An Issue With Electric Transportation

1   Introduction

In the Netherlands we want to decrease the amount of fossil fueled transportation. The ministry of Economic Affairs and Climate policy is one of the responsible parties for this endeavor. There are many, many ways to try to reach this goal. The question is though, which ones of these are good ones? And are we even considering all the relevant options and factors?

One of the chosen solutions is to replace fossil fueled transportation with electric transportation. In this transition one of the relevant aspects is the required infrastructure. Parking spaces that can charge an electric car are regarded as a requirement for people before they buy an electric car. This transition is a technical challenge, but also a social one[1]. In extreme cases residents might start fighting with other residents over services for electric transportation if they disrupt the current situation more than the social system can handle. As such further analysis is warranted.

2   Current model

The current model simulates a neighborhood where people live and want to park their cars. The parking spaces around dwellings with occupants that have electric cars can only be used by electric car users. These parking spaces have the special infrastructure required for charing electric cars. Each tick all the residents try to park their cars, in a random order, as close as possible to their home. The further away they park their car the lower the happiness. An even greater penalty on the happiness is imposed if the owner is not able the park his or her car at all.

3   Goal

The general goal is to gain more insights in how to improve this electric transition. Based on the current model two courses of action can be taken:

Broaden the view The current model can be used as sub-model of a bigger picture. People do more than just park their car in the neighborhood of residence. *Parkability* is only one of many things to consider when one thinks of switching to an electric car. Which other dynamics are relevant? Some can be found in current reports regarding policy[2] We want to have an agent based model, and simulation, that gives us more insights in the whole system.

Deepen the insight With the current model we can understand the basic dynamics of the parking situation. Yet the constraints and assumptions are based on educated guesses and rather arbitrary. How could car users interact with each other, other than the current "I take a parking spot" interaction. We also assume every day (tick) is the same, everyone leaves their parking spot, tries to find a new one and has no specific routines. And how to classify hybrid cars? To understand the parking problem better we need to improve the current model.

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[1]See this article for an example: https://www.nrc.nl/nieuws/2018/08/08/parkeren-onder-hoogspanning-a1612506

[2]https://www.rijksoverheid.nl/documenten/rapporten/2016/02/10/terugblik-en-vooruitblik-op-het-beleid-voor-elektrisch-vervoer