POWER WALK

Converting Foot Traffic into Sustainable Energy, Utilizing Piezoelectric Transducers with RFID and Data Visualization for Efficient Power Generation

User Manual

inquire@powerwalk@gmail.com
66 Hills St. Batasan Hills, Quezon City
+639215820554
powerwalktechnology.com


POWER WALK

TABLE OF CONTENTS

POWER WALK

INTRODUCTION

POWERWALK is an alternative sustainable energy initiative that aims to convert foot traffic into electrical energy using piezoelectric sensors installed in high-traffic areas at Quezon City University. By integrating RFID and Arduino Uno technology, it acts as the security when it comes to authorizing the students using the charging station and the system can track movement patterns and identify peak usage times, while data visualization will visualize energy generation, remaining battery unto the system. This project not only demonstrates the potential of piezoelectric energy harvesting in a university setting but also promotes innovation and environmental awareness through the use of smart, data-driven technology.

PURPOSE OF THE MANUAL

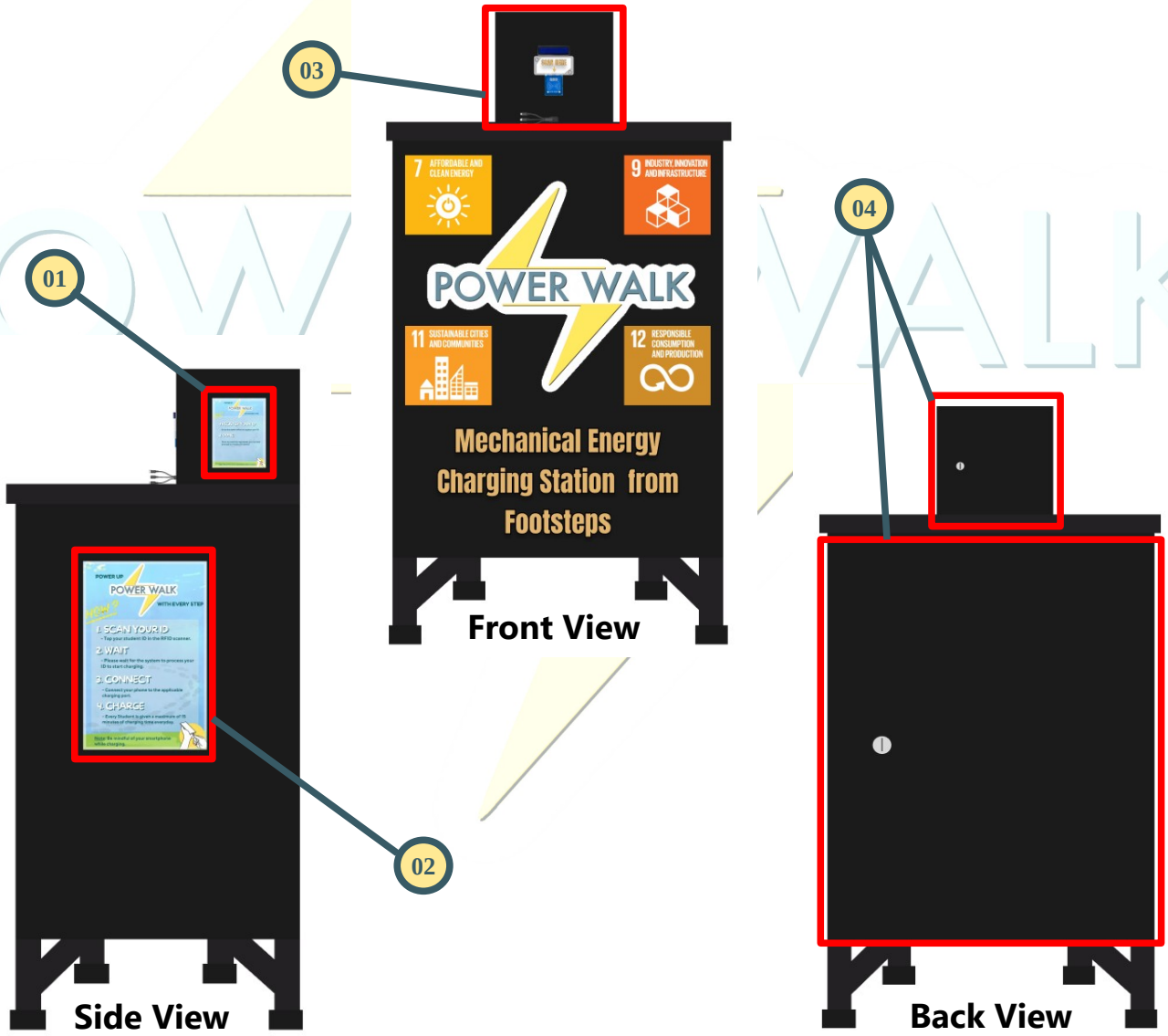
This serves as a guide to the users, specifically the ADMIN to walkthrough the software's functionalities one by one. One of the software's criteria when creating this project was its "simple and easy to use", so there is no doubt that even without a major background regarding engineering and the IT field, this software was made in consideration to be direct and understandable in terms of Power generation status, Battery Consumption, Daily Reports and etc.

