Here are the build instructions with the bill of materials for the project described in the article linked:https://randomnerdtutorials.com/power-esp32-esp8266-solar-panels-battery-level-monitoring/

Build Instructions:

Step 1: Gather Materials

Before starting the build, you'll need to gather the following materials:

- ESP32 or ESP8266 development board
- 5V solar panel
- Lithium-ion battery
- TP4056 lithium-ion battery charger module
- LM358 operational amplifier
- 10kΩ and 100kΩ resistors
- 220Ω and 1kΩ resistors
- 0.1µF and 10µF capacitors
- Jumper wires
- Breadboard

Step 2: Connect the Circuit

1. Insert the ESP32/ESP8266 development board into the breadboard.
2. Connect the positive terminal of the solar panel to the VIN pin of the TP4056 module.
3. Connect the negative terminal of the solar panel to the GND pin of the TP4056 module.
4. Connect the OUT+ pin of the TP4056 module to the positive terminal of the lithium-ion battery.
5. Connect the OUT- pin of the TP4056 module to the negative terminal of the lithium-ion battery.
6. Connect the positive and negative terminals of the battery to the VCC and GND pins of the LM358 operational amplifier, respectively.
7. Connect a 10kΩ resistor between the VCC pin of the LM358 and its output pin (pin 1).
8. Connect a 100kΩ resistor between the output pin (pin 1) of the LM358 and its non-inverting input pin (pin 3).
9. Connect a 220Ω resistor between the output pin (pin 1) of the LM358 and the LED positive pin.
10. Connect a 1kΩ resistor between the GND pin of the LM358 and the LED negative pin.
11. Connect a 0.1µF capacitor between the non-inverting input pin (pin 3) of the LM358 and the GND.
12. Connect a 10µF capacitor between the output pin (pin 1) of the LM358 and the GND.

Step 3: Upload the Code

1. Download the code from the GitHub repository provided in the article.
2. Open the Arduino IDE and select the appropriate board and COM port.
3. Copy and paste the code into the IDE and upload it to the development board.
4. Open the serial monitor to view the battery level readings.

Bill of Materials:

- ESP32 or ESP8266 development board (around $5-$15)
- 5V solar panel (around $10-$20)
- Lithium-ion battery (around $5-$10)
- TP4056 lithium-ion battery charger module (around $1-$2)
- LM358 operational amplifier (around $0.10-$0.20)
- 10kΩ and 100kΩ resistors (around $0.01-$0.02 each)
- 220Ω and 1kΩ resistors (around $0.01-$0.02 each)
- 0.1µF and 10µF capacitors (around $0.01-$0.02 each)
- Jumper wires (around $5-$10 for a set)
- Breadboard (around $5-$10)

Note: The prices listed are estimates and may vary depending on the supplier and location.

Here are the build instructions for a basic solar-powered ESP32 using the minimum materials:

Build Instructions:

Step 1: Gather Materials

Before starting the build, you'll need to gather the following materials:

- ESP32 development board
- Solar panel (with a voltage rating higher than the minimum input voltage required by the ESP32)
- Lithium-ion battery
- TP4056 lithium-ion battery charger module
- Jumper wires

Step 2: Connect the Circuit

1. Insert the ESP32 development board into the breadboard.

2. Connect the positive terminal of the solar panel to the VIN pin of the ESP32 development board.
3. Connect the negative terminal of the solar panel to the GND pin of the ESP32 development board.
4. Connect the positive terminal of the lithium-ion battery to the BAT pin of the TP4056 module.
5. Connect the negative terminal of the lithium-ion battery to the GND pin of the TP4056 module.
6. Connect the OUT+ pin of the TP4056 module to the VIN pin of the ESP32 development board.
7. Connect the GND pin of the TP4056 module to the GND pin of the ESP32 development board.
8. If required, add additional components such as voltage regulators or power management modules based on your project requirements.

Step 3: Test the Circuit

1. Place the solar panel in direct sunlight to ensure it's charging the battery.
2. Connect the ESP32 to your computer using a USB cable.
3. Upload a test program to the ESP32, such as a basic "Hello World" program.
4. Disconnect the USB cable and power on the ESP32 using the solar panel and battery.

Bill of Materials:

- ESP32 development board (around $5-$15)
- Solar panel (with a voltage rating higher than the minimum input voltage required by the ESP32) (around $10-$20)
- Lithium-ion battery (around $5-$10)
- TP4056 lithium-ion battery charger module (around $1-$2)
- Jumper wires (around $5-$10 for a set)

Note: The prices listed are estimates and may vary depending on the supplier and location. Additionally, please note that this is a basic setup, and additional components may be required based on the specific requirements of your project.