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SCHOOL OF ELECTRICALS &ELECTRONICS ENGINEERING:

B.Tech.
Topic- Approval & progress Presentation on charging station for electric vehicles:

Guided By:
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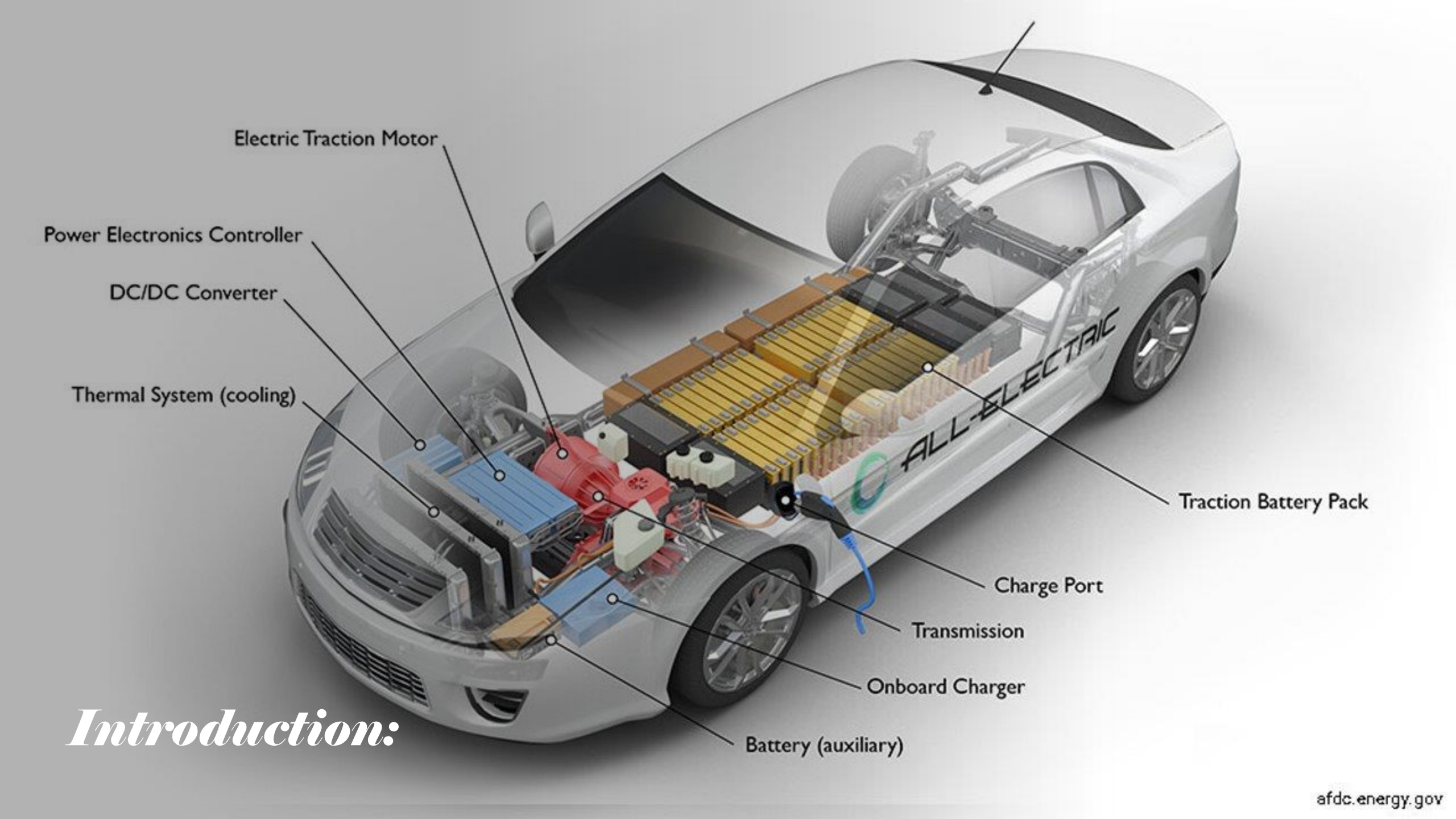
Contents :

Contribution:

1) Nilesh: **Research and findings.**
2) Radhika Gurjar : **designing and visualization.**
3) Anuradha Tiwari : **Calculation and components finding.**
4) Deepshikha Sen: **Simulation.**



Introduction:

Cont..

- An electric vehicle charging station, also called EV charging station, electric recharging point, charging point, charge point, electronic charging station (ECS), and electric vehicle supply equipment (EVSE), is a machine that supplies electric energy for the recharging of plug-in electric vehicles—including electric cars, neighborhood electric vehicles and plug-in hybrids.

