Design and set up a battery system that charges the battery using energy from a solar panel within Cisco Packet Tracer

1. Introduction

This project demonstrates how a solar panel generates electrical power that is then measured by a power meter and stored in a battery—simulated entirely within Cisco Packet Tracer using IoT functionality.

2. Objective

- Simulate solar energy generation

- Monitor power flow using a power meter

- Charge a battery using this generated energy

- Optionally, leverage IoT connectivity for remote monitoring via a web dashboard

3. Components & Setup

- **Solar Panel** – simulates sunlight-to-electricity conversion

- **Power Meter** – measures energy flow (Wh)

- **Battery** – stores generated energy

- **Home Gateway** – enables network connectivity
- **IoT Custom Cable**: A special cable used to connect IoT devices, which simplifies the wiring.
- **Cisco packet tracer software**

Connections:

1. Solar Panel → Power Meter → Battery (using IoT custom cables)

2. All devices connected to Home Gateway

4. Working Principle

1. **Solar Panel** simulates full sunlight exposure and outputs voltage (e.g., ~117 V).

2. **Power Meter** captures energy flow in real time (e.g., ~109 Wh).

3. **Battery** receives energy and increases in charge status.

5. Observations

- Solar panel voltage output: ~50 V

- Energy meter reading: ~46 Wh

- Battery status: Charging/charged

6. Circuit diagram:

DLC100
Home Gateway1

46 Wh
Power Meter

46 W

Solar Panel
solar_panel

Power Meter
IoT2
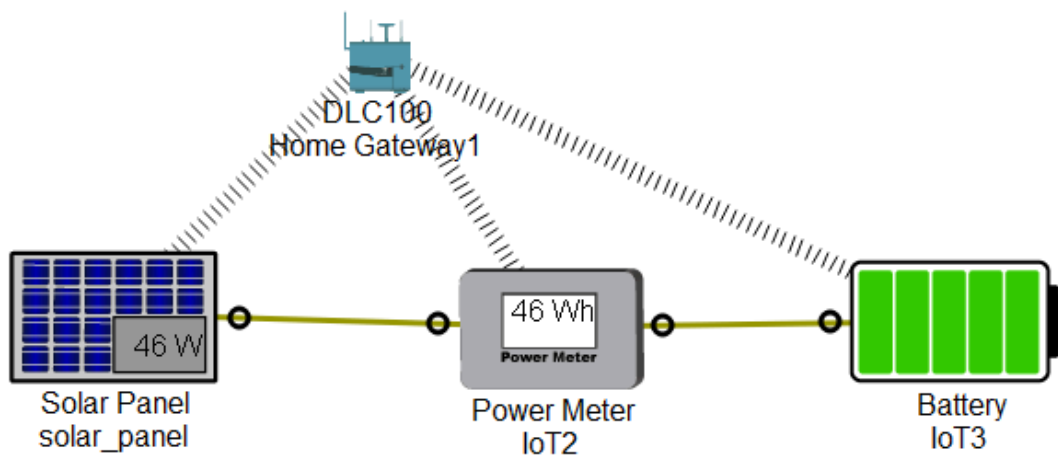
Battery
IoT3

7. Conclusion

The project successfully demonstrates solar-to-battery energy transfer within Packet Tracer, meeting all defined objectives. Optional enhancements can improve realism and introduce automation via sensors or switches.