Text, whiteboard

Description automatically generated

Read over Rafferty’s email about organizing the code.

Label EVs resistive heater and heat pump heaters.

* Seems quite hard,
* old Nissan leaf is resistive, new is maybe depending on trim and also even if it has heat pump it is a hybrid heat pump + resistive heaters.

Interpolate the quarterly VKT data to monthly. Currently considering pipeline to fit a sin wave to the seasonal decomposition. Error term to be big for total fuel used difference so that total fuel is unchanged and then MSE so that sin wave fits the data. Need to learn custom error function in pipeline.

Find average km driven per car in 2019 and leading up to. Use to calculate kWh based on the number of EVs by region and month for light vehicles. (Month only using efficiency).

On the model side use the coefficients of HDD and CDD from the linear model and use the base line efficiency (all other term of the linear model combined) to make a model (probably in the form of a function) that can predict the total power used in a region for a given HDD and CDD. Might also just calculate the power difference between months as if we can decompose approximate it to linear might be able to find the difference much more accurately that we can find total power used.

* Done calculation, difference in efficiency is approx. change over baseline squared
* Change in power can depend on only difference in seasons. Need to check with Michael/Rafferty if power linear model would be a better idea.
* Power usage (kWh/km) vs efficiency (km/kWh) model: R^2 is higher, HDD is same, CDD is more confident, qqplot does not seem to fit well as small number of cars that are not very inefficient make the distribution not a normal distribution breaking the assumption of normality, both have slight heteroscedasticity but could be explained by difference weather responses in cars.

Change everything to power consumption.

Find difference in power usage each month and plot by change in power usage from the norm based on 100% penetration and maybe 50% too.

Calculate power usage with current car make up and the worst case and a best-case car scenario. Probably use 62 kWh Nissan leaf and the Hyundai ioniq.

Take the eeca times model and using the estimated VKT travelled add my seasonal trend to it