• Motivation:

Electric vehicles now include cars, transit buses, trucks of all sizes, and even big-rig tractor trailers that are at least partially powered by electricity.

- Electric vehicles are saving the climate — and our lives.
- Electric vehicles have a smaller carbon footprint than gasoline-powered cars, no matter where your electricity comes from.
- Planning now by states and utilities to build infrastructure for charging electric vehicles will go a long way.

• Objectives:

- Steady of different type of charging station.
- Simulate the charging station using MATLAB.
- Develop the prototype .

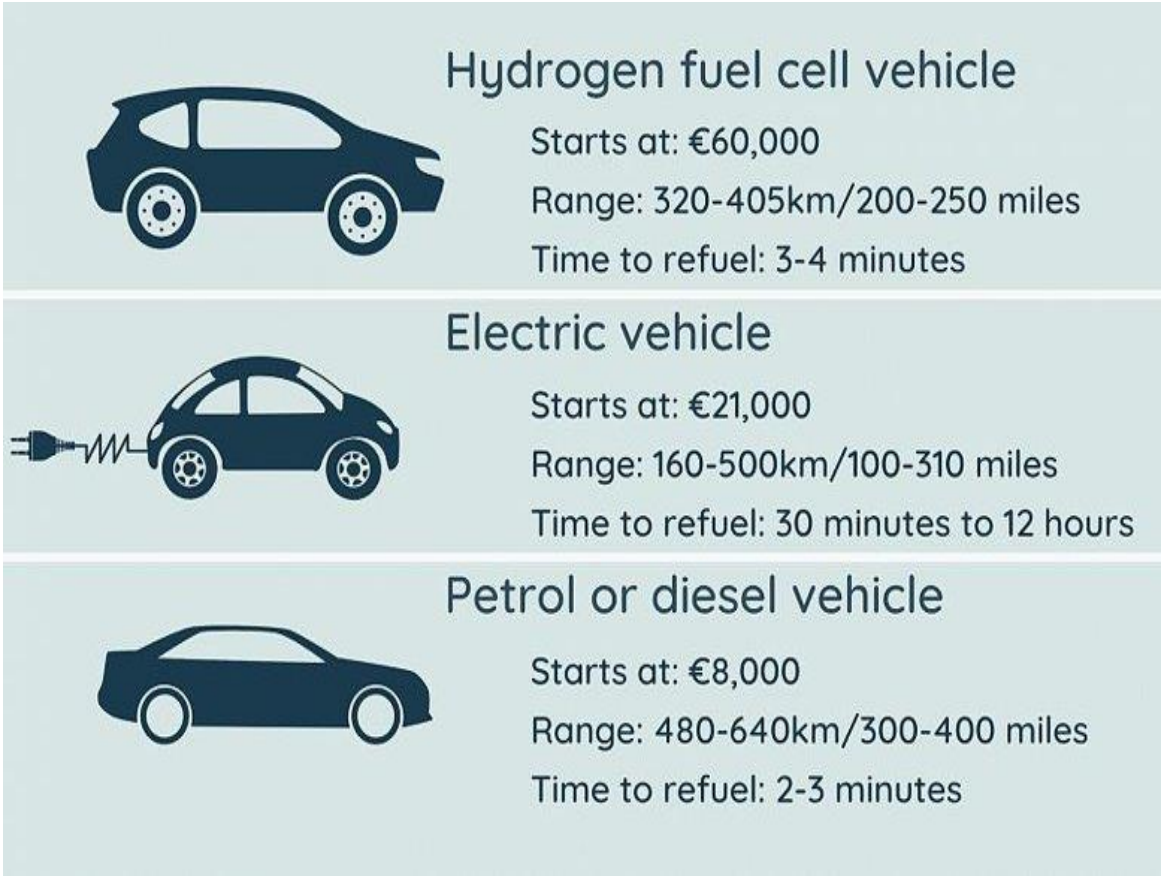
Work Plan:

No.	Particulars	duration	outcomes
1	Module 1(Give name such as literature survey with detail)	1-14 march 2021	planning & all basic about EV.
2	Module 2(planning)	15-30 march 2021	Design .
3	Module 3(Design)	30 march- 20 April 2021	Implementation.
4	Module 4 (Implementation)	20 April- 05 May 2021	Execution.

