
# SmartEnerx Dashboards User guide

Release 1.0

Dashboard Training & Documentation

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# Contents

## Introduction

This document is a user guide for the SmartEnerx tool that the user can follow to use and interact with the application as well as a detailed description of the features and parameters used to build each panel.

# Dashboard User Guide

## About the tool

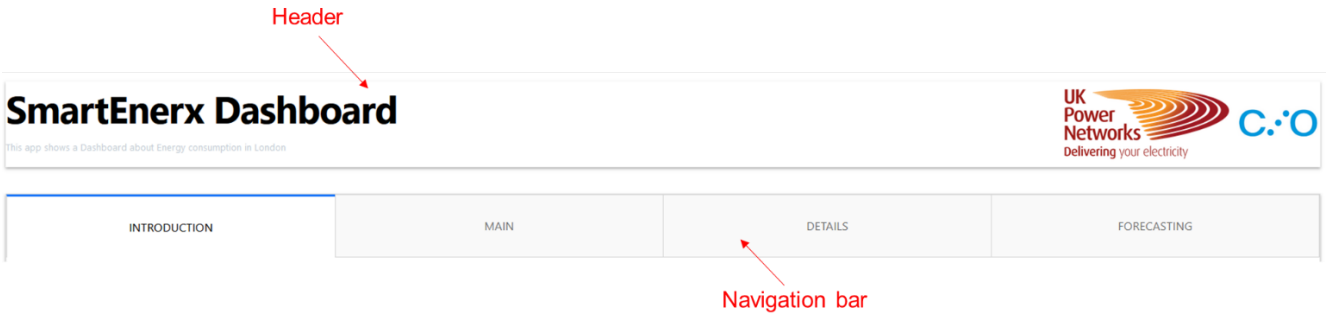
SmartEnerx is a visualization tool designed to provide a graphical representation of the historical daily energy consumption of households in London from November 2011 to February 2014. This application is very flexible and allows the user to display information about various ACORN categories and groups, within a specific period or season of interest.

SmartEnerx integrates a high-accuracy forecasting model that can be used to predict the daily energy consumption of one category and its groups of interest, in a defined forecast horizon. It gives the user the possibility to compare the performance of different models by changing the values of the most relevant hyperparameters.

## Overview of the application and layout

This section gives a brief description of the Overview and Application Layout

## Header and top navigation bar



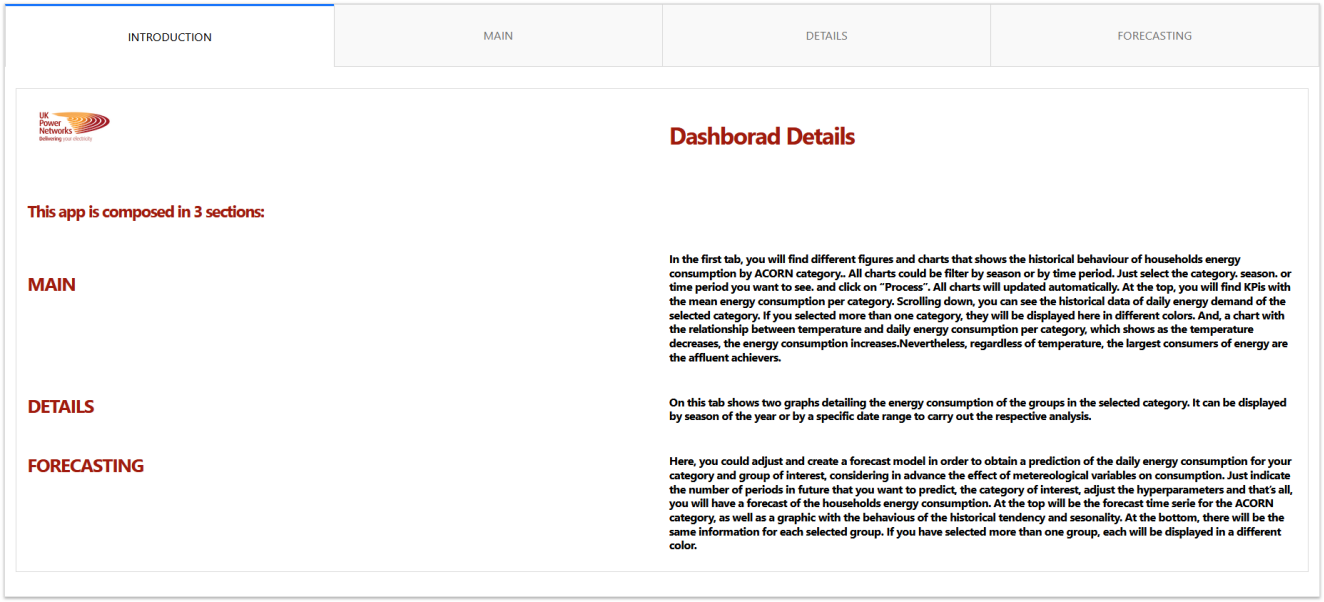

The application header includes the corresponding title, its main purpose, and the main institutions related to its development.

