

## The Inspiration




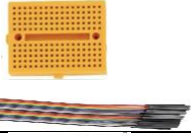

The inspiration for this project is linked with a holiday to Marseille, France and our cat! We and our neighbours take turns in caring for each other's cats whenever one of us go away. This is how our story starts; on the second day of a recent holiday. We get a call from said neighbour, advising that there was a loss of electric power in the house, which they very promptly restored by resetting the residual current device (RCD). The same event occurred on the following two days, which was eventually tracked down to a faulty well pump. Now, we have a freezer full of food and if we weren't fortunate enough to have a neighbour drop by once a day, we would have returned to a disastrous stench of rotting food.

So, I decided to build an IoT based power monitoring system that would send an alert text in the event of power failure. At the same time, I was wondering "what if there was a gas or water leak, or a fire, wouldn't I also want to be alerted to these potential problems?"

So, this project describes how almost anyone can implement such a system without needing to know too much about electronics nor is there any need to write any code. I'm using readily available and inexpensive sensors together with the Wrapit product from Wrapit-Solutions ([www.wrapit-solutions.org](http://www.wrapit-solutions.org)).

## Bits n Pieces

The table below gives the complete parts list required and a complete budgetary price.

No.		Description	Price
1		Wrapit Solutions Starter Kit, comes with power packs.	€99.00
2		Soil moisture sensor kit consisting of the YL-69 probe and YL-38 comparator board	€1.50
3		MQ2 Air Quality Sensor Hazardous Gas Detection Module	€1.96
4		Breadboard and hookup wire	€1.00
5		Uninterruptable Power Supply (UPS) around 300W	€45
	Total		€149

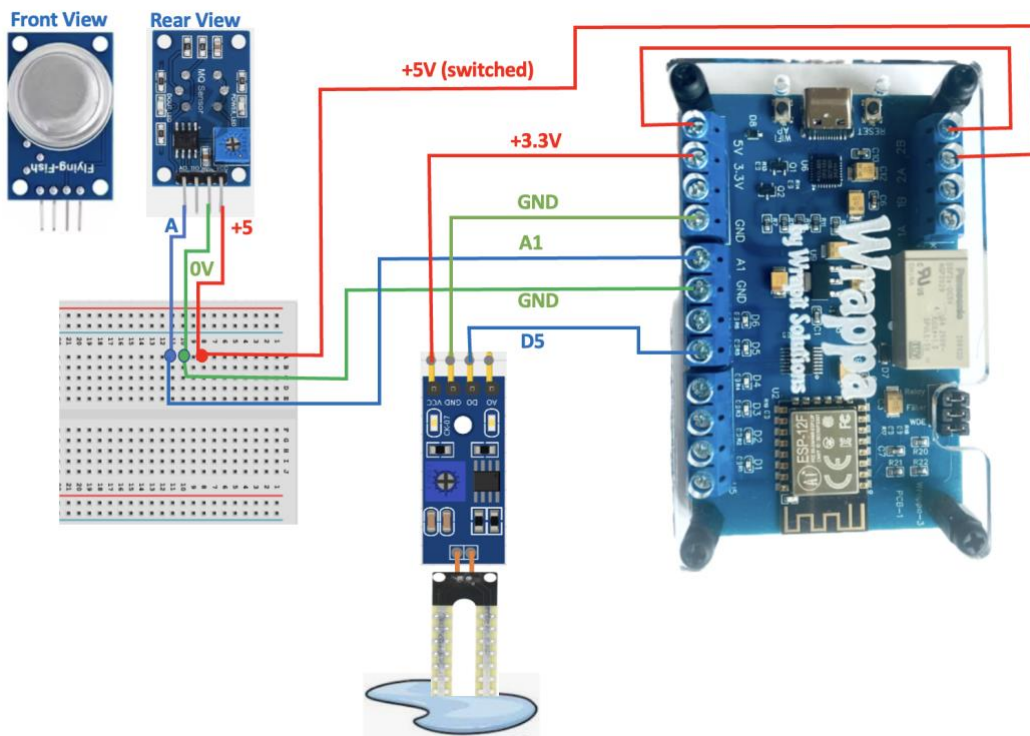
## Putting it Together

Plug the gas sensor into the breadboard for rigid support and connect the wiring to the Wrappa module, as shown in the diagram below. We connect the analog output of the MQ2 to the A1 analog input terminal of the Wrappa. Note that we are powering the MQ2 via a switched 5V from the Wrappa's built-in relay. This is done in order to preserve the life of the sensor module, which includes a heater as part of the sensing element. This is an optional implementation and may be ignored if you have other usage plans for the relay.

