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Group #8

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Project Background

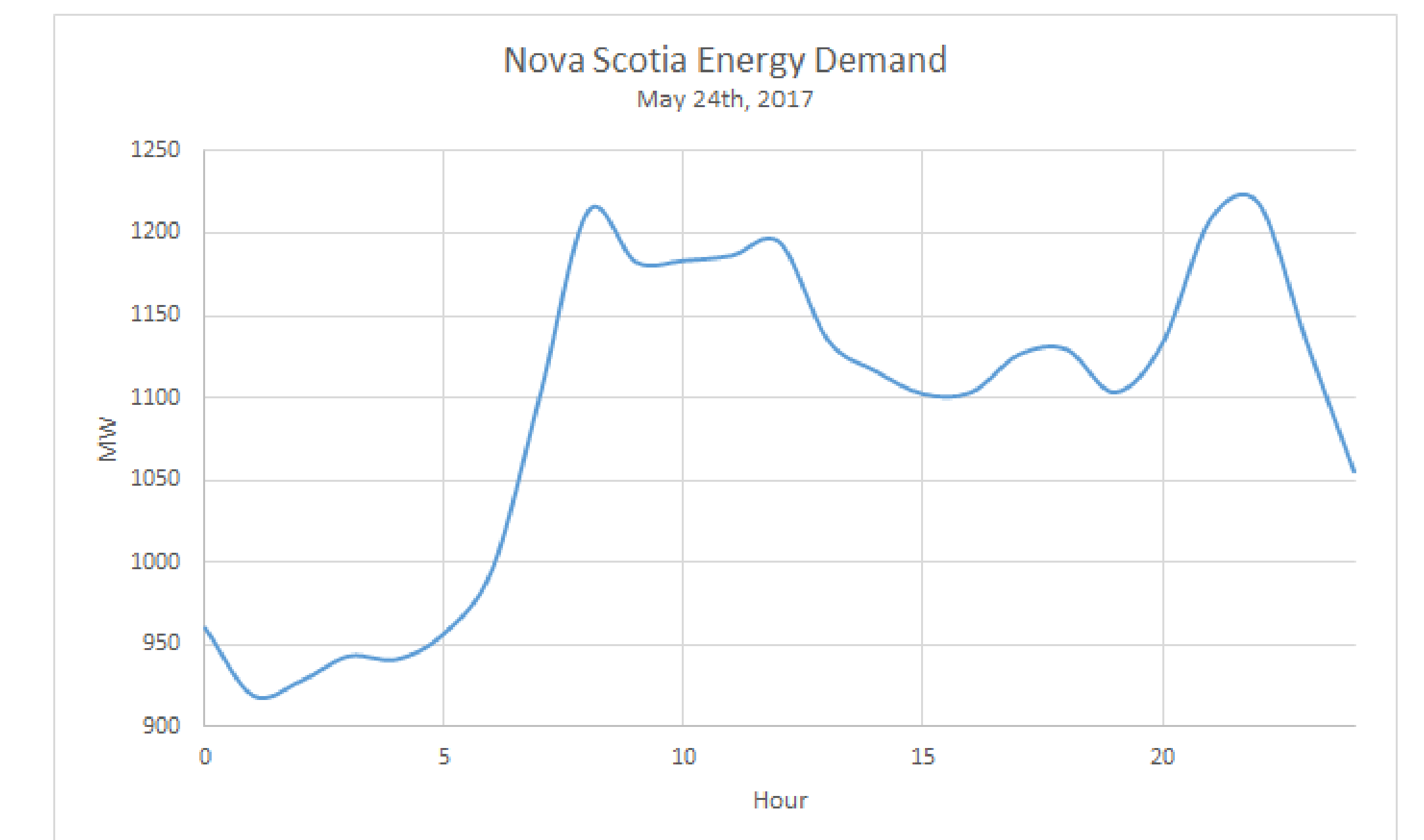
- For Nova Scotia to meet its 2030 and 2050 emissions targets (53% below 2005 levels by 2030 and net-zero by 2050) it will require the decarbonization of the transportation sector.
- This will require replacing fossil fueled vehicles with electric vehicles (EVs)
- Our goal is to create an Excel Visual Basic based datasheet that can determine the expected amount of power utilized by electric vehicles from the grid, focusing on peak time, off peak time and seasonality.
- We intend to use this data to determine how to minimize the impact of charging electric vehicles on the power grid.

