Bank Energi Load Shedding Module Engineering Guide

Date: 3 December 2025
Revision 1.0

INTRODUCTION

Bank Energi Load Shedding module provides a Niagara 4 Wire Sheet component to allow a local BMS / HVAC System to be controlled for Load Shedding events. The Niagara Station (Controller or Web Supervisor) will receive commands from the Bank Energi platform via MQTT / JSON formatted payloads for Load Shedding events. The Load Shed command will be passed to the Bank Energi module and it will determine if the configured Assets can be load shed based on the configured parameters. The Load shed output command(s) can then be used in the local Niagara Station or integrated 3rd Party BMS to disable HVAC Plant items for the duration of the Load Shed event.

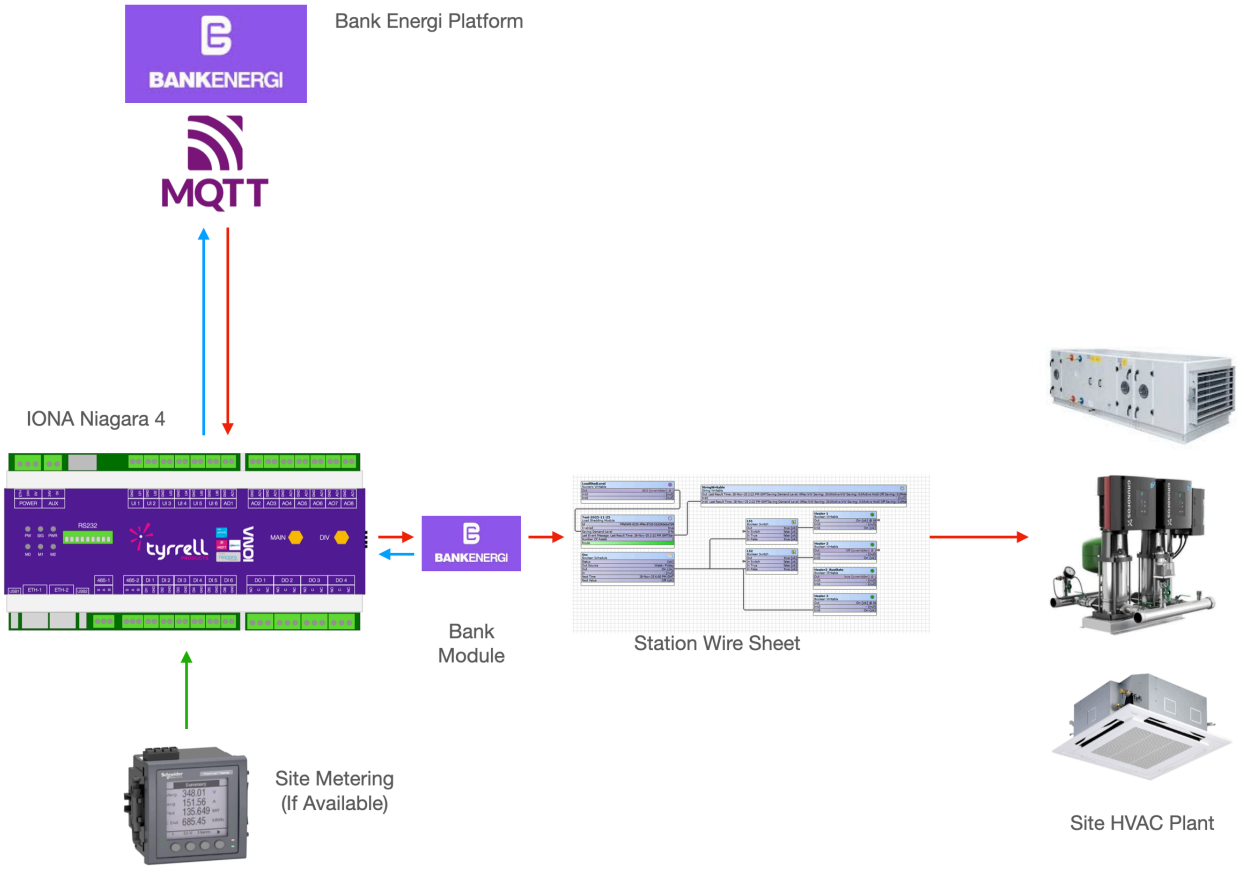
The Bank Energi Module also provides feedback to the Bank Platform via the MQTT connection as to the Status of the system, energy monitoring values (if available).

NIAGARA BMS EXAMPLE

An IONA Cellular enabled controller will be installed at site with cellular access to the Bank Energi platform.

The IONA will have the Bank Energi Load Shedding module installed and it will be configured with ‘Assets’. The Assets will then be linked to interact with local wire sheet components to override automatic BMS strategies to disable HVAC plant during a Load Shed event.

If site metering is available the energy & power data can be made available to the Bank Module for transmission to the Bank Energi Platform.

