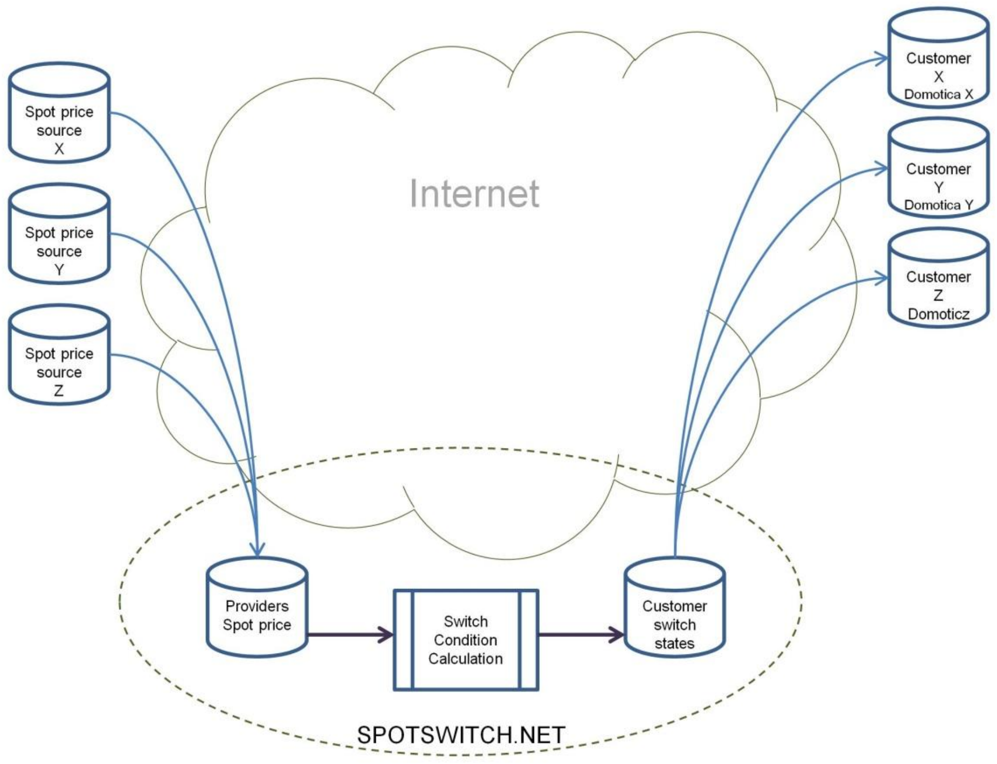
SpotSwitch.net

Automatic switching @home based on the Spot day-ahead price for power.

Contents

1 How it works

The Spot prices are collected from different sources onto a central server.



After calculating the providers fee, the Energy Tax and the VAT, the hourly prices are stored for all known providers.

The user’s conditions are analyzed, calculated and the results become available for retrieval.

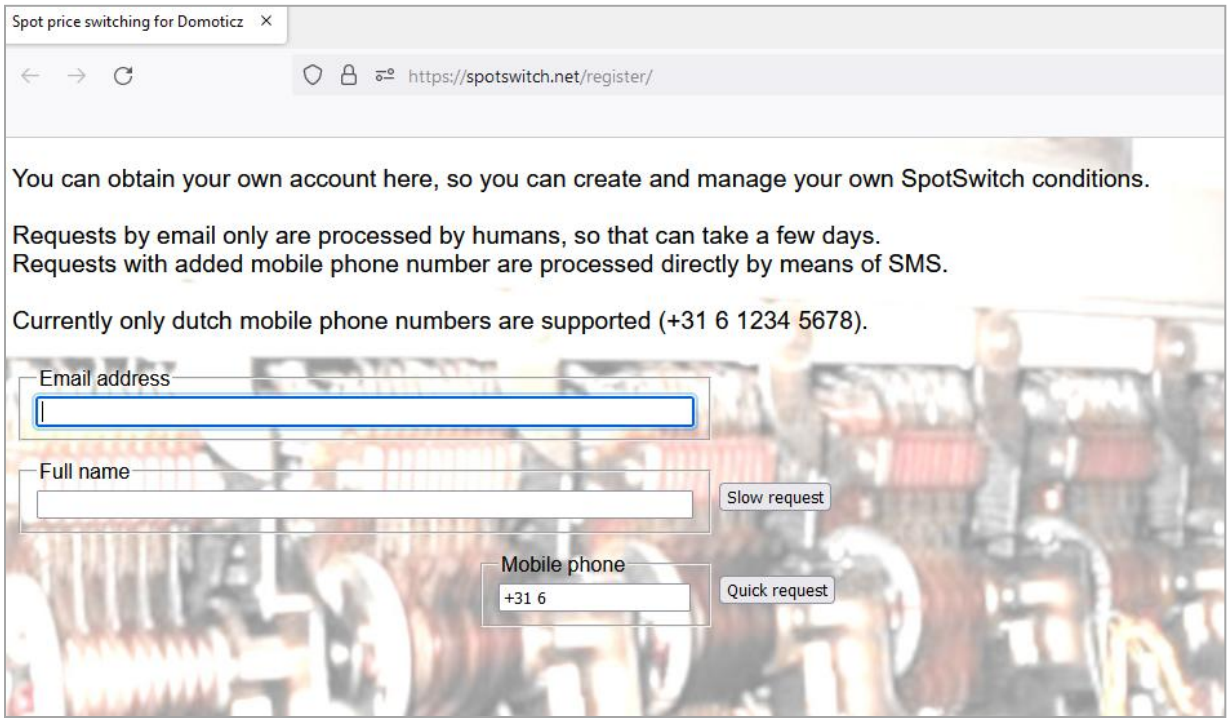
The Spot price change only happens around 13:00 CET, but some sources are one or two hours behind with publication, and the results have to be recalculated anyway. That's why they are continually collected and processed 2 minutes after every whole hour.

The Domoticz (or any equivalent domotica) system of the user retrieves the on/off status matching their conditions on a regular basis. The example script does this 5 times on the whole hour, with 1 minute interval. This compensates for small clock offset versus the atomic time. If your system clock has a greater error than 5 minutes, you have to adapt the time conditions.
This (virtual) switch - which exactly does what is defined on the SpotSwitch.net server- can then be used to toggle the desired power consuming system(s) on/off for the optimal price.

2 Website 'spotswitch.net'

2.1 Register

Before you can use the website, you have to register at https://spotswitch.net/register to get an account.


Spot price switching for Domoticz
https://spotswitch.net/register/

You can obtain your own account here, so you can create and manage your own SpotSwitch conditions.

Requests by email only are processed by humans, so that can take a few days.
Requests with added mobile phone number are processed directly by means of SMS.

Currently only dutch mobile phone numbers are supported (+31 6 1234 5678).

Email address:

Full name:

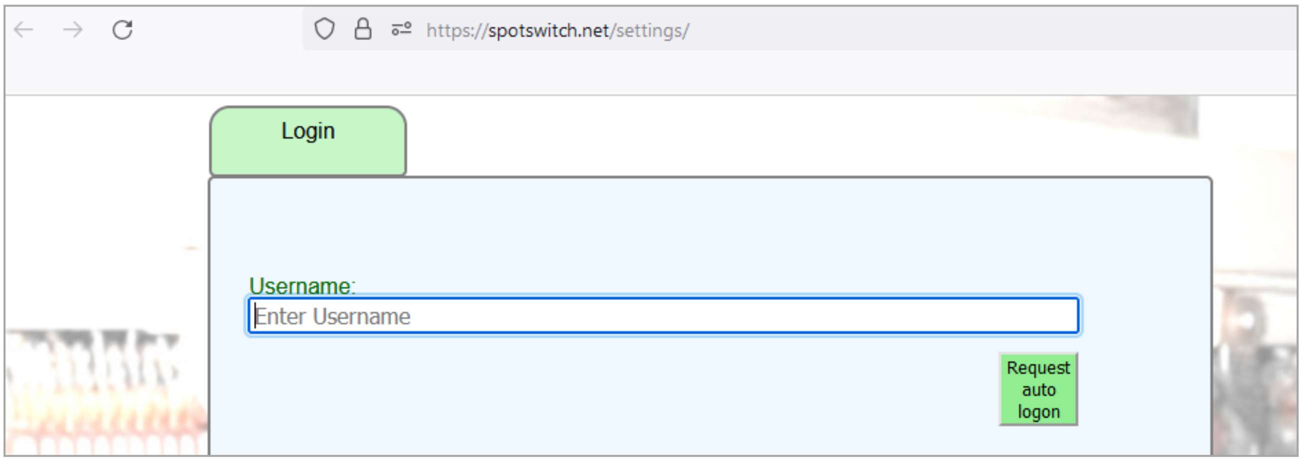
Mobile phone: +31 6

Slow request
Quick request

You can use the Slow or Quick request button; in both cases you first get an email to acknowledge the ownership of the email address.
When you have added your mobile phone number, you get a confirmation link via SMS.
If you don't have (or want to reveal) a Dutch mobile number, the slow method is also available.
The speed of the slow method depends on the working hours of the administrators..

