Optimication of Oil Burner / Hot Water Tank interaction.

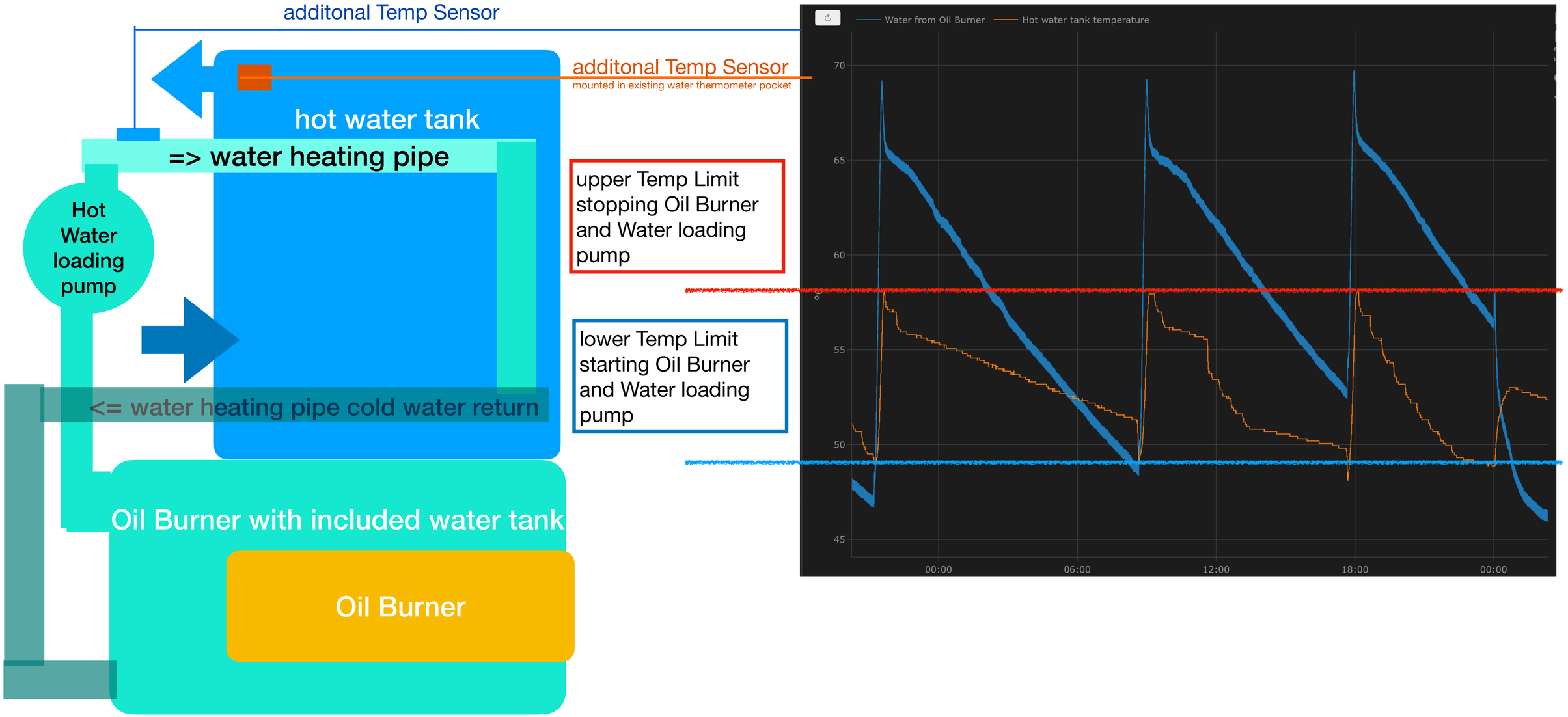
Raise efficience of the system
Raise max. Hot Water temperature (better bacteria protection)
Reduce the heat impact of the system to the rooms and enviroment
Reduce the number of Starts of the Burner

Desclaimer / to be considered / Warnings

These is only an example for an optimication.
For your System your system parameters have to be considered.
There may be a maximum Temperatur for your Hot Water Tank which should not be Overrun.
All working at the electric have to be done according to your local laws and the documentation of the used equippment.
The work at the electric may be only allowed by registered electricians, these may vary depending at your local laws.