OVERVIEW OF THE SYSTEM

The POWERWALK software system serves as the central platform for collecting, processing, and analyzing data generated by piezoelectric sensors and RFID modules installed across Quezon City University. It performs three primary functions: data acquisition, data processing, and data visualization. The software collects real-time input from piezoelectric sensors, which detect foot traffic and convert kinetic energy into electrical output. Simultaneously, RFID technology logs user movement to determine time-specific usage patterns. The software processes this raw data to calculate energy output, identify peak activity periods, and monitor system performance. Finally, it presents the results through an intuitive dashboard that displays energy generated, voltage output and battery consumption by using bar graphs, line graphs and more. This allows administrators and the Researchers to make informed decisions for improving energy efficiency.

PARTS OF THE
POWERWALK CHARGING STATION

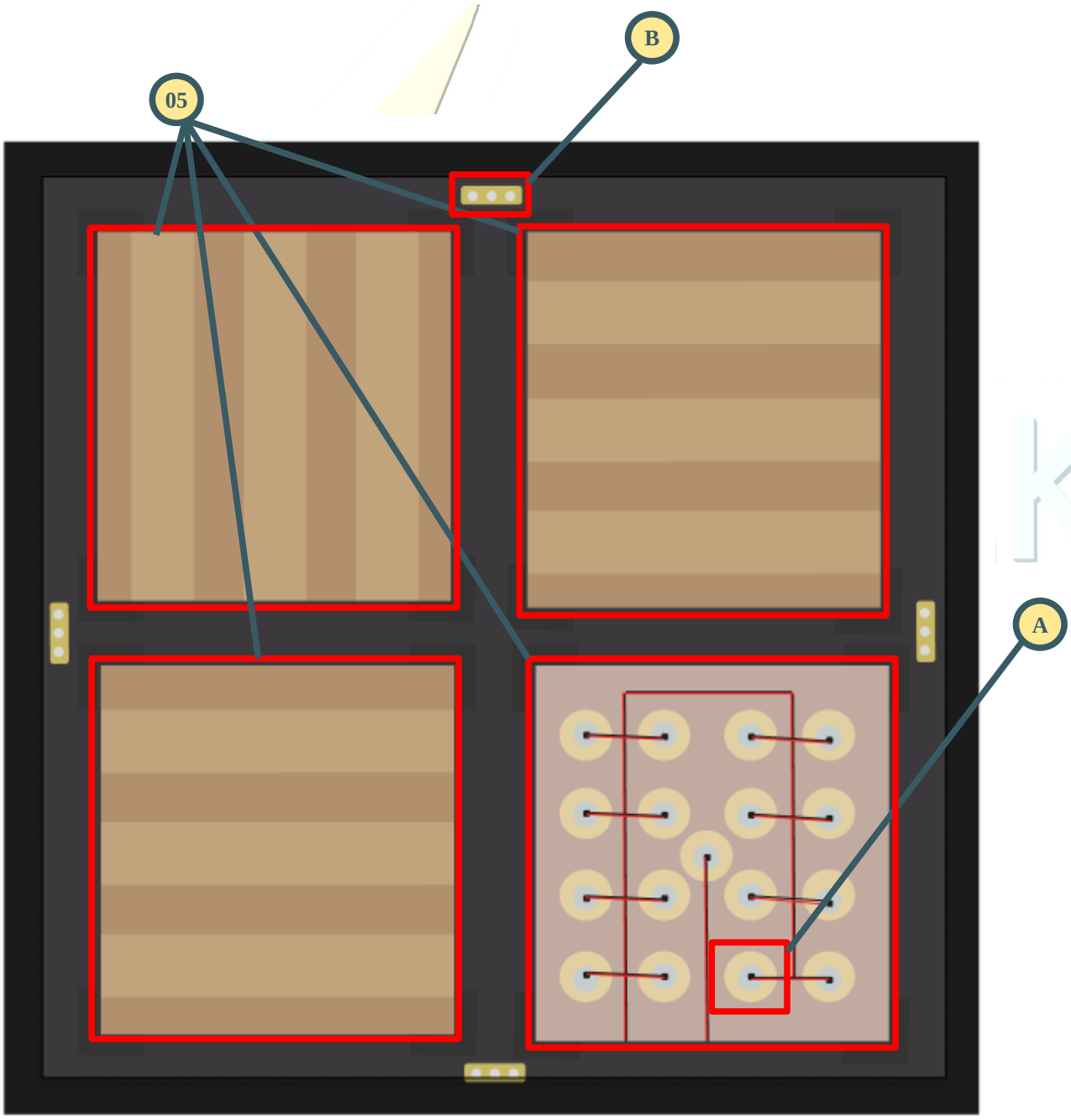
01. "How" and "Where" to Register your RFID (School ID) Instruction.
02. Step by step on how to use POWERWALK Charging Station Instruction.
03. Upper Box (Charging Station Panel) – GO TO PAGE 4 FOR SPECIFIC DETAILS.
04. Battery, Tools and Microcontrollers Compartments.