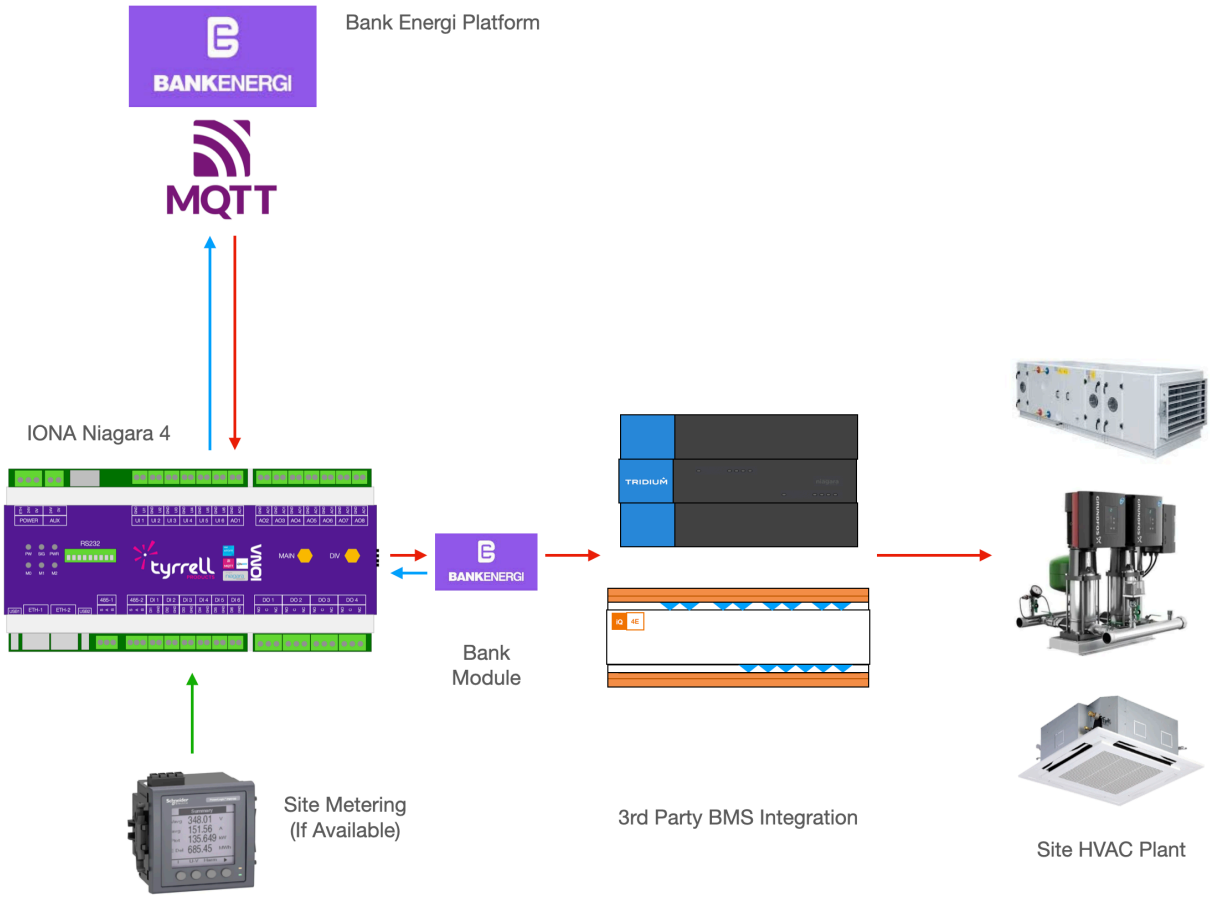


3RD PARTY BMS EXAMPLE

An IONA Cellular enabled controller will be installed at site with cellular access to the Bank Energi platform.

The IONA will have the Bank Energi Load Shedding module installed and it will be configured with ‘Assets’. The Assets will then be linked to interact with the site installed BMS via an integration interface (BACnet IP, Modbus, Proprietary Driver etc) to disable HVAC plant during a Load Shed event.

If site metering is available the energy & power data can be made available to the Bank Module for transmission to the Bank Energi Platform.



LOAD SHEDDING CONCEPT

The Load Shedding module allows for a 'Saving Demand Level' input to be received from the Bank Energi Platform, this signal can then be used in several ways to Load Shed connected HVAC plant items, for example:

- Supply & Extract Fans
- AHUs
- Chillers
- Air Conditioning Units / Systems
- Electric Heaters

Consideration needs to be given to the Asset at the start of a Load Shedding Event.

- If an Asset is enabled / running then it is available to be Load Shed.
  It can be turned off and a defined amount of power / energy saved for the duration of the Load Shed.
  This value contributes to the 'Calculated Active kW Saving' value.
- If an Asset is disabled / not running then it is not available to be Load Shed.
  It cannot be turned off as it is not running to start with.
  It can be 'Held Off' to prevent the asset from starting again during a Load Shed event.
  This value contributes to the 'Calculated Active kW Hold Off Saving' value.

Each Asset within the Load Shedding Module can be defined with a Load Shedding Set Point. This allows for:

- Different Assets to be shed at different set points / levels.
- Use the Load Shed Set Point to facilitate other 'functions' such as Step Up / Step Down (say for set point control).

NIAGARA 4 MODULES & LICENSING

There are software modules and licenses required for the SMS interface to work –

Install the tyrrellLoadShedding-rt JAR file into your Niagara Modules directory (C:\Niagara\Niagara-4.x.x.x\modules)
If using this feature on an IONA / JACE you will need to install the additional modules using Software Manager from the Platform of the controller.