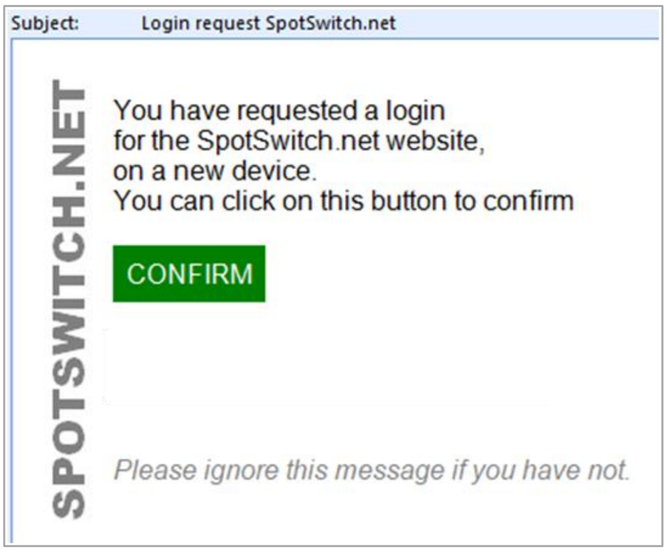
2.2 login

After registering, you can log in to your settings page (you get the link by email)



The settings page doesn't use passwords. It utilizes a machine UUID and email-address combination, which is stored in the browser. .This combination is generated when you press the green "Request auto login" button. So simply fill in the registered email address, click the green button.
You can close the browser, but if you leave it open you don't have to type in your email address again.

Shortly after this you should get an email with with a link to enable the login on this browser/machine.
.

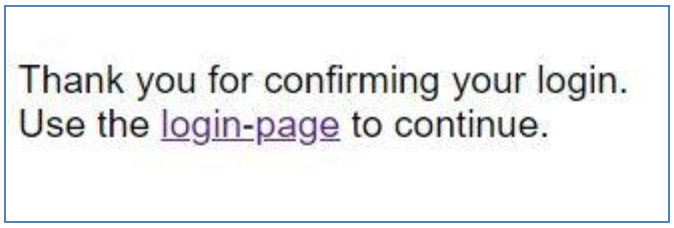


Subject: Login request SpotSwitch.net

You have requested a login
for the SpotSwitch.net website,
on a new device.
You can click on this button to confirm

Please ignore this message if you have not.

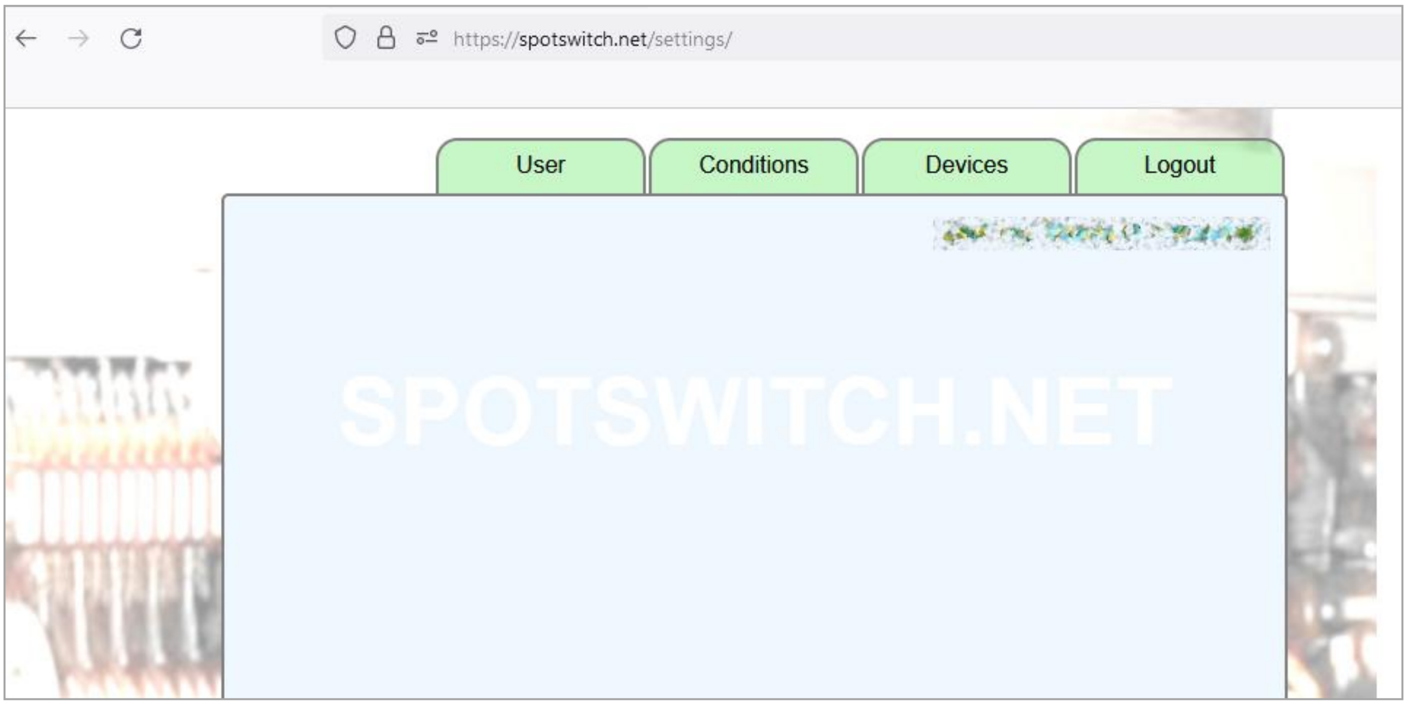
The green Confirm button opens the browser again and you can click on the "login-page" link.



Thank you for confirming your login.
Use the login-page to continue.

This takes you back to the login page, where you have to fill in your email address one final time. Unless you have previously left the browser open on the request page.

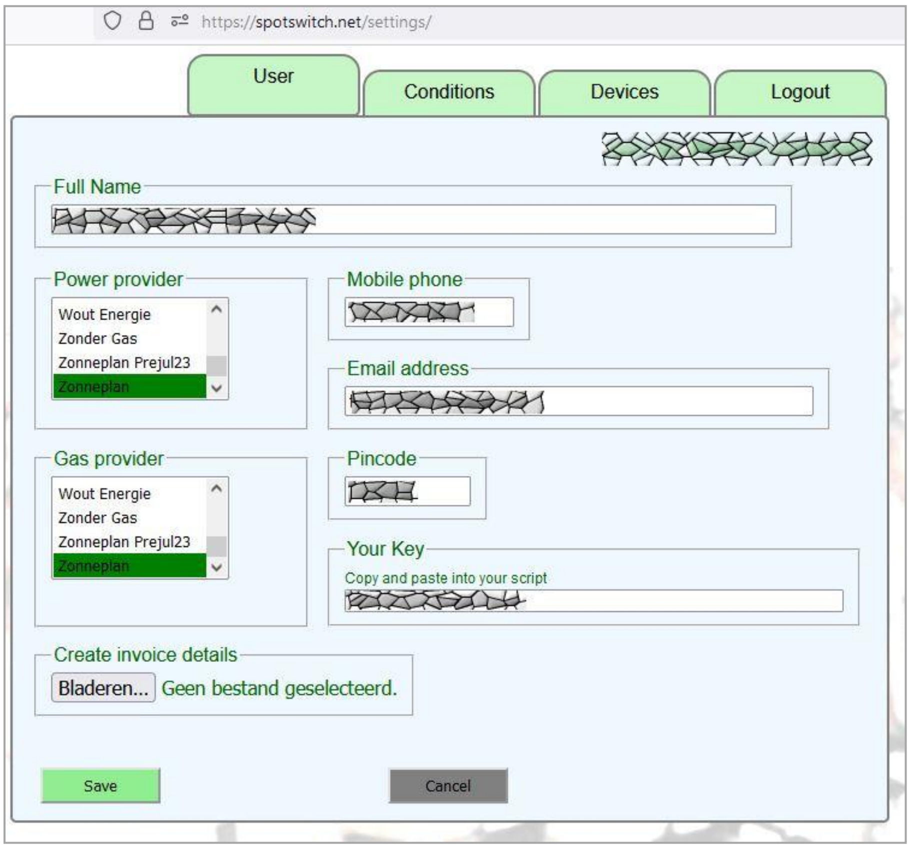
This time when you click the green "Request auto login" button, you are logged in. From now on you are automatically logged in when using the current browser on the current computer.



https://spotswitch.net/settings/

2.3 User tab

In the user tab you have to select your energy provider, so the conditions are matched to the price you are paying.



https://spotswitch.net/settings/

User | Conditions | Devices | Logout

[redacted]

Full Name: [redacted]

Power provider: Wout Energie / Zonder Gas / Zonneplan Prejul23 / [✓ Zonneplan]

Mobile phone: [redacted]

Email address: [redacted]

Gas provider: Wout Energie / Zonder Gas / Zonneplan Prejul23 / [✓ Zonneplan]

Pincode: [redacted]

Your Key
Copy and paste into your script
[redacted]