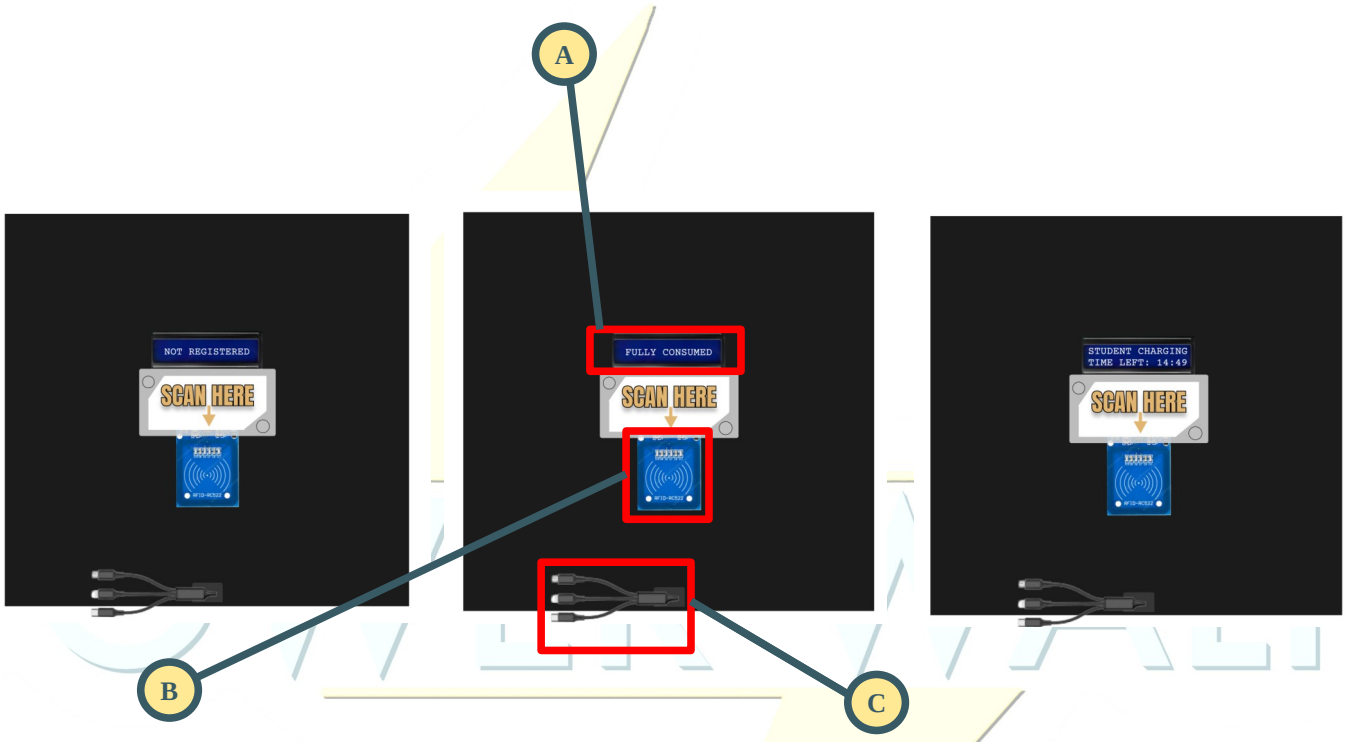
05. Piezoelectric Tiles.