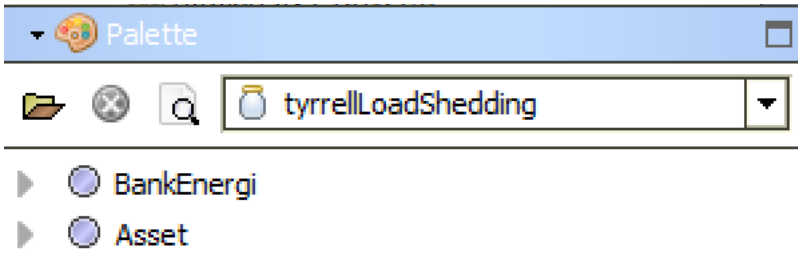
Install the Tyrrell Products Code Signing Certificates. Refer to the specific documentation for full steps -

- Workbench Certificate Manager
  Tools > Certificate Management > User Trust Store
- Target Platform Certificate Manager
  Host> Platform > Certificate Management > User Trust Store

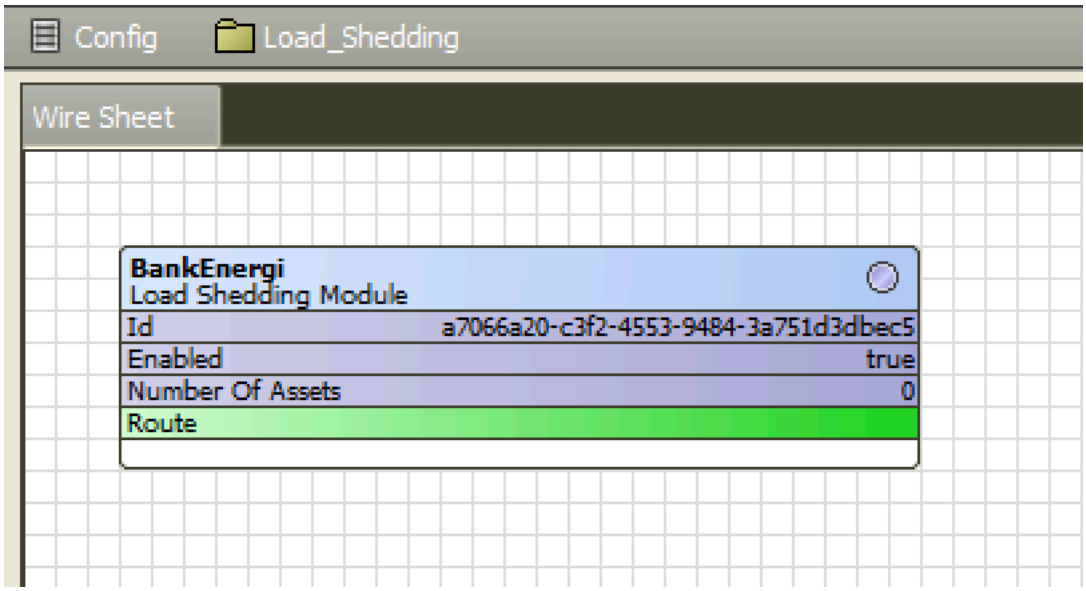
Open Workbench and connect to the platform of the target host.
Connect to the License Manager and import the updated licenses.
An updated tridium.license, new tyrrell.license and tyrrell.certificate file will be imported, in addition the tridium.license will also be updated to included the SMS Service feature.
Ensure you have matching license and certificate files before proceeding.
The Station will need to be restarted after this step.

LOAD SHEDDING MODULE

The Load Shedding Module can be placed onto any Wire Sheet within the Loc.al Niagara Station. The module can be located in the **Palette Tyrrell Load Shedding**



The Bank Energi component can be dragged onto any Wire Sheet view within the Station and given an appropriate name. Multiple Bank Energi modules can be added to a Station for configuration & control of multiple plant items.