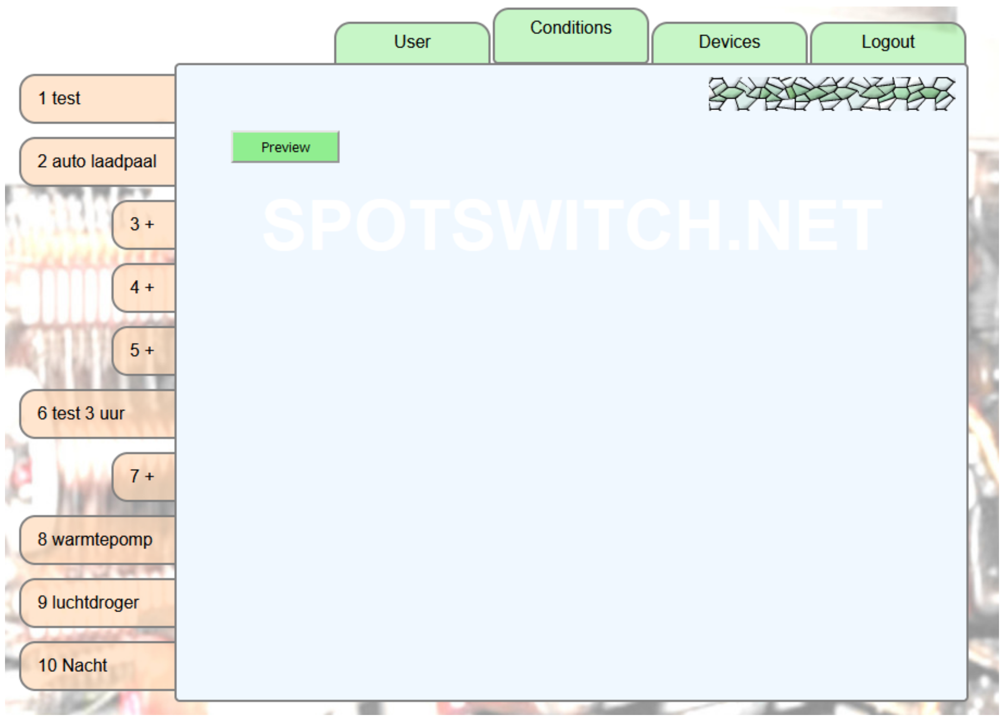
Create invoice details
Bladeren... Geen bestand geselecteerd.

Save | Cancel

You can change your Full Name, your phone number and your key-pincode.
The email-address cannot be changed, you have to re-register to change this.
The key field is automatically fully selected if you click on it. Just use copy/paste to put it in your Domoticz or Home Assistant script (or whichever domotica system you are using).

2.4 Conditions tab

In the conditions tab, you can create, modify and delete up to (at this moment) 10 conditions.



User | Conditions | Devices | Logout

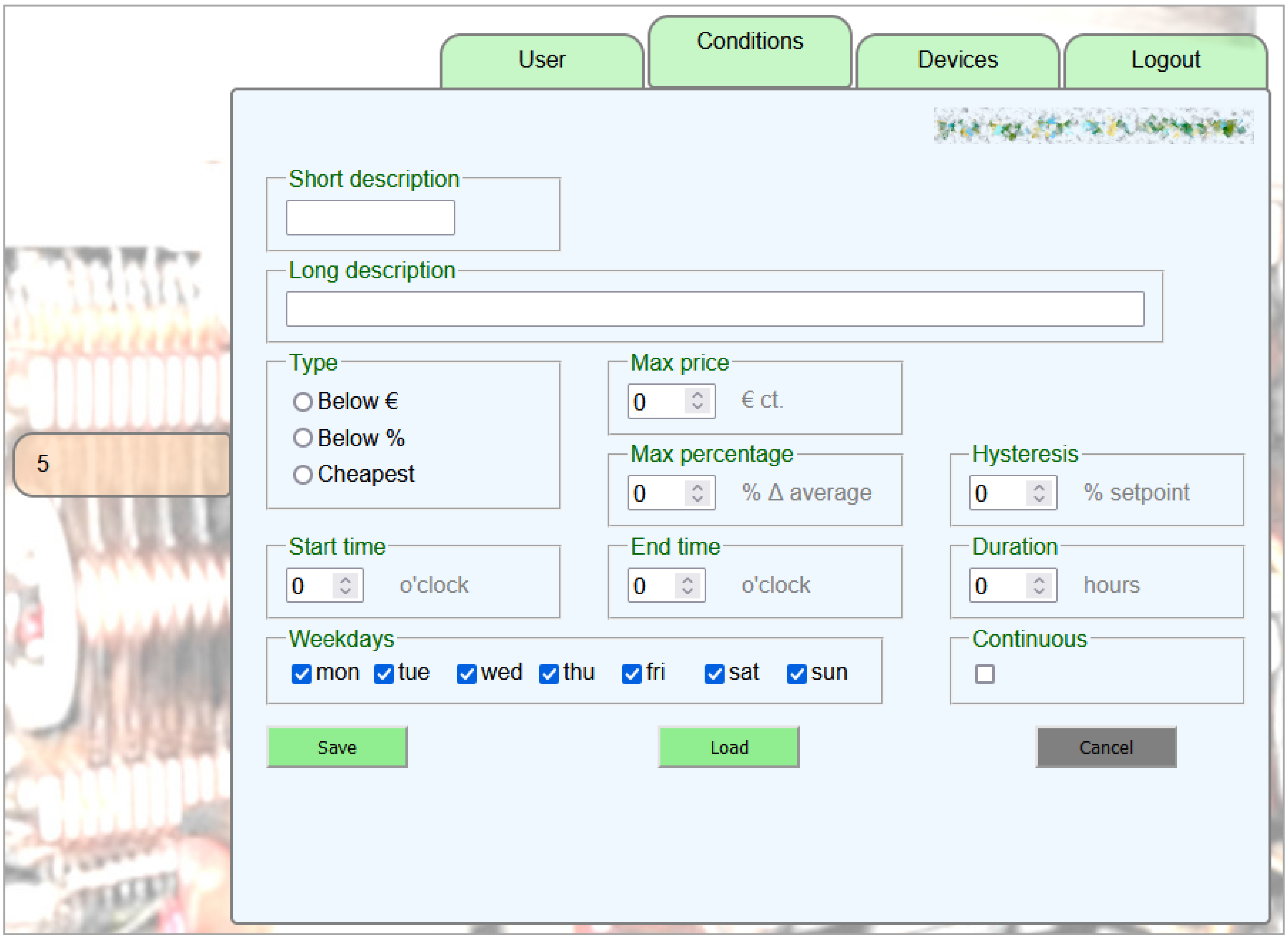
[redacted]

1 test
2 auto laadpaal
3 +
4 +
5 +
6 test 3 uur
7 +
8 warmtepomp
9 luchtdroger
10 Nacht

Preview

SPOTSWITCH.NET

Just left click on the condition you like to modify or on an empty one (marked by the plus sign)



Short description

Long description

Type
( ) Below €
( ) Below %
( ) Cheapest

Max price
0 € ct.

Max percentage
0 % Δ average

Hysteresis
0 % setpoint

Start time
0 o'clock

End time
0 o'clock

Duration
0 hours

Weekdays
[✓] mon [✓] tue [✓] wed [✓] thu [✓] fri [✓] sat [✓] sun

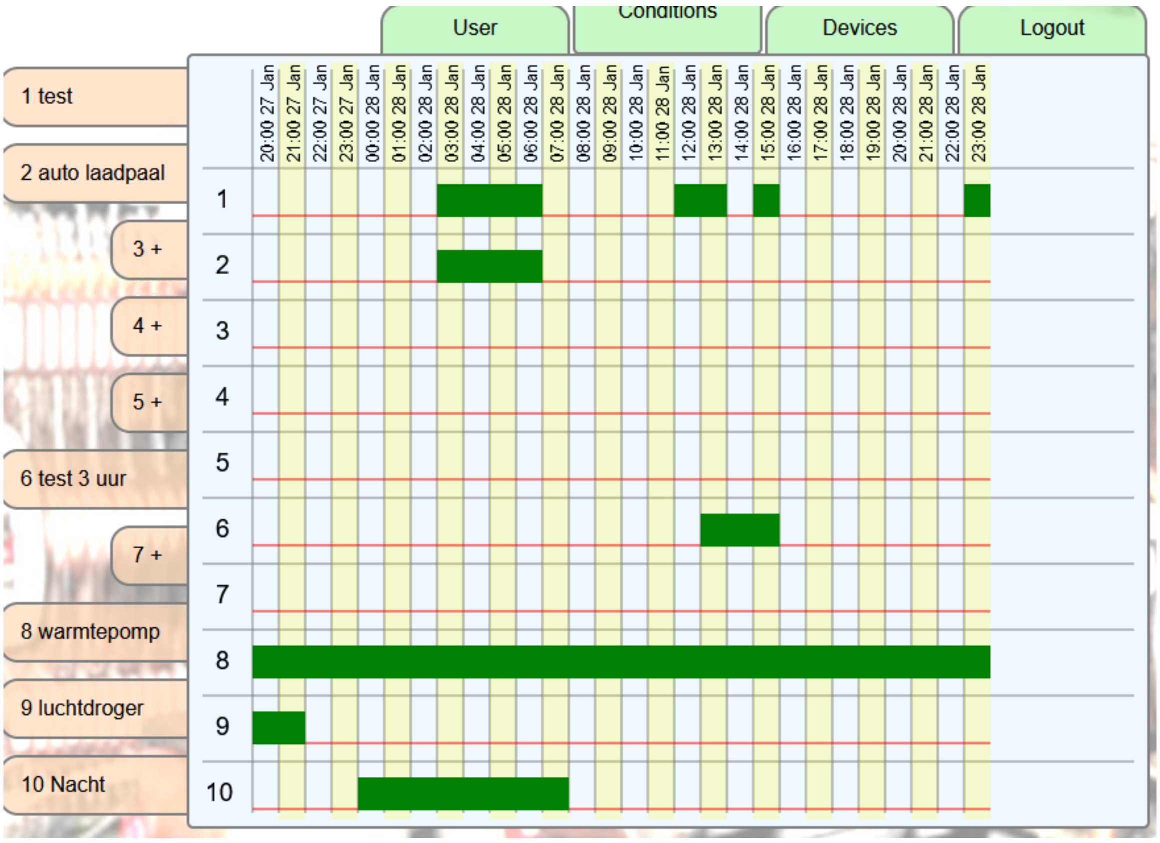
Continuous
[ ]