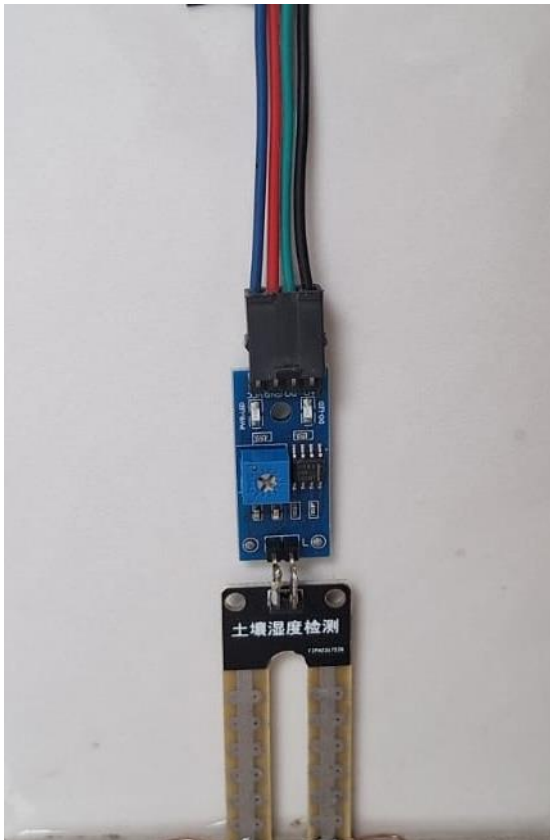
Next, connect the water sensing probe terminals to the terminals of the YL-38 comparator module and the comparator module to the Wrappa. We power the YL-38 board with 3.3V and use the digital output of the module to connect to D5 of the Wrappa digital input (see diagram below).



*Prepare the water sensing probe (YL-69) by shaving off the pointed bits at the end with a fine saw or side cutters so that the copper is flush at the ends.*



As explained later, you will need to adjust the threshold value of the water sensor via the trim pot on the YL-38.



*Water sensor wired and installed in place.*

*I directly soldered the probe to the comparator module for added stability but both devices have screw holes for rigid fixing to the wall or kick-board.*

*The trim-pot is exposed for further fine tuning if required.*

## Mains Power monitor

In order to be able to receive a power outage alert, it is necessary to ensure communications over the internet during this period. You will need to power your internet WiFi home router and the Wrapit Hub via a UPS. The UPS only needs to power the router and hub for around 5 minutes. So, a small capacity, low cost UPS of around 300W will suffice.