A) Piezoelectric Transducers.

B) LED Strips.



03 Upper Box (Charging Station Panel)

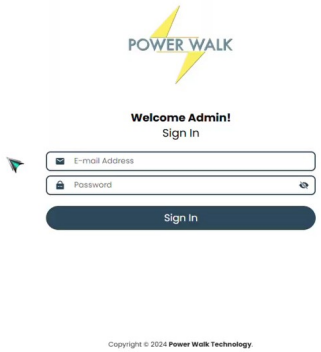


A. LCD Display Module
- **NOT REGISTERED** – Your RFID (School ID) is not registered in our database.
- **FULLY CONSUMED** – You have already used your one charging session for the day.
- **STUDENT CHARGING TIME LEFT: Ex. 14:50** – This message appears if your RFID (School ID) is registered in our database and you have not yet used your charging session for the day.

B. RC522 RFID Module
C. 1 USB to USB Micro B with Lightning and USB Type C Cable

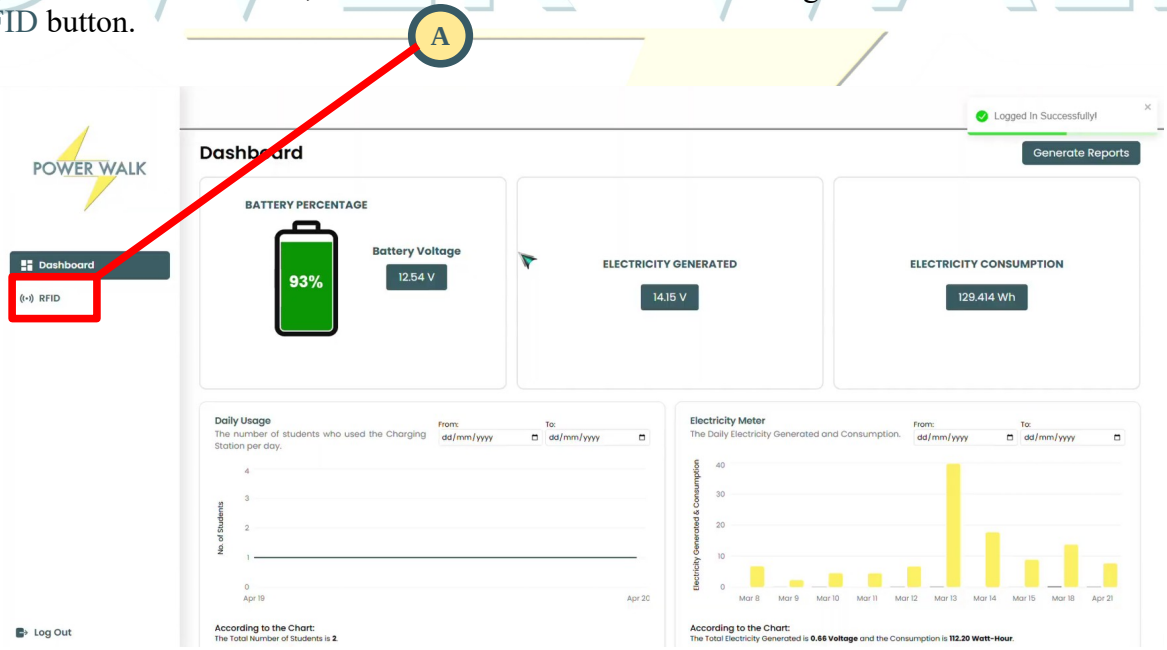
How to Register RFID (School ID)?

01. Log in to your Admin account using your credentials. The system will validate them, and if successful, you will be redirected to the Dashboard.