The short description is used in the left tab for selection. The long description can be used for a full comment with which you can understand the use of this function in the future.
The type is mandatory, and can be absolute (price in euro) or relative (price in relation to the average of last week) or just the cheapest of the day.
The Max price is used for the "Below euro" type.
The Max percentage and Hysteresis is used for the "Below %" type.
The Hysteresis defines the gap before a condition is switched off again when it was on.
The Start and End time determine in what time frame the condition is active. When both are set to zero it will be active the entire day, and when the Start time is after the End time, it will be active at night.
The duration field can be used to specify the desired active time when the Cheapest type is selected. When the Below euro or percentage option is selected instead, the duration field will set the minimum active time required - whenever the condition by itself is not providing enough hours for that day, it will fill them to the set minimum duration using the cheapest hours.
The weekdays can be used to choose which day of the week the condition is active.
And last but not least; if the Continuous field is ticked, the active hours are chosen by the system as one uninterrupted block for that day.

With the Load button; visible with empty conditions only, you can load general examples and your own conditions. Handy as a quick start or just to move conditions to other numbers (copy and delete the original condition afterwards).

2.4.1 Preview conditions

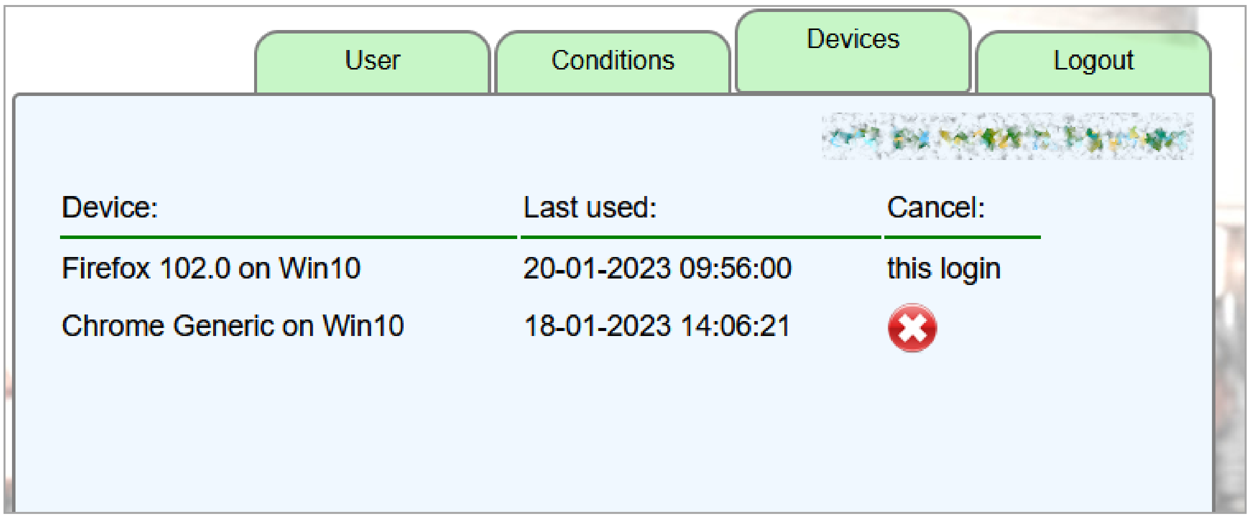
To preview the conditions so far as the prices are known, press the PreView button:



The states in this preview are updated directly after saving or deleteting conditions.
So you don't have to wait for the hourly update.

2.5 Devices tab

In the devices tab, you can overview all your released devices.



Device:	Last used:	Cancel:
Firefox 102.0 on Win10	20-01-2023 09:56:00	this login
Chrome Generic on Win10	18-01-2023 14:06:21	✖

If a device is no longer used or unwanted, you can click on the cancel icon to withdraw the access.

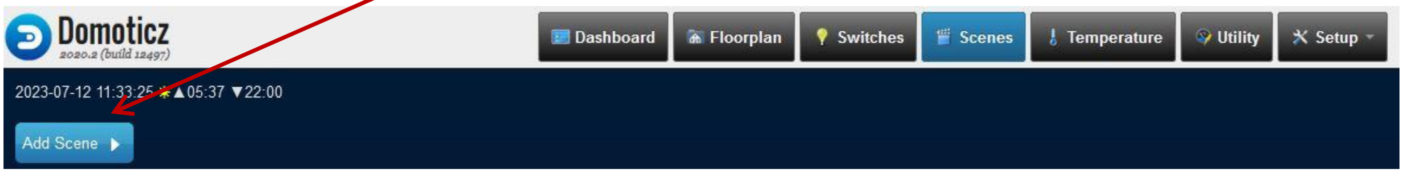
2.6 Logout tab

Just used to log out, but you can also choose to simply close the browser, as there is no password.

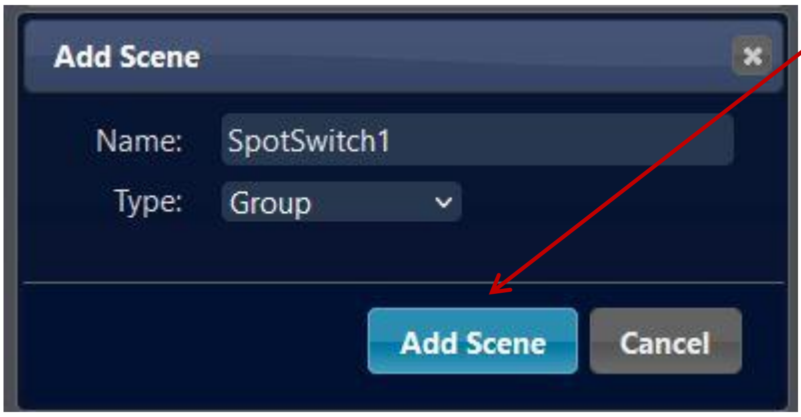
3 Prepare Domoticz for SpotSwitch.net

3.1 Groups creation

First click on "Scenes" and "Add Scene"

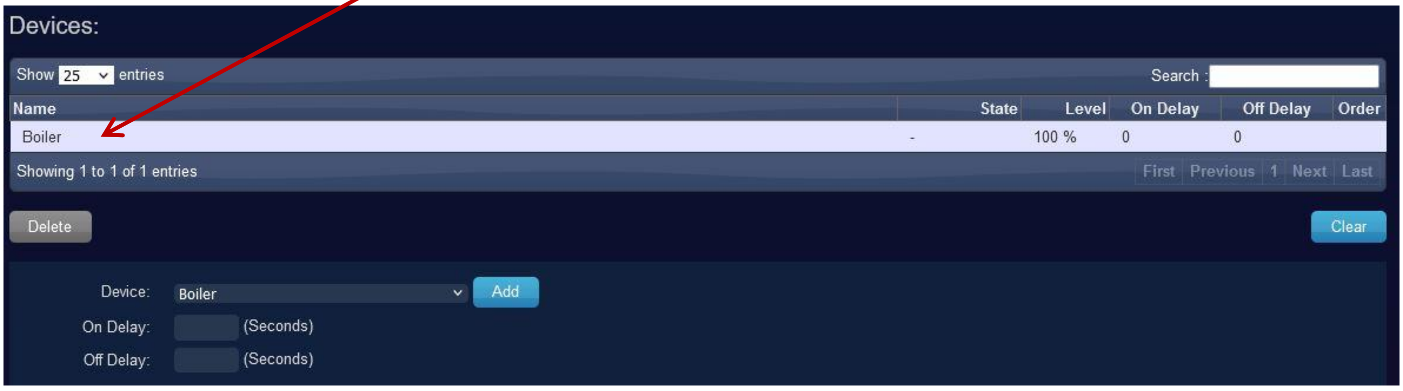


Change the Name to SpotSwitch1 and Type to Group, then click "Add Scene"



Repeat this step for SpotSwitch2 till SpotSwitch10

Place everything you like to switch at the bottom of the right Group(=Scene) with the Edit button afterwards



Devices:

Show 25 entries Search :

Name	State	Level	On Delay	Off Delay	Order
Boiler	-	100 %	0	0	

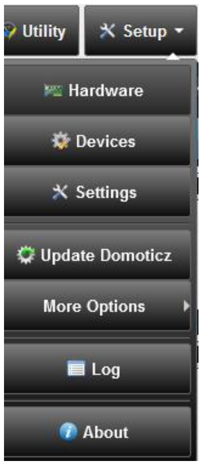
Showing 1 to 1 of 1 entries First Previous 1 Next Last