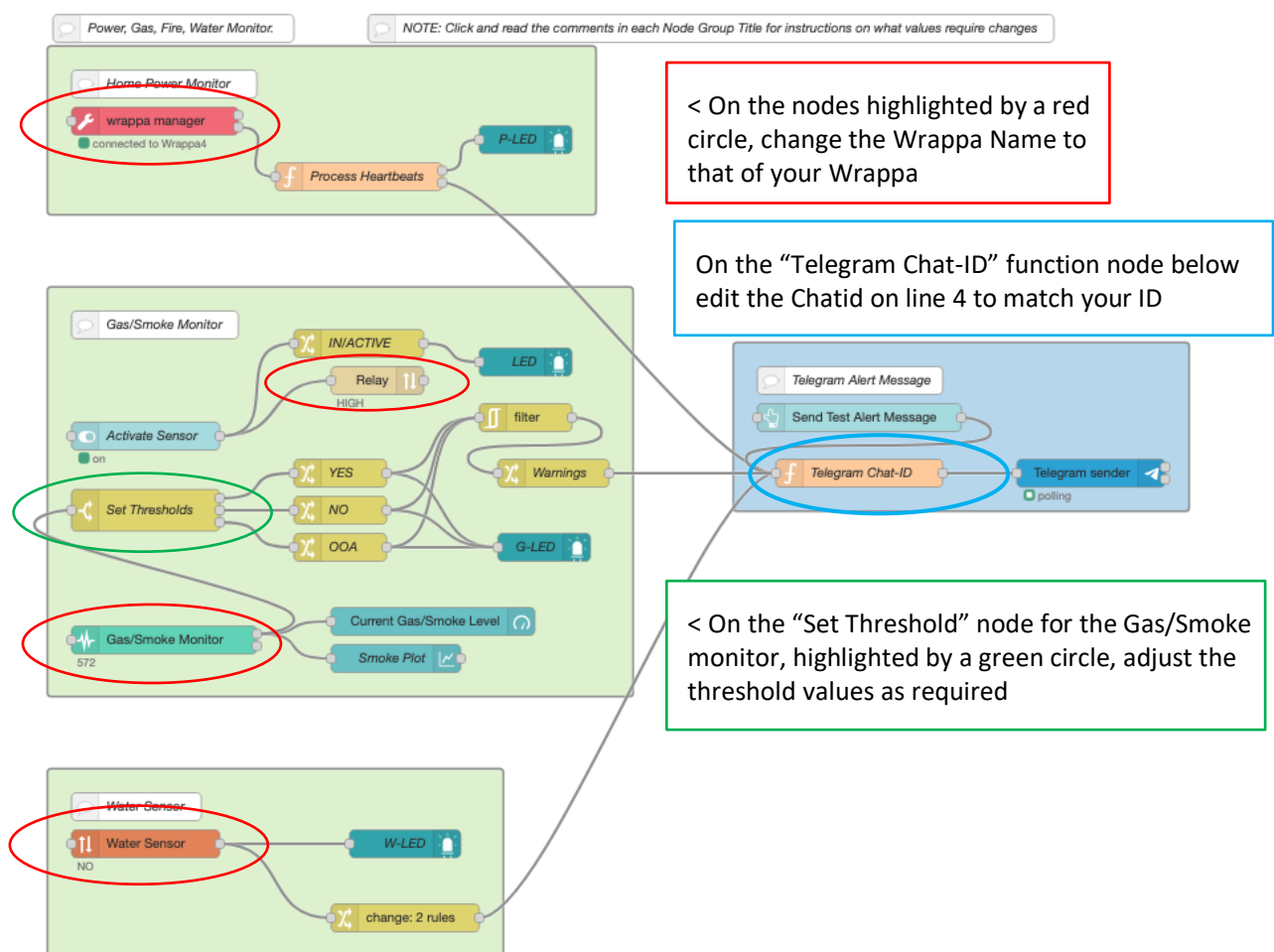
The Wrappa module needs to be powered by the power adapter that comes with it, and needs to be plugged into an outlet on the same mains circuit as your refrigerator or freezer. How it works; the Wrappa module sends continuous heartbeats to the Wrapit Hub. When power to the fridge/freezer/Wrappa is lost, the Wrapit hub detects the loss of heartbeats from the wrappa and sends an alert to your smartphone via Telegram, after a timed persistence check is exceeded.

## Bringing it to Life

It is assumed that you have already setup your Wrapit Solution Environment, if not, you should refer to the “Wrappa Getting Started” video, accessible [here](#).

