

BLUESTONE EV CHARGER

Bluestone in-house product

EV Billing and Management Software

Service Features

- Web-based EV Billing and Management Software
- Suitable for condos, hotels, resorts, schools and shopping center
- Managing EV chargers in the station
- Managing energy in the station
- Making payments through mobile banking and RFID card
- Logging charging history
- Communication: MQTT, Modbus RTU, Modbus TCP, OCPP 1.6J

Easy Setting



Easy setting on web browser
with remote controlling

History memory



Logging charging history
in details

Connectivity



MQTT, Modbus RTU,
Modbus TCP, OCPP 1.6J



EV Charger

EV3-AC1-7,4 IoT / EV3-AC3-22 IoT



Product Development

Solution

1. Design EV Charger to have longer lifetime by separating control part from high power side to avoid collective heat during charging.
2. Have most protection needed inside.
3. Design home use software to maximise customer experiences.

Features

- Made from industrial high-grade components
- Isolate the power supply side from the control side
- Aluminum housing
- IP65
- DC 6mA residual current monitoring built-in
- Minimal Style
- Many colours



EV Charger Hardware

Features

Made from industrial high-grade components

Isolate the power supply side from the control side

Aluminum housing

IP65

DC 6mA residual current monitoring built-in

Benefits

Longer lifetime

Avoid high temperatures from high current to damage electronic board

Heat dissipation of the collective temperature to the outside easily

Has no effect from UV

Can be installed indoor and outdoor

No additional outdoor housing needed

Can use RCB type A instead of RCCB-B to lower installation cost



EV Charger STATION

Software - Station

Features

- Status
- Displaying real-time charging parameters
- Authentication (RFID)
- Management platform
- Log history
- Admin management
- User management
- Station management
- Top up
- Billing

Benefits

- Real-time status monitoring on the smartphone.
- Real-time information on charging duration, energy kWh, current and total power kW.
- Limit people for charging.
- Self authentication assigned by users.
- Easy to manage station
- Can monitor EV charger usage
- Can manage admin
- Can manage user
- Can manage station
- Can give credit to users on the platform
- Easy to top up for special case
- Can easy manage charging price