Delete Clear

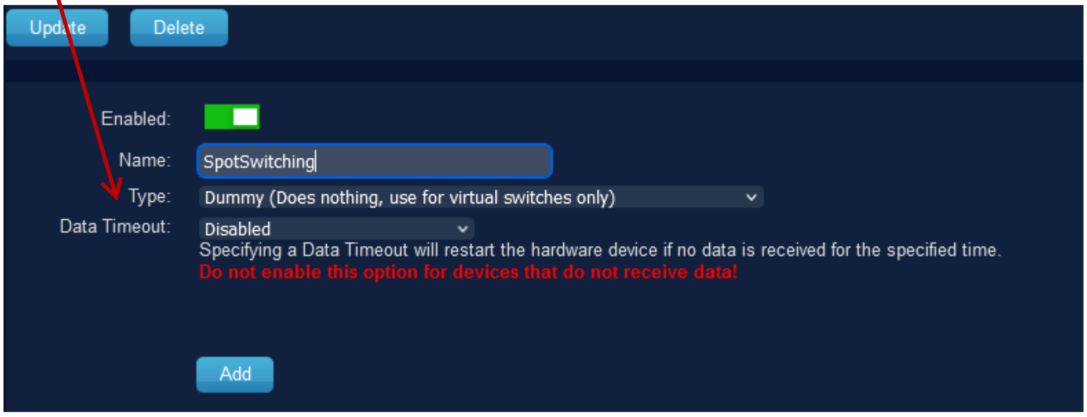
Device: Boiler Add
On Delay: (Seconds)
Off Delay: (Seconds)

3.2 Current prices

Optionally you can create 'ElectricityPrice', 'ElectricityAverage' and 'GasPrice' if you want to have these values in your system. These will than automatically be filled with the current prices of your provider.
This requires a bit more work, because you have to create new hardware for virtual sensors:



Add a Dummy Type, named SpotSwitching



Enabled:

Name: SpotSwitching

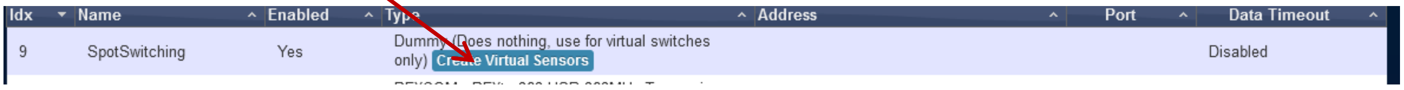
Type: Dummy (Does nothing, use for virtual switches only)

Data Timeout: Disabled

Specifying a Data Timeout will restart the hardware device if no data is received for the specified time.

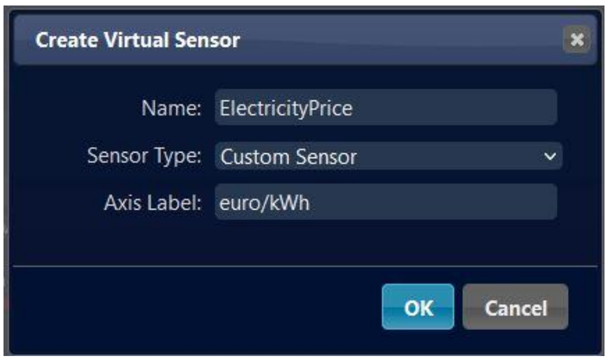
Do not enable this option for devices that do not receive data!

Add three times a new sensor via Create Virtual Sensors



Idx	Name	Enabled	Type	Address	Port	Data Timeout
9	SpotSwitching	Yes	Dummy (Does nothing, use for virtual switches only) Create Virtual Sensors			Disabled

Name these sensors 'ElectricityPrice', 'ElectricityAverage' and 'GasPrice' respectively:



Name: ElectricityPrice

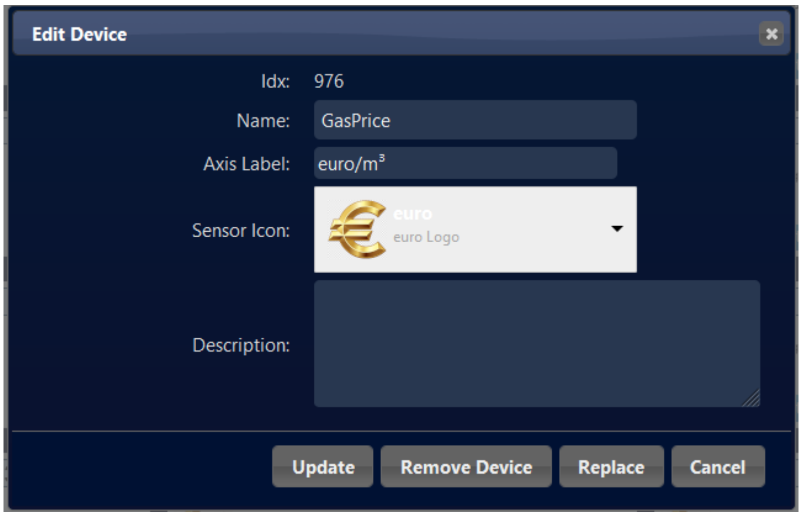
Sensor Type: Custom Sensor

Axis Label: euro/kWh

The Sensor Type have to be Custom Sensor

Fill in 'euro/kWh' for the first two and 'euro/m³' for the last one in the field Axis Label.

Afterwards you can optionally change the Sensor Icon via the Edit button under Utility



Idx: 976

Name: GasPrice

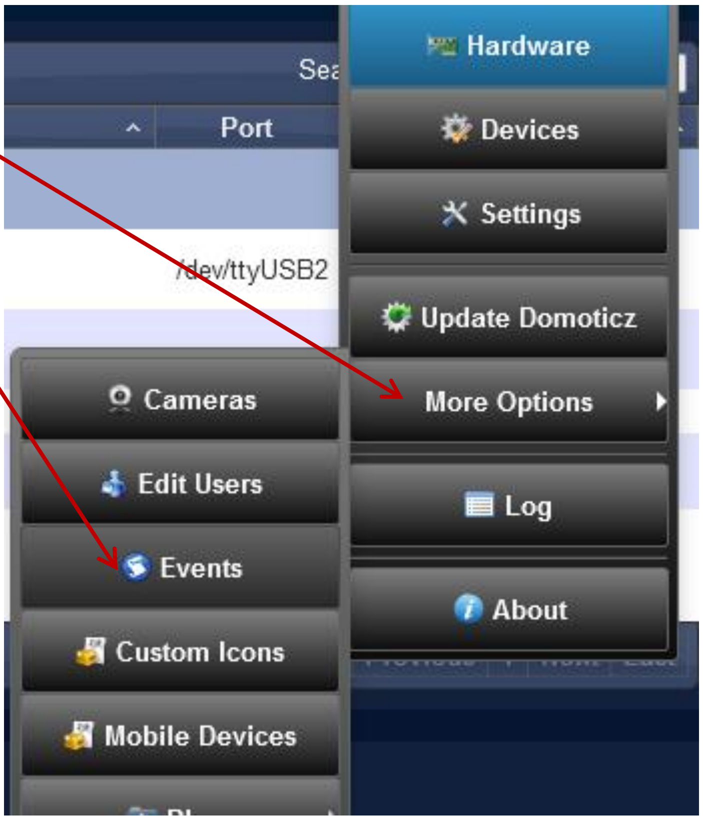
Axis Label: euro/m³

Sensor Icon: euro euro Logo

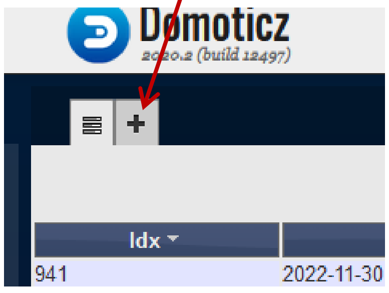
Description:

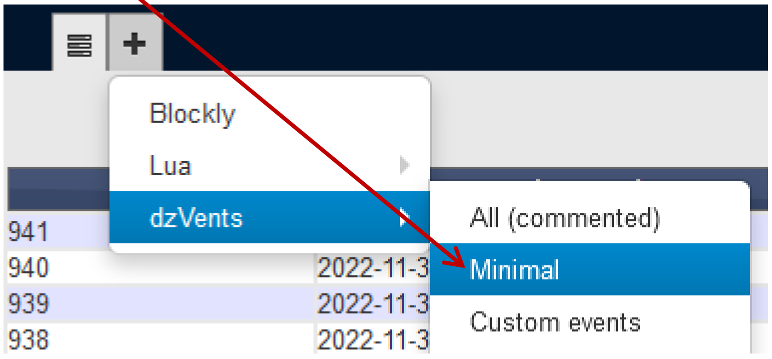
3.3 The Lua script

Now go to "More Options"-"Events"

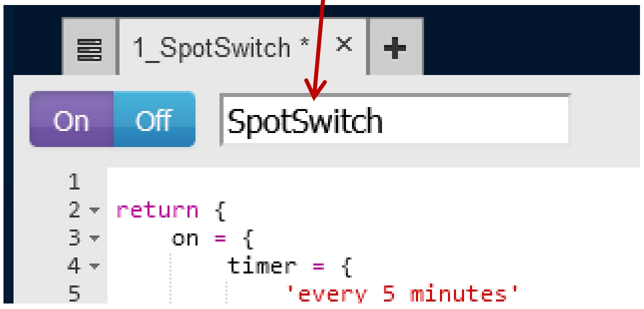


Create a new script via the plus button and dzVents - Minimal





Rename the script SpotSwitch



```
return {
    on = {
        timer = {
            'every 5 minutes'
```