Design Details

- Program will take inputs from user on factors for projections
 - (i.e. number of EV currently in market, Different charging timing scenarios, etc...)
- Program will take inputs from credible websites, mostly government or NSPI, to populate data on factors for projections
 - (i.e. emissions of transport market, etc...)
- Program will run using excel sheets and macros to perform data collection and analysis
- Program will create graphs depicting projections and data sheets to compare with zero emissions goals set by provincial and federal government
- A more detailed design is anticipated to be complete prior to the Fall semester
- % of EVs
- Average Commute
- Percentage of energy produced by renewable sources
- Percentage of each type of charging being used
- Vehicle's energy efficiency
- Smart Charging

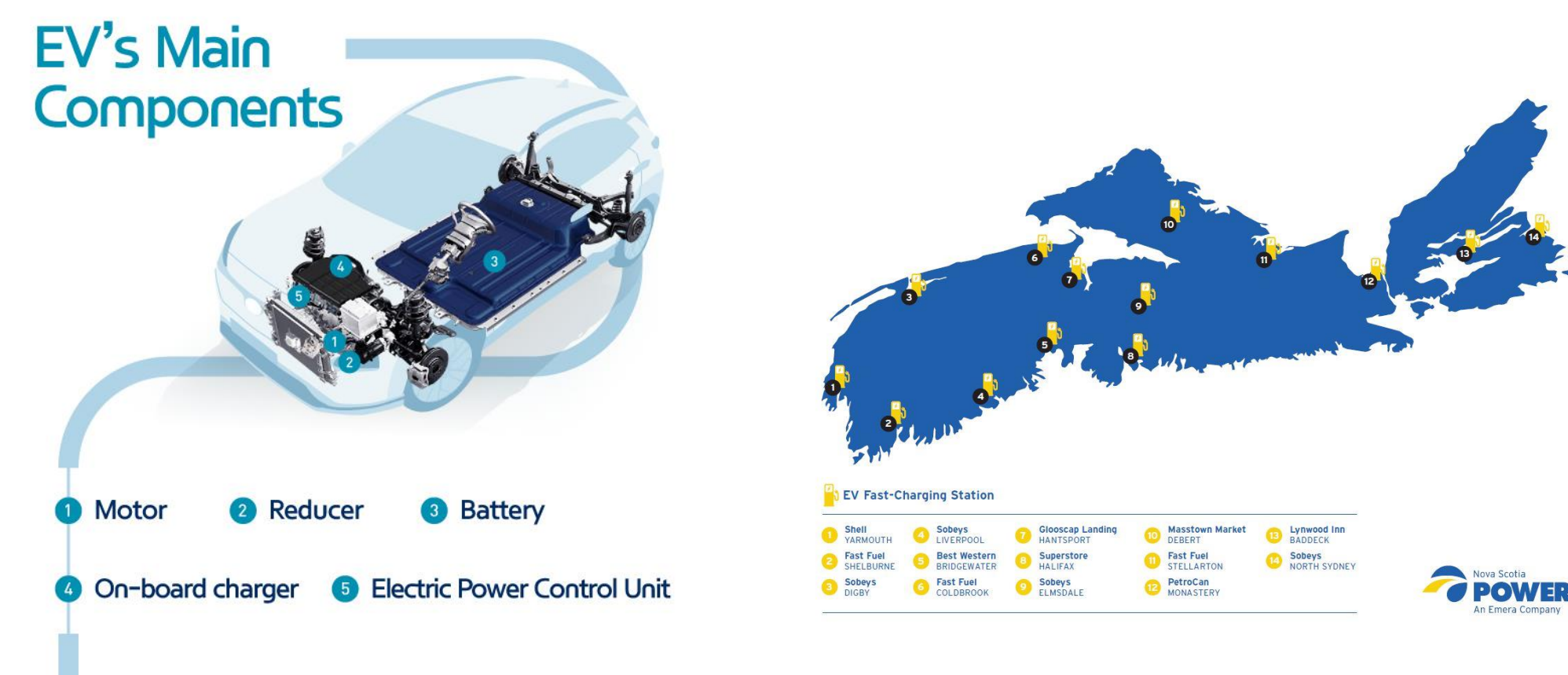
What are Peak Times?

- Times of greatest power demand
- Costly and bad for the environment
- Electric cars could have a significant impact on the peak demand



What are Electric Vehicles?

- Simply put, an electric vehicles (EV) is a vehicles that runs on electricity
- These vehicles use an electric motor powered by electricity from batteries or fuel cell
- Battery-EVs store electricity directly in their battery packs
- Fuel cell EVs store the electricity via gaseous hydrogen, releasing it through a chemical reaction in the cells
- Plug-in Hybrid Electric Vehicles (PHEVs) combine a gasoline or diesel engine with an electric motor and rechargeable battery