The navigation tabs below the header can be used to navigate across the different tabs or panels of the application, changing the content area and its corresponding filters.

SmartEnerx is composed of four panels: the introduction to the tool, the main dashboard panel, a panel with specific details of the household energy consumption by the ACORN group, and the forecasting panel.

## Introduction tab

The introduction tab includes a brief description of the content and functionalities of each tab.

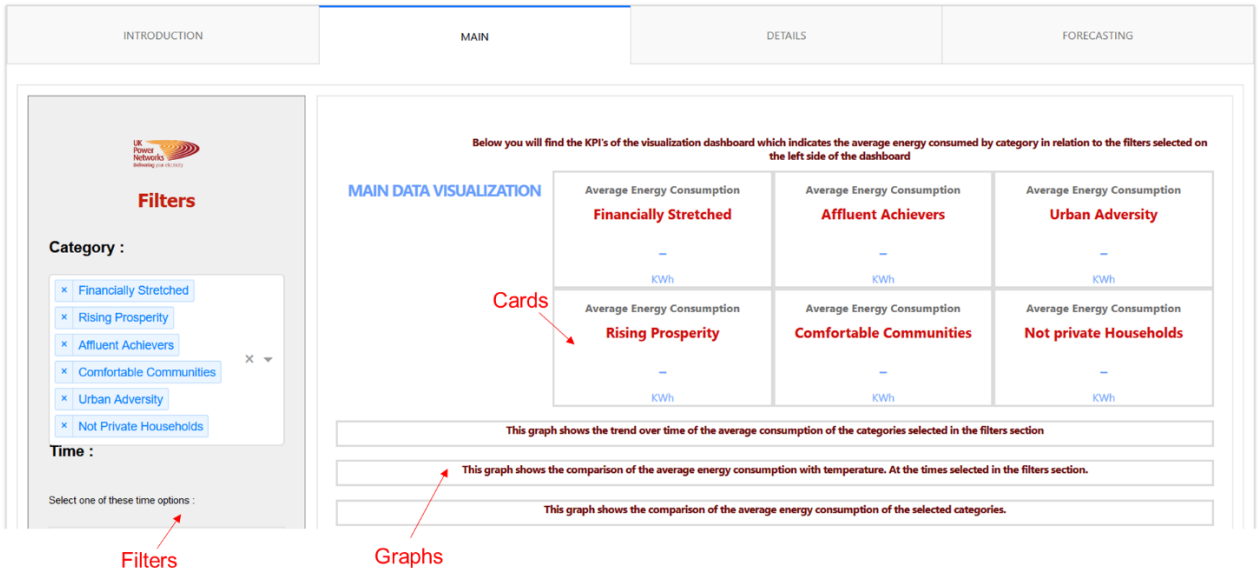



This tab is loaded by default by the application to give the user a piece of additional information on how to use it and what to expect from each tab.

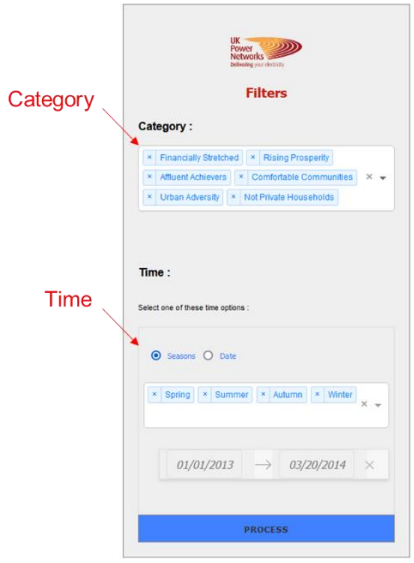
## Main Tab

On the main tab, there are three main elements:

1. Filters: this allows the user to display the information by the categories and period of interest.
2. Cards: display the most important Key Performance Indicators (KPIs) of the household energy consumption by category.
3. Graphs: display the filtered information in three graphs
    a. Trend over time of the daily average consumption of the selected categories.
    b. Comparison of the average daily energy consumption with the mean temperature.
    c. Comparison of the mean daily energy consumption between the selected categories on the period.