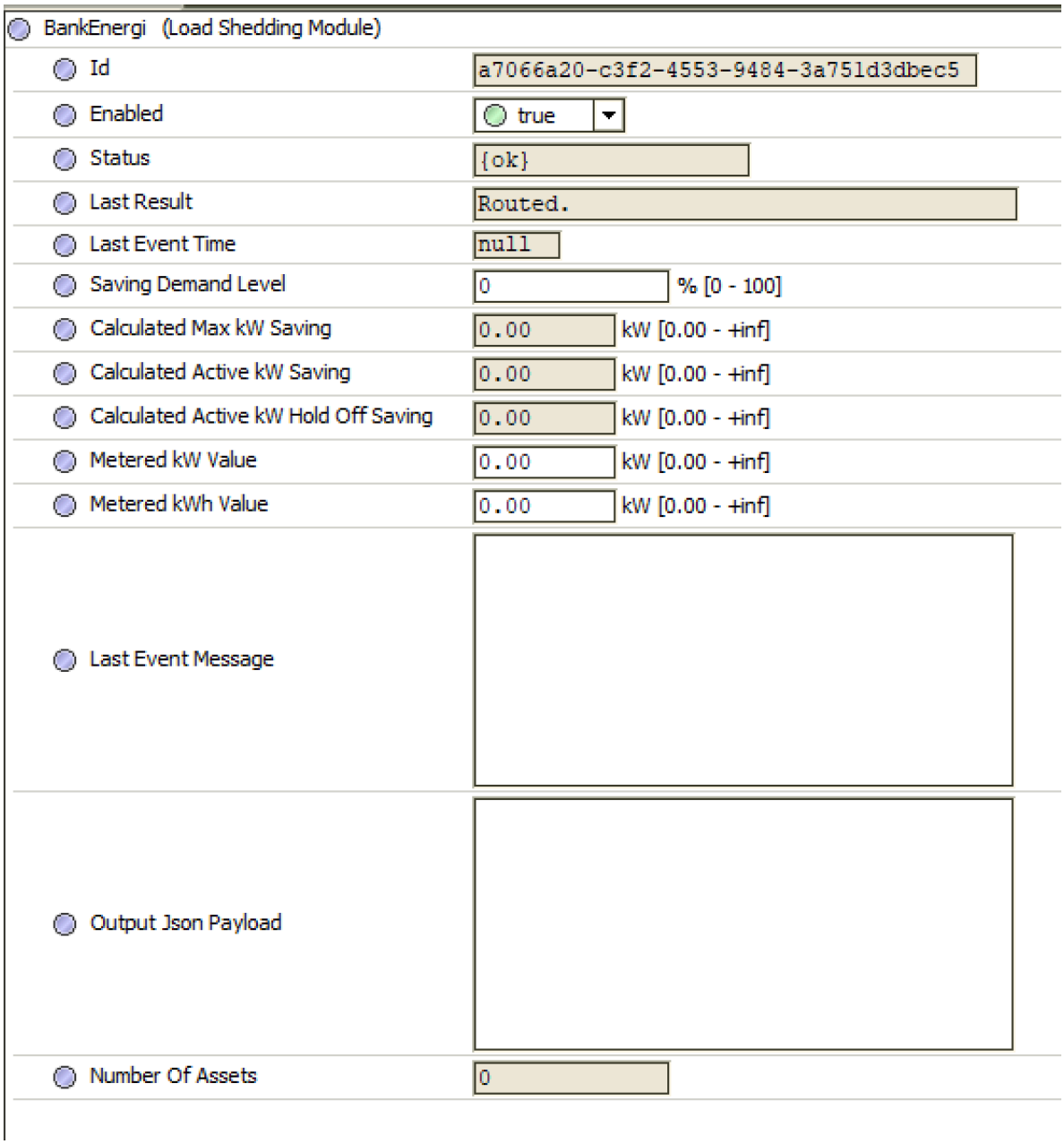


The module will then require configuration in the AX Property Sheet, the following pages will cover all settings and configuration.

Load Shedding Module AX Property Sheet

The module has the following properties (detailed explanation) on the following page.

The module can be further expanded by adding Asset component(s) from the palette.



	Slot	Description
○	Id	Global Unique Identifier for the Load Shed module - randomly generated
●	Enabled	Enable / Disable the module
○	Status	Description of any Faults (for example Not Licensed)
○	Last Result	Input From Bank Platform via MQTT Could be used as Binary component (0/1 or 0 /100)
○	Last Event time	Date & Time Stamp of the Last Event. For example 'Saving Demand Level 0% > 100% or 100% > 0%.
●	Saving Demand Level	Load Shedding Input from the Bank Energi platform. 0% = Normal Operation If Saving Demand Level Input => Load Shed Set Point Asset Then Load Shed = TRUE
●	Calculated Max kW Saving	Calculated from all of the Configured Assets (see next section) Based on ALL Assets being Turned OFF.
●	Calculated Active kW Saving	Calculated during a Load Shed Event. Based on any Assets that have been Load Shed.
●	Calculated Active kW Hold Off Saving	Calculated during a Load Shed Event. Based on any Assets that have been Held Off during Load Shed.
●	Metered kW Value	Link Mark from Metering integration in local Station *If Available*
●	Metered kWh Value	Link Mark from Metering integration in local Station *If Available*
○	Last Event Message	Status of the Module values on the Last Event
○	Output JSON Payload	JSON Formatted output of the Last Event Message
●	Number Of Assets	Number of Assets

LOAD SHEDDING ASSETS

The Load Shedding Module will need to have at least one Asset added to it, but will support multiple assets.

Example of an Electric Wall Heater Load Shed

- There are 10x Electric Wall Heater Panels.
- Option 1

  The Load Shed Module could be configured with 1x Asset that will control and load shed all 10x Heaters.

  Whilst this will functionally work, it will be unknown what each heater is doing individually. For example Heaters 1-5 may be enabled by a T-Stat to provide heating, Heater 6-10 may be disabled by a T-Stat due to the local set point being satisfied.

  In this example only 50% of the system can be actively Load Shed, the other 50% is already disabled and unavailable for Load Shed, this load is available for 'Hold Off' as it still need to be prevented from starting up during a Load Shed Event. The 'Calculated Active kW Saving' would not be an accurate calculation.
- Option 2

  The Load Shed Module could be configured with 10x Assets that will control and load shed 1x Heater each.

  In this example it will be known exactly what each heater is doing individually.

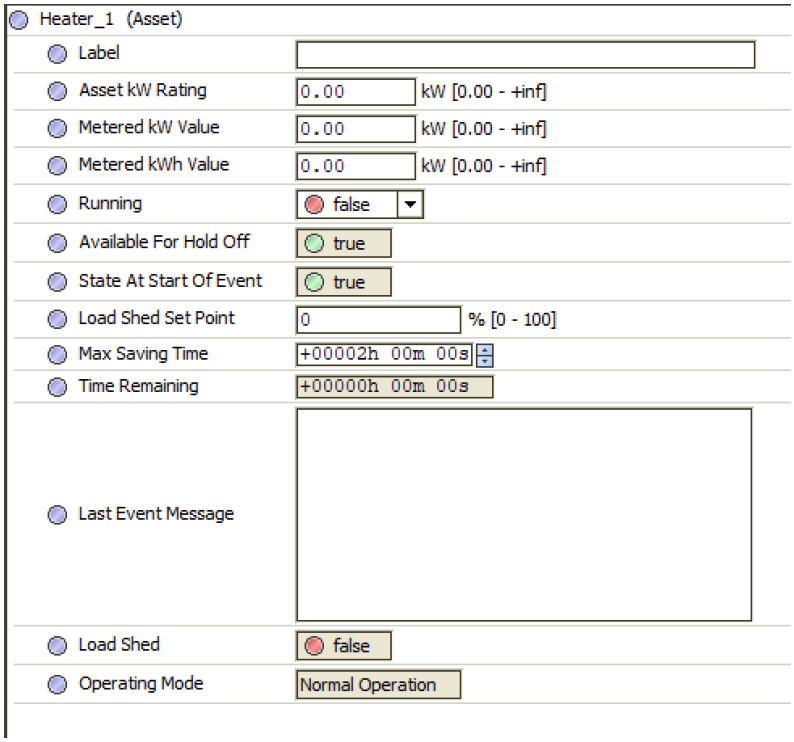
  For example Heaters 1-5 may be enabled by a T-Stat to provide heating, Heater 6-10 may be disabled by a T-Stat due to the local set point being satisfied.