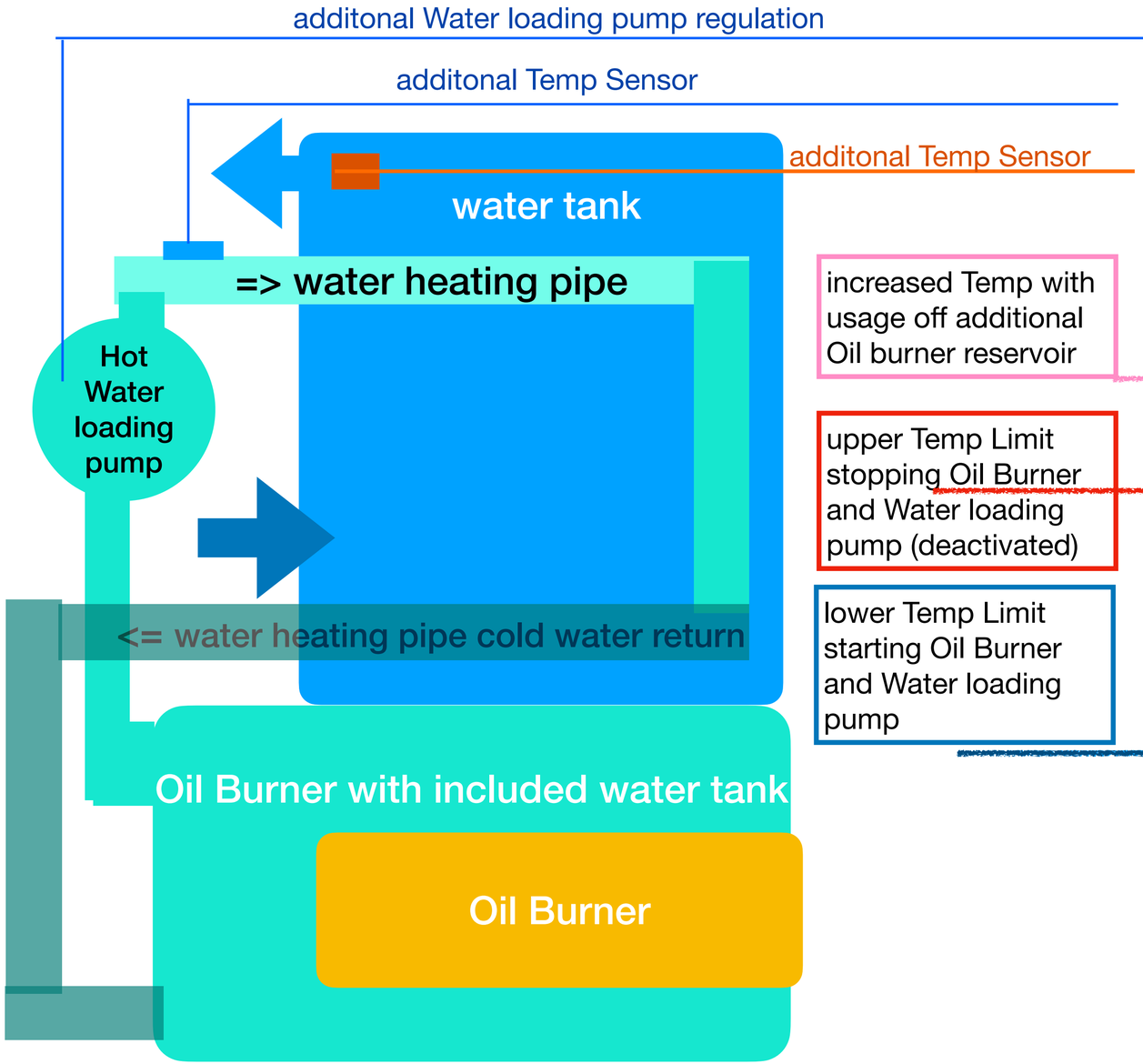
All informations given in these example are without garantie if you do not have knowledge and education for electric work and heating systems consult your local specialist.

