

The background image shows a man in a light blue shirt from the side, holding a tablet. He is in a factory or industrial setting with various machines and equipment visible in the background. The Siemens logo is in the top left corner.

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Application Example • 11/2016

SIMATIC Energy Suite - Getting Started

SIMATIC Energy Suite, SIMATIC STEP 7 Professional V14,
SIMATIC WinCC Professional V14



<https://support.industry.siemens.com/cs/ww/en/view/109739102>

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1 Task

1.1 Overview

Introduction

Energy consumption presents an enormous cost factor for many companies, of this consumption only the total consumption and total costs are known.

In times of increasing energy costs, legal measures and the increasing significance of environmentally friendly production processes, energy management becomes increasingly important in production.

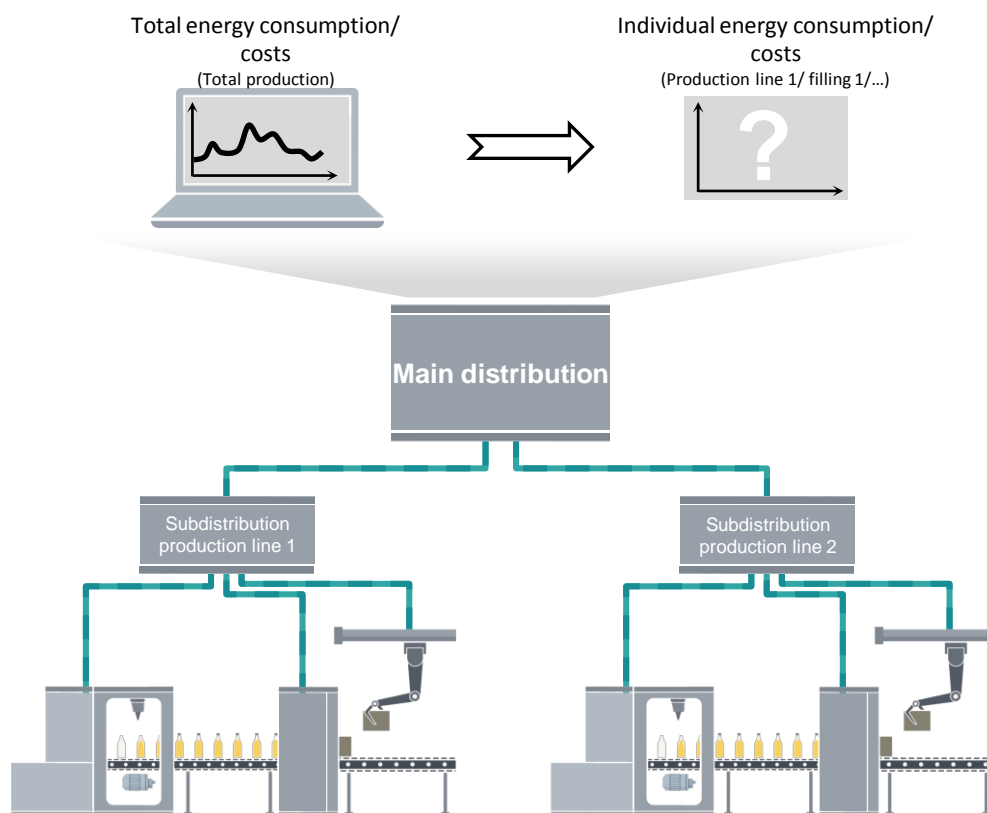
In order to guarantee efficient energy management (in accordance with ISO 50001), it is therefore necessary to create transparency concerning the individual energy consumption. Only when you know the causes, can counter-measures be introduced and costs be saved.

The SIMATIC Energy Suite (called Energy Suite below) helps you to transparently display the energy consumption in your production plant. The required data for this, among others, is supplied by measuring and automation devices from the Siemens portfolio.

Overview of the automation task

The figure below provides an overview of what an exemplary automation task could look like.

Figure 1-1



1.2 Requirements

In order to get an overview of all energy trends in a system, there are certain requirements that have to be met. These include, for example:

- Acquisition of electrical variables (for example, power, energy).
- Recording of non-electrical variables (for example, water consumption, compressed air).
- Connection to other devices (third-party providers).
- Simultaneous use of several measuring points.
- Archiving of energy data supplied by the measuring points.
- Visualizing the energy data via HMI operator panels.

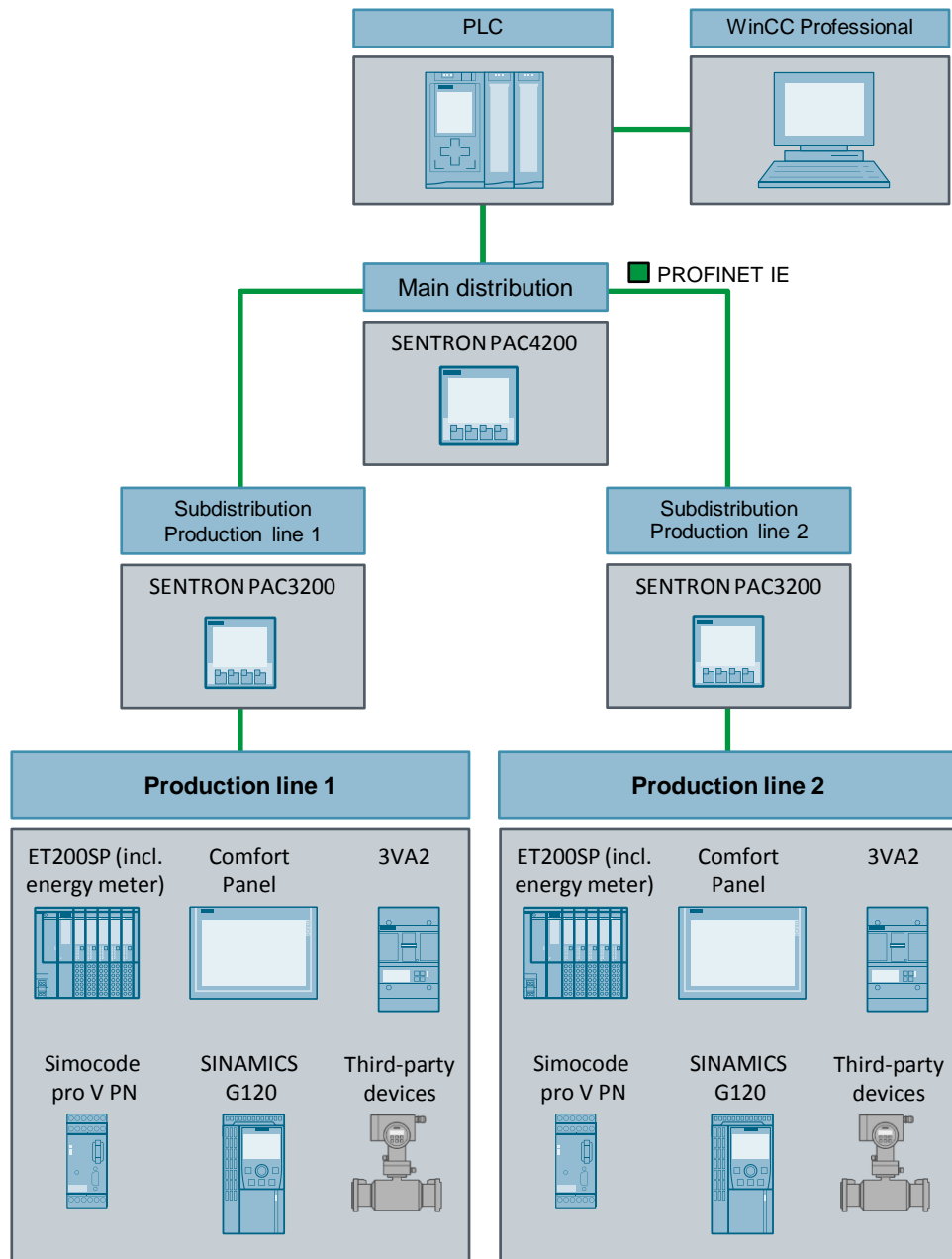
2 Solution

2.1 Overview

Schematic layout

The following figure schematically shows possible components on two production lines that enable the energy data acquisition in the automation environment.

Figure 2-1

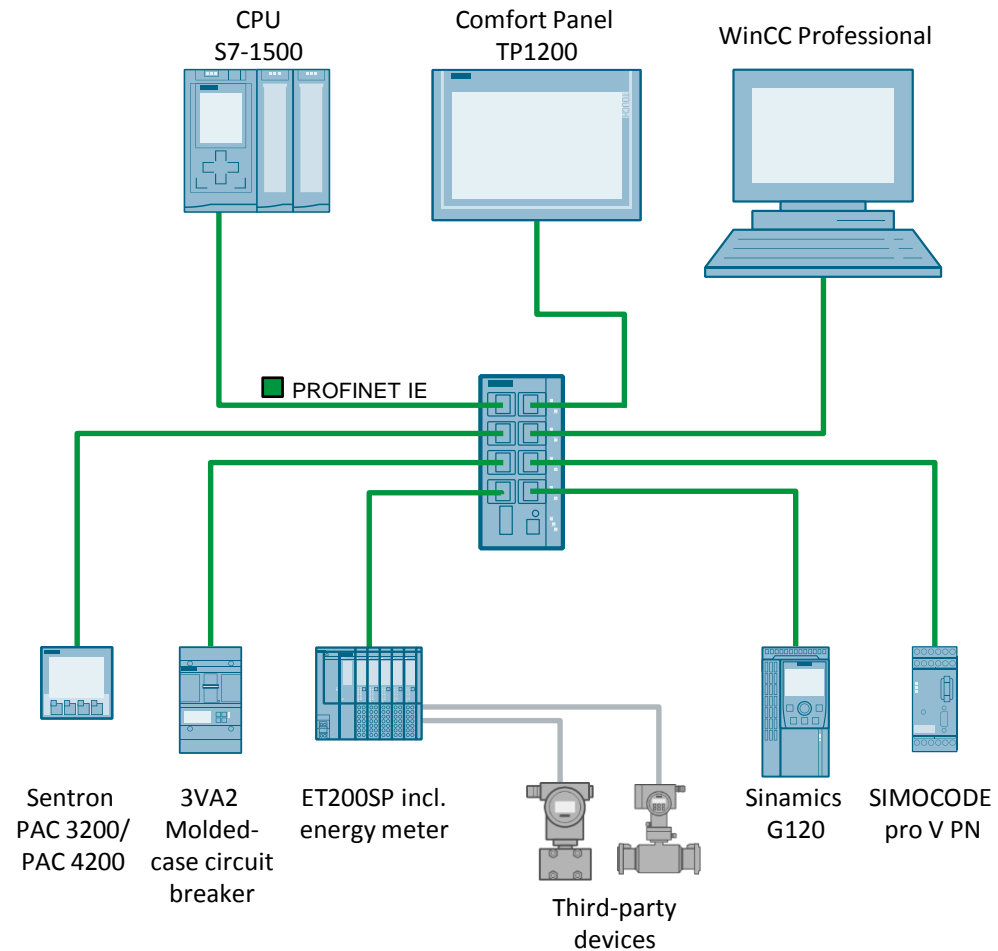


The implementation of the overview is displayed in the following chapters on the example of production line 1 with the associated main und subdistribution. This is how all devices used are described in detail in the configuration.