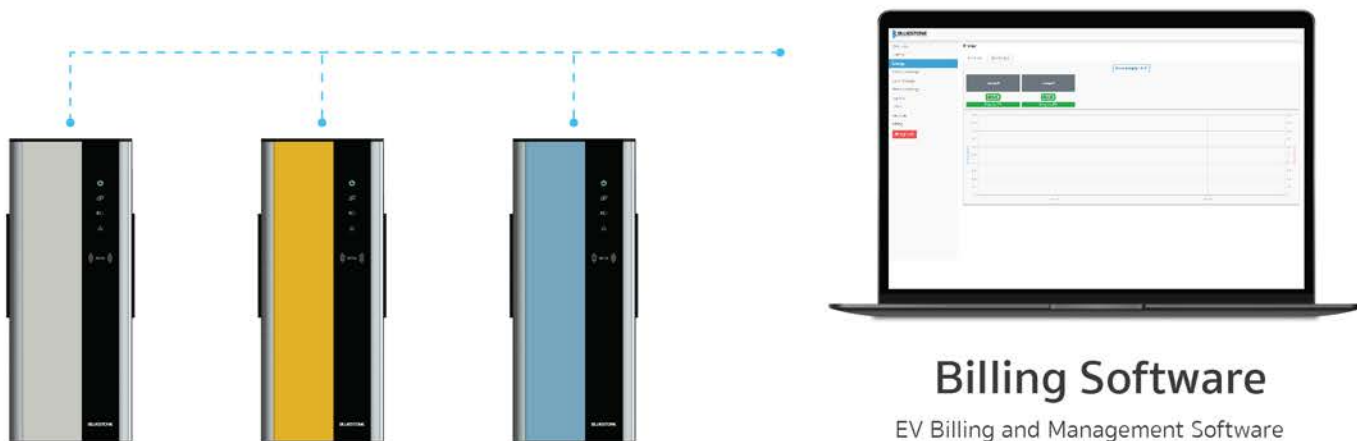
Shopping center, Restaurants, and Café



Condos, Apartments, and Hotel



Offices



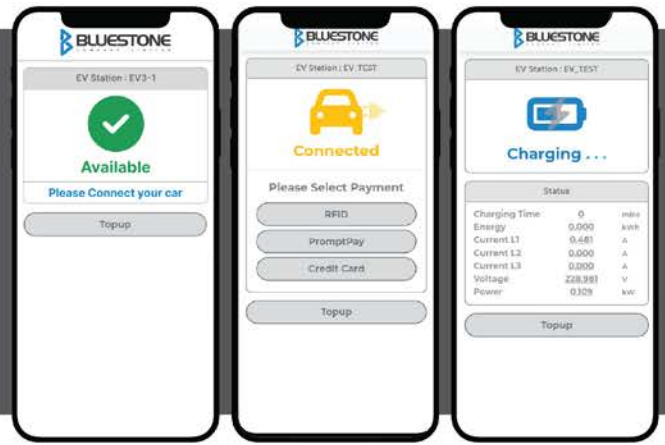
Billing Software

EV Billing and Management Software

EV billing and Management Software

User Interface

Customer journey



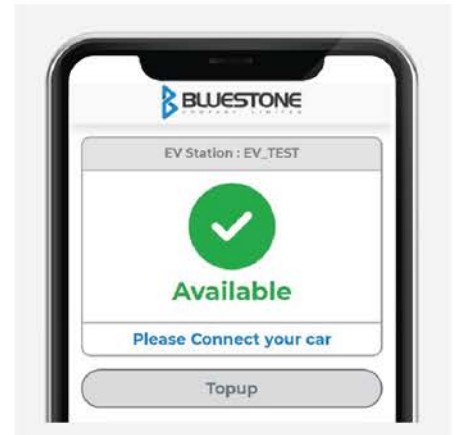
Arrive

Arrive at the station



Scan QR code

Scan the QR code on the EV charger to get on web application



Display status

Web application display EV charger status

Smartphone screen showing 'Available' status with a green checkmark and a 'Please Connect your car' button. The screen also has a 'Topup' button at the bottom.

Available

EV charger connector is not yet connected to EV

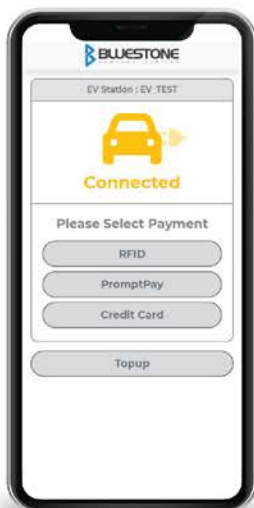
An isometric illustration of a person standing at an EV charging station with two cars parked.

Smartphone screen showing 'Connected' status with a yellow car icon and a 'Please Select Payment' section with buttons for 'RFID', 'PromptPay', and 'Credit Card'. The screen also has a 'Topup' button at the bottom.

Connect

Connect EV charger connector to the EV

An illustration of a red car being charged by a person using a charging cable.



Payment type

Choose payment type.

Customer can choose to pay with RFID, Promptpay or Credit card.