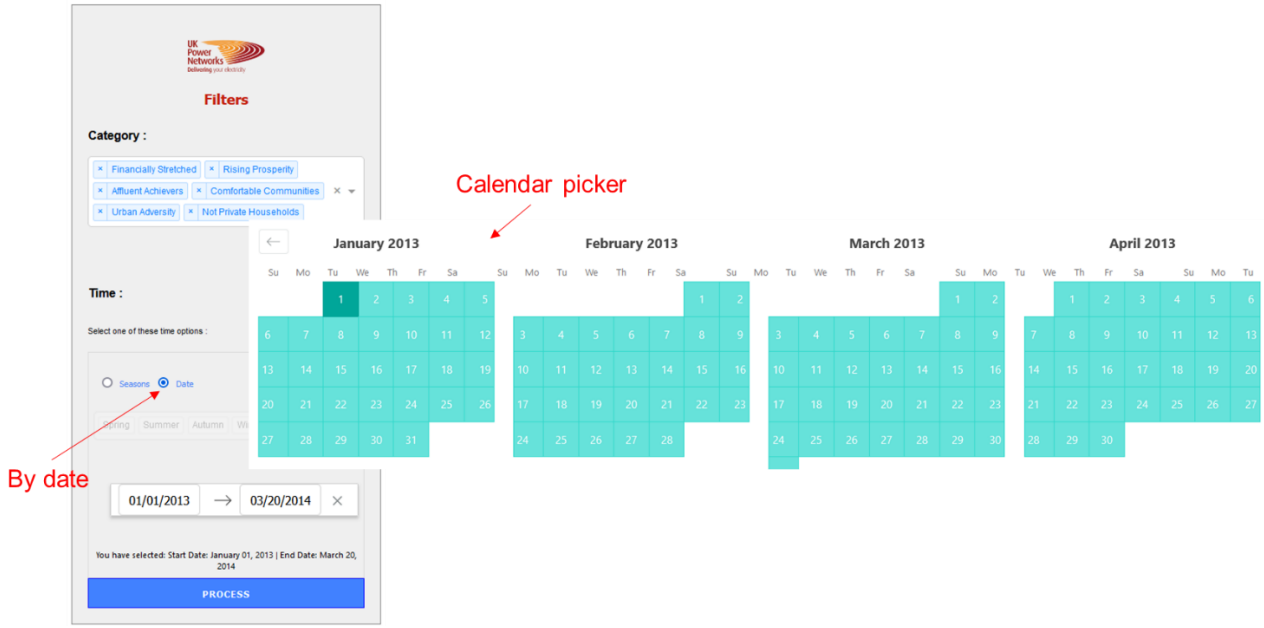



Filter options

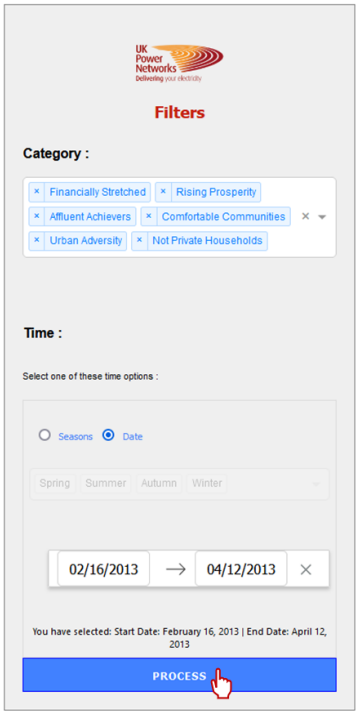


The filter options are divided into two main elements:

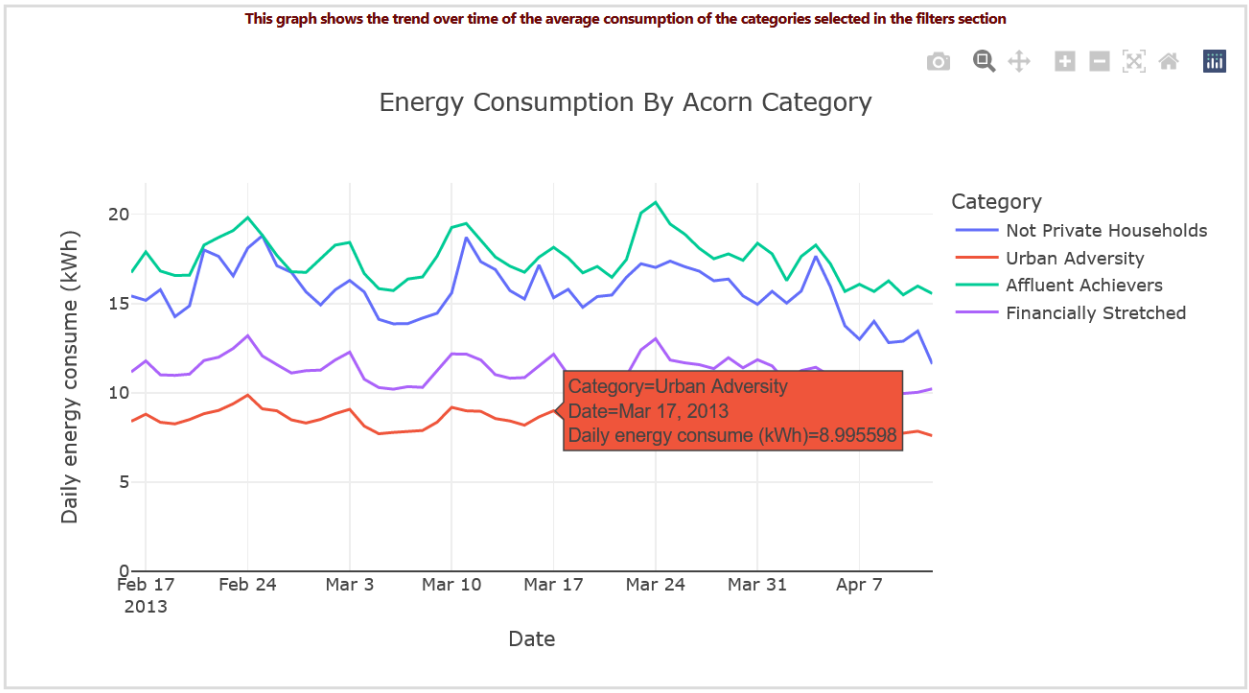
1. Category: where the user selects the categories of interest
2. Time: which can be filtered by season or by date.
    a. By season the user is allowed to select the corresponding seasons of interest.
    b. By date, a calendar picker is displayed, and the user can select between two specific dates.