Configuration

The figure below shows you the exemplary configuration of the application example based on production line 1 with the supporting Siemens automation and measuring devices.

Figure 2-2



Advantages

The solution presented here offers you the following advantages:

- General description of the topic SIMATIC Energy Suite.
- Time and cost savings thanks to comprehensible step-by-step instructions.
- Overview of all possible hardware and software components

Topics not covered by this application

This application does not include a description of:

- Basic configurations in STEP 7 (TIA Portal)
- Basic configurations in WinCC (TIA Portal)

Assumed knowledge

Basic knowledge of the TIA Portal is assumed.

2.2 Hardware and software components

2.2.1 Validity

This application is valid for

- STEP 7 (TIA Portal) V14
- WinCC (TIA Portal) V14

2.2.2 Components used

The application was created using the following components:

Hardware components

Table 2-1

Component	Qty.	Article number	Note
CPU 1516-3 PN/DP	1	6ES7516-1AL01-0AB0	Firmware V2.0 required. Alternatively, any other CPU from the S7-1500 family with firmware V2.0 can also be used. HF and soft PLCs are not supported.
SIMATIC Memory Card 256MB	1	6ES7954-8LL02-0AA0	Among other factors, the size depends on the amount of energy data to be archived
IM 155-6PN ST	1	6ES7155-6AU00-0BN0	
AI Energy Meter 480VAC (ET 200SP)	1	6ES7134-6PA20-0BD0	
Comfort Panel TP1200	1	6AV2124-0MC01-0AX0	Alternatively, any other Comfort Panel can also be used.
3VA2 molded-case circuit breaker	1	3VA2225-5KQ32-0AA0	Molded-case circuit breaker are only supported with ETU 8 series
COM800 data concentrator	1	3VA9987-0TA10	Alternatively, a COM100 can also be used.
SIMOCODE pro V PN	1	3UF7011-1AB00-0	
Current/voltage acquisition module	1	3UF7110-1AA00-0	
SINAMICS G120 Power Module	1	6SL3210-1PB13-0AL0	
Control Unit (CU240E-2 PN)	1	6SL3244-0BB1.-1FA0	
Operator Panel (IOP)	1	6SL3255-0AA00-4JA1	
SETRON PAC3200	1	7KM2111-.BA00-.AA0	Switched Ethernet PROFINET expansion module required
SETRON PAC4200	1	7KM4211-.BA00-.AA0	

2 Solution

2.2 Hardware and software components

Software components

Table 2-2

Component	Qty.	Article number	Note
SIMATIC STEP 7 Professional V14	1	6ES7822-1A.04-0YA5	
WinCC Professional V14	1	6AV2103-0XA04-0A.5	
WinCC Runtime Advanced V14	1	6AV2104-0.A04-0A.0	
WinCC Runtime Professional V14	1	6AV2105-0.A04-0A.0	
SIMATIC Energy Suite	1	6AV2108-0AA04-0A.5	

3 Basics

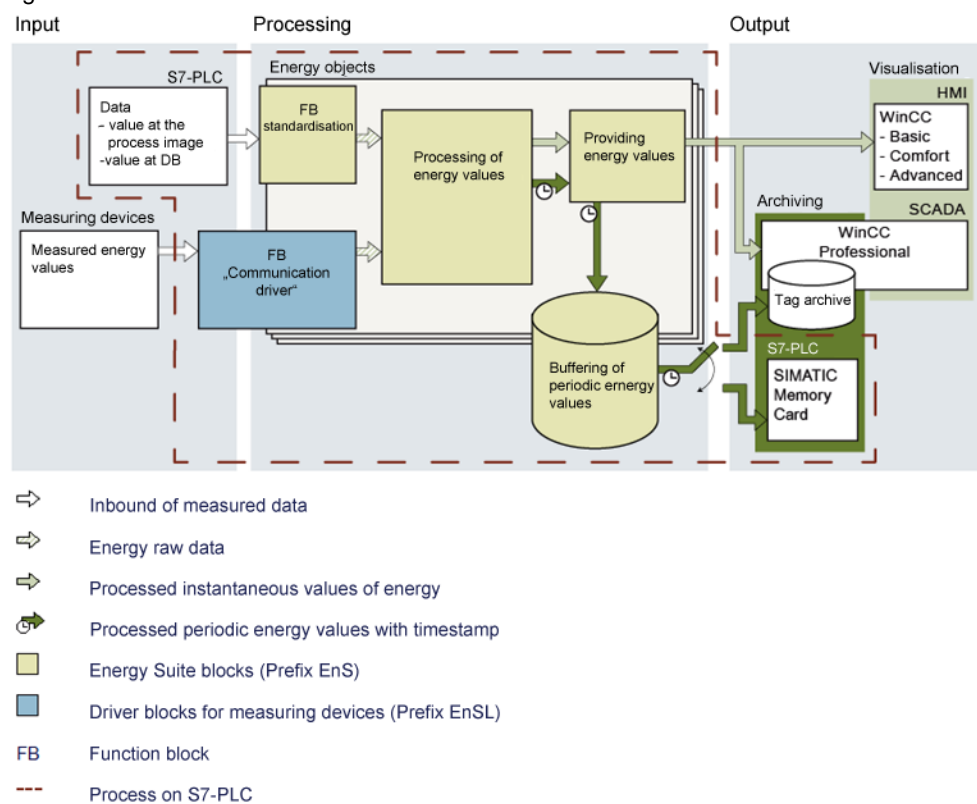
3.1 General information

Apart from measuring devices, automation devices also provide energy data.

3.2 Overview of functions

The following overview gives a general overview of the functioning of the energy suite.

Figure 3-1



3.2.1 Functions (general information)

Acquisition

Energy Suite processes energy data cyclically. The data is then provided with a time stamp and prepared accordingly via the function blocks of the Energy Suite. The precise interaction of the Energy Suite blocks and the driver blocks can be found in the "SIMATIC Measuring Hardware for SIMATIC Energy Suite in the TIA Portal" manual.

<https://support.industry.siemens.com/cs/ww/en/view/109741978/90969966987>

Archiving

The acquired data is archived by the Energy Suite in respective archiving periods. You can use the pre-defined archiving periods here, and you can also create user-defined periods.

Furthermore, you can select whether the energy data is to be archived on the SIMATIC memory card of the S7-1500 CPU or in a WinCC Professional tag archive.

A detailed configuration description can be found in chapter [5.5](#).

Data export

In order to be able to document the archived energy data you have the option to export the archived data.

The energy data that is archived in the data logs on the SIMATIC memory card is saved as CSV file. More information regarding the export of data, for example, via web server can be found in chapter [5.7.1](#).

The SIMATIC Energy Suite Runtime Toolbox provides a system that enables a simple data export of the tag archive in WinCC Professional. The necessary settings are described in chapter [5.7.2](#).

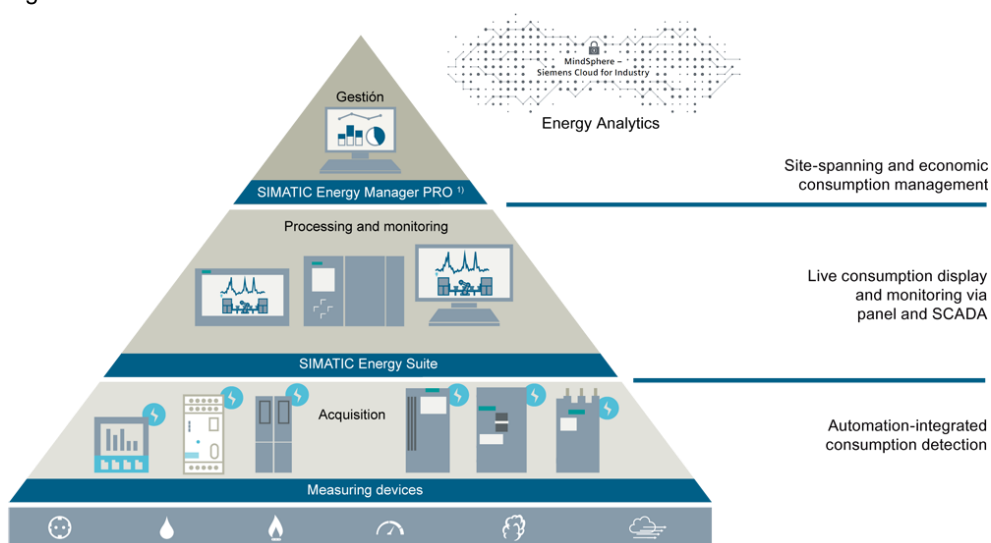
Visualization

Another option is to visualize the energy data via HMI operator panels. There are many example images and image elements available in Siemens Industry Online Support. Different functionalities are supported, depending on the operator panel used. More information and a link to the entry in Siemens Industry Online Support can be found in chapter [5.5](#).

3.2.2 Interface to Energy Manager Pro

The energy data that you have determined with the Energy Suite can be processed further in next step with the SIMATIC Energy Manager PRO (successor of SIMATIC B.Data).

Figure 3-2



Distinction from SIMATIC Energy Manager PRO

The SIMATIC Energy Manager PRO (below called Energy Manager Pro) is suitable for company-wide energy analysis at management level and is therefore based on Energy Suite.

Whilst the Energy Suite offers functions for production-related energy data acquisition, processing and monitoring as well as simple energy reports, the tasks of the Energy Manager PRO can be seen in the commercial energy management. These include, for example:

- Calculating key figures and display in dashboards
- Advanced reporting/KPI
- Energy procurement/prognosis
- Energy efficiency measures

3.3 Supported hardware and software

3.3.1 Hardware

Controllers

SIMATIC Energy Suite is supported by all S7-1500 CPUs as of firmware version V2.0.

Note

Not supported are SIMATIC S7-1500 software controllers, SIMATIC S7-1200 as well as HF and soft PLCs.