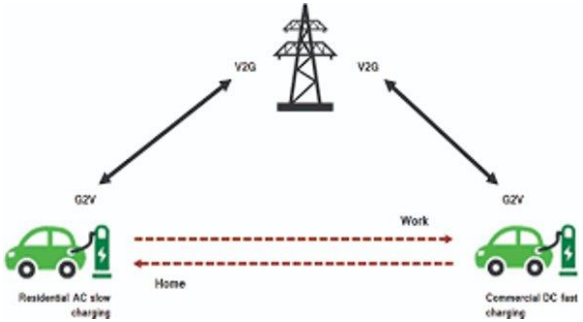
• Problem Formulation

A conventional plug socket can just about deal with 2.3 kilowatts – a modern electric car with a battery capacity of 24 kilowatt hours could leave you waiting for 11 hours while it charges up at that power.

But a charging station using technology that allows it to charge using a high charging power can do much better. Our charging time summary shows you just how much time you can save by charging using a charging station.



Proposed Methodology



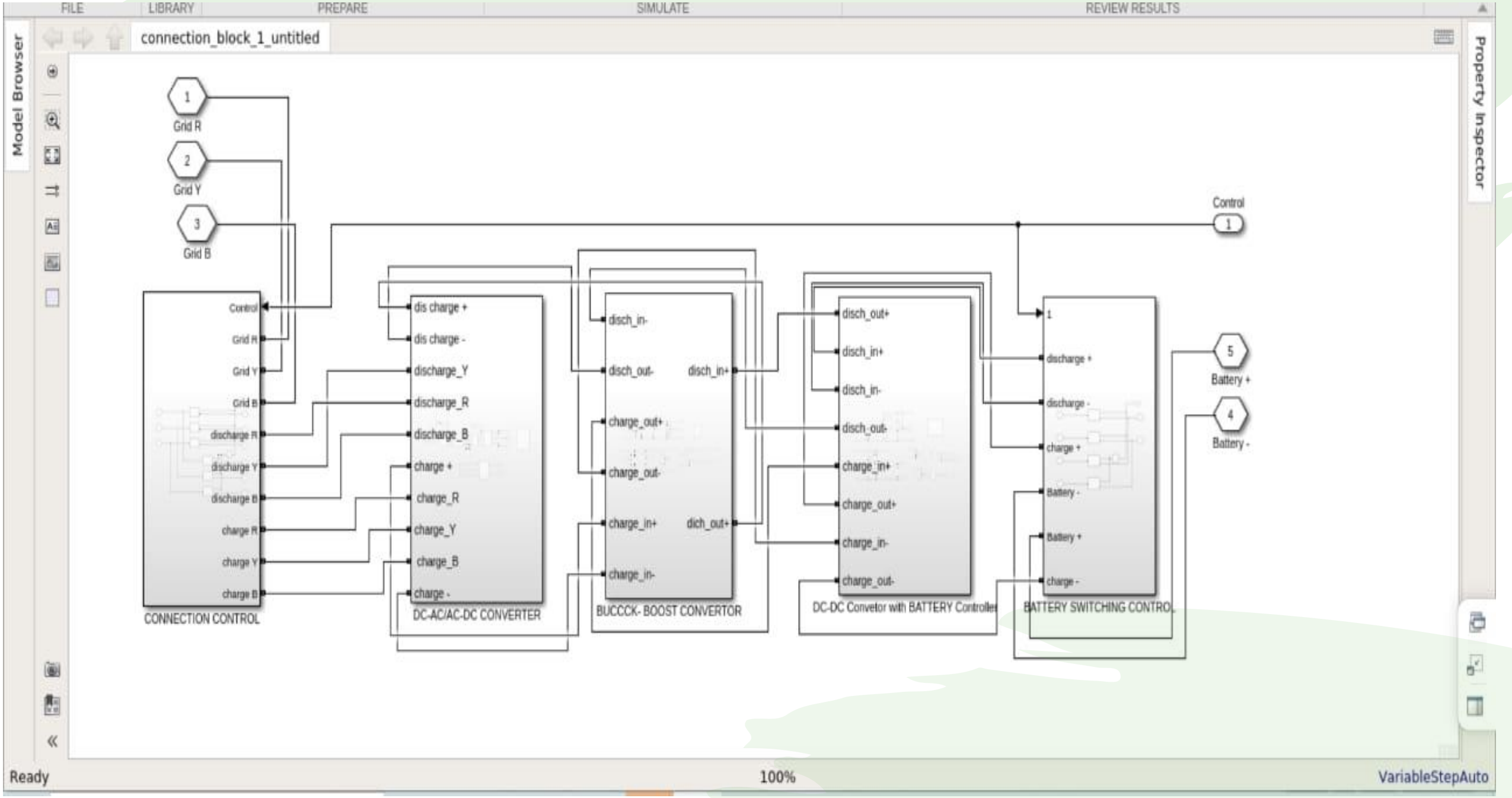
- **Why Bidirectional?**
- Increase in electric vehicle mobility has encouraged the growth of vehicle to grid technology.