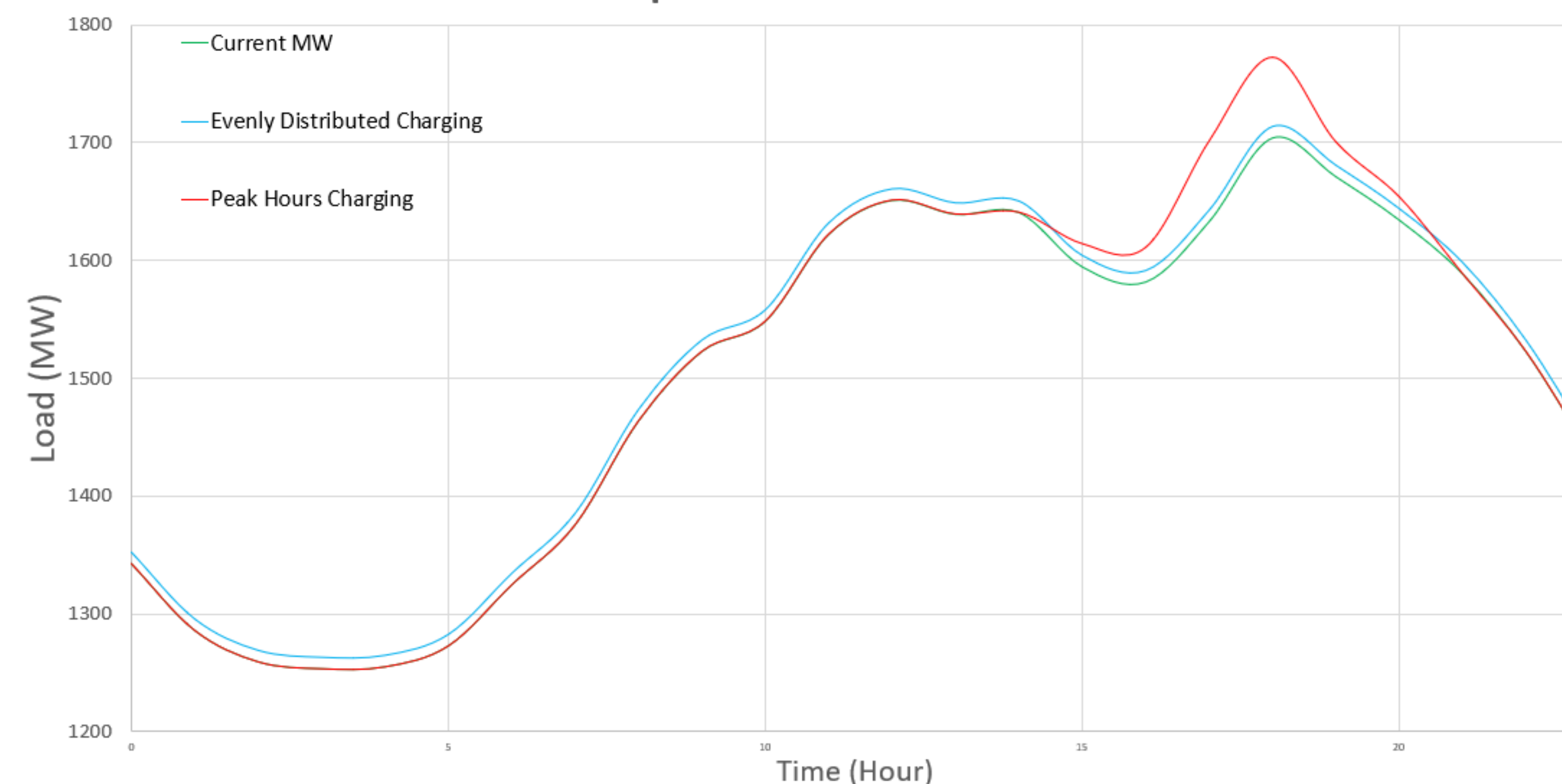


Sample Input and Output

As apart of our design we have included a sample input and output data set and graph

Start Year	End Year	
2021	2030	
Number of cars in Nova Scotia	Average Commute (in Km)	
600000	6.5	
Renewable Energy Policy	Emissions Regulations	
80% Renewable by 2030		
KWH/100Km	Percentage of Electric Vehicles in NS	
20	30	
Percentage of Charging Methods Used		
Type 1	Type 2	Type 3
100%	0%	0%

Impact on Grid



Completed Goals

- Gather data from numerous sources about electric vehicles, electric vehicle power usage, and power grid data
- Analyze the data found in the previous goal and extract key information
- Create trial models with data collected
- Plan for models for Fall Term

Goals to be Completed

- Combine relevant data, that was previously analyzed and extracted in Winter Term
- Review trial models created in Winter Term
- We anticipate to create an Excel Visual Basic based datasheet
- We anticipate to create a dynamic prediction model
- Determine the criteria required to keep the impact on the electric grid to a minimum

References

- <https://news.hyundaimotorgroup.com/Article/Understanding-EV-Components>
- <https://www.nspower.ca/your-home/energy-products/electric-vehicles/charging-stations>