02. Once you're on the Dashboard, click the RFID button in the side navigation bar.

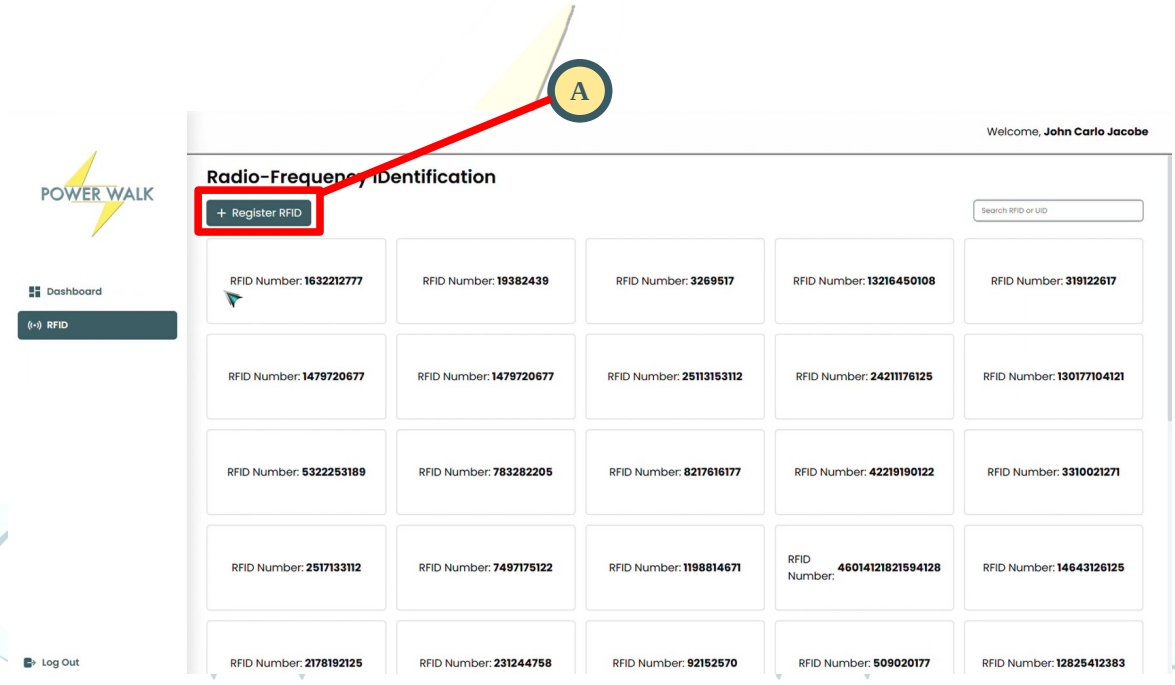
A) RFID button.