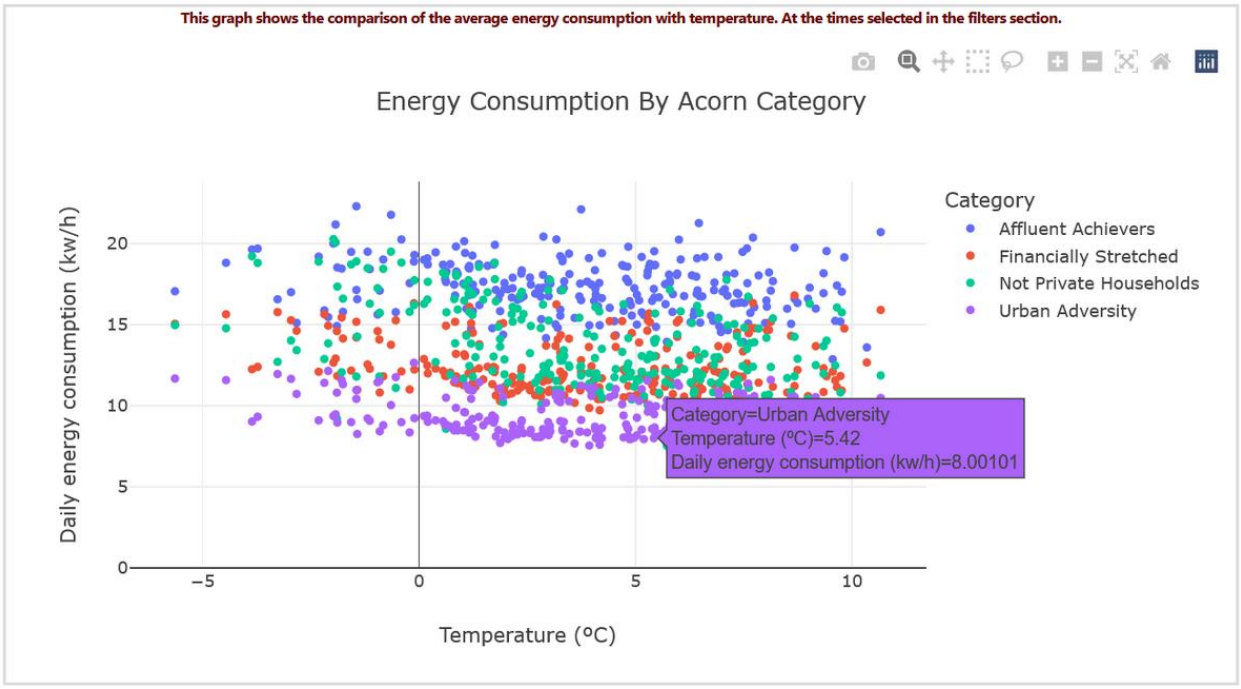



Finally, to show the graphs the application needs user authorization, thus is necessary that the process button is clicked.