Energy data sources

For the measuring components of the Siemens portfolio, devices from the SIMATIC, SENTRON, SINAMICS, SIRIUS and SIMOCODE product families are supported. A detailed list of the supported hardware from the Siemens portfolio can be found in the FAQ "Which energy-measuring components and higher-level systems does the SIMATIC Energy Suite support?":

<https://support.industry.siemens.com/cs/ww/en/view/109482454>

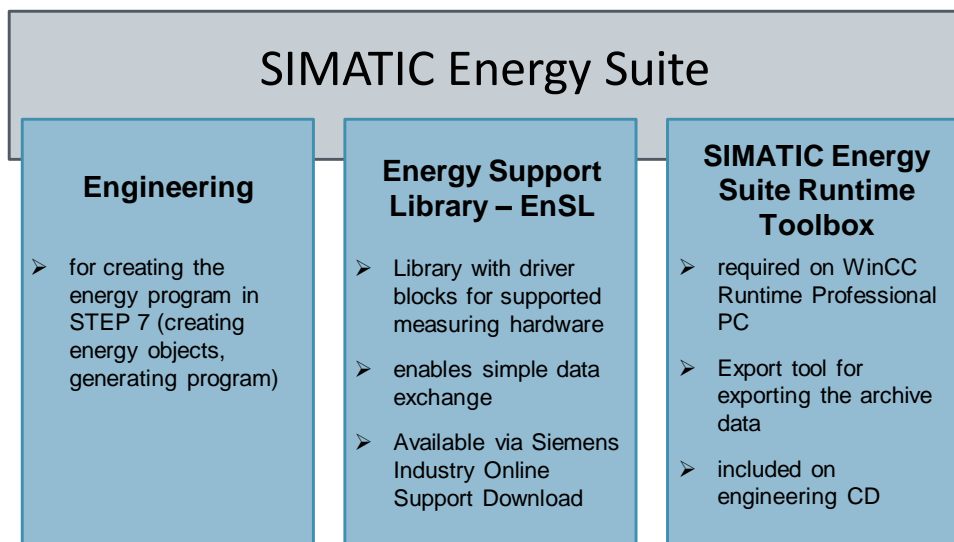
3.3.2 Software

The Energy Suite as well as the Energy Support Library assume TIA Portal V14 with STEP 7 Professional V14.

4 Installation of Software and Driver Blocks

The SIMATIC Energy Suite includes three separate installations for the full scope of function. The overview below shows you what the respective installations are needed for.

Figure 4-1



The following three subchapters 4.1 to 4.3 give a detailed description of the individual installation steps for the engineering, the Energy Support Library and the SIMATIC Energy Suite Runtime Toolbox.

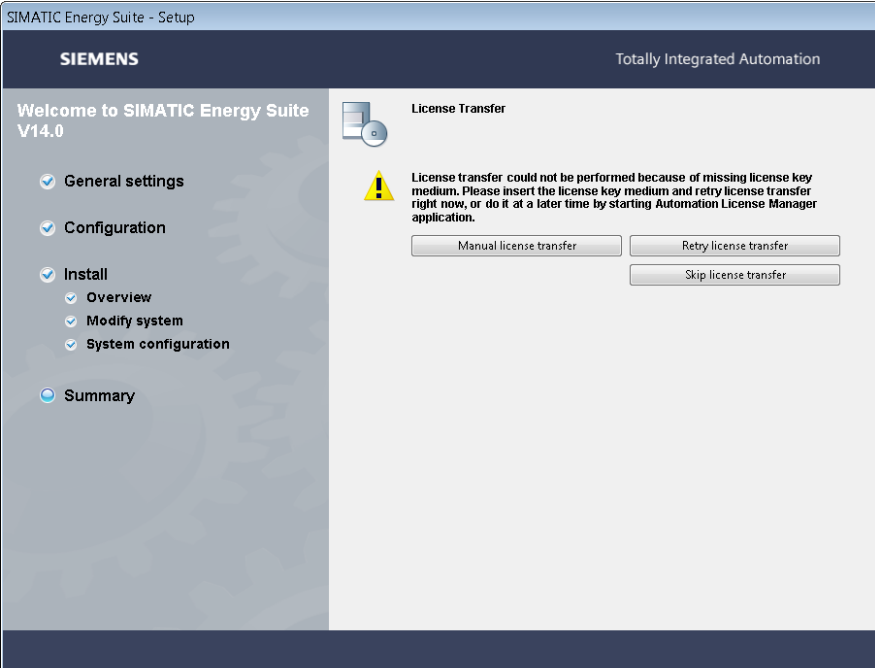
4.1 SIMATIC Energy Suite (Engineering)

Table 4-1

No.	Action
1.	Start the setup program of the SIMATIC Energy Suite V14.0 software by double-clicking the "Start" application of the installation medium.
2.	Select your preferred installation language and click on "Next".
3.	Select the SIMATIC Energy Suite V14.0 and click "Next".
4.	Read the security information and confirm it. Click on the "Next" button to proceed with the installation.
5.	Click on "Install" to install the SIMATIC Energy Suite.

4 Installation of Software and Driver Blocks

4.1 SIMATIC Energy Suite (Engineering)

No.	Action
6.	<p>Transfer the license for SIMATIC Energy Suite from the license data carrier.</p> 
7.	<p>Then click the “Close” button to close the setup menu once the installation has been completed successfully.</p>

4.2 Energy Support Library – EnSL (driver blocks)

Download

The Energy Support Library can be downloaded for free at Siemens Industry Online Support. You can find it in “Energy Support Library (EnSL) – Download”: <https://support.industry.siemens.com/cs/ww/en/view/109741558>

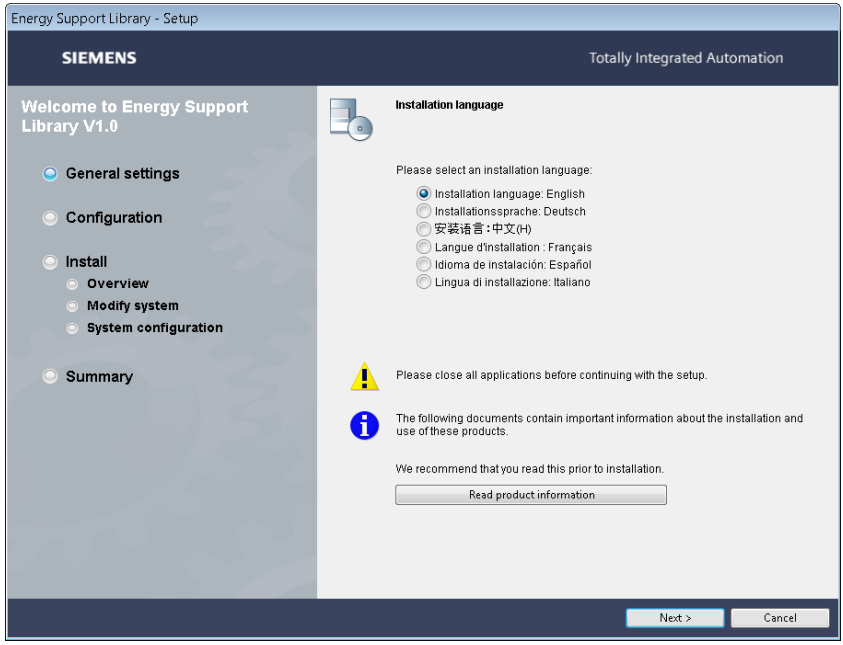
Background

The energy data of the measuring hardware is provided in different ways (for example, differences in data format or in data record address). For you to be able to use the data of the measuring hardware later on together with the SIMATIC Energy Suite, you have to install the driver blocks first.

Note

A detailed description of the individual driver blocks and the parameters is included in the configuration manual of the Energy Support Library. After the installation you will find it in “Start > All Programs > Siemens Automation > Energy Support Library > Manuals”.

Table 4-2

No.	Action
1.	Download the “EnergySupportLibrary_V1.0.zip” file.
2.	Unzip the “EnergySupportLibrary_V1.0.zip” file.
3.	Open the unzipped folder and start the installation by double-clicking on “Start.exe”.
4.	Select your preferred installation language. 
5.	Carry out the remaining installation steps. They are identical to steps 3 to 7 from Table 4-1 .

Note

The Energy Support Library does not have to be licensed.

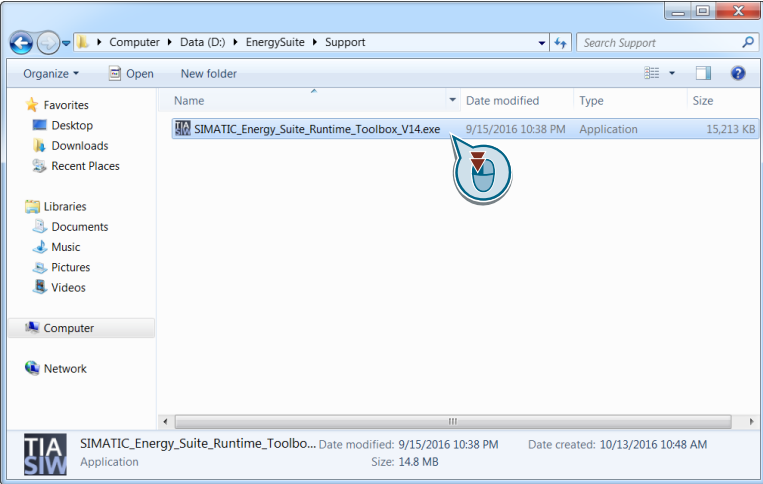
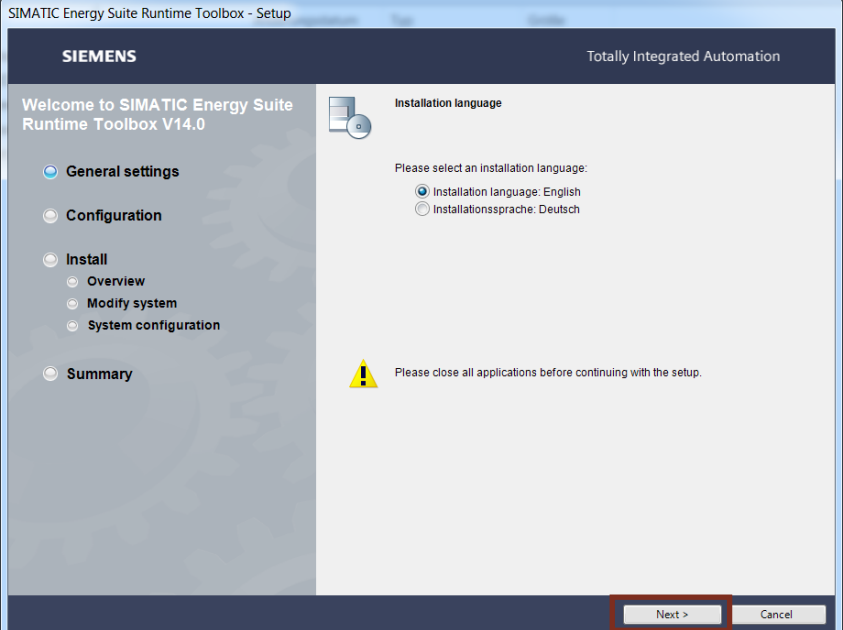
4.3 SIMATIC Energy Suite Runtime Toolbox

If you want to use WinCC Professional together with the Energy Suite, it is necessary to additionally install the SIMATIC Energy Suite Runtime Toolbox. Only this way can all the functions of the Energy Suite be used in WinCC Professional.

Note

The SIMATIC Energy Suite Runtime Toolbox has to be installed on the computer on which WinCC Runtime Professional is running.

Table 4-3

No.	Action
1.	<p>Open the "Support" folder on the data carrier of the Energy Suite and start the "SIMATIC_Energy_Suite_Runtime_Toolbox_V14.exe" application.</p> 
2.	<p>Select the installation language and click on "Next".</p> 
3.	<p>Carry out the remaining installation steps. They are identical to steps 3 to 7 in Table 4-1.</p>

5 Configuration and Settings

The subchapters below describe what configuration steps are required in order to determine, archive and export energy data from the respective measuring and automation devices.

The hardware configuration is based on the example of production line 1, which was shown at the beginning of this application example ([chapter 2.1](#)).