Choose RFID

Choose to deduct credit from RFID card



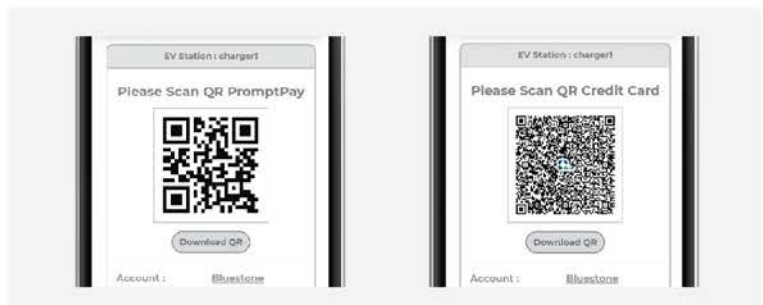
Scan RFID and choose kWh

Scan RFID card for authentication and choose charging energy



Choose Promptpay

Choose to pay with Promptpay



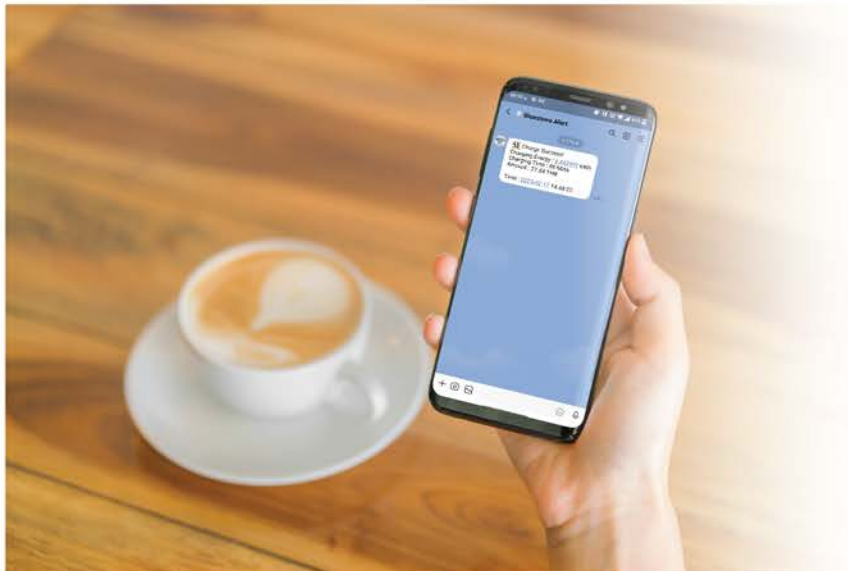
Choose kWh and pay

Choose charging energy and pay through mobile banking, Promptpay.



Charging

Display real-time charging parameters, including charging duration, energy kWh, current and total power kW.



LINE Alert (Only for RFID)

When the charger charging completed, Will receive a notification message via LINE OA.



Finish charging

Show finish status with total energy on the screen

EV billing and Management Software

Management and Controlling Platform

Customer journey



Overview

Managing station on the platform. This includes admin, user, station, top-up management and billing price setting (charging price).



Displaying EV charger details



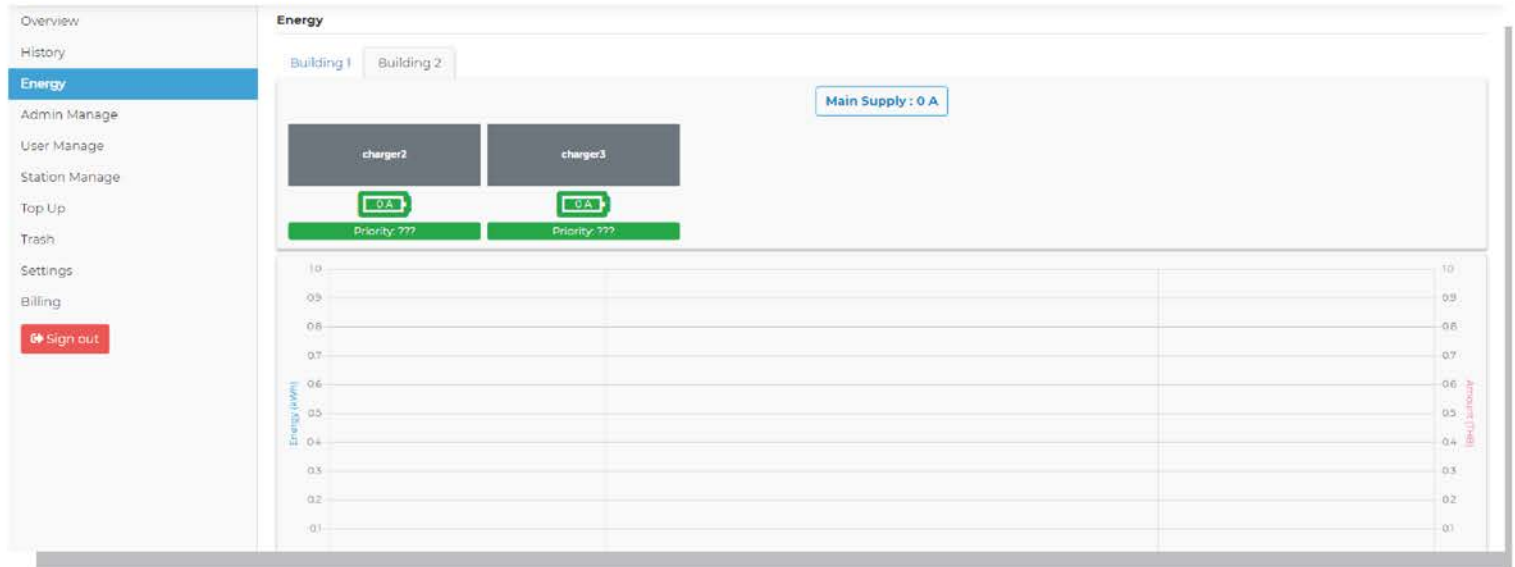
History

Displaying charging history. The information can be filtered by time duration and user. After making a selection, all information will be displayed with a summary on top.