Water heating optimication
Step 1 collect Data



Water heating optimication
Step 2 optimication logic

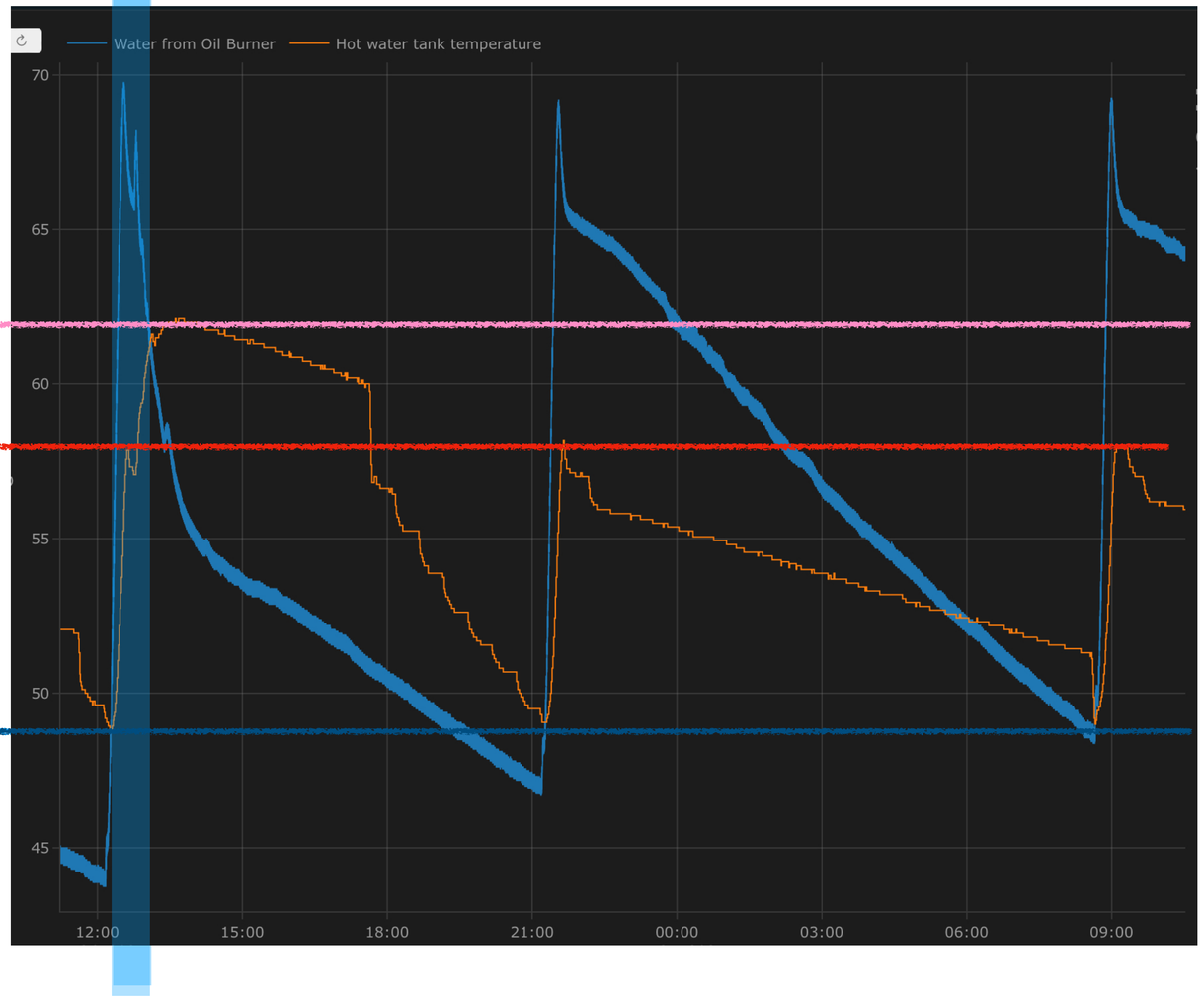
additional Water loading pump regulation, (in summer) water loading pump is running until temp Oil burner reservoir is equal to use water tank temperature.
=> hotter use water.
=> less room heating caused by unused burner / burner water reservoir heat
=> less burner starts
=> higher used water temp. better water hygenic