Prerequisite

In order to be able to carry out the hardware configuration, the following devices have to be already created:

- CPU 1516-3 PN/DP
- PC station with WinCC Runtime Professional
- HMI Comfort Panel TP1200
- ET 200SP Station (only head module IM 155-6PN ST)

All devices listed are part of the hardware catalog and can therefore be created in the network view using drag-and-drop.

All other device-specific configurations are described in detail in the following chapters. Here, there is the option to use preconfigured selected measuring hardware from the “EnS_Hardware_Lib” library included ([chapter 5.1](#)) or to configure the measuring hardware manually ([chapter 5.1.2](#)).

5.1 Creating the hardware configuration with the library

Devices

The hardware library included contains the already preconfigured devices for Energy Suite:

- SENTRON PAC3200 and PAC4200
- SIMOCODE pro V PN
- ET 200SP Energy Meter 480 VAC
- Molded-case circuit breaker 3VA

Provided none of these devices are available in your project, you can add them to your project as described in [Table 5-3](#).

Note

If you have already one of the supporting devices preconfigured in your project, you can also make the required settings for the Energy Suite manually. A detailed description is available in [chapter 5.1.2](#).

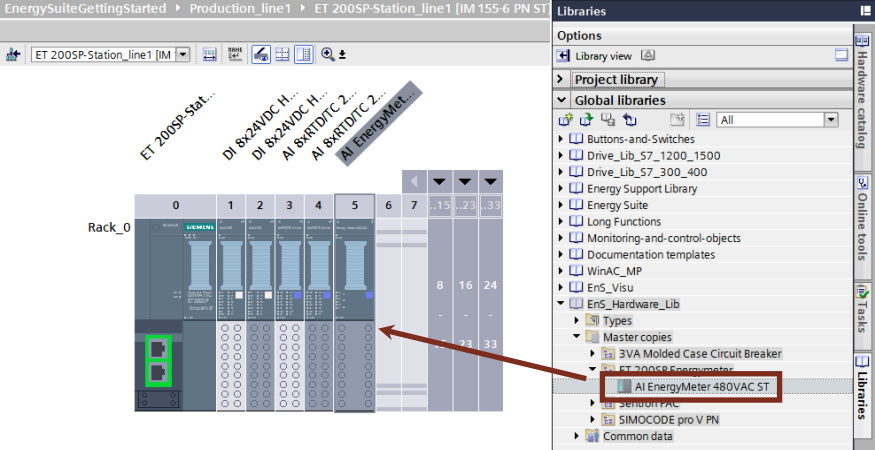
5.1.1 Configuring the ET 200SP station with AI Energy Meter 480VAC ST

With the example of the Energy Meter, the following table shows you how you can use energy measuring devices in your project, using the included example library.

5 Configuration and Settings

5.1 Creating the hardware configuration with the library

Table 5-1

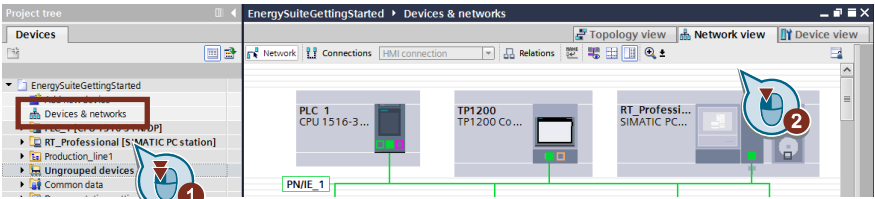
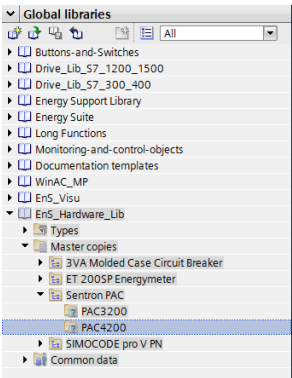
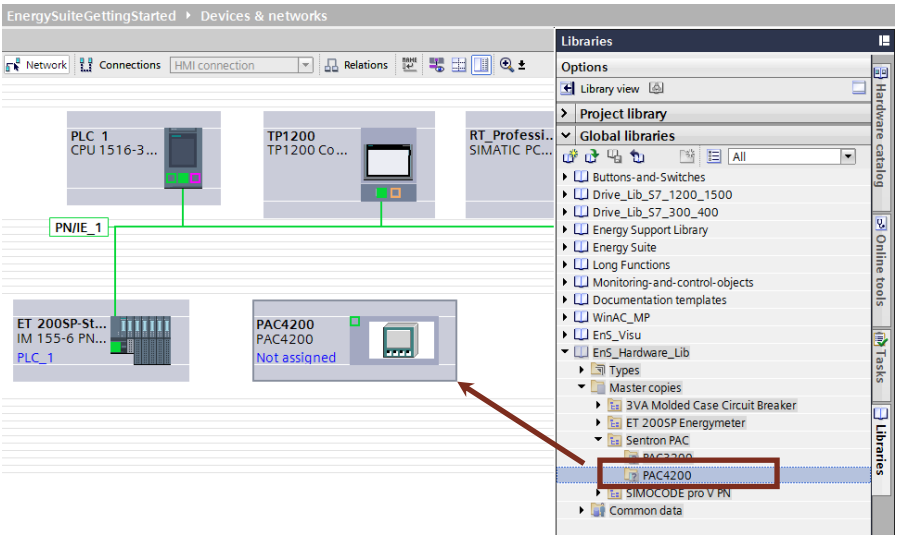
No.	Action
1.	Save the “EnS_Hardware_Lib” library from this application example locally on your computer and unzip it.
2.	Open the library in the TIA Portal.
3.	Click on “Devices & networks” and open the “Network view”.
4.	Select the distributed I/O to which you want to add the Energy Meter and open the “Device view”.
5.	Open the “ET 200SP Energy Meter” folder in the global library in “Master copies”.
6.	<p>Drag the Energy Meter using drag-and-drop to the appropriate slot of the ET 200 station</p>  <p>Note Modules have already been preconfigured (slot 1-4) in the ET 200SP station. Other information on these modules or the reason to use them is described in Table 5-3.</p>
7.	Assign the ET 200SP station to CPU 1516-3 PN/DP in the “Network view”.

5 Configuration and Settings

5.1 Creating the hardware configuration with the library

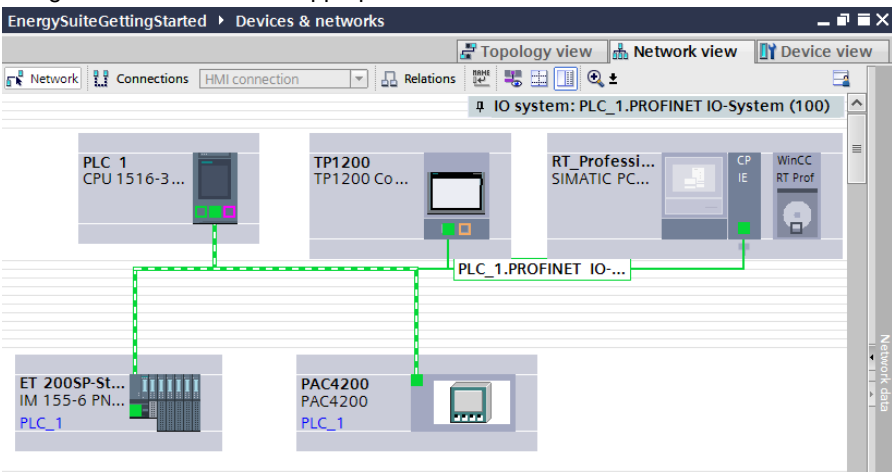
5.1.2 Configuring another library elements

Table 5-2

No.	Action
1.	Save the “EnS_Hardware_Lib” library from this application example locally on your computer and unzip it.
2.	Open the library in the TIA Portal.
3.	Click on “Devices & networks” and open the “Network view”. 
4.	Open the “Sentron PAC” folder in the global library in “Master copies”. 
5.	Drag the PAC4200 into the graphic area of the “Network view” using drag-and-drop. 
6.	Adjust the IP address.
7.	Optional Rename the PAC4200, if required, in order to have several devices with unique assignment.

5 Configuration and Settings

5.1 Creating the hardware configuration with the library

No.	Action
8.	<p>Assign the PAC4200 to the appropriate CPU.</p> 
9.	Save your project.

Note

The library elements are only preconfigured for the function of the energy measurement in connection with the Energy Suite. It may therefore be required to adjust the devices (especially SIMOCODE pro V PN and the molded-case circuit breaker 3VA2) to your plant conditions.

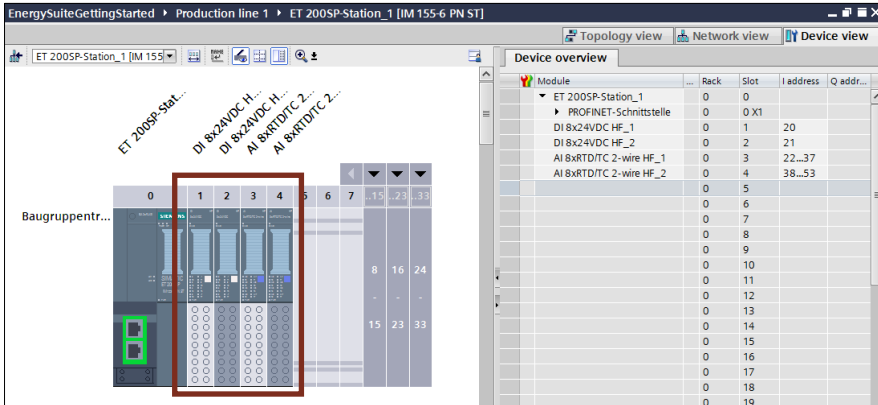
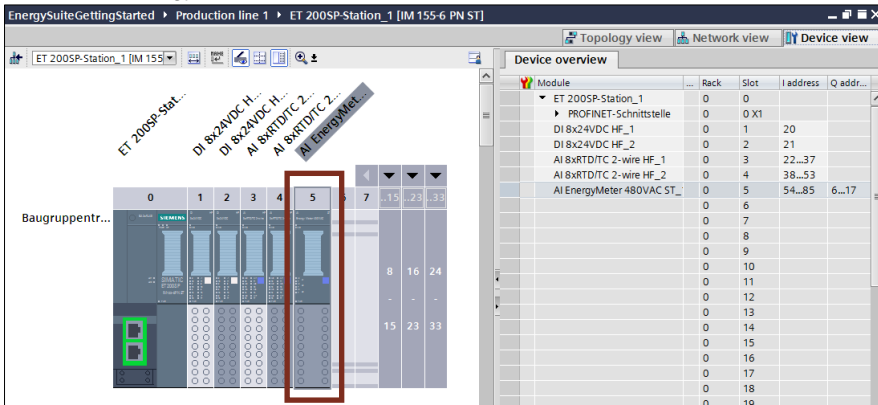
5.2 Creating the hardware configuration manually

This chapter explains to you in detail what settings you have to make in the hardware configuration on the energy measuring components and how to configure them for the Energy Suite.