Mark all text and delete it (keys Ctrl-A and Delete)

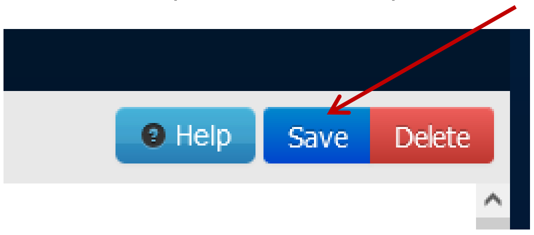
Now Copy and Paste the rest of this page into it, including the last line with only a curly bracket

```
return {
  on = {
    timer = {
      'at *:00', 'at *:01', 'at *:02'
    },
    httpResponses = {
      'triggerStates'
    },
    customEvents = {
      'GetSpotswitch',
    },
  },
  logging = {
    level = domoticz.LOG_INFO,
    marker = 'SpotSwitch',
  },
  execute = function(domoticz, item)
    if (item.isHTTPResponse) then
      if (item.ok) then
        if (item.isJSON) then
          local result_table = item.json
          local DevName, state, device, scene
          if (item.trigger == 'triggerStates') then
            for key,value in pairs(result_table.States) do
              DevName = 'SpotSwitch' .. result_table.States[key].index
              if (domoticz.utils.deviceExists(DevName)) then
                state = string.lower(result_table.States[key].state)
                device = domoticz.devices(DevName)
                if string.find('on', state) then
                  if ( device._state~="On") then
                    device.switchOn()
                    domoticz.log('Updated ' .. device.name..': ' .. device.state)
                  end
                end
                if string.find('off', state) then
                  if ( device._state~="Off") then
                    device.switchOff()
                    domoticz.log('Updated ' .. device.name..': ' .. device.state)
                  end
                end
              end
              if (domoticz.utils.groupExists(DevName)) then
                state = string.lower(result_table.States[key].state)
                group = domoticz.groups(DevName)
                if (string.find('on', state)) then
                  if ( group._state~="On") then
                    group.switchOn()
                    domoticz.log('Updated ' .. group.name..': ' .. group.state)
                  end
                end
                if (string.find('off', state)) then
                  if ( group._state~="Off") then
                    group.switchOff()
                    domoticz.log('Updated ' .. group.name..': ' .. group.state)
                  end
                end
              end
            end
            if result_table.Prices~=nil then
              DevName = 'GasPrice'
              if domoticz.utils.deviceExists(DevName) then
                device = domoticz.devices(DevName)
                device.updateCustomSensor(result_table.Prices.gas)
              end
              DevName = 'ElectricityPrice'
              if domoticz.utils.deviceExists(DevName) then
                device = domoticz.devices(DevName)
                device.updateCustomSensor(result_table.Prices.electricity)
              end
              DevName = 'ElectricityAverage'
              if domoticz.utils.deviceExists(DevName) then
                device = domoticz.devices(DevName)
                device.updateCustomSensor(result_table.Prices.average)
              end
            end
          end
        else
          domoticz.log('HTTP is not json', domoticz.LOG_ERROR)
        end
      else
        domoticz.log('There was a problem handling the request: ' .. url, domoticz.LOG_ERROR)
        domoticz.log(item, domoticz.LOG_ERROR)
      end
    elseif (item.isCustomEvent) then
      -- get the states from the SpotSwitch server change the key to yours
      domoticz.openURL({
        url = 'https://spotswitch.net/api/?key=123456-not.registed.example.only@kampmation.eu',
        method = 'GET',
        callback = 'triggerStates',
      })
    else
      -- delay to spread the server load, change the time to your zipcode divided by 166, for example 1217WD, it is 7,331325 so use 7
      domoticz.emitEvent('GetSpotswitch', '').afterSec(13)
    end
  end
}
```

Change the yellow marked key to your own key (copy/paste your key from the Settings user tab)
If don't change the key, just to see what happens, you get the conditions from this example account:
Condition 1 : price below -20% average with 10% hysteresis.
Condition 2 : cheapest 6 hours of the day
Condition 3 : price below -25% average with 5% hysteresis for at least 2 hours a day
Condition 4 : price below 40 euro cent
For all conditions: every day of the week, prices from provider Zonneplan.

Please change the yellow marked 13 as written in the comment, this will help to spread the requests to the server over the whole country.
It appears that all domotica systems are running on the atomic time and therefore all request are done within the same second. If you delay it a few seconds the chances are better you don't get a timeout.

Leave it enabled (so don't click Off) and save it.



Now create your own conditions on the SpotSwitch.net settings page

4 Prepare Home Assistant for Spotswitch.net

4.1 The retrieval part

Insert this code into configuration.yaml which defines the retrieval of the structure:

```
# Internet source for Spotswitch condition states
sensor:
  - platform: rest
    resource: https://spotswitch.net/api/?key=123456-not.registed.example.only@kampmation.eu
    name: spotswitch_states
    scan_interval: 31536000
    json_attributes:
      - States
        Prices

# define the prices as bonus
  - platform: template
    sensors:
      hourprice:
        unique_id: spothourprice
        unit_of_measurement: Eur/kWh
        device_class: energy
        value_template: >
          {{ states.sensor.spotswitch_states.attributes.Prices.electricity }}
      avgprice:
        unique_id: spotavgprice
        unit_of_measurement: Eur/kWh
        device_class: energy
        value_template: >
          {{ states.sensor.spotswitch_states.attributes.Prices.average }}
      gasprice:
        unique_id: spotgasprice
        unit_of_measurement: Eur/m3
        device_class: energy
        value_template: >
          {{ states.sensor.spotswitch_states.attributes.Prices.gas }}
```

Change the yellow marked text to your own key (copy/paste your key from the Settings user tab)
If don't change the key, just to see what happens, you get the conditions from this example account:
Condition 1 : price below -20% average with 10% hysteresis.
Condition 2 : cheapest 6 hours of the day
Condition 3 : price below -25% average with 5% hysteresis for at least 2 hours a day
Condition 4 : price below 40 euro cent
For all conditions: every day of the week, prices from provider Zonneplan.

It is fired on startup and not again (only after a year because HA lacks the never functionality)

4.2 The virtual switches

Insert this code into configuration.yaml as well, which defines the 10 virtual switches:

```
# virtual switch which follows the Spotswitch states automatically
switch:
  - platform: template
    switches:
      spotswitch1:
        unique_id: spotsw1
        value_template: >
          {% for item in states.sensor.spotswitch_states.attributes.States %}
            {% if item.index=="1" %}
              {{item.state}}
            {% endif %}
          {% endfor %}
        turn_on:
        turn_off:
      spotswitch2:
        unique_id: spotsw2
        value_template: >
          {% for item in states.sensor.spotswitch_states.attributes.States %}
            {% if item.index=="2" %}
              {{item.state}}
            {% endif %}
          {% endfor %}
        turn_on:
        turn_off:
      spotswitch3:
        unique_id: spotsw3
        value_template: >
          {% for item in states.sensor.spotswitch_states.attributes.States %}
            {% if item.index=="3" %}
              {{item.state}}
            {% endif %}
          {% endfor %}
        turn_on:
        turn_off:
      spotswitch4:
        unique_id: spotsw4
        value_template: >
          {% for item in states.sensor.spotswitch_states.attributes.States %}
            {% if item.index=="4" %}
              {{item.state}}
            {% endif %}
          {% endfor %}
        turn_on:
        turn_off:
      spotswitch5:
        unique_id: spotsw5
        value_template: >
          {% for item in states.sensor.spotswitch_states.attributes.States %}
            {% if item.index=="5" %}
              {{item.state}}
            {% endif %}
          {% endfor %}
        turn_on:
        turn_off:
      spotswitch6:
        unique_id: spotsw6
        value_template: >
          {% for item in states.sensor.spotswitch_states.attributes.States %}
            {% if item.index=="6" %}
              {{item.state}}
            {% endif %}
          {% endfor %}
        turn_on:
        turn_off:
      spotswitch7:
        unique_id: spotsw7
        value_template: >
          {% for item in states.sensor.spotswitch_states.attributes.States %}
            {% if item.index=="7" %}
              {{item.state}}
            {% endif %}
          {% endfor %}
        turn_on:
        turn_off:
      spotswitch8:
        unique_id: spotsw8
        value_template: >
          {% for item in states.sensor.spotswitch_states.attributes.States %}
            {% if item.index=="8" %}
              {{item.state}}
            {% endif %}
          {% endfor %}
        turn_on:
        turn_off:
      spotswitch9:
        unique_id: spotsw9
        value_template: >
          {% for item in states.sensor.spotswitch_states.attributes.States %}
            {% if item.index=="9" %}
              {{item.state}}
            {% endif %}
          {% endfor %}
        turn_on:
        turn_off:
      spotswitch10:
        unique_id: spotsw10
        value_template: >
          {% for item in states.sensor.spotswitch_states.attributes.States %}
            {% if item.index=="10" %}
              {{item.state}}
            {% endif %}
          {% endfor %}
        turn_on:
        turn_off:
```

Each switch takes over it own state from the fetched states structure automatically.
Below the right switch, you can put in the Turn-on and -off commands, like:

```
        turn_on:
          service: switch.turn_on
          target:
            entity_id: switch.boiler
        turn_off:
          service: switch.turn_off
          target:
            entity_id: switch.boiler
```

This can be just as many commands as you wish, or in some cases only turn_on:

```
        turn_on:
  -       service: script.turn_on
          data_template:
            entity_id: script.start_dishwasher_{{ states('input_select.vaatwasser_opties') }}
```

In the given code it's all empty, so nothing happens yet.