Types of technology:

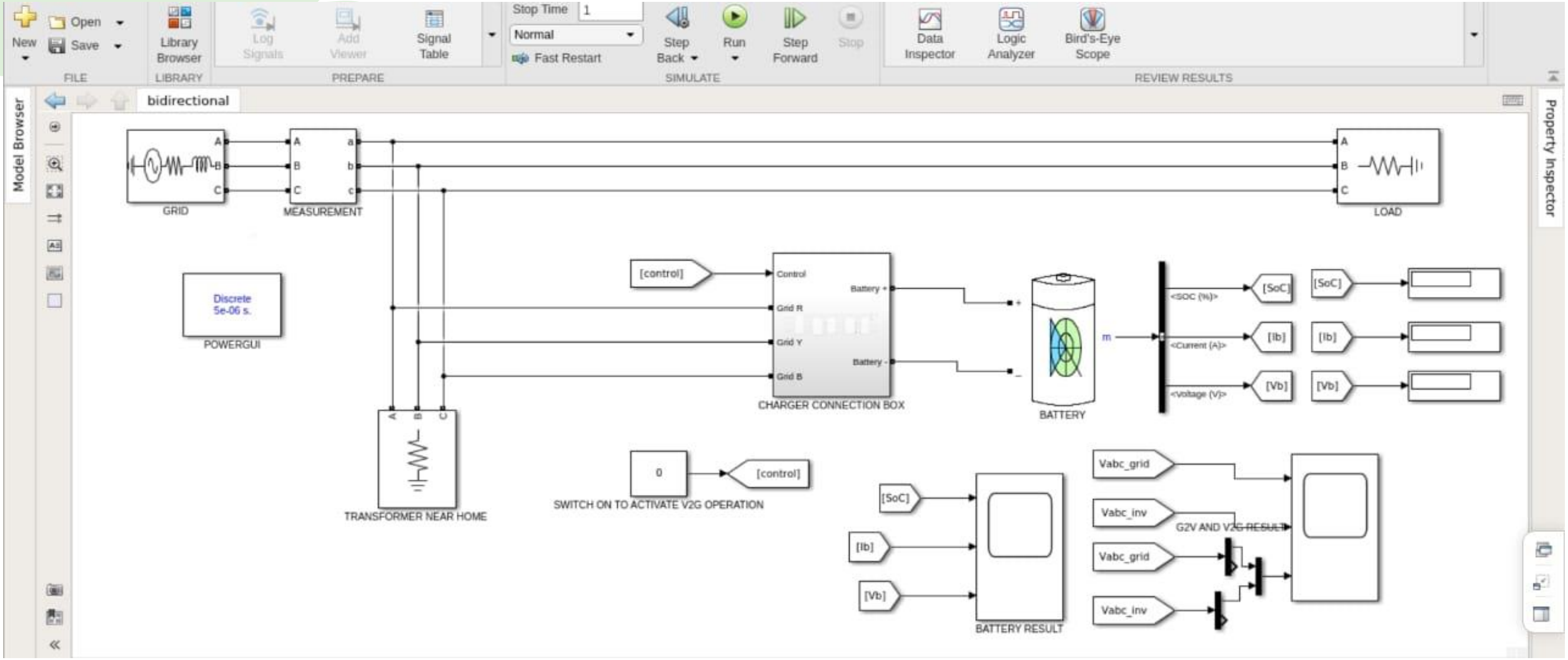
a.V2G

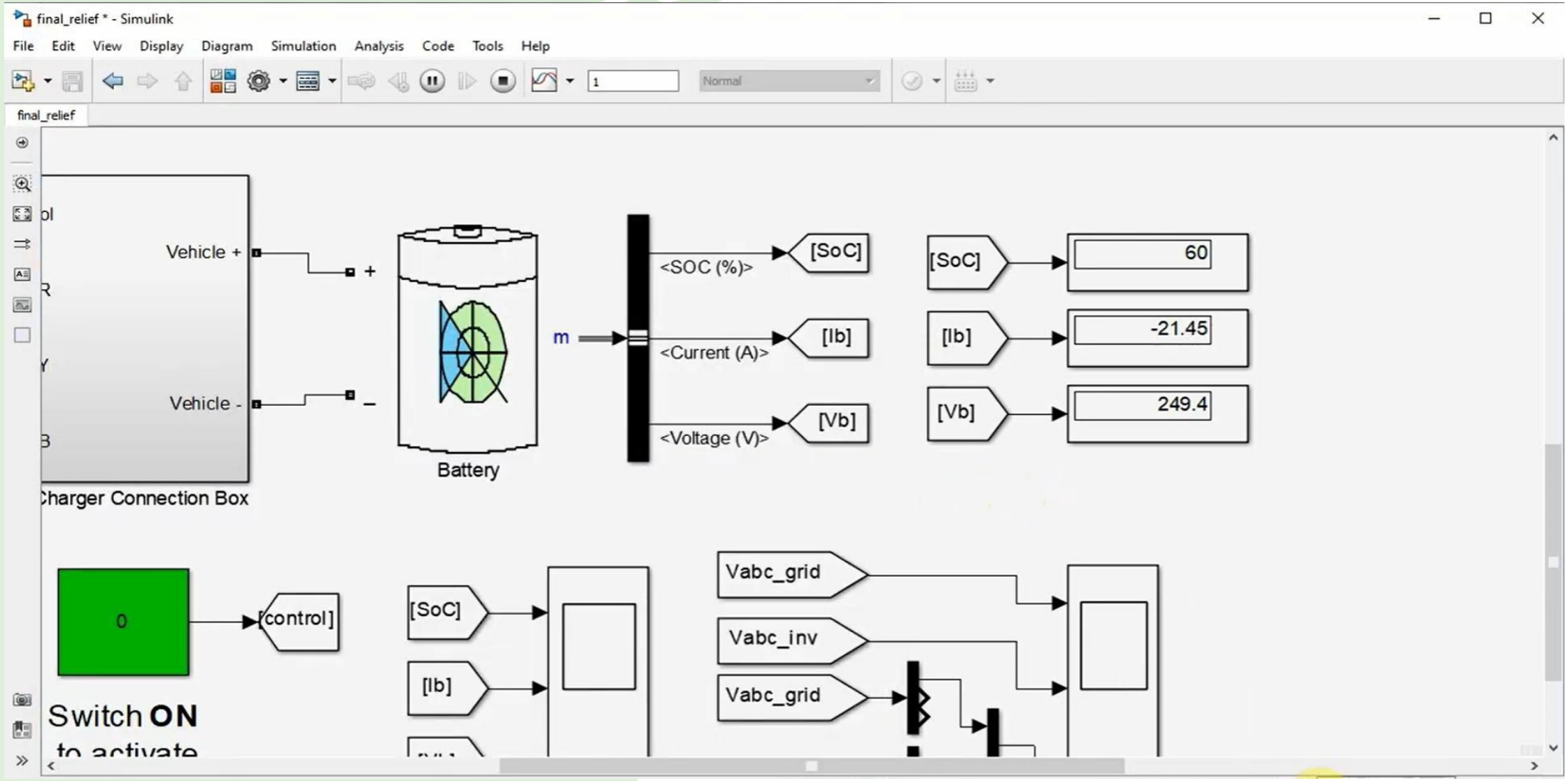
b.G2V

Vehicle to grid technology allows bidirectional power flow between the battery of electric vehicle and the power grid. This allows peak load shaving, load leveling, voltage regulation and improvements of power system stability. Implementation of the vehicle to grid technology requires dedicated electric vehicle battery charger, which allows bidirectional power flow between power grid and electric vehicle battery.


FILE
LIBRARY
PREPARE
SIMULATE
REVIEW RESULTS
Model Browser
Property Inspector
connection_block_1_untitled
1
Grid R
2
Grid Y
3
Grid B
Control
1
Control
Grid R
Grid Y
Grid B
discharge R
discharge Y
discharge B
charge R
charge Y
charge B
CONNECTION CONTROL
dis charge +
dis charge -
discharge_Y
discharge_R
discharge_B
charge +
charge_R
charge_Y
charge_B
charge -
DC-AC/AC-DC CONVERTER
disch_in-
disch_out-
disch_in+
charge_out+
charge_out-
charge_in+
dich_out+
charge_in-
BUCCCK- BOOST CONVERTOR
disch_out+
disch_in+
disch_in-
disch_out-
charge_in+
charge_out+
charge_in-
charge_out-
DC-DC Convetor with BATTERY Controller
1
discharge +
discharge -
charge +
Battery -
Battery +
charge -
BATTERY SWITCHING CONTRO
5
Battery +
4
Battery -
Ready
100%
VariableStepAuto

Matlab Circuit Diagram:





When switch ON to activate V2G operation :(0)

G2V operation:

