# Appendix A

# Manual on how to install and use the power model

In order to be able to complete the following steps and to include the power model, Anaconda needs to be installed correctly. A manual on how to install Anaconda can be found **on this page**.

1. The first thing to do is to ”trust access to the VBA project object model” in Excel. To do this go to Excel $\rightarrow$ Options $\rightarrow$ Trust Center $\rightarrow$ Trust Center Settings $\rightarrow$ Macro Settings. Here you check the checkbox ”Trust access to the VBA project object model”.

2. Go to your anaconda prompt.

3. Activate the environment in which you want to install the Xlwings software. If you have only the (base) environment, you can of course ignore this step.

4. Install Xlwings with the following line of code

   conda install xlwings

   If they ask to proceed, type: ’y’ (yes).

5. The Excel add-in will automatically be add to you Excel after running the following line of code:

   xlwings addin install

   Test now if the add-in is installed correctly in your Excel by opening a new, blank, Excel workbook. A new tab, ’Xlwing’, should be added.

6. Other packages still need to be added. Run the following lines of code, seperetly, in the Anaconda prompt:

conda install matplotlib
conda install pandas
conda install scipy

7. The easiest way to implement later the Excel file with the proposed power model is to now make an Xlwings quickstart project. It is important to know where this project will be placed on your computer. An easy way to make sure you will find it back later is to save it on you 'Desktop'. To do this, the directiory in which you work in the anaconda prompt needs to be changed to 'Desktop'. This can be done as follows:

   cd Desktop

   The quickstart project will now we placed under something like: '(Base) C:\User\Windows 10\Desktop'. Run the following line of code in the prompt to actually make the quicstart project called 'myproject'.

   xlwings quickstart myproject

8. Now it is time to download the model. You can find it on the following **GitHub page.**
   Download the whole folder by clicking on the green button 'Code' $\rightarrow$ Download ZIP.

9. Unzip this folder "myproject" (found on Github) and replace this folder by the quickstart folder 'myproject' (see two steps ago), made by the code 'xlwings quickstart myproject' a few steps before.
   If you ran the code 'cd Desktop' before, you can find this 'myproject' folder in the following file path: 'C:\User\Windows 10\Desktop' or something similar.

10. In this folder you will find an excel file and .py file with the same name as this folder. You can now open this Excel file. Make sure you "Enable editing" when Excel gives this notification.

11. Go to the tab 'Xlwings' in excel. The python code still needs to be implemented in Excel. If everything went right, you can click the 'Import function' button here and not error will pop up. If this is the case, your model is ready to be used!

12. Give in your own preferred field width, field length, number of users, and antennas. If wished, other parameters can also be changed.

13. You are now able to calculate the consumed power by filling in some parameters and clicking the "Calculate Power" button.