5.2.1 Configuring the ET 200SP station with AI Energy Meter 480VAC ST

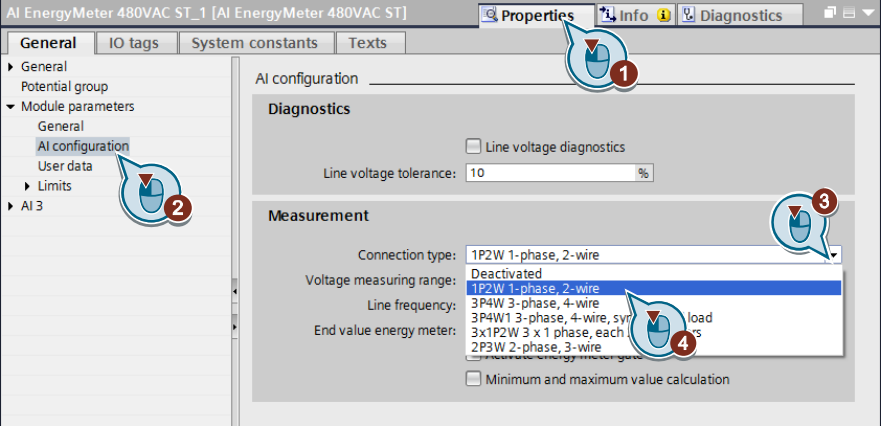
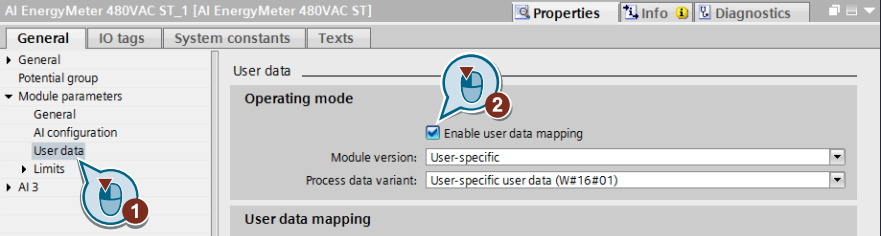
In the table below, you will be shown what configuration steps are required for an ET 200SP station with AI Energy Meter 480VAC ST in order to be able to use it later with the Energy Suite.

Table 5-3

No.	Action
1.	Open the "Device view" of the ET 200SP station.
2.	<ul style="list-style-type: none"> Add two DI modules on slots 1 and 2 Add two AI modules on slots 3 and 4.  <p>Note</p> <p>In this case, both module types are intended for the connection of possible non-electric measuring devices in the plant configuration. The connection of such measuring devices in connection with the SIMATIC Energy Suite can be found in Chapter 5.3.3.</p>
3.	<p>Add the AI Energy Meter 480VAC ST to slot 5.</p> 

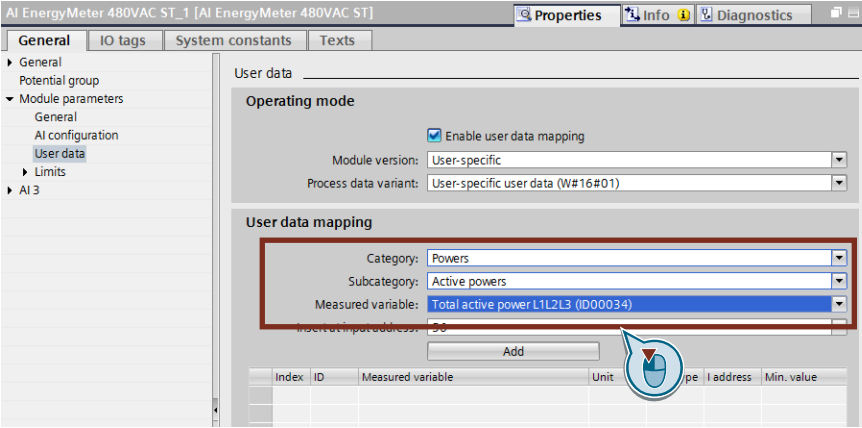
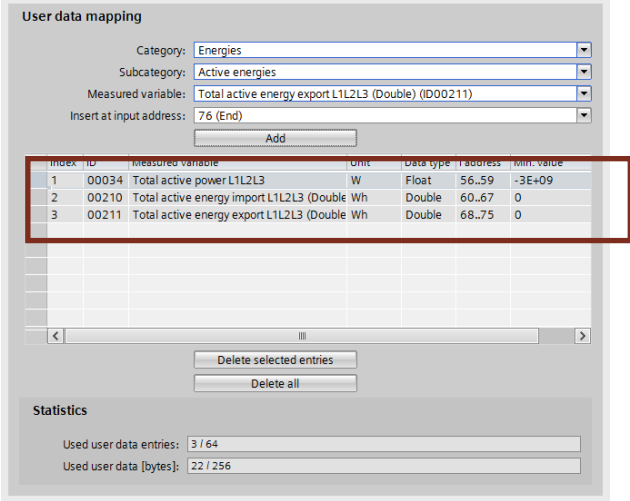
5 Configuration and Settings

5.2 Creating the hardware configuration manually

No.	Action
4.	<ul style="list-style-type: none"> • Open the “Properties” of the Energy Meter (1). • Open the “Module parameters” in the area navigation and click on “AI configuration” (2). • Open the dropdown list box of the “Connection type” in the inspector window in “Measurement” (3). • Select the “1P2W 1-phase, 2-wire” type from the list (4).  <p>Note The type of the connection depends on the consumer connected on the Energy Meter.</p>
5.	<ul style="list-style-type: none"> • Open the “User data” in the area navigation (1). • Enable the user data mapping (2) in the inspector window in “Operating mode”. 

5 Configuration and Settings

5.2 Creating the hardware configuration manually

No.	Action																												
6.	<p>Select the following parameters in the inspector window in "User data mapping":</p> <ul style="list-style-type: none">Category: "Powers"Subcategory: "Active powers"Measured variable: "Total active power L1L2L3 (ID00034)" <p>Then click on "Add".</p> 																												
7.	<p>Repeat step 6 to complete the following two measured variables:</p> <ul style="list-style-type: none">Total active energy import L1L2L3 (Double) (ID00210)Total active energy export L1L2L3 (Double) (ID00211) <p>You have to observe precisely this order for the measured variables.</p>  <table><thead><tr><th>Index</th><th>ID</th><th>Measured variable</th><th>Unit</th><th>Data type</th><th>Address</th><th>Min. value</th></tr></thead><tbody><tr><td>1</td><td>00034</td><td>Total active power L1L2L3</td><td>W</td><td>Float</td><td>56.59</td><td>-3E+09</td></tr><tr><td>2</td><td>00210</td><td>Total active energy import L1L2L3 (Double Wh</td><td>Double</td><td>60.67</td><td>0</td><td></td></tr><tr><td>3</td><td>00211</td><td>Total active energy export L1L2L3 (Double Wh</td><td>Double</td><td>68.75</td><td>0</td><td></td></tr></tbody></table>	Index	ID	Measured variable	Unit	Data type	Address	Min. value	1	00034	Total active power L1L2L3	W	Float	56.59	-3E+09	2	00210	Total active energy import L1L2L3 (Double Wh	Double	60.67	0		3	00211	Total active energy export L1L2L3 (Double Wh	Double	68.75	0	
Index	ID	Measured variable	Unit	Data type	Address	Min. value																							
1	00034	Total active power L1L2L3	W	Float	56.59	-3E+09																							
2	00210	Total active energy import L1L2L3 (Double Wh	Double	60.67	0																								
3	00211	Total active energy export L1L2L3 (Double Wh	Double	68.75	0																								
8.	Save your project.																												

5.2.2 Configuration of Sentron PAC3200 and PAC4200

The SENTRON PAC3200 and PAC4200 is connected via PROFINET IO to the TIA Portal. However, by default they are not part of the basic TIA hardware catalog. They can be installed later via a separate generic station description file (GSDML file).

Note

The GSDML file is only designed for the use of the appropriate communication expansion module with the respective model of the PAC3200/PAC4200.

5 Configuration and Settings

5.2 Creating the hardware configuration manually

GSDML download

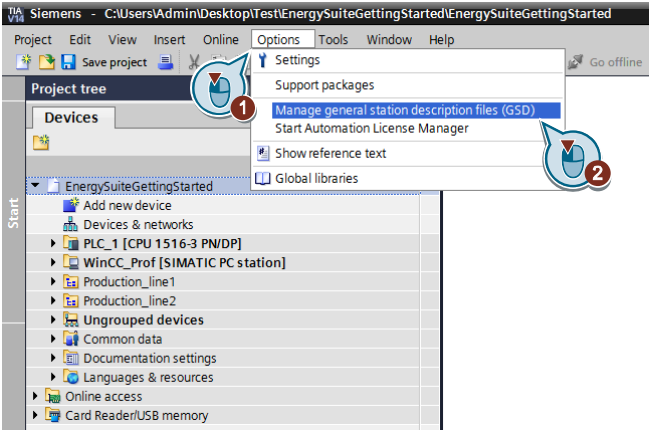
The GSDML file is available for free in the Siemens Industry Online Support at the following link: <https://support.industry.siemens.com/cs/ww/en/view/59840946>

Installing GSDML later

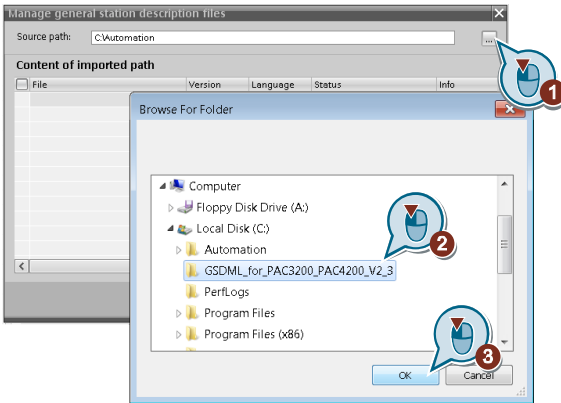
The following table shows how to integrate the GSDML files into the TIA Portal.

Table 5-4

No.	Action
1.	Download the GSDML file from the Siemens Industry Online Support and save the ZIP file locally on your computer.
2.	Unzip the zip file.
3.	Open your project in the TIA Portal.
4.	Open the “Options” menu and select “Manage general station description files (GSD)”.

