



OPTIMIZING VEHICLE CHARGING STATIONS

 \$1500



About Invest Windsor Essex

Invest WindsorEssex is a not-for-profit organization supported by the City of Windsor and County of Essex. They are responsible for advancing economic development to grow and sustain prosperity in the region.

As the lead economic development organization in the region, they provide confidential and expert assistance to companies and entrepreneurs in all sectors. Our focus is to develop and execute strategies to retain, expand, attract and help start up new businesses in the Windsor-Essex region.

Eligibility

All hackers, from anywhere in the world, are eligible for this prize.

Challenge Details

Invest Windsor Essex wants to speed up the transition from conventional gas vehicles to zero emission vehicles which help to protect the environment.

In order to do that, they're looking for ways to optimize the availability of electric vehicle chargers in the region.

Your task is to build a tool that will help them determine the location of newly built chargers across Windsor / Essex. The best solution will take into account multiple different factors to maximize the effectiveness of this initiative.

What it will do:

You must create an algorithm that strategically suggests locations for new electric vehicle chargers in the Windsor / Essex region.

For this challenge you may ignore personal / private chargers located inside people's homes or businesses and only consider those that are publicly available.

Scoring System:

Projects will be judged on a numerical score out of 100 as well as on a more subjective scale based on the judges impressions of the project and the demo video.

Points will be awarded as follows:

<i>Item</i>	<i>Description</i>	<i>Point Value</i>
Demo video	Demo video presented is no longer than 3 minutes long, simple to understand and includes a thorough description and demonstration of the project	15
GitHub repository	A project repository which includes all relevant code is linked and has at least one contribution from each group member.	10
Basic functionality	All items listed as basic functionality are included and executed to at least the minimum requirement	25
Additional functionality	Each item included from the those listed as additional functionality is executed to at least the minimum requirement	5 / item
Advanced functionality	Each item included from the those listed as advanced functionality is executed to at least the minimum requirement	10 / item

In addition, the following subjective criteria will be evaluated. These items will not be scored on any objective scale and will be left solely to the discretion of each individual judge.

<i>Item</i>	<i>Description</i>
Competency	Has the project been completed with care and attention to detail? Is the user experience smooth and unhindered by bugs and glitches? Could this project go into production with additional time and work?
Creativity	Does this project demonstrate creativity in it's execution? Have interesting design elements been included? Are problems solved in an interesting or unconventional way?
Innovation	Is this same solution found in other, similar projects? Does this project include new or novel techniques or technology?

Basic Functionality:

These basic functions **MUST** be part of your solution in order to be considered for a prize:

<i>Item</i>	<i>Description</i>
User Inputs	Number of new chargers to be installed
Program Outputs	GPS locations of new chargers to be installed
Charger location	Chargers must be located on a road but may not be located on a highway Chargers should be distributed across the whole region including: <ul style="list-style-type: none"> • Essex County • Belle River • Lakeshore • Tecumseh • Windsor • Lasalle • Amherstburg • Harrow

	<ul style="list-style-type: none"> • Kingsville • Leamington ...and the areas in-between
User Interface	Simple enough for non-technical municipal staff to use and understand

Additional Functionality

Additional functionality can optionally be included to improve the overall effectiveness of the project:

<i>Item</i>	<i>Description</i>
Different charger types	Allow the user to specify different types / tiers of chargers in their input and consider this data in their placement <i>Example:</i> Place smaller / less powerful chargers between residential areas and larger / more powerful chargers near industry
Detailed location output	Specify an address or street location in addition to GPS data
Zone consideration	Avoid placing chargers in residential areas, areas with little or no population density, etc.
Trip length consideration	Chargers are placed in such a way that drivers are able to make round trips between key locations in the region without running out of charge
Road quality	Chargers should be placed on roads that are large enough to support medium traffic flow and not too large as to be unsafe <i>Example:</i> not placing chargers on small residential roads
Web-based application	Prepare your solution as a web-based / browser application

Advanced Functionality

<i>Item</i>	<i>Description</i>
Show charger location on map	Display charger locations on a map of the region as part of your user interface
Consider the location of existing chargers	Do one or both of the following: Allow users to specify the locations of existing chargers and take this data into account Collect the locations of existing chargers from some third party source and take this data into account

Resources

- Road data: <https://www.openstreetmap.org/>
- Information about car chargers: <https://chargehub.com/en/electric-car-charging-guide.html>
- Automotive Statistics (StatCan): <https://www.statcan.gc.ca/en/topics-start/automotive>
- Location of existing car chargers in Windsor / Essex: <https://chargehub.com/en/Charging-Stations-Map.html>
- Information about electric vehicle range (distance on one charge): <https://blog.evbox.com/far-electric-car-range>

Submission Requirements

Submissions must include the following:

- ☐ A demo video no longer than 3 minutes long
- ☐ A link to the project GitHub repository
- ☐ The names of all team members who contributed to the project
- ☐ A link to download / access and run the final tool

Prizing

A cash prize will be awarded in the amount of \$1500 for the first place submission.

Questions

Questions related to the challenge, judging, etc. can be directed to any of the help channels in the WinHacks 2022 Discord server, or to Aislyn Laurent at alewis-laurent@investwindsoressex.com.