  The running state of each heater will be known.

  The Calculated Active kW Saving and Calculated Active kW Hold Off Saving will be accurate.

  Enabled Assets can be Load Shed, Disabled Assets can be Held Off.

Drag an Asset from the Palette onto the Load Shedding Module and give it an appropriate label.


Heater_1 (Asset)
Label
Asset kW Rating
0.00
kW [0.00 - +inf]
Metered kW Value
0.00
kW [0.00 - +inf]
Metered kWh Value
0.00
kW [0.00 - +inf]
Running
false
Available For Hold Off
true
State At Start Of Event
true
Load Shed Set Point
0
% [0 - 100]
Max Saving Time
+00002h 00m 00s
Time Remaining
+00000h 00m 00s
Last Event Message
Load Shed
false
Operating Mode
Normal Operation

	Label	Adjustable Description To Describe the Asset For Example Heater 1
	Asset kW Rating	kW Rating of the Asset *Used in Calculated Max kW Saving / Calculated Active kW Saving / Calculated Active kW Hold Off Saving* Not a Live value - for indication purposes only
	Metered kW Value	Link Mark from Metering integration in local Station *If Available*
	Metered kWh Value	Link Mark from Metering integration in local Station *If Available*
	Running	Input from the local Station Points (for example a Fan Enable) False / True This will determine if the Asset can 'load shed' (Turned OFF during an event).
	Available For Hold Off	Based on Running input Even if the Asset is not Running it will need to be HELD OFF to stop it from starting during a load shed.
	State At Start of Event	Was the Asset on / off at the start of the load shedding event? RUNNING INPUT is expected to go FALSE when Asset is load shed.
	Load Shed Set Point	0-100% 0 = Normal Operation Saving Demand Level Input => Load Shed Set Point then Load Shed = TRUE
	Max Saving Time	Default 2h Time that the asset is available for Load Shed If set to 15 Mins, after 15 mins of load shed asset goes back to 'Normal'
	Time Remaining	Time Remaining on Active Load Shed Event Based on Max Saving Time v Event Start
	Last Event	Last Event That Occurred Date & Time Stamp & Last Event Level
	Load Shed	Calculated based on settings Used to control local Station Strategy / Points to Load Shed
	Operating Mode	Calculated based on settings Enumerated Value of Land Shed

LOAD SHEDDING CONFIGURATION EXAMPLE

This section will now cover the example configuration of an Asset.

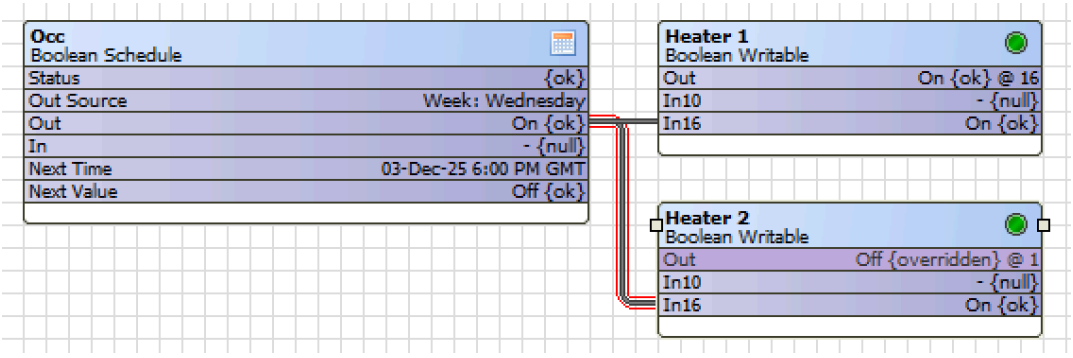
The steps are as follows:

- Add a Load Shedding Component
- Configure the Load Shedding Component with at least one Asset.
  In this example there will be 2x Heaters.
- Configure Each Asset with the required settings / information.
- Create ‘Load Shed Logic’ in the local Station to TURN OFF or HOLD OFF the required plant equipment.
- Link the Load Shed output of the Asset to the local wire