Overview	History																												
<ul style="list-style-type: none"> Overview History Admin Manage User Manage Station Manage Top Up Trash Settings Billing Sign out 	<p>Start Date: <input type="text" value="mm/dd/yyyy"/> End Date: <input type="text" value="mm/dd/yyyy"/> User: <input type="text"/></p> <p>Station: <input type="text"/> Payment: <input type="text" value="All"/></p> <p><input type="button" value="Submit"/> <input type="button" value="Reset"/></p> <p>Total Summary Total Energy: 2,340.70 kWh Total Time: 4,301.00 mins Total Amount: 17,144.50 THB</p> <p>Show 10 entries Search: <input type="text"/></p> <table border="1"> <thead> <tr> <th>Date-Time</th> <th>User</th> <th>Station</th> <th>Payment</th> <th>Charging Energy</th> <th>Charging Time</th> <th>Amount</th> </tr> </thead> <tbody> <tr> <td>2022-09-23 14:26:19</td> <td>โธณัฐ วัฒนศิริสง่า</td> <td>EV_2</td> <td>Postpaid</td> <td>22 kWh</td> <td>60 mins</td> <td>165.00 THB</td> </tr> <tr> <td>2022-09-22 14:28:19</td> <td>โธณัฐ วัฒนศิริสง่า</td> <td>EV_2</td> <td>Postpaid</td> <td>22 kWh</td> <td>60 mins</td> <td>165.00 THB</td> </tr> <tr> <td>2022-09-22 14:28:33</td> <td>โธณัฐ วัฒนศิริสง่า</td> <td>EV_1</td> <td>Postpaid</td> <td>64 kWh</td> <td>120 mins</td> <td>330.00 THB</td> </tr> </tbody> </table>	Date-Time	User	Station	Payment	Charging Energy	Charging Time	Amount	2022-09-23 14:26:19	โธณัฐ วัฒนศิริสง่า	EV_2	Postpaid	22 kWh	60 mins	165.00 THB	2022-09-22 14:28:19	โธณัฐ วัฒนศิริสง่า	EV_2	Postpaid	22 kWh	60 mins	165.00 THB	2022-09-22 14:28:33	โธณัฐ วัฒนศิริสง่า	EV_1	Postpaid	64 kWh	120 mins	330.00 THB
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Energy

Managing energy in the system to not exceed the threshold by controlling the charging current for EVs to be responsive to the total current in the circuit. This prevents the main circuit breaker from tripping.



Admin Management

Monitoring and controlling the system about station, finances, and members.

The Admin Management dashboard shows a list of administrators. The table has columns for #, Name, User Name, and Role. There are two entries: 'surasuk' and 'Allan Hart', both with the role of 'admin'.

#	Name	User Name	Role
1	surasuk	surasuk_admin	admin
2	Allan Hart	admin	admin

User Management

Managing members in the system by allowing users to be added/removed to/from the system. Also, information about the user's last charge is displayed for the admin to easily track.

The User Management dashboard displays a list of users with their last charge information. The table includes columns for #, Name, Last Charge, Credits, Payment, and Status.

#	Name	Last Charge	Credits	Payment	Status
1	white stone RFID: 04510979322859909	0 mins 2022-02-02 08:34:07	7,155.91 THB	Prepaid	Enable
2	blue stone RFID: 107110034621545486	2 mins 2022-02-08 14:13:42	-631.23 THB	Postpaid	Enable
3	Tony x RFID: 111	3 mins 2022-03-17 14:54:42	1,093.43 THB	Prepaid	Enable
4	Owen RFID: 147		700.00 THB	Postpaid	Enable
5	Spencer Hebert RFID: 365	57 mins 2022-03-01 16:37:12	-303.03 THB	Postpaid	Enable
6	romelu lukaku RFID: 258		0.00 THB	Postpaid	Enable
7	rooney pig RFID: 996	1 mins 2022-02-07 16:32:12	-1,609.26 THB	Postpaid	Enable
8	Bob Simpson RFID: 3136382		1,000.00 THB	Prepaid	Enable
9	Komkrit Kankacha RFID: 071625093717707993	0 mins 2022-02-02 08:43:58	998,877.81 THB	Prepaid	Enable

Station Management

Managing EV chargers in the system includes adding/removing EV chargers and setting the status to enable or disable. All status will be displayed to be easily monitored: charging status, network status and status.

#	Name	Location	Charger Status	Network Status	Status
1	EV Station : charger1 S/N : 1	Building 1	Available	Normal	Enable
1	EV Station : charger2 S/N : 2	Building 2	Charge	Normal	Enable
1	EV Station : charger3 S/N : 3	Building 2	Error	Normal	Enable
1	EV Station : charger4 S/N : 4	Building 3		Fail	Disable
1	EV Station : charger5 S/N : 5	Building 3		Fail	Disable

Use Cases

