GREENDOW

A smart, convenient and energy saving window management option

Summary

When it comes to ventilating a room, it is easy to make the mistake of waiting with it until the air is very stale, then keeping the window open too long, this way losing a lot of heat energy. We aim to automate this process in order to keep your air fresh while saving you money and time. In addition to this automatic function, you can also use our products as a part of a bigger and more complicated home automation setup.

The system

The system we designed can easily be integrated into an existing smart home setup, or it can be your first step toward automating your home. It consists of two main elements: the ControllerBox and the SensorBox. The Controller is located at your window and needs to be connected to 230V (the linear actuator moving your window needs a lot of energy). The Sensor can be powered from simple batteries and should be placed where you want your air quality and temperature measured. You can use any number of these two units in a setup, as you see fit.

The devices are communicating between each other using a Silicon Laboratories RF IC at 433 MHz. The Controller (or one of your Controllers if you use more than one) acts as a gateway between your GreenDow devices and your WiFi network (through an ESP32). Using this connection, you can easily integrate your GreenDow setup into Home Assistant for example.

The decision of opening your window is based on multiple input parameters. We are measuring the temperature and the air quality in your room. The Controller gets the outside weather information through WiFi, and you can also set the desired temperature (or if you already have a smart thermostat, we can get this information through WiFi as well). The decision is based on a weighted sum of these factors: e.g. if it is too cold in the room, the Controller will be more reluctant to open the window (or if it is raining outside, it won't open at all).

Saving energy

The main way you can save energy using our system is by keeping a constant temperature inside instead of cooling you room down drastically and then heating it back up. We made an estimation of the energy you can save by choosing our product. For this example we used a 60 m^2 flat. Please keep in mind that this is a very rough estimate since there are a lot of variables that we cannot know in advance. Based on our numbers, you can save around 15-25k Ft (around 35-60 EUR) each winter that you use our setup. If we are counting the colder autumn and spring days, and also the fact that the system can be very useful in the summer as well (this time you are saving electricity by using less climate control), our yearly savings estimate comes to around 25-35k Ft (around 60-85 EUR). This means that a system consisting of 1 Controller and 1 Sensor brings back its price in 2 years, while you also get a smart home system that is expendable and that you can use for other things as well.