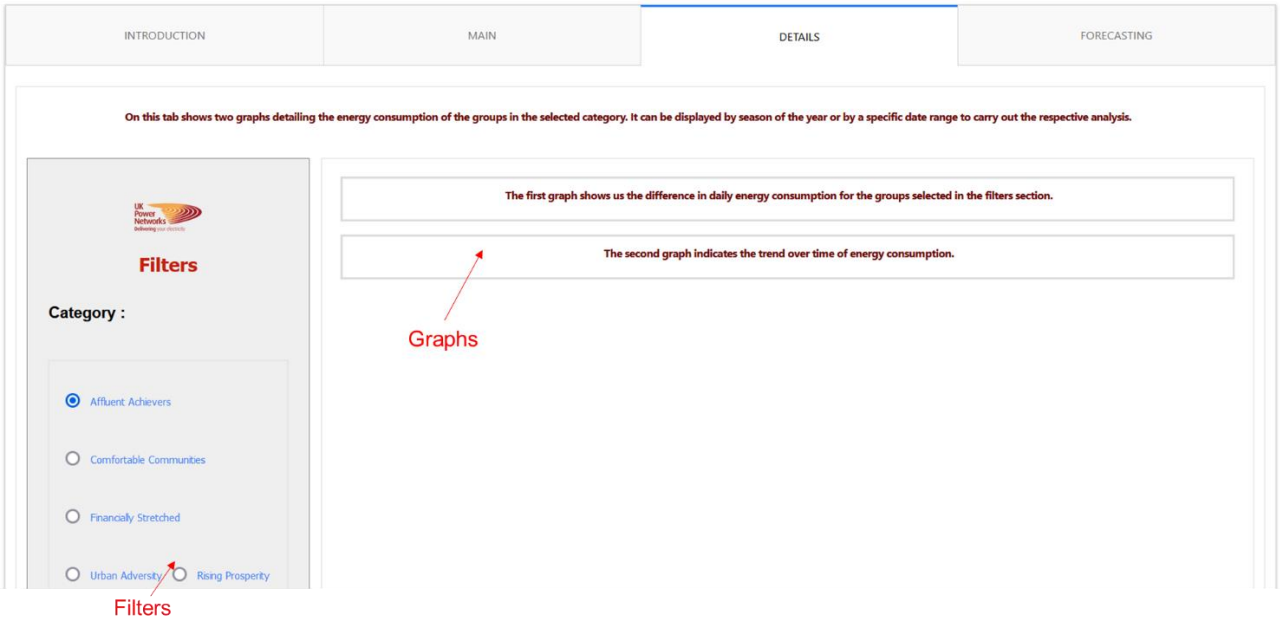
*Some of the output graphs displayed on the tab:*



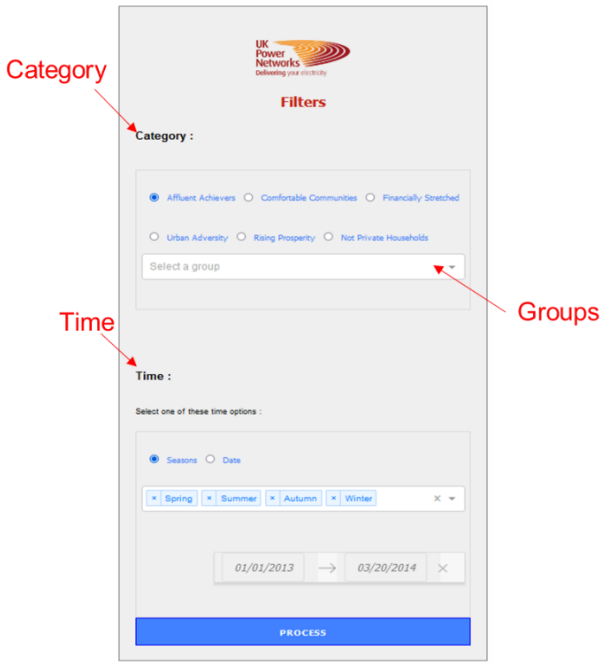



## Details Tab

On the detail tab, two graphs are displayed with the detailed behavior of the daily energy consumption by each group. Although the structure is like the main tab, the filters and graphs are different. In this case for each ACORN category, its corresponding groups are available to select.

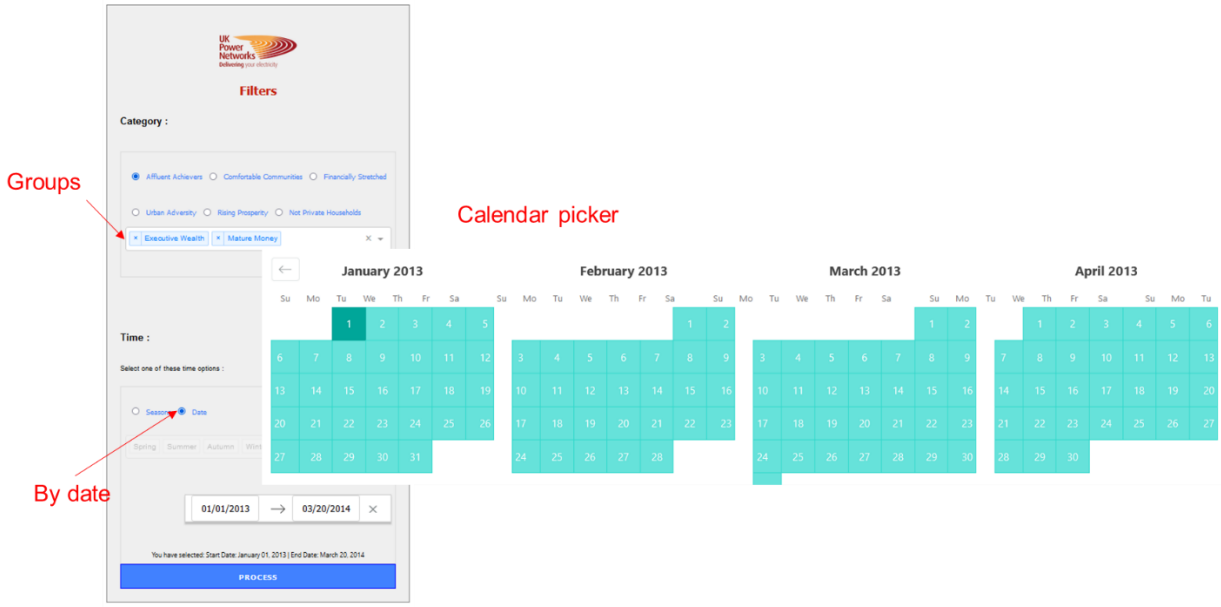



1. Filters: to select the groups and period of interest.
2. Graphs: display the filtered information in two graphs
    a. Difference in daily energy consumption of the groups
    b. Daily trend of the energy consumption by group