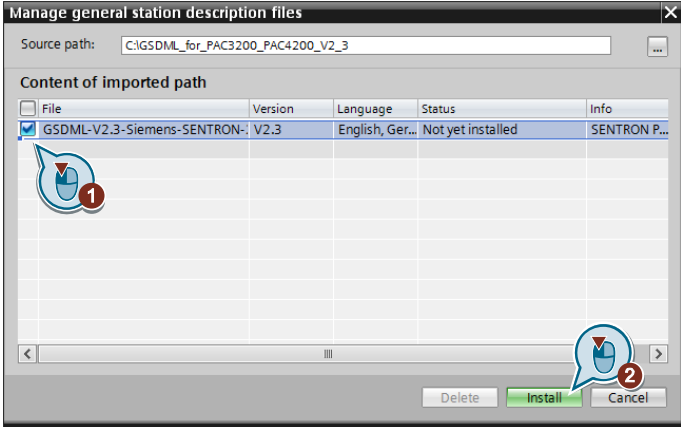
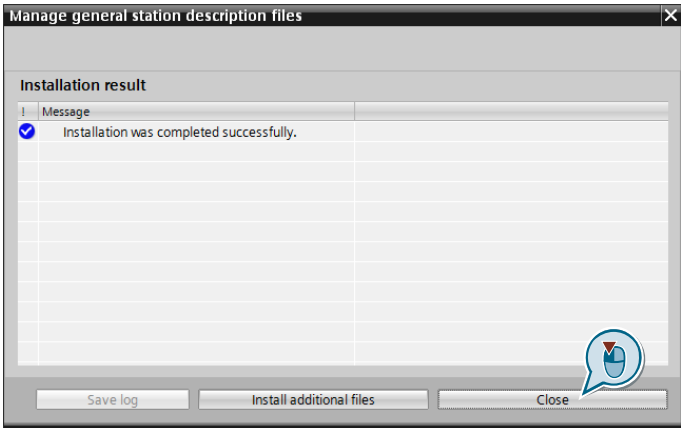
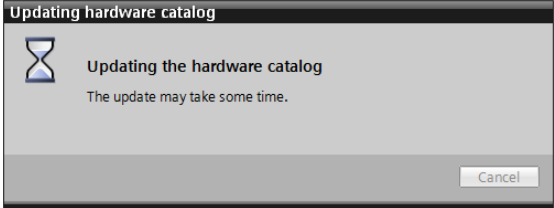


5.	A window for managing the station description files opens up.
6.	<ul style="list-style-type: none">Click on the “ ” button search the file (1).Navigate to the unzipped station description file of the SENTRON PAC and select the folder (2).Open the folder with “OK” (3).



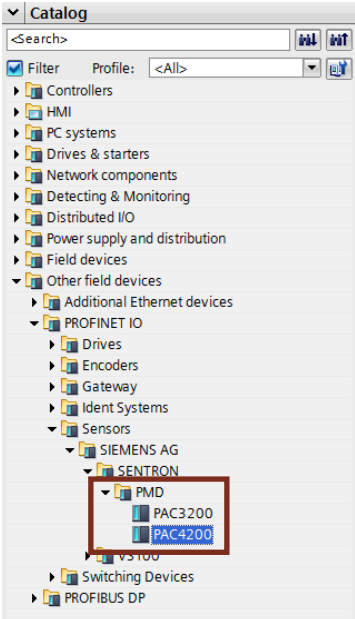
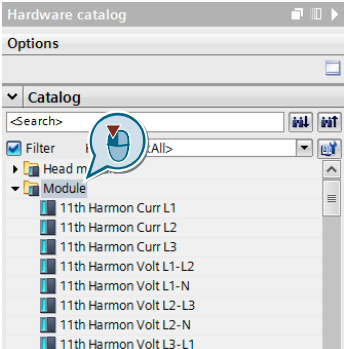
5 Configuration and Settings

5.2 Creating the hardware configuration manually

No.	Action
7.	<p>Enable the check box of the imported GSD file (1) and then click “Install” (2).</p> 
8.	<p>After the successful installation, the installation result will be displayed. Click on “Close” to finish the installation.</p> 
9.	<p>After closing, a window opens up that shows the update of the hardware catalog.</p> 
10.	<p>The SENTRON PAC3200 and PAC4200 is now available in the hardware catalog of the TIA Portal.</p>

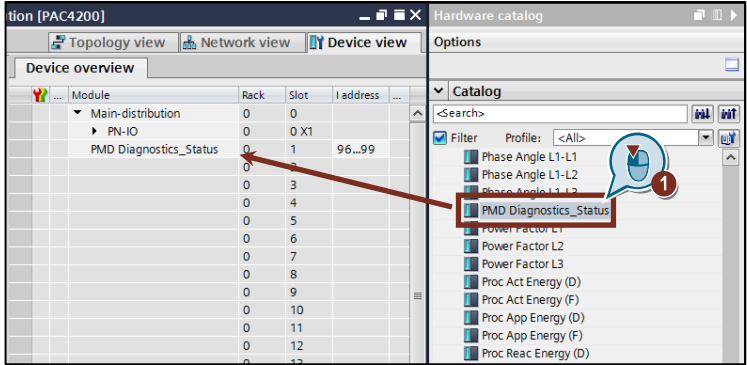
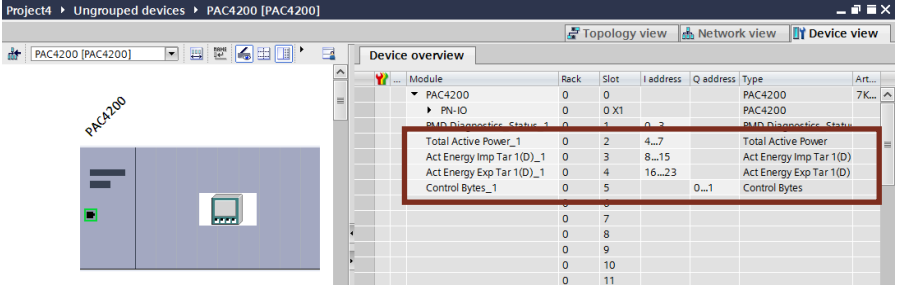
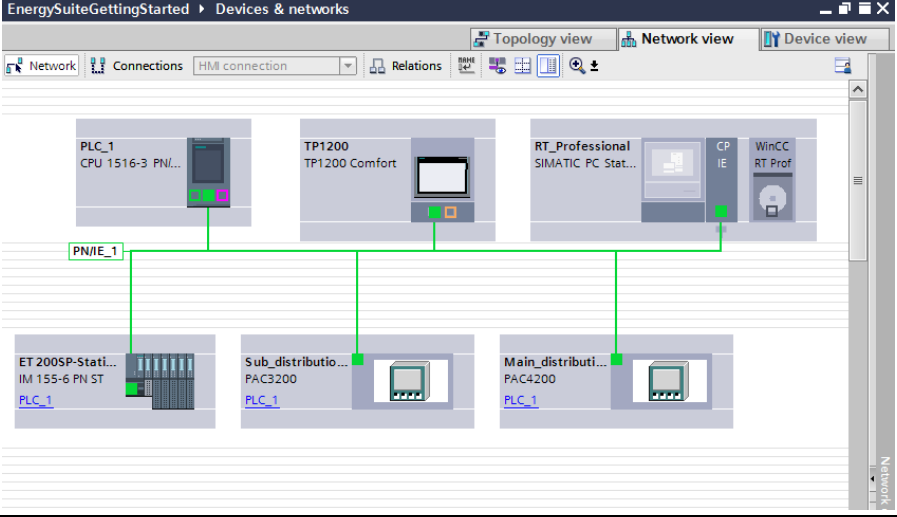
Creating SENTRON PAC4200

Table 5-5

No.	Action
1.	Go to the network view of the TIA Portal.
2.	<ul style="list-style-type: none"> Open the hardware catalog. Navigate in the area navigation via “Other field devices > PROFINET IO > Sensors > Siemens AG > SENTRON > PMD” and select the “PAC4200”. 
3.	Drag the device into the graphic area of the network view using drag-and-drop and assign it to the CPU 1516.
4.	<p>Optional</p> <p>In order to simplify the device assignment, rename the SENTRON PACs. In this example here:</p> <ul style="list-style-type: none"> PAC4200: Main distribution PAC3200: Sub-distribution line1 and sub-distribution line2
5.	Open the device view of the PAC4200.
6.	<p>Open the “Module” folder in the hardware catalog.</p> 

5 Configuration and Settings

5.2 Creating the hardware configuration manually

No.	Action
7.	<ul style="list-style-type: none"> Navigate to the “PMD Diagnostics_Status” module and select it (1). Drag the module to the device overview of the PAC4200 (2). 
8.	<p>Supplement the following modules, as described in step 7. Make sure to observe precisely this order:</p> <ul style="list-style-type: none"> “Total Active Power_1” “Act Energy Imp Tar 1(D)_1” “Act Energy Exp Tar 1(D)_1” “Control Bytes_1”  <p>Note When the modules are set, the measuring data is read cyclically by the PLC via the process image.</p>
9.	Repeat steps 2 to 8 also for the PAC3200.
10.	<p>The configuration of PAC4200 and the PAC3200 is ready.</p> 
11.	Save your project.

5.2.3 Configuration of molded-case circuit breaker and data concentrator

The 3VA2 molded-case circuit breaker is connected to the TIA Portal via PROFINET IO by means of data concentrator. However, by default it is not part of the basic TIA hardware catalog. It can be installed later via a separate GSDML file.

Note

The GSDML file is only designed for the use of the respective communication expansion module with the appropriate COM800 or COM100 data concentrator.

GSDML download

The GSDML file for the 3VA molded-case circuit breaker is available for free in the Siemens Industry Online Support at the following link:

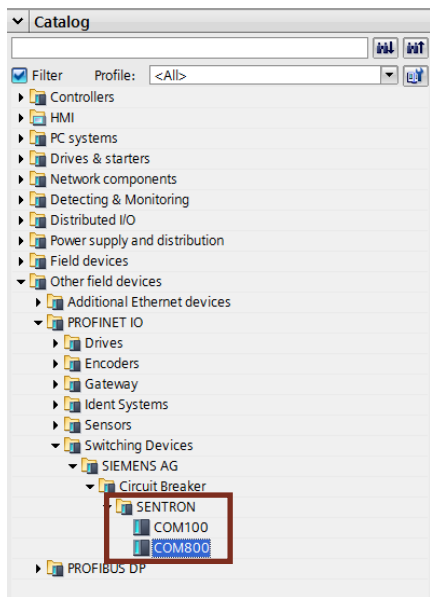
<https://support.industry.siemens.com/cs/ww/en/view/59840946>

Installing GSDML later

Once you have loaded and unzipped the GSDML file on your computer it has to be integrated into the TIA Portal. A detailed description of all required steps can be found in [Chapter 5.2.2](#) in [Table 5-4](#).