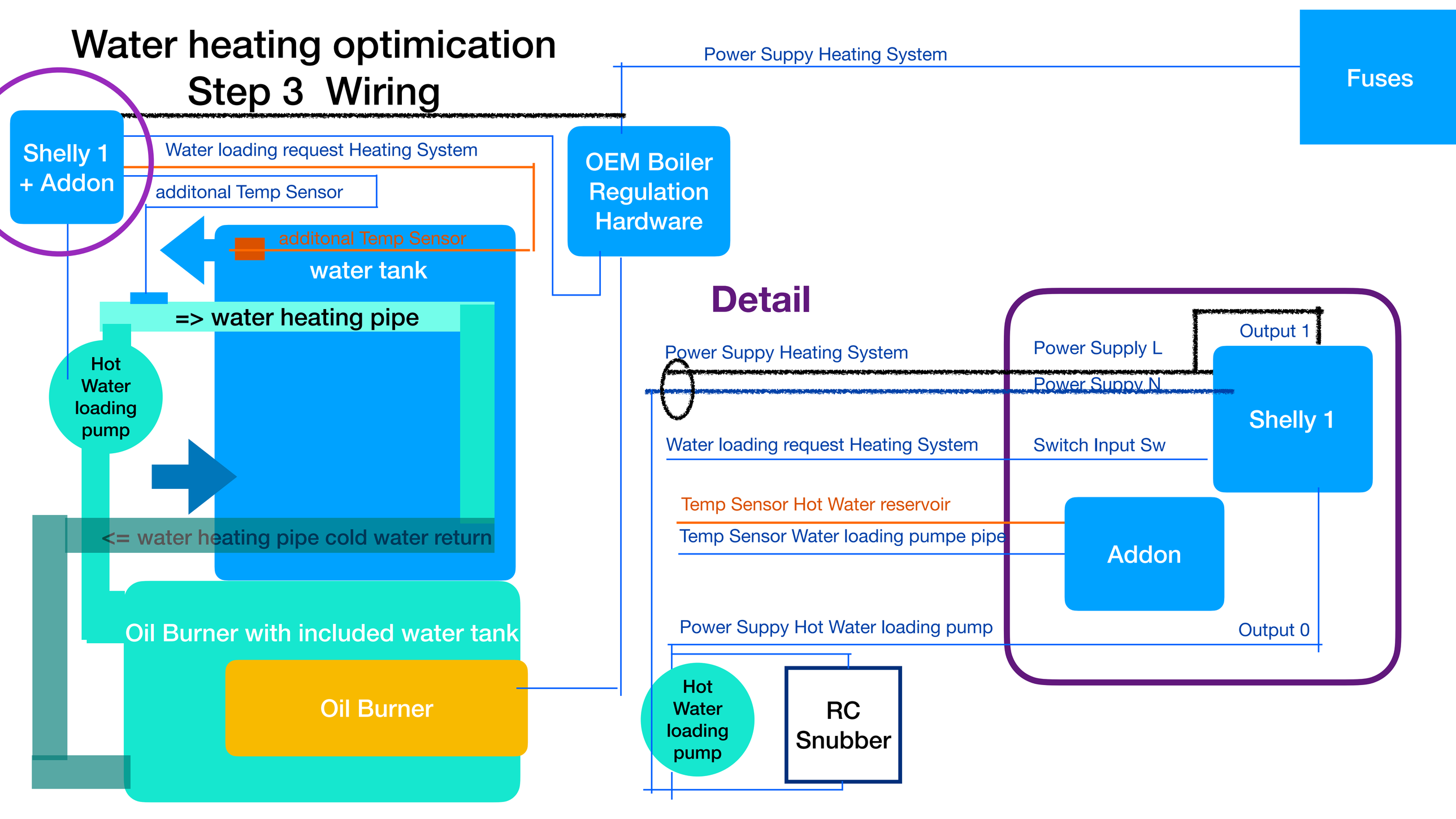
increased Temp with usage off additional Oil burner reservoir

upper Temp Limit stopping Oil Burner and Water loading pump (deactivated)

lower Temp Limit starting Oil Burner and Water loading pump



Water heating optimication
Step 3 Wiring



Hardware used

Temperature Sensor DS18B20 for Hot water reservoir (inside water reservoir)
Temperature Sensor DS18B20 for Hot Water Loading pipe at surface of pipe
(Oil Burner reservoir was not reachable)

