Enschede, The Netherlands, August 29th, 2024

MSc Qualifier: Derian Carlos Tairo Garcia

Title: Implementation of a Microgrid Energy Management System Considering E-Mobility, Uncertainties and Contingencies: A Multi-Objective Approach

General comments:

1. The text is well written. A lot of work already done. Very interesting topic. Paper almost ready for publication. Congratulations!

2. Abstract.
   - Add more quantitative results at the end, it is too general.

3. Introduction:
   - Development of EVs. What do you mean by that? Is it more deployment of EV charging infrastructure? Or including charging demand?
   - Since the main contribution or added value of this work is the inclusion of the EVs, I think it is worth to give a context of the EV charging, how are they incorporated in microgrids, and why is there energy no supplied. You went directly to what differentiate your work and paper from 23, but without giving any context…
   - Uncertainties related to PV and demand, but what about the inherent uncertainty from EVs: arrival times, departures times, initial SOC. It would be a good addition/contribution

4. Data to create scenarios? Where is it coming from, and how do you create the scenarios?

5. Maybe add a discussion on the model complexity according to number of scenarios, etc.

6. 24 hours simulations…. What's the capability of your model to decrease the time step to 15 min for example to make the application more realistic?

7. How much is sufficient charging?

8. In the nomenclature you called maximum char/dischar limit of the EV charger. Did you consider V2G? (after reading the whole work I realized that you did not consider V2G, then, please change accordingly).

9. Battery capacity and initial SOC. Difficult to get in real life…. One approach to simplify and avoid this discussion is to ask energy required and focus on that without worrying about battery capacity for example…..

10. Could you elaborate a bit more about 36 and 20% range?

11. What is this SIL API, is it the microgrid conf? Maybe include it in Fig 2.

12. 3.1.2 Database -- > measured data during microgrid operation, is this coming from real measurements in the field, or from the HIL simulation?
    - Initial SOC should be there
    - Charging power is a variable, you mean power rated or nominal power of the EV charger?

13. It is not clear if the microgrid is simulated or if is real.
14. Figure 3. Very small, you cannot see the EV tab for example. You could use a bigger fig or use or add a zoom for this specific functionality in the figure to highlight it
15. Huge EV capacity, this is not a conventional EV, this is an e-BUS!!!
16. Page 8. You mention: The final node is equipped with an EV charging station, capable of charging one or two EVs simultaneously.
    - How are these dynamics included in the EV charging model. How does the model limit the charging power to one or two EVs.
    - Can EVs be charged with two plugs? This is a bit confusing! You should also be aware that not all EVs allow fast charging… there are some technical limitations. I think, it is better to clarify that this is for the specific charging of e-buses within the unicamp.
    - If you only consider fast charging, You can only charge one BUS, correct? You cannot charge two EVs simultaneously… Therefore you need information beforehand about the usage of your charging station. It might not be useful for different applications… Let's say that someone randomly would like to use this station. WOULDN'T BE NICE TO HAVE SMTH LIKE AVAILABILITY OF THE CHARGING STATION?
    - Study case for only TWO EVs. Tailor this to the specific application, otherwise, could be highly criticized!
    - Optimize charging of E-buses within the unicamp… If they have this pre-scheduling well defined, why are you worry about ENS?

17. Page 9. You mention 6 cases in the introduction but here you mentioned 7 cases
18. Cases 1 – 3, without EVS?
19. Nos resultados, é estranho falar que quer minimizar custos via ENS. Idealmente miniminiza custos de corte de carga. ENS no final é um tipo de corte de carga, certo? Entao minha pergunta é, porque considerar somemente ENS dos EVs, e nao das otras cargas também? Seria possível misturar de alguma forma as duas? No final Evs sao cargas também....
20. In this case study, the initial SoC is 64.8 kWh (20%). By adding 259.2 kWh, is guaranteed that the EV reaches its total maximum energy capacity of 324 kWh (100%). O Centroide garante que um EV é carregado mas o outro nao carga nada. This might not be fair from a customer point of view.... teria como escolher uma solucao em que ambos os Ves sao carregados pelo menos um pouco, levando a mesma energia nao suprida. Qué poderia ser feito para ter uma carga mais balanceada entre os EVs...
21. Na figura 10, parece um pouco curioso que tenha corte de PV. No caso de ter Ves disponiveis para carregar, seria melhor aproveitar essa energia pra carregar os Ves, certo?

Once again, congratulations, and I wish you all the best in your future career!

Nataly Bañol Arias