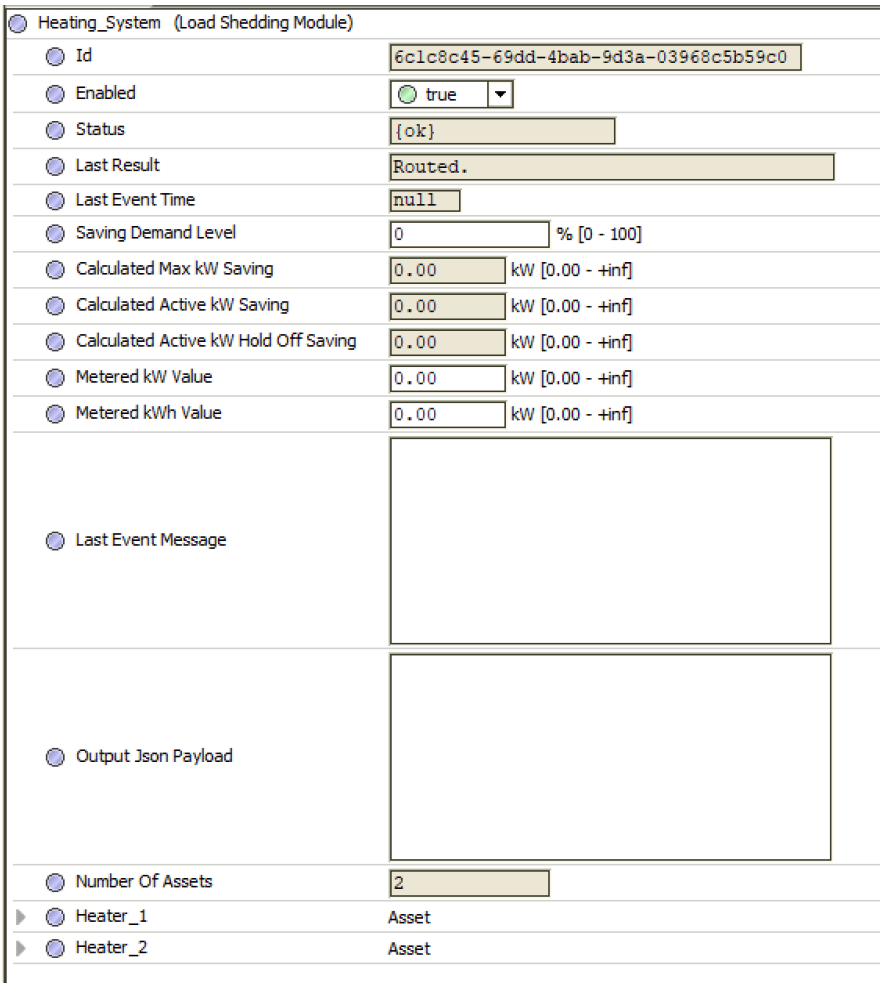
EXISTING STATION BMS STRATEGY

This is an example of a simple BMS Scenario.

A time schedule controls two electric heaters. These heaters will be made available for Load shedding. Noting that Heater 2 is in Emergency Override OFF, so it cannot be LOAD SHED, it can be HELD OFF.



A Bank Energi Load Shedding module will be added to the Wire Sheet and 2x Asset components added to it.

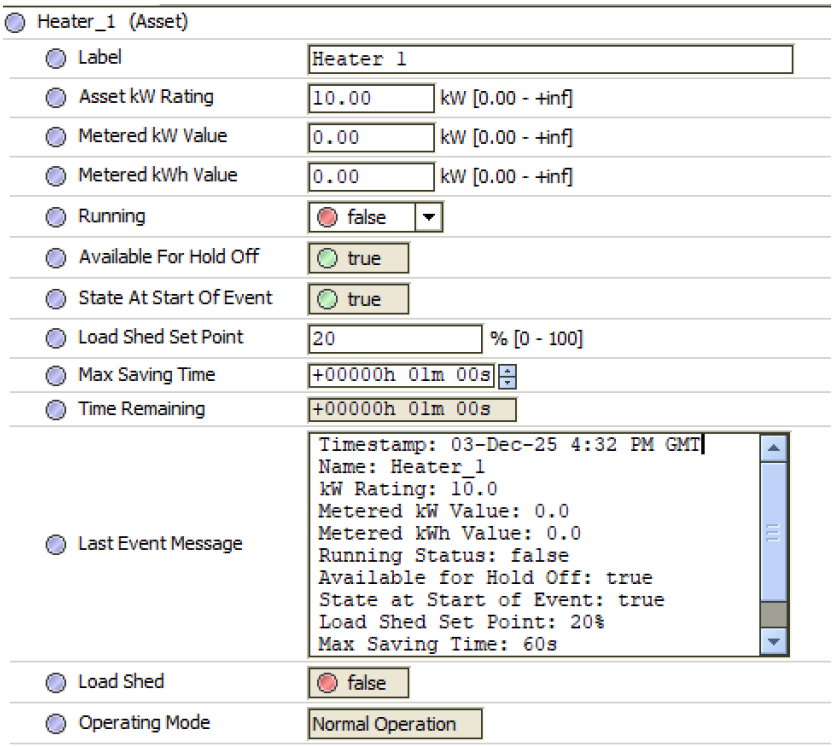


ASSET CONFIGURATION

The two Assets will need to be configured:

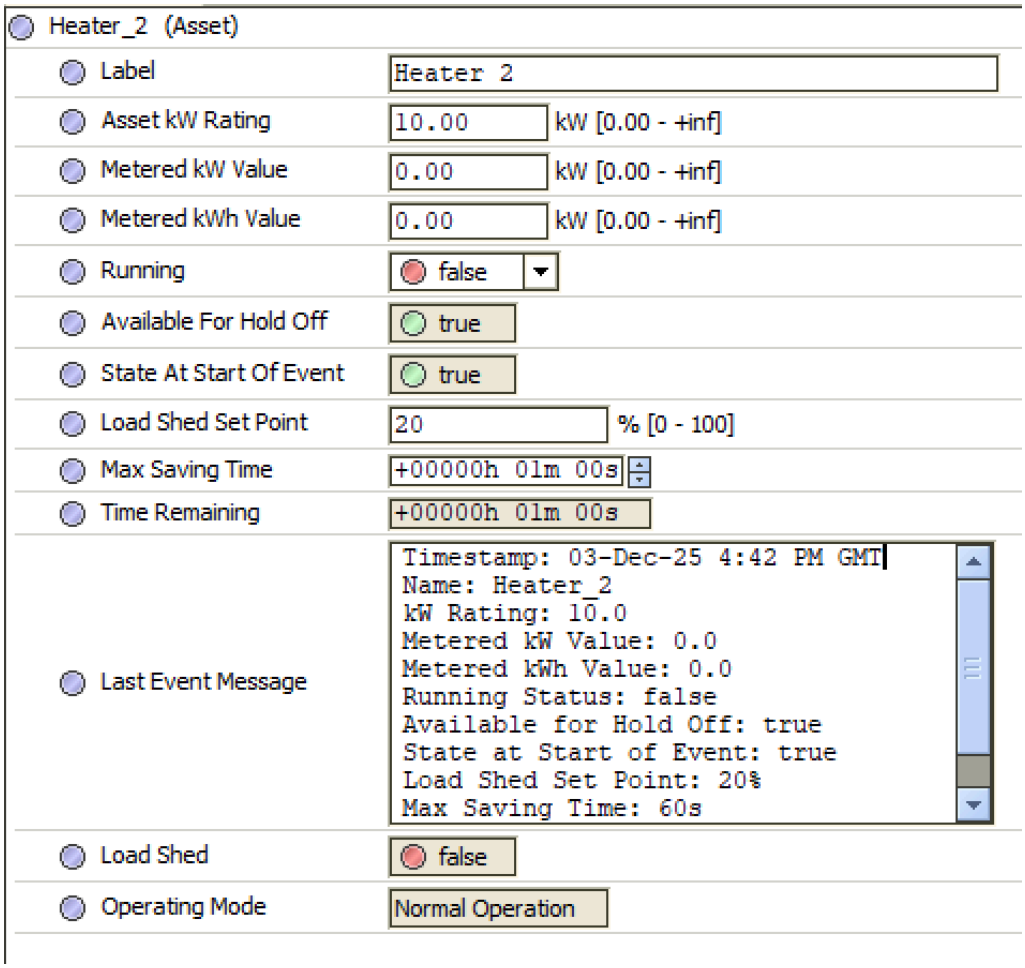
Heater 1 Configuration:

- Label - Heater 1
- Asset kW Rating - 10kW
- Load Shed Set Point 20%
- Running - To be **Linked Marked IN** from a local Station point.
  For example the Heater Enable output
- Load Shed - To be **Linked Marked OUT** to a local Station strategy point.
  Will be used to override / gate out the automatic enable signal to the Heater



Heater 2 Configuration:

- Label - Heater 2
- Asset kW Rating - 10kW
- Load Shed Set Point 20%
- Running - To be **Linked Marked IN** from a local Station point.
  For example the Heater Enable output
- Load Shed - To be **Linked Marked OUT** to a local Station strategy point.
  Will be used to override / gate out the automatic enable signal to the Heater
- NOTE: this heater is OVERRIDDEN OFF. Meaning the Running Input will be FALSE.
  It can be Turned OFF but it can be Held Off.

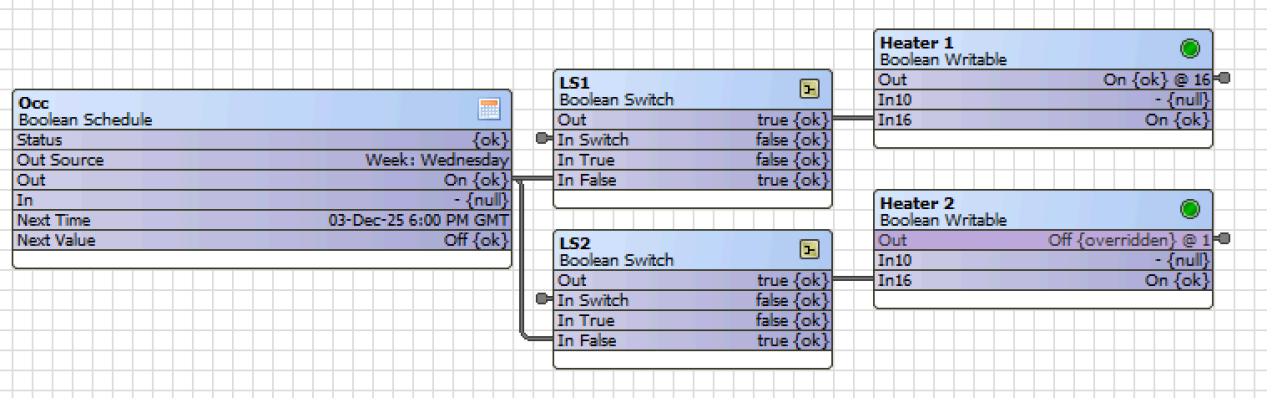


WIRE SHEET MODIFICATION

The automated BMS strategy is then updated to introduced a Boolean Switch component per Assert.

The **In Switch** slot on **LS1 / LS2** is controlled from the **Load Shed** slot of the associated **Asset**.