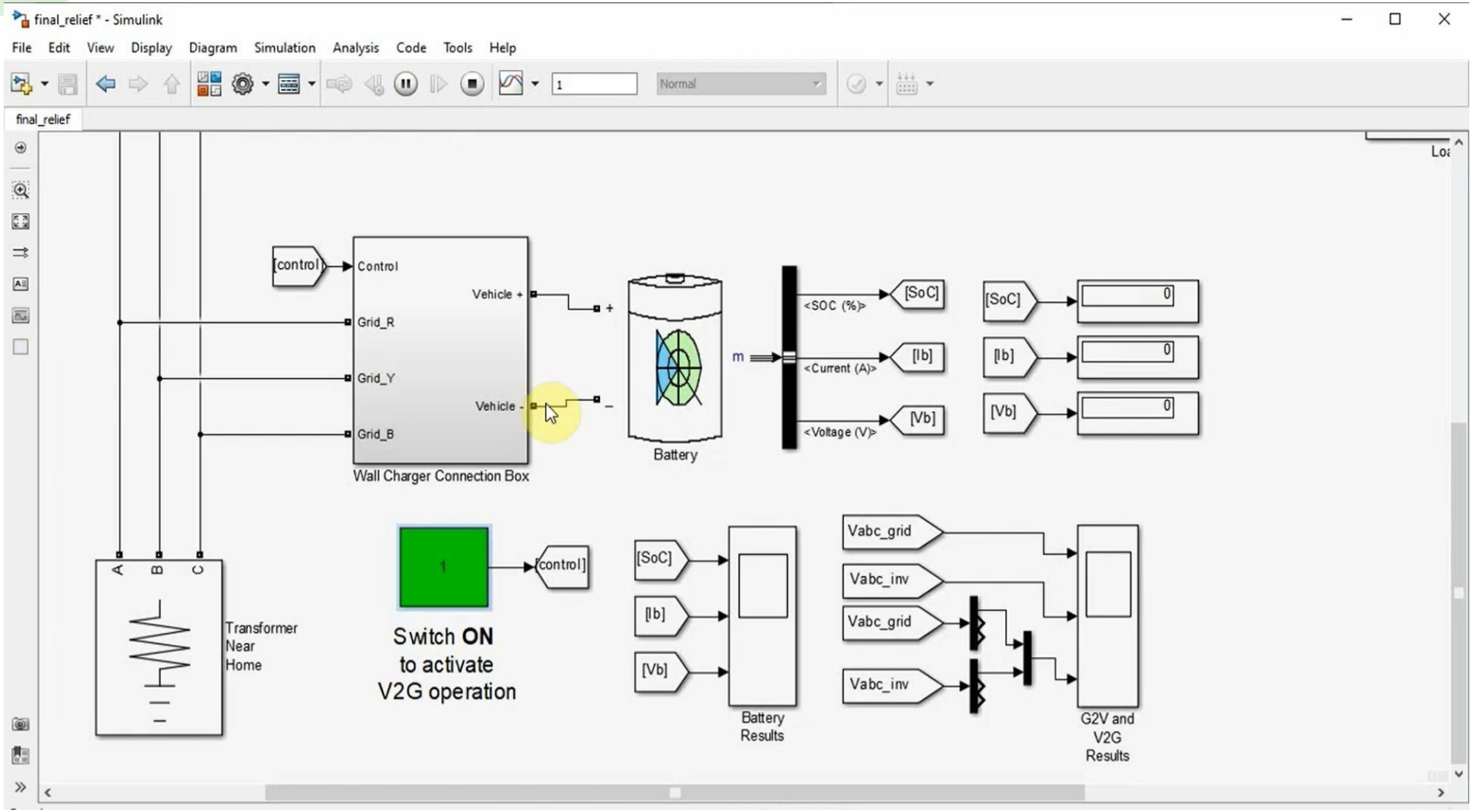
When we charge battery (G2V operation), soc will increase and battery current will be negative ,battery voltage will be positive.

Here ,there is no inverter voltage.

Output:


G2V and V2G Results
600
400
200
0
-200
-400
-600
-300
-400
-500
-600
-700
-800
600
400
200
0
-200
-400
-600
0.45
0.5
0.55
0.6
0.65
0.7
0.75
0.8

Switch ON to activate V2G operation (1):