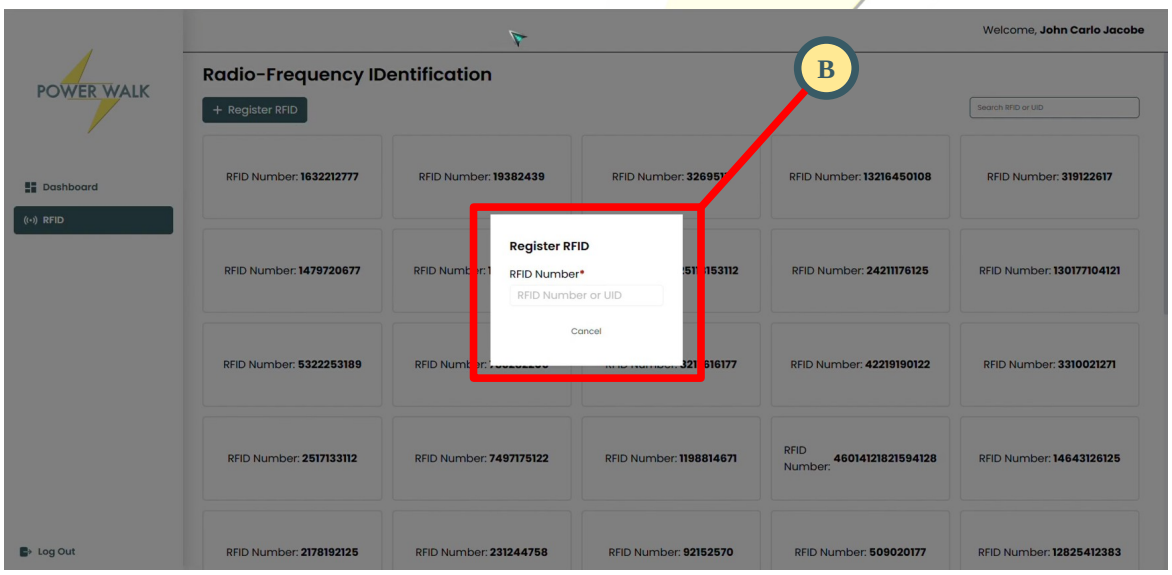


03. Click the "Register RFID" button to open the RFID Registration form.

A) Register RFID button

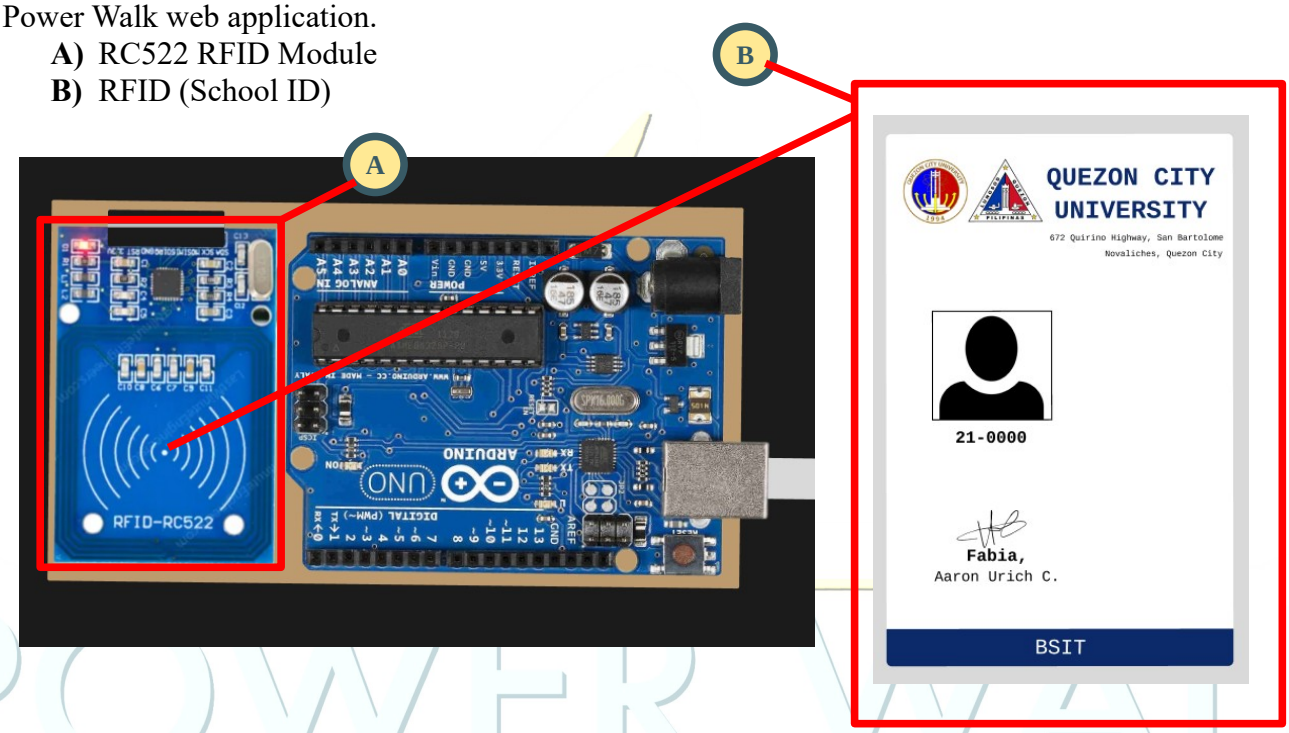
B) Register RFID form





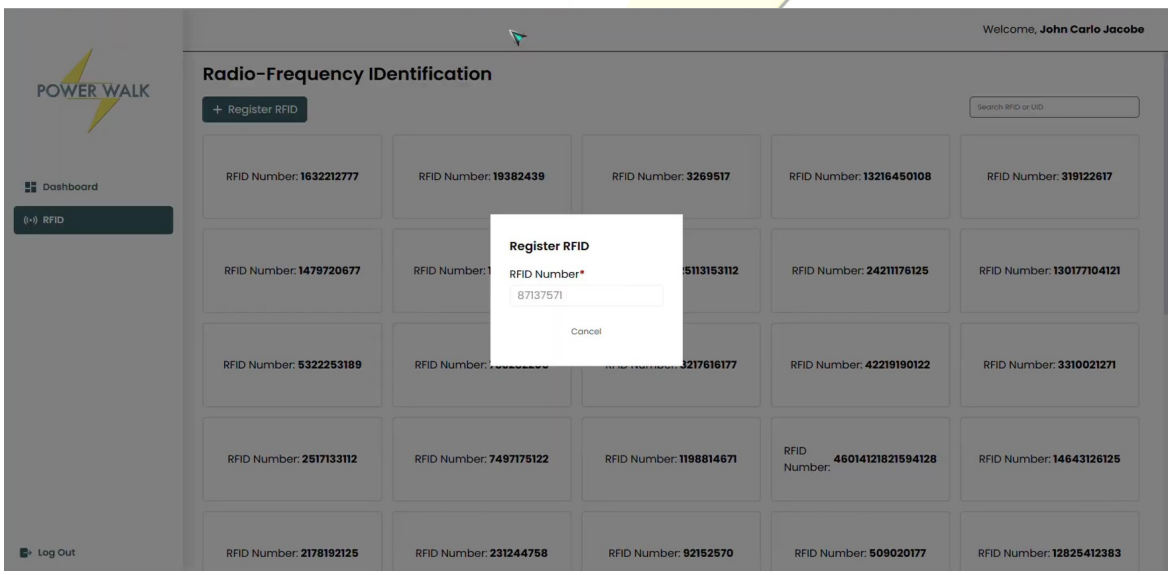
04. Tap your RFID (School ID) on the RFID Scanner connected to the computer to register it in the Power Walk web application.

A) RC522 RFID Module
B) RFID (School ID)



05. Once you tap your RFID (School ID) on the RFID Scanner, its UID will appear in the RFID Registration form of the POWERWALK web application, and a confirmation message saying 'Successfully Created!' will be displayed.

A) Pop-up Message