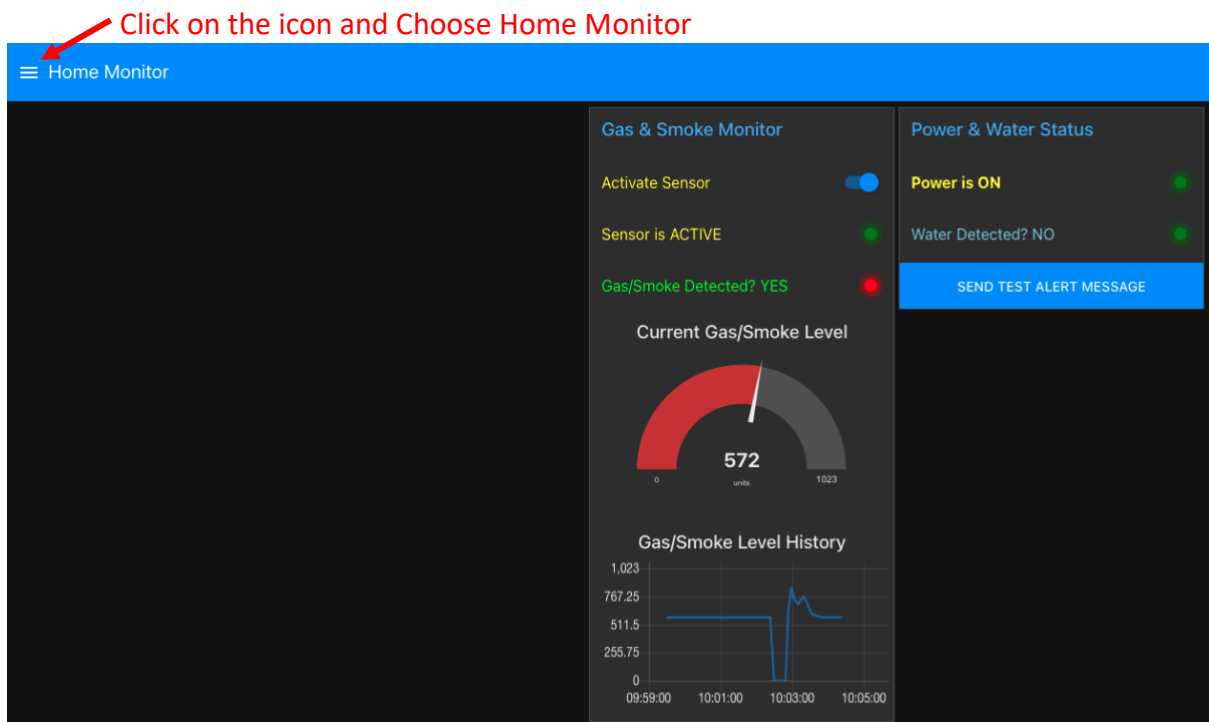
On your browser, open up the Wrapit NodeRed development environment and import the Home-Monitor flow, which is available by clicking the [link](#).

The flow is broken up into functional groups. Some nodes in each group require some very minor edits to reflect the specific naming relevant to your Wrappa or Telegram account details. These nodes are highlighted with a red circle in the diagram below, with relevant comments provided for guidance.



Once you have made all the edits that pertain to the unique names of your devices or the registration ID of your Telegram account, click on “Deploy” and open your Dashboard in another tab on your browser by entering [wrapit-hub.local:1880/ui](http://wrapit-hub.local:1880/ui) in the URL bar.

Select “Home Monitor” from the Dashboard Selector Dropdown and you should see the following.



## Testing and Tuning

You may need to adjust the threshold level on the Water detection sensor by setting the trim pot on the YL-38 comparator module to a suitable threshold. Place the sensor tip in about 1mm of water and adjust the trim pot until the trigger LED on the module comes on. Remove the probe from the water and make sure the trigger LED goes off.

For the gas/smoke sensor the reading shown on the dashboard gauge should indicate the quiescent value within around 30s after the sensor is activated and warms up. The value from the sensor varies from 0 to 1023. To set the thresholds for which alert messages will be sent, you must edit the threshold in the switch node, identified as "Set Thresholds". To test this sensor use a gas top lighter or safely blow some smoke over the sensor.

## Future Enhancement

This project can be readily enhanced with additional home monitor capabilities like security lighting and intrusion detection. Watch for a separate projects where MQTT based devices like the Shelly Plug with the Big-Timer node are combined to create feature rich pseudo random control of lights or other appliances.