BB5 (portable for phones/tablets) and BB17 (portable but heavy and large) for laptops
        - SunPowerAfrica - Reseller in Lusaka
    - Lumos: A solar powered backpack that has USB outlets to charge your electronic devices
    - Nokero: Their current light/charger (N223) can recharge a 2000/3000 mAh battery efficiently, they have a new model coming out in January 2016 that will be even more powerful. Great price point at 29 dollars a unit.
    - Little Sun: Portable solar chargers. For 7 hours of charging in the sun, the Little Sun solar phone charger can charge smartphones or standard phones and benefit from 12h to 150h of light thanks to the integrated lamp

- Alternatives to solar panels:
    - BioLite - that chargers your phone and boils a pot of water a the same time. (NOTE: this was NOT designed for the developing world)
    - Bicycle powered generator. Remember those old school bike lights that turned on when you pedaled your bike? Well, now it can power a light AND charge your cell phone at the same time. Scour the internet, as last time I checked Nokia, Nike, and a slew of Do It Yourself-ers all had websites with products and designs

Local Charging Stations:

- With the growing use of cell phones, it is more and more common for villages to find their own ways to charge cell phones, and turn it into a business. Many shops will have a battery or solar charger that they will offer to charge cell phones for a nominal fee. NOTE: beware that some of these shop owners like to take factory batteries out of phones and replace them with imitations, or mess with the software on the phone while its charging.

Tips for increasing Battery Life:

- **Keep WiFi, Bluetooth, and GPS switched OFF when not in use.**
- **Reduce Screen Brightness and Screen Timeout.**
- **Switch to using only 2G networks, especially if the primary use of phone is to run CommCare (which works fine with just 2G).**
- See which applications are using up a lot of battery charge. Go to Settings -> Battery. **Generally, 3G, WiFi, Screen Brightness, GPS, and Bluetooth consume most power.**
- Setup a black image as phone background. To take a black picture, cover camera with your hand and click a photo. Then use it as wallpaper.
- In general, feature phones have much better battery life than Android smartphones
- Turn the phone off at night- especially if it is only being used for work, be sure to keep the phone off when not in use
- Keep your screen off when not in use- most of a smart phone's battery will be used for the screen. By having your screen time out quickly or making the screen "sleep" when not in use you can conserve charge.
- Put your phone into "airplane mode"- if you are in an area with limited reception your phone will expend a lot of energy trying to find signal. Putting your phone into airplane mode will help with this.
- Try installing a battery monitoring app- on android, some of these will show the percentage charge in the status bar which makes it easy for the user to see how much charge is remaining.
- Here are some more hints: http://www.wikihow.com/Save-Battery-Power-on-an-Android

Good Questions to make sure you are asking:

- **About the device:**
    - Has the device been selected? (can estimate power usage if specific model hasn't been selected)
    - How much power does it take to charge?
- **About the charging workflow/power plan:**
    - Will each solar unit only be used to charge the device? What else will it be used to power?
    - How many devices will be used per charger/solar system?
    - What hours are the devices expected to be used? What hours are the devices expected to be charged? Is there enough of a charge to use ratio to ensure the devices are fully charged, even on cloudy days?
    - How many days can a fully charged device last without needing to be recharged?

- How much time is needed to fully charge a device from the solar system?
- Are the devices going to be left overnight to charge? Or in the afternoon when not in use?
- Is there worry of theft of the devices while they are charging?
- **About the solar system:**
  - Does the solar system need to be mobile?
  - Who is installing the solar system? Have they used solar before? (know which way to point the panels (not just at the sun...))
  - What is the warranty/replacement policy for the battery and units?
- **Parasitic use:**
  - Should we expect parasitic use of the solar panel? (lights, charging personal phones, powering TVs and DVD players)
  - If the answer is no parasitic phone use - I challenge you - and would be curious to know the plan for preventing it
- **Checking assumptions and calculations:**
  - Do you have examples of the calculations you ran to size the solar system for the device and workflow?