B) New Registered RFID (UID)



Note: The POWERWALK web application does not store any student information—only the UID is saved in our system.

How to use POWERWALK Charging Station?

01. To use the POWERWALK Charging Station, tap your RFID (School ID) on the RC522 RFID module and plug your phone into a compatible charging cable.

A) The Phone must be charging.

02. After charging for 15 minutes, tap your RFID (School ID) again. The LCD display module will then show a message saying “FULLY CONSUMED”.

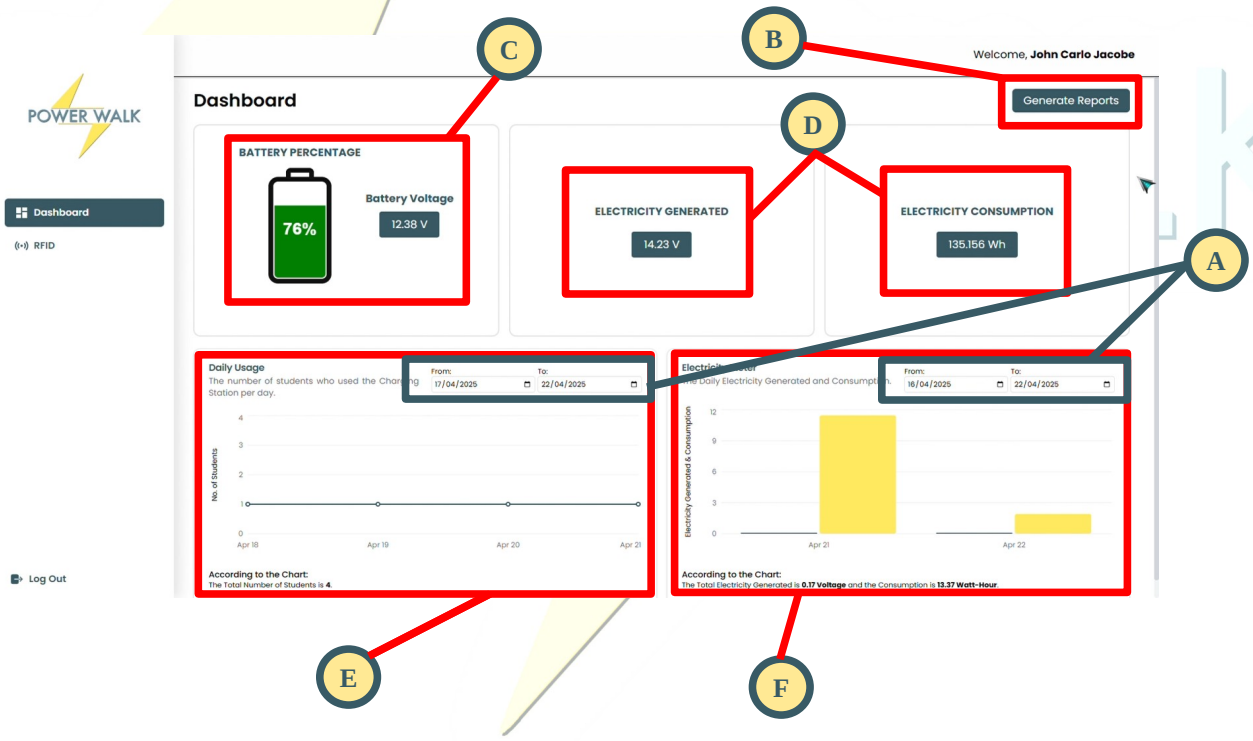
A) The phone will stop charging. This also applies if your RFID (School ID) is not registered in our system.