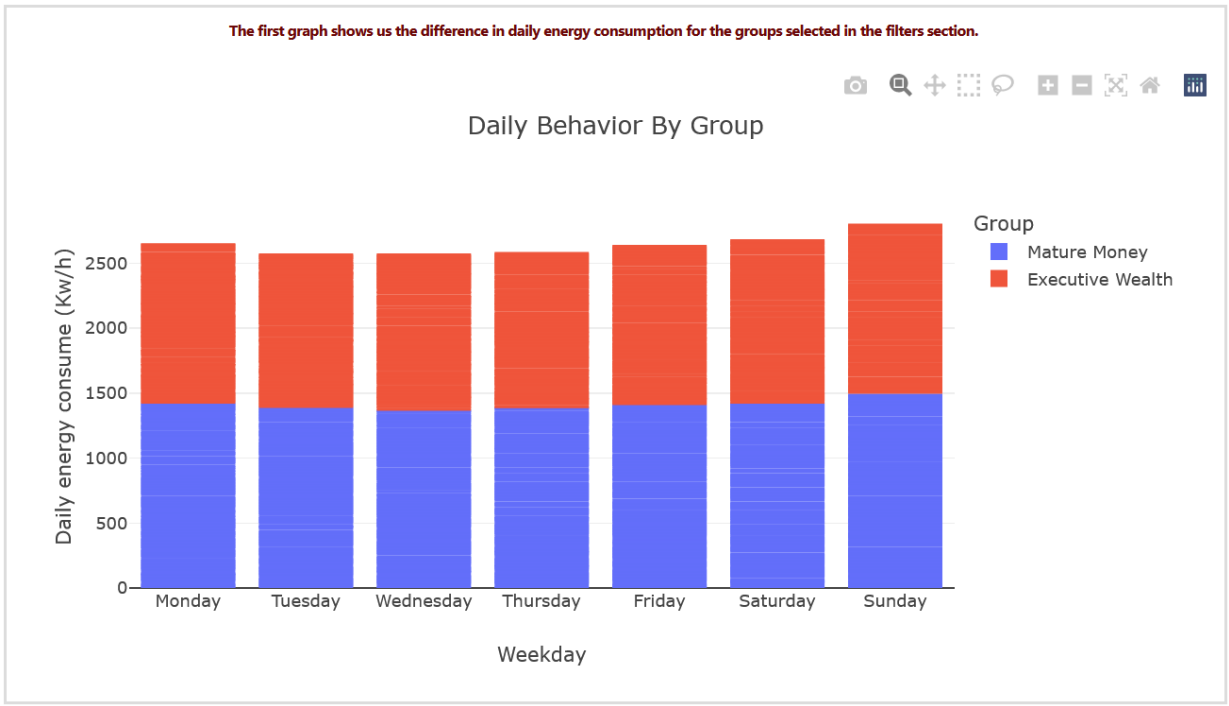
In this case, the user can select between the different groups that belong to each ACORN category.

The time selection works like the previous tab, with the opportunity to select between seasons of interest or specific dates.




Similarly, to the previous tab, it is necessary to click on the process button to display the graphs.