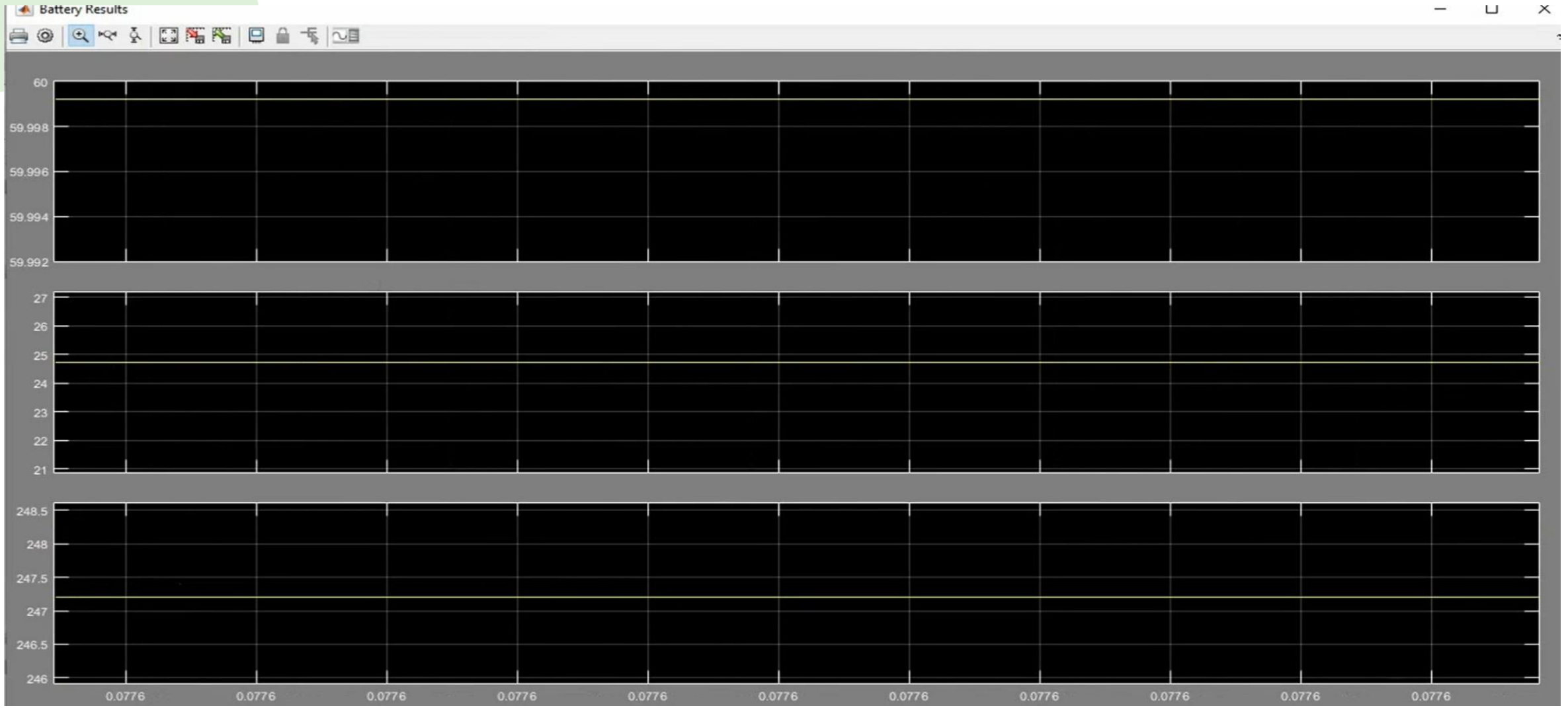
V2G operation:

- To activate the V2G operation ,there is a virtual switch in the vehicle , by turning on that switch , V2G operation can be activated .