Note: Each registered RFID (School ID) is allowed only one 15-minute charging session per day.

How to Generate Reports in the Dashboard?

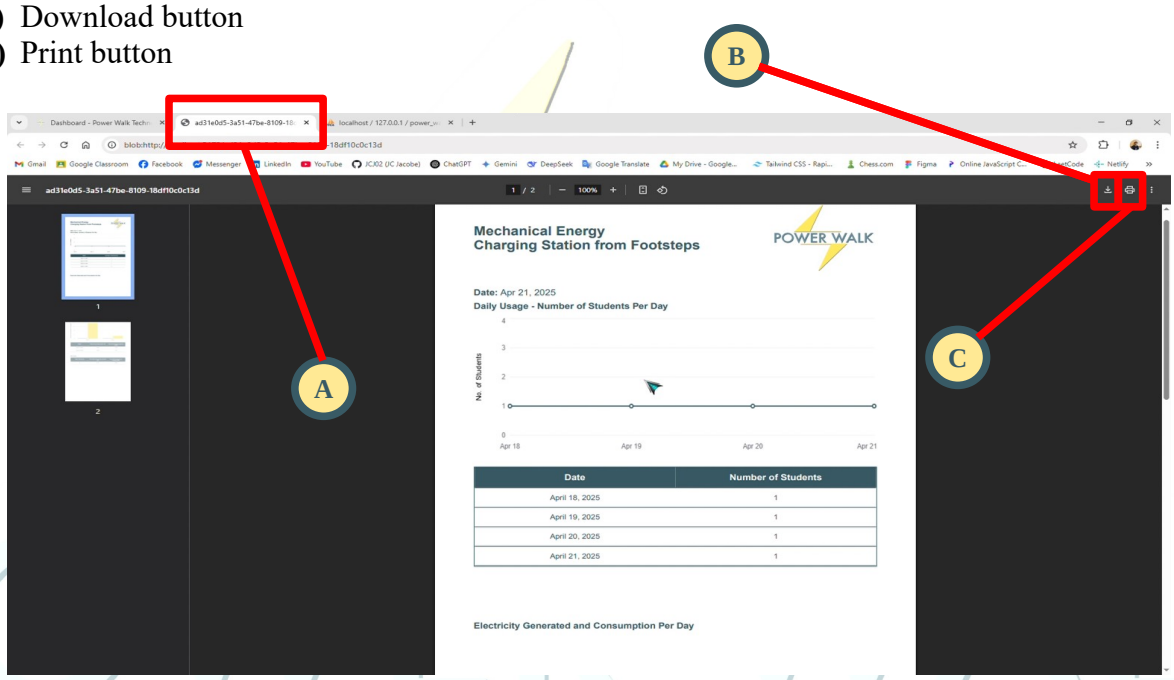
01. In the POWERWALK web application, filter the range of the date that you want to generate reports, then, click the 'Generate Reports' button to create a report.

- **A)** Filter dates
- **B)** Generate Reports button
- **C)** Battery Percentage and Voltage
- **D)** Electricity Generated and Consumption (Whole usage)
- **E)** Daily Usage Chart (The number of students who used the POWERWALK charging station per day)
- **F)** Electricity Meter Chart (The daily electricity generated and consumption)



02. When 'Generate Reports' is clicked, you will be directed to the document page, where you will have the option to download or print the reports.

A) Generated Reports or Document
B) Download button
C) Print button



GROUP 2 – SBIT-4B

COPYRIGHT © 2025 | ALL RIGHTS RESERVED.