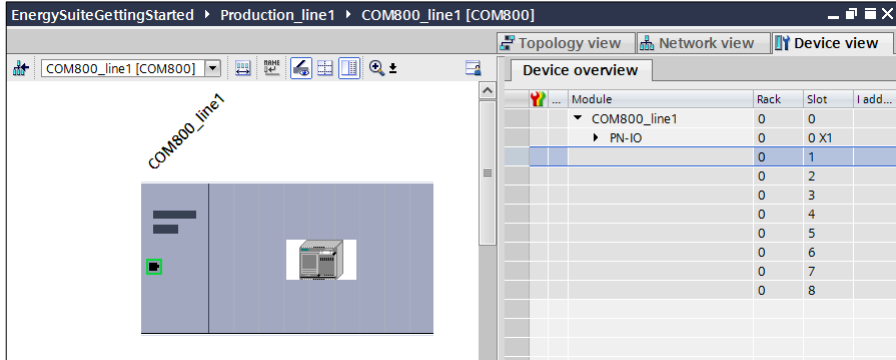
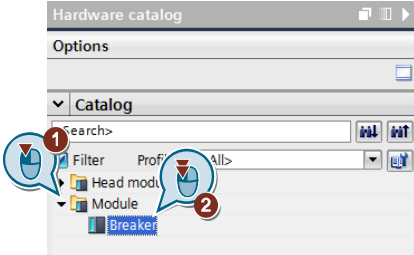
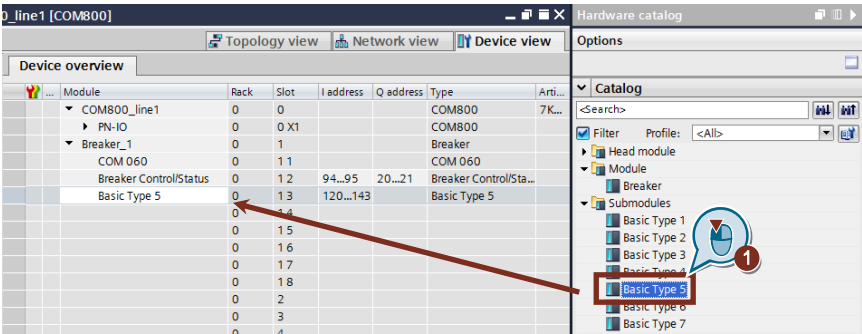
Creating 3VA molded-case circuit-breaker with data concentrator

Table 5-6

No.	Action
1.	Open the network view of the TIA Portal.
2.	<ul style="list-style-type: none"> Open the hardware catalog. Navigate in the area navigation via “Other field devices > PROFINET IO > Switching Devices > Siemens AG > Circuit Breaker > SENTRON” and select the “COM800”  <p>Note</p> <p>With a COM800 you can connect up to eight molded-case circuit breakers whilst you can only connect one molded-case circuit breaker for a COM100.</p>

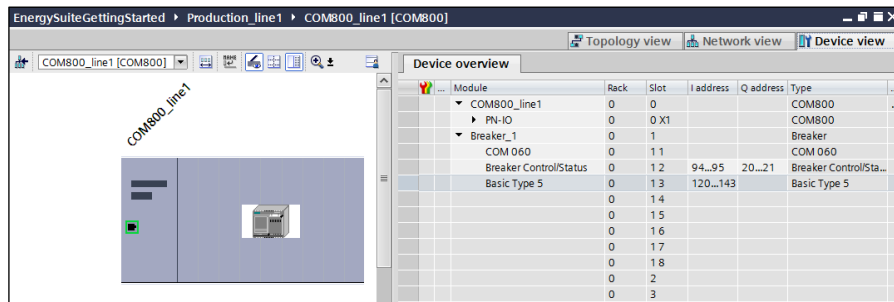
5 Configuration and Settings

5.2 Creating the hardware configuration manually

No.	Action																																																																																																									
3.	Drag the device into the graphic area of the network view using drag-and-drop and assign it to the CPU 1516.																																																																																																									
4.	Optional For reasons of simplifications, rename the data concentrator. Here in the example “COM800_line1” for production line 1.																																																																																																									
5.	Open the “Device view” of the data concentrator. 																																																																																																									
6.	<ul style="list-style-type: none">Open the device view in the hardware catalog and open the “Module” folder in the area navigation (1).Double click the “Breaker” to assign a 3VA molded-case circuit breaker to the data concentrator (2). 																																																																																																									
7.	<ul style="list-style-type: none">Open the “Submodules” folder in the hardware catalog and select the “Basic Type 5” submodule (1).Drag the selected submodule to the device overview using drag-and-drop (2).  <table><thead><tr><th>Module</th><th>Rack</th><th>Slot</th><th>I address</th><th>Q address</th><th>Type</th><th>Art...</th></tr></thead><tbody><tr><td>COM800_line1</td><td>0</td><td>0</td><td></td><td></td><td>COM800</td><td>7K...</td></tr><tr><td>PN-IO</td><td>0</td><td>0 X1</td><td></td><td></td><td>COM800</td><td></td></tr><tr><td>Breaker_1</td><td>0</td><td>1</td><td></td><td></td><td>Breaker</td><td></td></tr><tr><td>COM 060</td><td>0</td><td>1.1</td><td></td><td></td><td>COM 060</td><td></td></tr><tr><td>Breaker Control/Status</td><td>0</td><td>1.2</td><td>94...95</td><td>20...21</td><td>Breaker Control/Sta...</td><td></td></tr><tr><td>Basic Type 5</td><td>0</td><td>1.3</td><td>120...143</td><td></td><td>Basic Type 5</td><td></td></tr><tr><td></td><td>0</td><td>1.4</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>0</td><td>1.5</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>0</td><td>1.6</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>0</td><td>1.7</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>0</td><td>1.8</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>0</td><td>2</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>0</td><td>3</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>0</td><td>4</td><td></td><td></td><td></td><td></td></tr></tbody></table>	Module	Rack	Slot	I address	Q address	Type	Art...	COM800_line1	0	0			COM800	7K...	PN-IO	0	0 X1			COM800		Breaker_1	0	1			Breaker		COM 060	0	1.1			COM 060		Breaker Control/Status	0	1.2	94...95	20...21	Breaker Control/Sta...		Basic Type 5	0	1.3	120...143		Basic Type 5			0	1.4						0	1.5						0	1.6						0	1.7						0	1.8						0	2						0	3						0	4				
Module	Rack	Slot	I address	Q address	Type	Art...																																																																																																				
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5 Configuration and Settings

5.2 Creating the hardware configuration manually

No.	Action																																																																																				
8.	<p>The configuration of the molded-case circuit breaker is ready.</p>  <table><tr><th>Module</th><th>Rack</th><th>Slot</th><th>I address</th><th>Q address</th><th>Type</th></tr><tr><td>COM800_line1</td><td>0</td><td>0</td><td></td><td></td><td>COM800</td></tr><tr><td>PN-IO</td><td>0</td><td>0 X1</td><td></td><td></td><td>COM800</td></tr><tr><td>Breaker_1</td><td>0</td><td>1</td><td></td><td></td><td>Breaker</td></tr><tr><td>COM 060</td><td>0</td><td>1 1</td><td></td><td></td><td>COM 060</td></tr><tr><td>Breaker Control/Status</td><td>0</td><td>1 2</td><td>94...95</td><td>20...21</td><td>Breaker Control/Sta...</td></tr><tr><td>Basic Type 5</td><td>0</td><td>1 3</td><td>120...143</td><td></td><td>Basic Type 5</td></tr><tr><td></td><td>0</td><td>1 4</td><td></td><td></td><td></td></tr><tr><td></td><td>0</td><td>1 5</td><td></td><td></td><td></td></tr><tr><td></td><td>0</td><td>1 6</td><td></td><td></td><td></td></tr><tr><td></td><td>0</td><td>1 7</td><td></td><td></td><td></td></tr><tr><td></td><td>0</td><td>1 8</td><td></td><td></td><td></td></tr><tr><td></td><td>0</td><td>2</td><td></td><td></td><td></td></tr><tr><td></td><td>0</td><td>3</td><td></td><td></td><td></td></tr></table>	Module	Rack	Slot	I address	Q address	Type	COM800_line1	0	0			COM800	PN-IO	0	0 X1			COM800	Breaker_1	0	1			Breaker	COM 060	0	1 1			COM 060	Breaker Control/Status	0	1 2	94...95	20...21	Breaker Control/Sta...	Basic Type 5	0	1 3	120...143		Basic Type 5		0	1 4					0	1 5					0	1 6					0	1 7					0	1 8					0	2					0	3			
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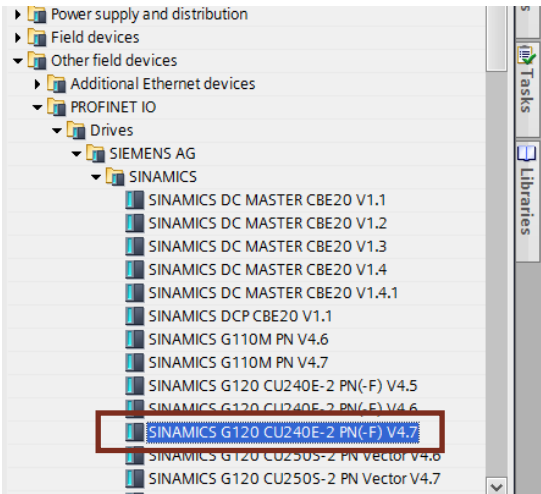
5.2.4 Configuration of SINAMICS AC/AC

The SINAMICS AC/AC frequency converter can be connected via PROFINET IO in the TIA Portal. The GSDML files required for this are already part of the TIA Portal installation.

The table below shows you the required configuration steps to create a SINAMICS in the hardware configuration in such a way that it can be used together with the Energy Suite.

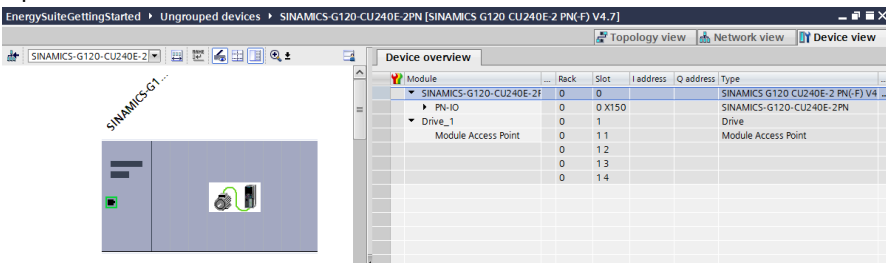
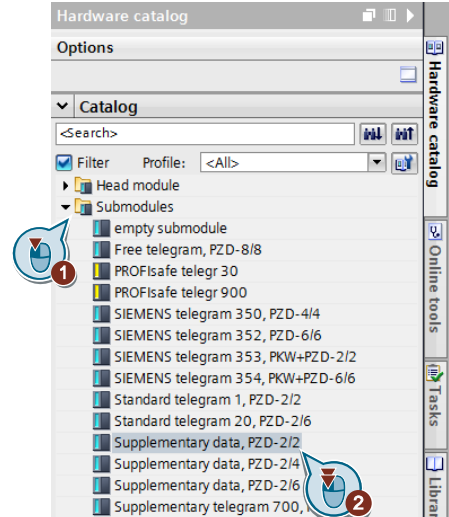
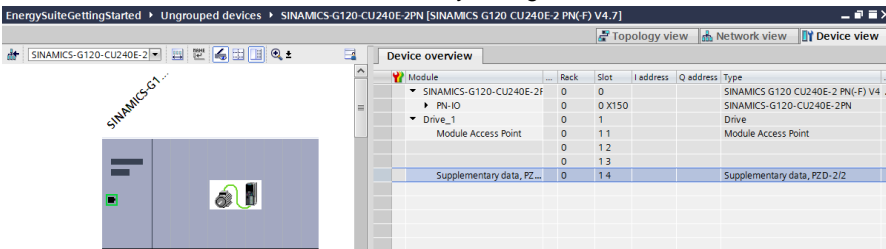
Creating SINAMICS frequency converter

Table 5-7

No.	Action
1.	Open the network view of the TIA Portal.
2.	<ul style="list-style-type: none"> Open the hardware catalog. Navigate in the area navigation via “Other field devices > PROFINET IO > Drives > SIEMENS AG > SINAMICS” and select the SINAMICS used. 
3.	Drag the device into the graphic area of the “Network view” using drag -and-drop and assign it to the CPU 1516.