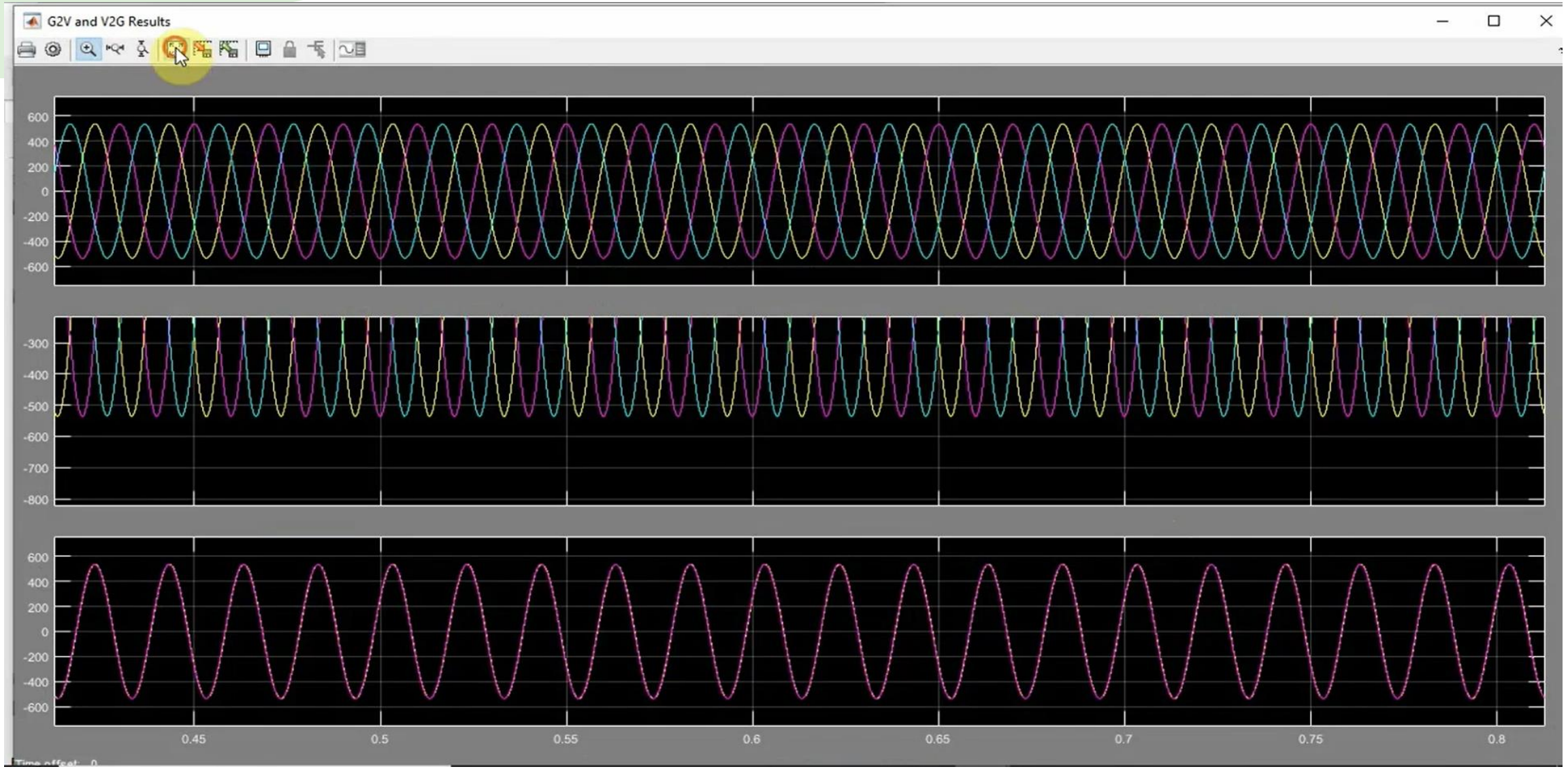
  By turning it on (I.e 1) it will start,

  During V2G operation soc will decrease and battery current and battery voltage will be positive.

Output:


Battery Results
60
59.998
59.996
59.994
59.992
27
26
25
24
23
22
21
248.5
248
247.5
247
246.5
246
0.0776
0.0776
0.0776
0.0776
0.0776
0.0776
0.0776
0.0776
0.0776
0.0776
0.0776

Output:


G2V and V2G Results
600
400
200
0
-200
-400
-600
-300
-400
-500
-600
-700
-800
600
400
200
0
-200
-400
-600
0.45
0.5
0.55
0.6
0.65
0.7
0.75
0.8

Outcomes:

- Constantly supplying 24.72A and 247.2V

And [Soc] = 59.99

[Ib]=24.72 V

[Vb]=247.2V

At the output end this are the values of voltage and current , for that we get the voltage which is in phase.

Protection:

- Although the rechargeable electric vehicles and equipment can be recharged from a domestic wall socket, a charging station is usually accessible to multiple electric vehicles and has additional current or connection sensing mechanisms to disconnect the power when the EV is not charging.

There are two main types of safety sensor:

- Current sensors which monitor the power consumed, and maintain the connection only if the demand is within a predetermined range. Sensor wires react more quickly, have fewer parts to fail and are possibly less expensive to design and implement. Current sensors however can use standard connectors and can readily provide an option for suppliers to monitor or charge for the electricity actually consumed.
- Additional physical "sensor wires" which provide a feedback signal that require special (multi-pin) power plug fittings.

Conclusion:

- This presentation proposes to the effectiveness of EV Charging Station where we can do fast charging, at same time we can charge one and more than electrical vehicle 30-40 minute time duration.
- On the conclusion point:
  - Changed behavior is important for transition towards e-mobility.
  - Customised regional and city planning for e-mobility.
  - Develop smart charging systems - V2G.

• References

- (https://www.researchgate.net/publication/320410391_A_Study_of_Electric_Vehicle_Charging_Station_Installation_Progress_in_Malaysia) proposed methodology.
- (http://www.eai.in/blog/2018/12/components-of-ev-charging-infrastructure.html) component of EV charging.
- (https://pdiwan.medium.com/slow-fast-and-super-ev-chargers-conundrum-d35ea0da5a87) DC fast charging.
- Boook: Power Electronics by Ps bimbhra (design of convertor)
- Matlab for simulation

Thank you