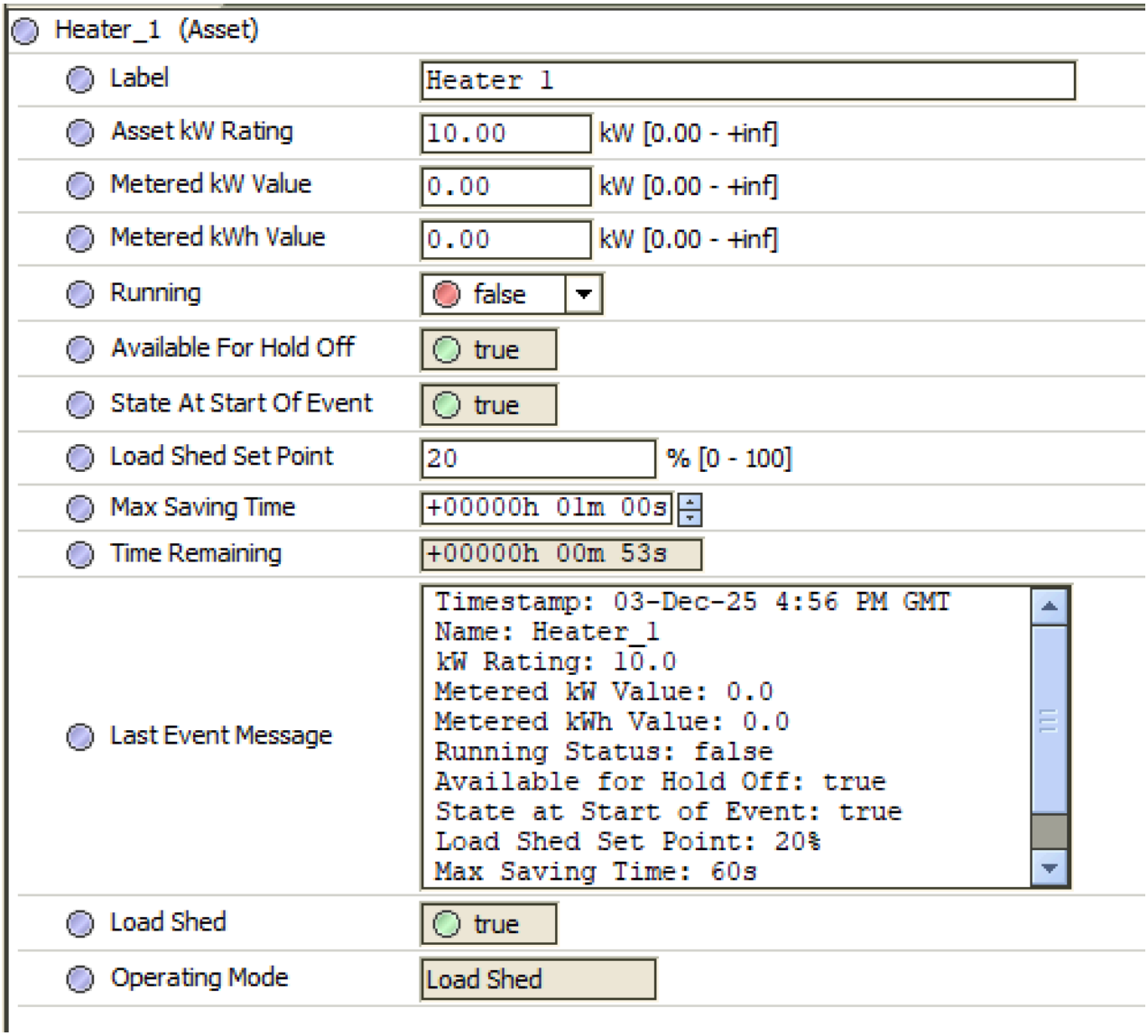
The **OUT** slot on Heater 1 / Heater 2 is fed back to the Running slot of the associated **Asset**.



The Load Shedding Asset then understands IF the asset is enabled / running, or not and can disable the asset via Boolean Switch on a Load Shed event.

LOAD SHED

Once the **Saving Demand Level** input value is set => **Load Shed Set Point** the Load Shed output will become True.



The Load Shed output will remain True until:

- Saving Demand Level is set to 0%
- Max Saving Time (in this example 1 min) has elapsed`
  At this point the asset will return to normal /automatic operation controlled from the BMS strategy.

LOAD SHEDDING JSON

The Load Shedding module automatically provides a JSON formatted output.
This will automatically updated on a Change of Value (COV) within the Load Shedding Module. The intentions is that this date will be sent back to the Bank Energi platform as a live status and audit trail of the system status.


```
{
   "asset_id": "6c1c8c45-69dd-4bab-9d3a-03968c5b59c0",
   "assets": [
      {
         "available_for_holdoff": false,
         "kw_saving": 10,
         "load_shed": false,
         "load_shed_set_point": 20,
         "max_saving_time": 60,
         "metered_kw_value": 0,
         "metered_kwh_value": 0,
         "name": "Heater_1",
         "running": true,
         "state_at_start_of_event": true,
         "timestamp": 1764781038076
      },
      {
         "available_for_holdoff": true,
         "kw_saving": 10,
         "load_shed": false,
         "load_shed_set_point": 20,
         "max_saving_time": 60,
         "metered_kw_value": 0,
         "metered_kwh_value": 0,
         "name": "Heater_2",
         "running": false,
         "state_at_start_of_event": false,
         "timestamp": 1764781038076
      }
   ],
   "calculated_active_kw_hold_off_saving": 10,
   "calculated_active_kw_saving": 10,
   "calculated_kw_saving": 20,
   "last_event": 1764780978036,
   "metered_kw_value": 0,
   "metered_kwh_value": 0,
   "saving_demand_level": 20,
   "timestamp": 1764781038076
}
```

REVISION HISTORY

REVISION	DESCRIPTION
1.0	Release Candidate