What is renewable or "green" energy? Renewable energy is made from resources that nature will replace, like wind, water and sunshine. Renewable energy is also called "green energy" because it doesn't pollute the air or the water.

As we read about and watched in the story of William Kamkwamba, "The Boy Who Harnessed the Wind". Green energy and in his case Wind energy can mean the difference between feast and famine in many places in the world today. However, we all should be looking for ways to support our Earth by using green resources and methods whenever we can.

For our project today, we will build a solar usb charger. This charger is a green source because it is powered by solar energy.

Time: 30-60 Minutes

Parts:
- 6v Solar Cell
- USB Charging Circuit
- 3 AA Battery Holder
- 3 AA Rechargable Batteries
- Toggle Switch
- Wire
- 1N914 Diode
- Altoid tin or other case

Tools:
- Solder
- Soldering Iron
- Wire Cutters
- Hot Glue Gun or Foam Tape (optional)

Instructions:
1. **STRIP WIRES**: Strip the ends of the loose wire segments as well as the ones leading from the battery holder.
2. **SOLDER the DIODE**: Find and examine the diode. Positive and negative sides are pictured at left. Solder the positive wire to the positive terminal of your solar cell. Trim the excess wire from the diode.
3. **SOLDER LOOSE RED WIRE**: Twist one stripped end of a loose wire segment around the negative (unsoldered at this point) side of your diode. Solder this connection and then thread the other end of the wire through the hole in the top piece of the box.
4. **TWIST BOTH RED WIRES**: Twist the other end of the first loose red wire with the positive (red) wire from the battery pack.
5. **SOLDER RED WIRES to SWITCH**: Solder the joint pictured in step 4 to the middlemost terminal of the toggle switch. Solder one stripped end of a different loose wire to the outermost terminal of the toggle switch.
6. **SOLDER LOOSE BLACK WIRE**: Solder one stripped end of the single black wire to the negative terminal of the solar cell. Thread the other end through the same hole on the top piece of the box as the diode/red wire combo.
7. **TWIST BLACK WIRES**: Twist the negative (black) solar cell wire and the negative (black) battery holder wire together.
8. **SOLDER WIRES to USB CIRCUIT**: Solder the twisted black wires to the negative (-) terminal of the USB circuit. Solder the single red wire from the switch to the positive (+) terminal of the USB circuit.
9. **TEST CIRCUIT**: Use a gadget to test your circuit before final assembly.
10. **FINAL ASSEMBLY**:
    a. Use hot glue or foam tape to secure the battery holder & USB circuit inside Altoid tin or other container.
    b. Secure switch with the included nut.
    c. Use hot glue or foam tape to secure the solar panel to the top of the box and screw it down.

YOU'RE FINISHED!

HOW CAN WE IMPROVE THIS DESIGN?

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