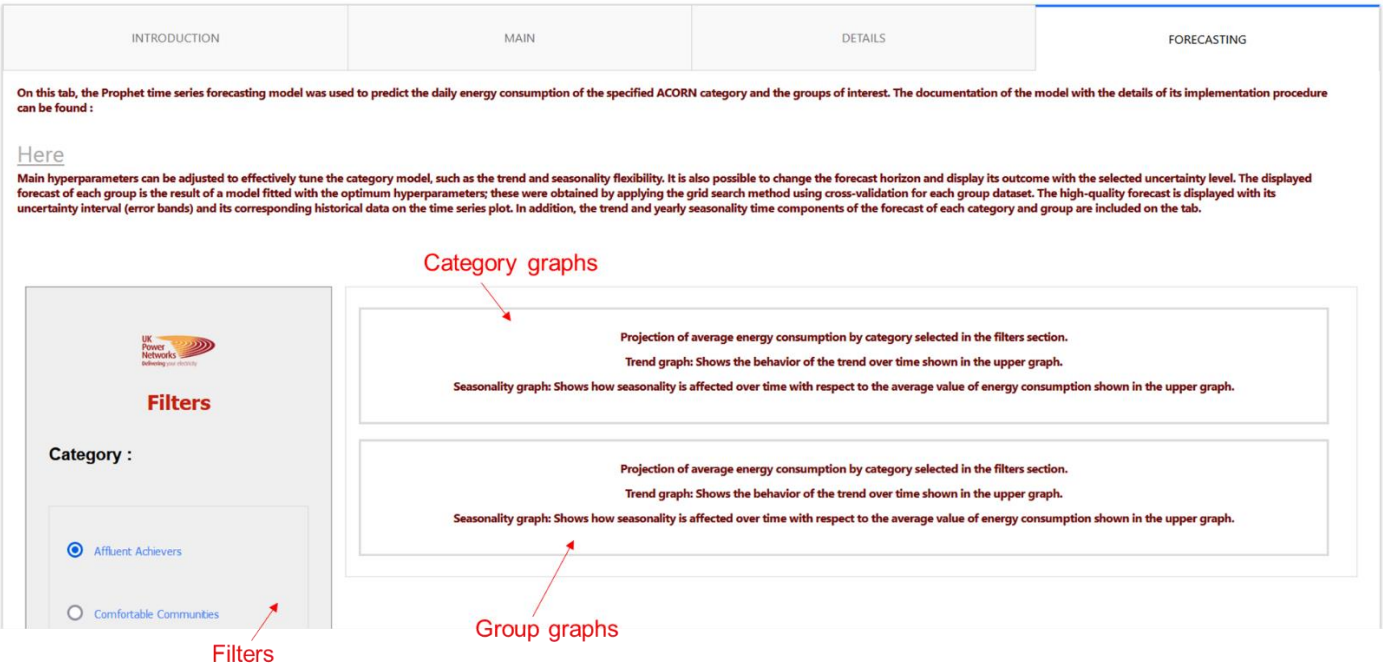
*Some of the output graphs displayed on the tab:*



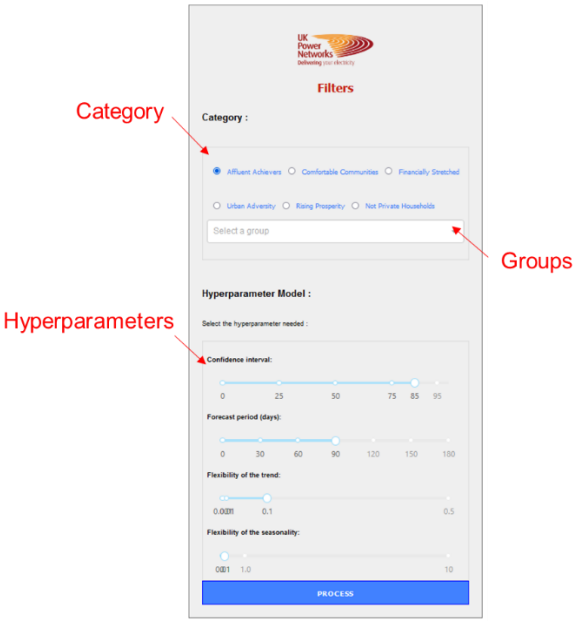
## Forecast Tab

On the forecast tab, the Prophet time series forecasting model was used to predict the daily energy consumption of the specified ACORN category and the groups of interest.

The historical data with the obtained forecast is displayed for both the selected category and its groups, having selected the custom hyperparameters and the forecast horizon.




1. Filters: allows selecting a category and groups of interest with custom hyperparameters.
2. Graphs: Two types of graphs are displayed, historical data with the forecast and the trend and yearly seasonality time components of the forecast.



There are four Hyperparameters that can be adjusted:

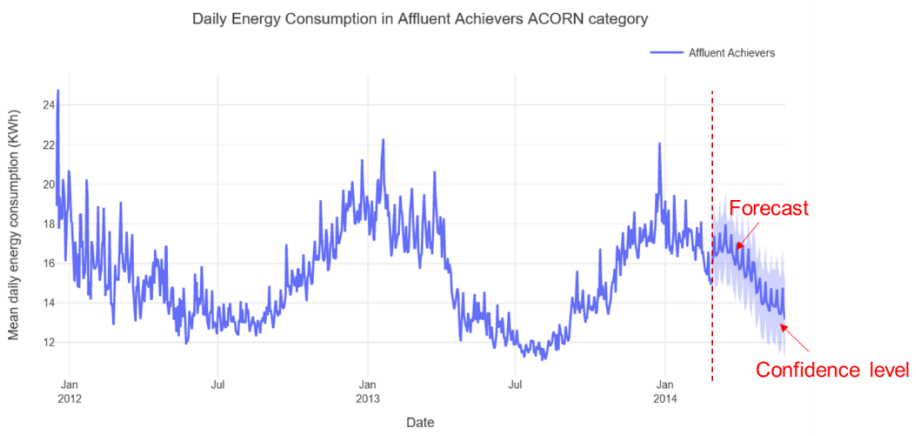
1. Confidence interval: uncertainty range (both for group and category models).
2. Forecast period: days to be forecasted (both for group and category models).
3. Flexibility of the trend: hyperparameter that affects the trend of the category model.
4. Flexibility of the seasonality: hyperparameter that affects the seasonality of the category model.