4.3 Timer for retrieval

Insert this code into automations.yaml which updates the state retrieval every hour:

```
- id: 'spotswitchtimer'
  alias: UpdateSpotswitches
  description: Update virtual switches from spotswitch.net API
  trigger:
  # replace seconds with your zipcode divided by 166, for example 1217 WD, it is 7,331 so 7
  - platform: time_pattern
    minutes: 0
    seconds: 7
  - platform: time_pattern
    minutes: 1
    seconds: 7
  - platform: time_pattern
    minutes: 2
    seconds: 7
  - platform: time_pattern
    minutes: 3
    seconds: 7
  - platform: time_pattern
    minutes: 4
    seconds: 7
  condition: []
  action:
  - service: homeassistant.update_entity
    data: {}
    target:
      entity_id: sensor.spotswitch_states
  mode: single
```

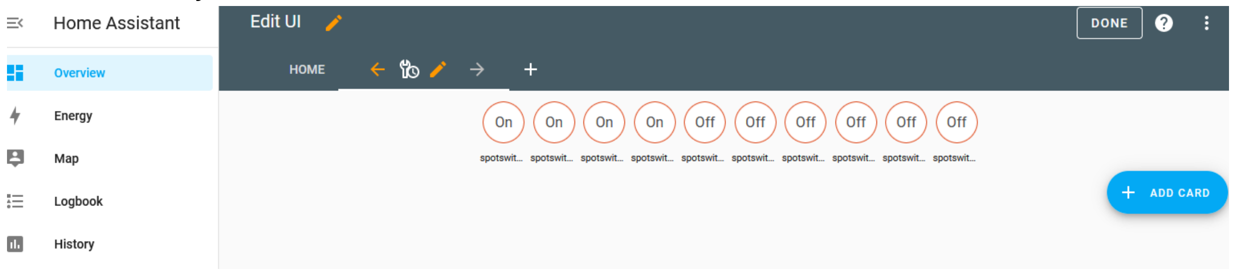
Please change the 7 after seconds 5 times as written in the comment, this will help to spread the requests to the server.
It appears that all domotica systems are running on the atomic time and therefore all request are done within the same second. If you delay it a few seconds the chances are better you don't get a timeout.

4.4 Overview

To have a nice overview of all the virtual switches, you can add this in the raw editor over Overview:

```
- theme: Backend-selected
    title: Spotswitch overzicht
    icon: mdi:wrench-clock-outline
    badges:
      - entity: switch.spotswitch1
      - entity: switch.spotswitch2
      - entity: switch.spotswitch3
      - entity: switch.spotswitch4
      - entity: switch.spotswitch5
      - entity: switch.spotswitch6
      - entity: switch.spotswitch7
      - entity: switch.spotswitch8
      - entity: switch.spotswitch9
      - entity: switch.spotswitch10
```

That will show you:



5 Appendixes

5.1 Appendix 1 Extra Feature Invoice Details

In the User Settings screen you find an item "Create Invoice details".
Here you can upload your hourly metering figures in CSV format. Per hour there must be one line:

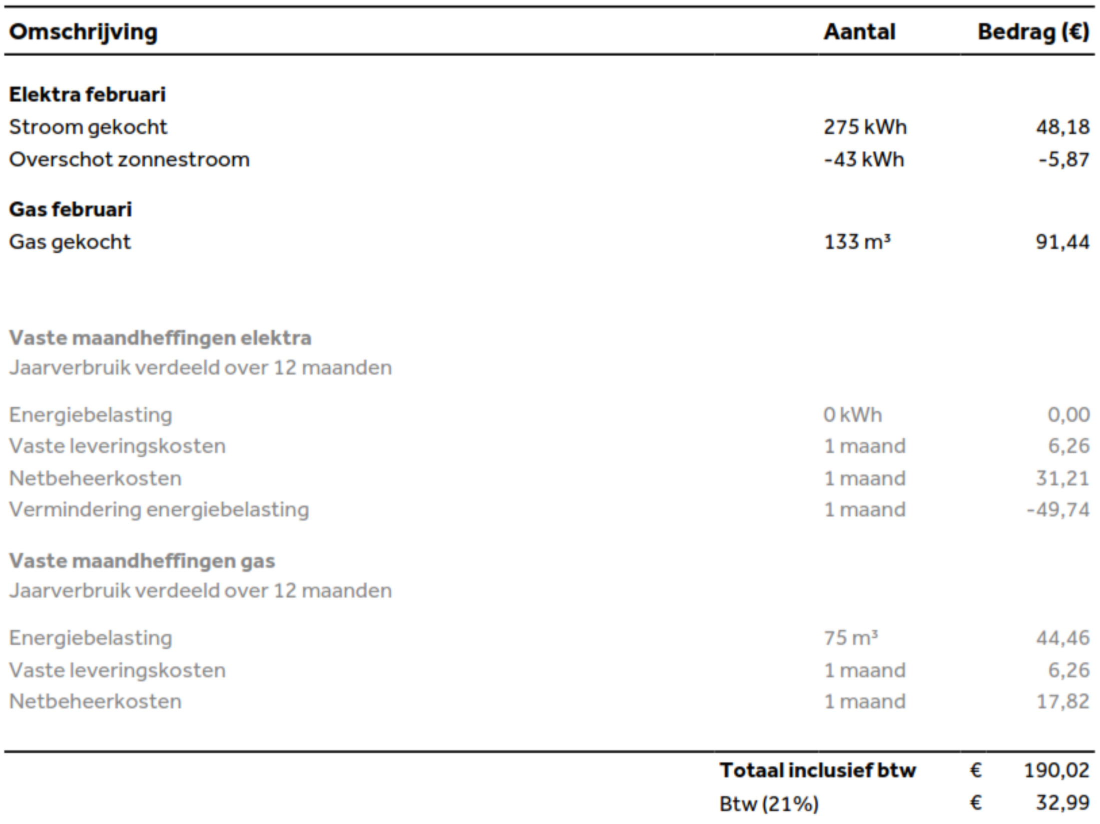
```
magic;script;date-time-UTC;usage T1;return T1;usage T2;return T2;gas usage
```

For example two lines how it should look like:

```
power&gas;dmtz1;2023-04-01T07:00:00Z;1428562;743196;1050527;1761908;2647.746
power&gas;dmtz1;2023-04-01T08:00:00Z;1428698;743213;1050527;1761908;2647.999
```

The Spotswitch.net server will calculate all the hourly usages and returns them with the prices.
This way you get an overview of every hour on every day of the month, so you can check if your provider is charging you the right prices.

The totals are based on the way Zonneplan has set up their invoice:



Omschrijving	Aantal	Bedrag (€)
Elektra februari		
Stroom gekocht	275 kWh	48,18
Overschot zonnestroom	-43 kWh	-5,87
Gas februari		
Gas gekocht	133 m³	91,44
Vaste maandheffingen elektra		
Jaarverbruik verdeeld over 12 maanden		
Energiebelasting	0 kWh	0,00
Vaste leveringskosten	1 maand	6,26
Netbeheerkosten	1 maand	31,21
Vermindering energiebelasting	1 maand	-49,74
Vaste maandheffingen gas		
Jaarverbruik verdeeld over 12 maanden		
Energiebelasting	75 m³	44,46
Vaste leveringskosten	1 maand	6,26
Netbeheerkosten	1 maand	17,82
	Totaal inclusief btw	€ 190,02
	Btw (21%)	€ 32,99

So the first three lines, without the gray lines are calculated for you.
These are without Energy Tax and all fixed monthly prices, but including Value-added Tax (BTW).

If your provider has another way of setting up the invoice, please contact Spotswitch.net with details.

The output is in CSV format (with only the usage and prices of every hour), in ODS or XLSX (with a sheet for every day and an overview of the month) or in PDF which is a printed version of the last.