Shelly Addon to get temperatures into data stream
Shelly 1 to get original Water pumpe supply from oil burner (Hot water request old)
Shelly 1 to set new Water pump supply according new regulation (Hot Water request new)

(Automation could also done with other Shelly products in fact I am using a Shelly Pro 4PM which supports some other Stuff, usage off RC Snubber have to be considered depended on the products used)

Rasperry Pi running Homeassistant for automation
(could also be done with other systems / tools)

Logic

Signal definition :
— HWR old ..Hot water request from Burner
— HWR new ...Hot water request from new automation
—T HWR ...Temp of Hot water reservoir
-T WfB ...Temp of Water Boiler reservoir

Logic

Use most possible Temperature of Boiler (Sommer use)

- If HW request (old) is send from OEM Automation switch HW request (new) to on
- maybe wait tbd sec. (depending on system)
- if T HWR is equal or higher than T WfB (maybe - Offset dependend on Sensor position ..)
and HW request (old) is 0 than shut off HW request

in case of Hot water consumption T HWR is falling maybe faster than T WfB than restart HW request

- if T HWR is lower than T WfB (maybe - Offset dependend on Sensor position ..)
than shut on HW request (new)
- if T HWR is equal or higher than T WfB (maybe - Offset dependend on Sensor position ..)
than shut off HW request (new)

Winter use maybe different as example (reload HWR each time when T WfB is higher than T HWR)

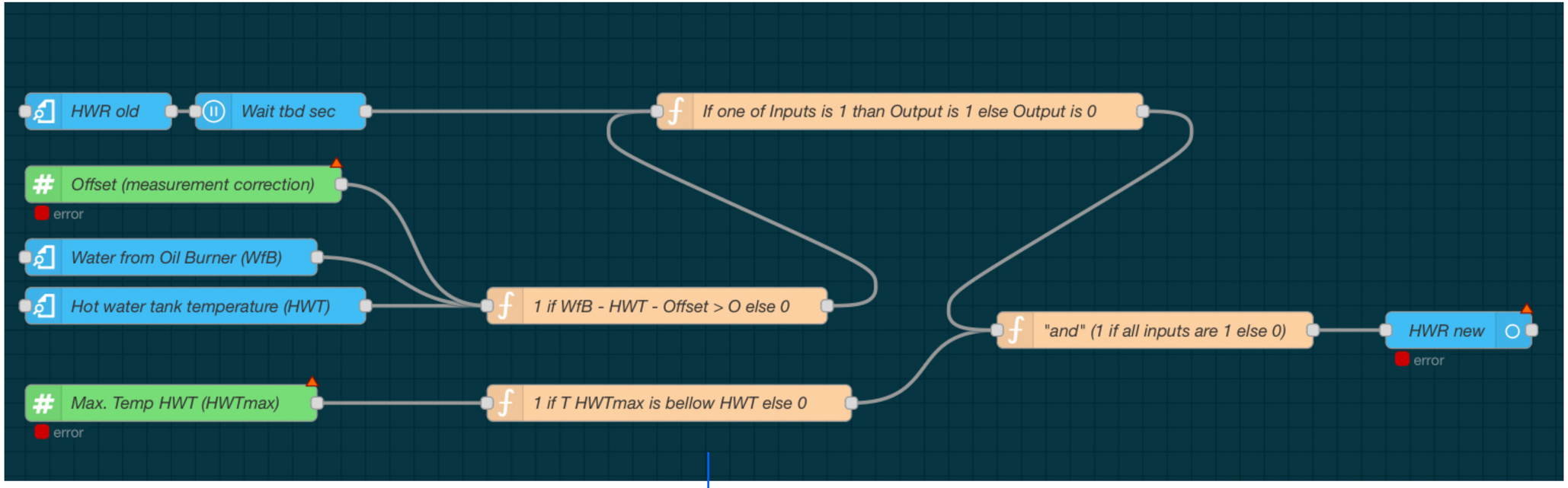
Logic mathematic description

Signal definition :

— Hot water request from Burner (WWR old))

— Hot water request from new automation (HWR new)

—Temp of Hot water reservoir (HWR)

- Temp of Water from Boiler (WfB)

logic in diagramm Style only for explanation (please ignore Error messages)
(Implementation was done in Homeassistant without using these grapfic programming function)
automation could be done in many other Systems with and without grafic interfaces.