All the hyperparameters have a predetermined value that is loaded with the application, but the user has a defined range of values in which these hyperparameters can be settled to the category model. **It is important to consider that the forecasts made by the group models had the optimum parameters previously found for each model**.

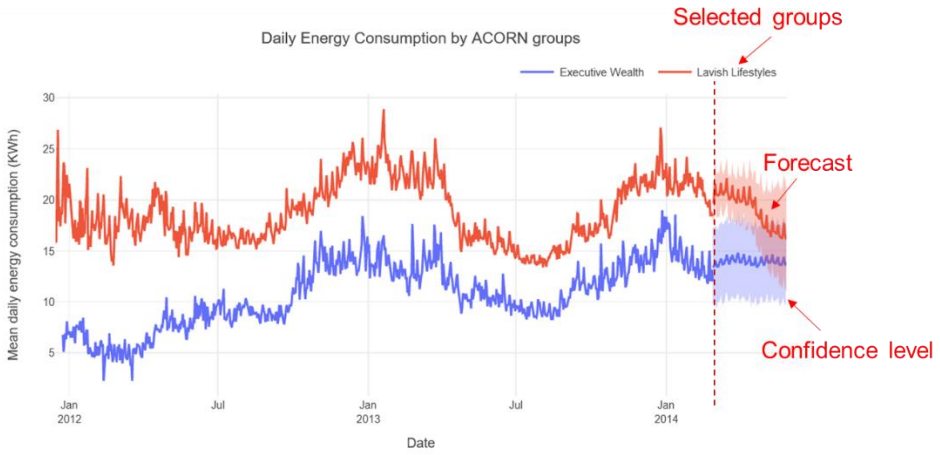
The forecast is displayed right after the end of the historical data, to clearly distinguish the forecasted values the uncertainty range is included in the graph.

Similarly, to the previous tab, it is necessary to click on the process button to display the graphs.

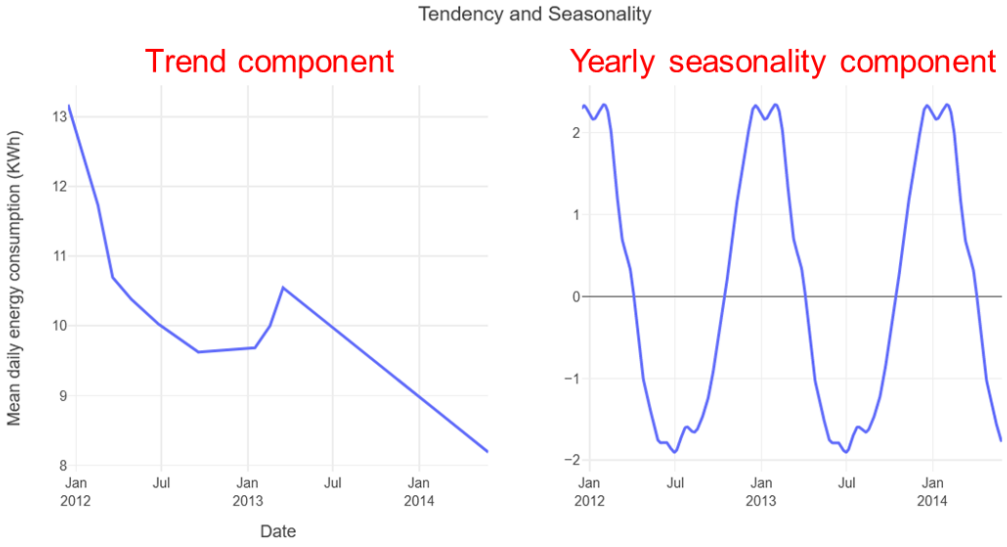
*Some of the output graphs displayed on the tab:*




The layout of the graph is similar between the category and the groups models. The forecast is displayed with the corresponding uncertainty level.

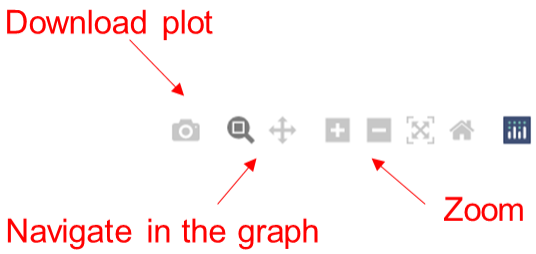



Also, the time components of the forecast are presented both for the selected category and the groups of interest. Below is presented the graph of the trend and yearly seasonality that will be displayed for the selected category.



## Graphs

Since all the graphs are built with plotly graphing library, which has integrated some tools to interact with the visualization, allowing to zoom in it or exporting it in a .png format.




For example, it is possible to zoom in a specific region of the graph.