5.1.1 Appendix 1 A Domoticz script

To collect your metering automatically in Domoticz, you can add a DzVents script like this:

```
return {
  on = {
    timer = {
      'at *:00'
    },
  },
  logging = {
    level = domoticz.LOG_INFO,
    marker = 'Test',
  },
  execute = function(domoticz, item)
    -- auto lookup or manually fill in wanted Power and Gas idx
    PowerIDX = domoticz.devices('Power').idx
    GasIDX = domoticz.devices('Gas').idx
    -- fill in output path of CSV files, like '/home/pi/share'
    CSVpath = '/volume1/tmp'
    -- most domoticz systems create files as root/root, some systems only have read rights for group
    -- if you want the newly created files belong to another group like 'pi', enter here:
    NewGroup = ''
    -- NOTHING TO ADAPT FROM HERE --

    -- create meters information line
    Meters='power&gas;dmtz1;' .. domoticz.time.getISO() .. ';'
    device = domoticz.devices(PowerIDX)
    Meters=Meters .. device.usage1 .. ';' .. device.return1 .. ';'
    Meters=Meters .. device.usage2 .. ';' .. device.return2 .. ';'
    device = domoticz.devices(GasIDX)
    Meters=Meters .. device.counter
    -- check if on month break
    yesterday = domoticz.time.addMinutes(-121)
    today = domoticz.time.addMinutes(61)
    if ( yesterday.month == today.month ) then
      csvfile = CSVpath .. '/DPhourly-' .. today.year .. '-' .. today.month .. '.csv'
      csvhandle = assert(io.open(csvfile, "a"))
      csvhandle:write(Meters .. '\n')
      csvhandle:close()
    else
      csvfile = CSVpath .. '/DPhourly-' .. yesterday.year .. '-' .. yesterday.month .. '.csv'
      csvhandle = assert(io.open(csvfile, "a"))
      csvhandle:write(Meters .. '\n')
      csvhandle:close()
      csvfile = CSVpath .. '/DPhourly-' .. today.year .. '-' .. today.month .. '.csv'
      csvhandle = assert(io.open(csvfile, "a"))
      csvhandle:write(Meters .. '\n')
      csvhandle:close()
      if ( NewGroup ~= '' ) then
          os.execute('chgrp ' .. NewGroup .. ' ' .. csvfile)
      end
    end
  end
}
```

5.1.2 Appendix 1 B Home Assistant script

To collect your metering automatically in Home Assistant, you can add these entries:
Create a new folder "scripts" in /config and create a file called "store-meter":

```
#
# this script stores all smart meter values in the right places
# rev 1.1 23 april 2023 copyright Kampmation
#
# 1: change this path to the desired (existing) folder where the meter files should be stored
CSVpath=/share/meters
# - - - - - - - - - - - - - - -#
# NOTHING TO ADAPT FROM HERE #
# - - - - - - - - - - - - - - -#

epoch=$(date +%s)
yesterday=$(date +%Y-%m -d @$((epoch-7500)))
today=$(date +%Y-%m -d @$((epoch+3900)))
iso=$(date +%Y-%m-%dT%H:%M:00Z -u -d @$((epoch+30)))
regel="power&gas;hass1;$iso;$1;$2;$3;$4;$5"
if [ $today = $yesterday ]; then
  echo "$regel">>$CSVpath/SpotP1-$today.csv
else
  echo "$regel">>$CSVpath/SpotP1-$today.csv
  echo "$regel">>$CSVpath/SpotP1-$yesterday.csv
fi
```

In Configuration.yaml:

```
shell_command:
  dsmr_logger: bash /config/scripts/store-meter {{ t1 }} {{ r1 }} {{ t2 }} {{ r2 }} {{ gas }}
```

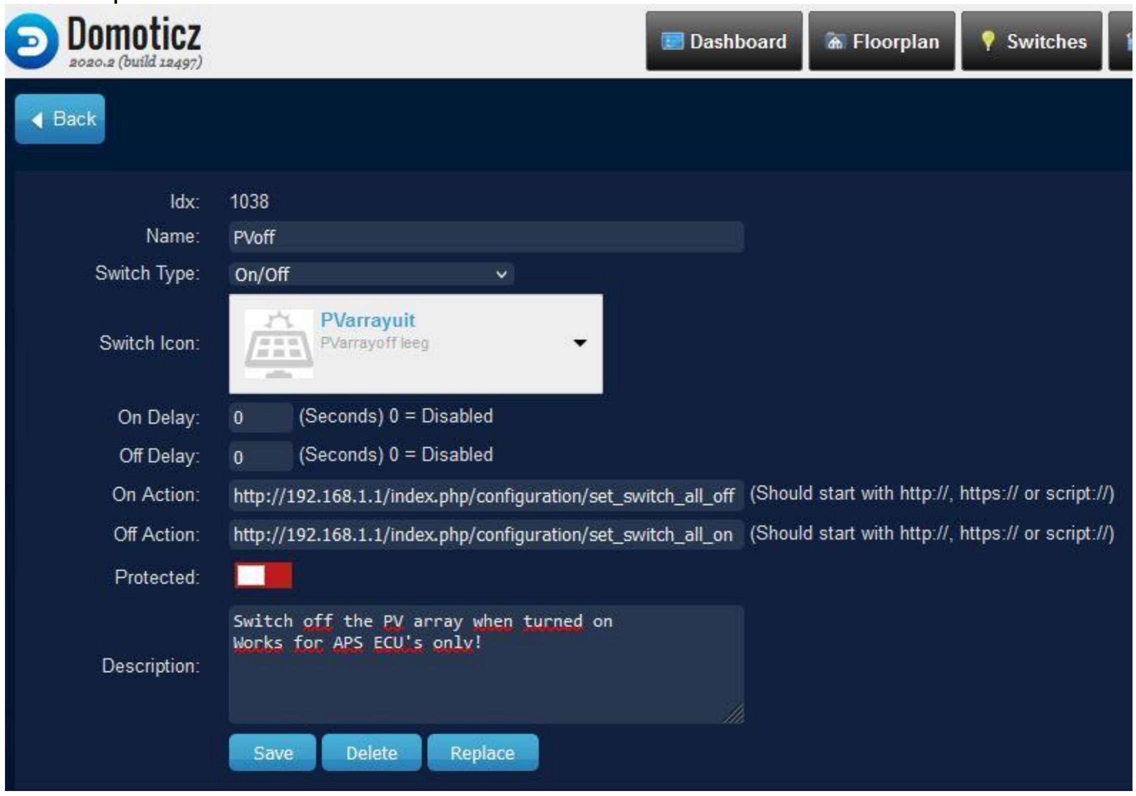
In Automation.yaml:

```
- id: 'dsmrlogger'
  alias: DSMRlogger
  description: Start P1 usage logging shell script
  trigger:
  - platform: time_pattern
    minutes: 0
    seconds: 0
  condition: []
  action:
  - service: shell_command.dsmr_logger
    data:
     t1: "{{ states.sensor.energy_consumption_tarif_1.state }}"
     r1: "{{ states.sensor.energy_production_tarif_1.state }}"
     t2: "{{ states.sensor.energy_consumption_tarif_2.state }}"
     r2: "{{ states.sensor.energy_production_tarif_2.state }}"
     gas: "{{ states.sensor.gas_consumption.state }}"
   mode: single
```

Of course you also have installed and configured "Samba share" in Settings-Add-ons, to be able to reach the created CSV files.

5.2 Appendix 2 Domoticz example to switch off PV-panels

If the spot price is negative and you are not at home, you can have the PV panels switch off automatically to save money. Assuming you have fulfilled all the settings from chapter 3.
First; create a new virtual switch PVoff, just as written on page 10 but with Sensor Type "switch"
Look it up under switches and click on the Edit button:



Idx:	1038
Name:	PVoff
Switch Type:	On/Off
Switch Icon:	PVarrayuit PVarrayoff leeg
On Delay:	0 (Seconds) 0 = Disabled
Off Delay:	0 (Seconds) 0 = Disabled
On Action:	http://192.168.1.1/index.php/configuration/set_switch_all_off (Should start with http://, https:// or script://)
Off Action:	http://192.168.1.1/index.php/configuration/set_switch_all_on (Should start with http://, https:// or script://)
Protected:	
Description:	Switch off the PV array when turned on Works for APS ECU's only!

Fill in the right actions for your system. In this example the webpage of the APsystems ECU is called. These are:
http://ecu.lan/index.php/configuration/set_switch_all_on
http://ecu.lan/index.php/configuration/set_switch_all_off
The "ecu.lan" is set in the local DNS, but the numerical IP notation is also good. Like http://192.168.1.201/index-etc-
For other brands it works different, just google how.
Select the (downloadable under /sources) PVarrayuit Icon which is grayed out when on.
Pay attention that the device has reverse logic: the On Action switches the PV system Off and the Off Action switches it On again.
Also it is wise to setup the notification tab; you like to be informed if the PV system switches.

You should now be able to click on the PVoff under switches and check to see if it works.
The APS ECU takes a few minutes to switch, so be patient.

The next step is to create a condition (copy from the examples) on the Spotswitch.net website to make it switch automatically, depending on the spot price.
The used price in this example is 7 cent. That is a compromise, which has to do with the Energy Tax.
If your annual consumption exceeds the PV harvest and the government still let you settle the difference, you can use 0 ct. But if your PV harvest is more than your annual consumption, you should use 15 ct (which is the Energy Tax including the VAT). The only problem is that you don't know how often it is switched off in a year, and risk your PV harvest dropping below your annual consumption.

Last step is to add the PVoff switch to the device-list from the SpotSwitchx group you have just setup.

5.3 Appendix 3 Browser security settings

This website doesn't use cookies, but stores the UUID and username in the browsers memory.
If you have setup your browser to delete cookies and site memory on closure, you have to make an exception for https://spotswitch.net.
Otherwise the authentication will not work properly.

5.4 Appendix 4 Convenience in copying sources codes

All mentioned source codes and icons are also available on https://spotswitch.net/sources/ from which it is easier to copy/paste than from this PDF.
Especially the Home Assistant YAML files are very picky about spaces and tabs.