5 Configuration and Settings

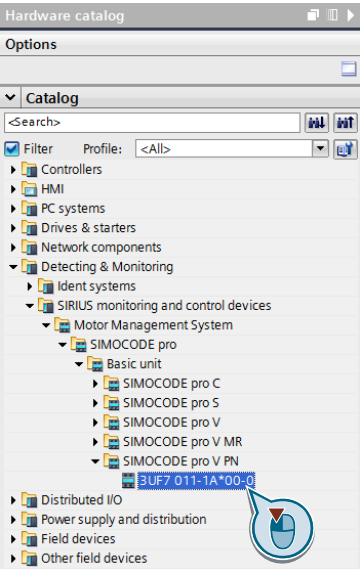
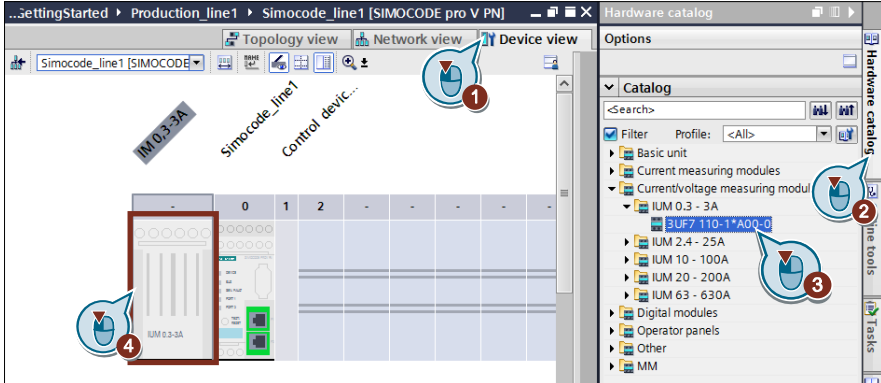
5.2 Creating the hardware configuration manually

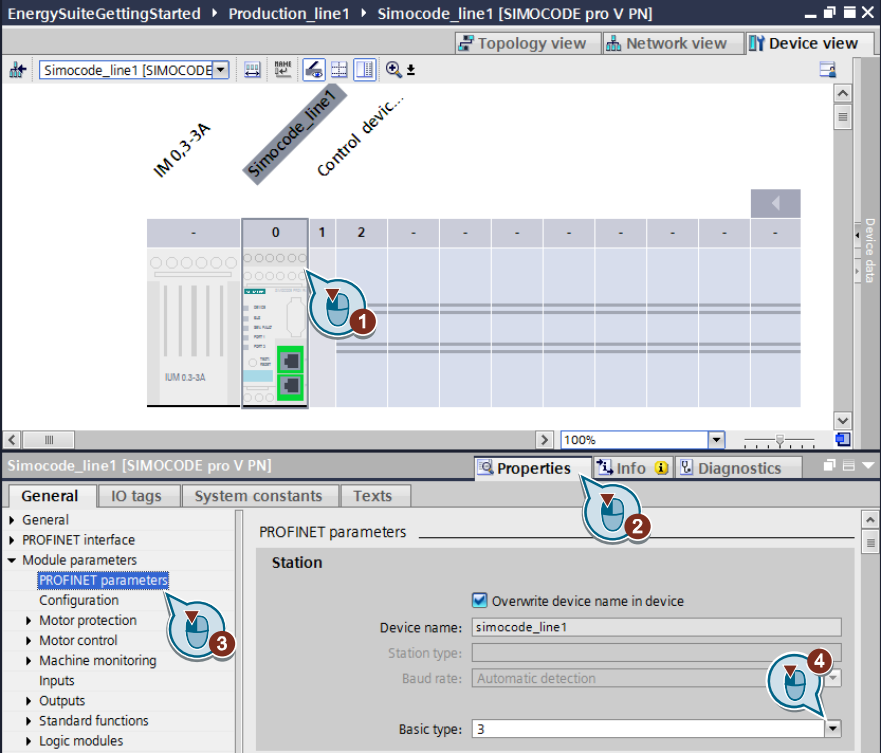
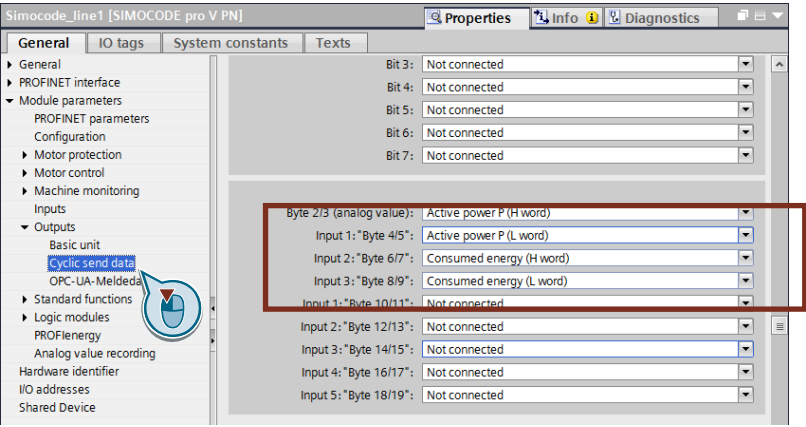
No.	Action
4.	<p>Open the “Device view” of the SINAMICS.</p> 
5.	<ul style="list-style-type: none"> Open the device view in the hardware catalog and open the “Submodules” folder (1) in the area navigation Double-click on “Supplementary data, PZD-2/2” to add them (2). 
6.	<p>The STEP7 side of the SINAMICS is readily configured.</p> 
7.	Save your project.

5.2.5 Configuration of SIMOCODE pro V PN

The table below shows you the required configuration steps to create a SIMOCODE pro V PN in the hardware configuration in such a way that it can be used together with the Energy Suite.

Table 5-8

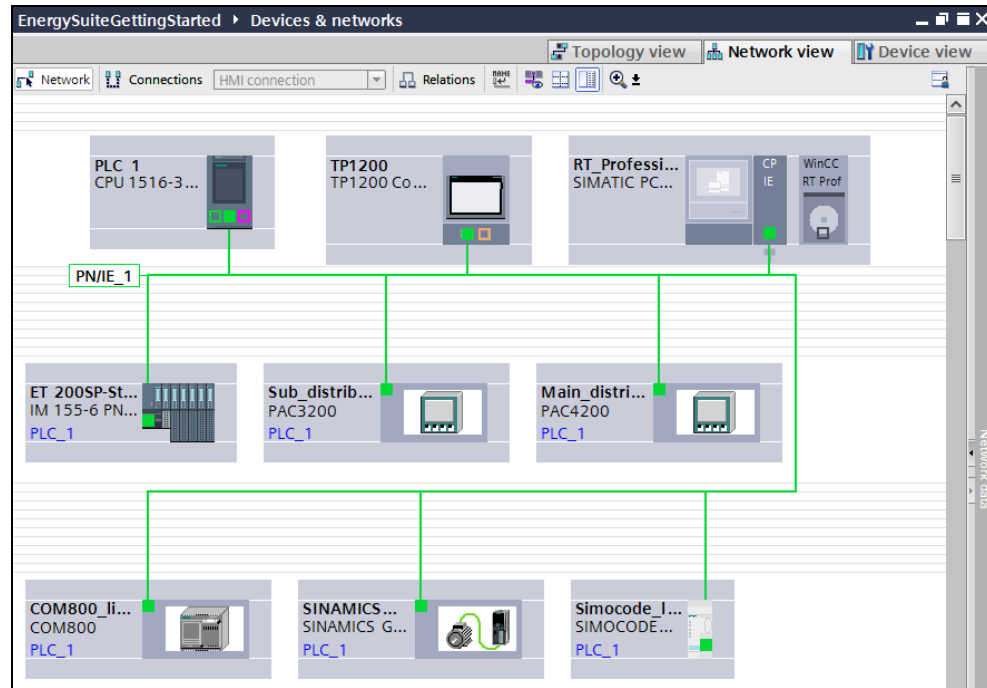
No.	Action
1.	Click on the hardware catalog in the “Network view”.
2.	<p>Open “Detecting & Monitoring” in the area navigation and navigate to the “SIMOCODE pro V PN” folder.</p> 
3.	Drag the device into the graphic area of the “Network view” using drag-and-drop and connect the device with the CPU.
4.	<p>Optional</p> <p>Rename the SIMOCODE so that you have a unique assignment if you have several devices with the same type.</p>
5.	<ul style="list-style-type: none"> Open the “Device view” of the SIMOCODE (1). Open the “Hardware catalog” (2). Navigate in the area navigation to the “Current/voltage measuring modules” used (3). Replace the default current measuring module by the appropriate current/voltage measuring module (4). 

No.	Action
6.	<ul style="list-style-type: none"> • Select the basic device (1). • Open the “Properties” of the basic device (2). • Select the “PROFINET parameters” (3) in the area navigation in “Module parameters”. • Select value 3 (4) for the “Basic type” for the communication via PROFINET IO. 
7.	<p>Select the “Cyclic send data” item in the properties in “Outputs” and configure it precisely in this order:</p> <ul style="list-style-type: none"> • Byte 2/3 (analog value): “Active power P (H word)” • Input 1: “Byte 4/5”: “Active power P (L word)” • Input 2: “Byte 6/7”: “Consumed energy H word” • Input 3: “Byte 8/9”: “Consumed energy (H word)” 
8.	Save your project.

5.2.6 Overview of the hardware configuration

The following figure gives you an overview of the exemplary hardware configuration of a production line from [Chapter 2.1](#).

Figure 5-1



5.3 Creating and editing energy objects

In this chapter you find out how you create energy objects in the Energy Suite and how to configure them in such a way that the data is read from the connected hardware.

Note

An energy object in the Energy Suite corresponds to one measuring point (hardware device or PLC tag).

This means that a total of 11 energy objects are required in the example configuration, as described in chapter 1.1.

- 1 x PAC4200
 - 2 x PAC3200
 - 2 x 3VA molded-case circuit-breaker (COM800)
 - 2 x Energy Meter (ET200 SP)
 - 2 x SIMOCODE pro V PN
 - 2 x SINAMICS G
- } 11 energy objects

5.3.1 Specifying archiving periods

General information

By default, two archiving periods are preconfigured in the Energy Suite

- 15 minute periods (typically for the acquisition of electric variables)
- 60 minute periods (typically for the acquisition of non-electric media)

5.3 Creating and editing energy objects

In addition, you can specify other, user-defined archiving periods.

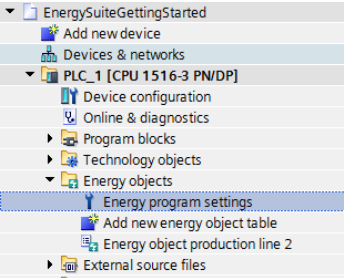
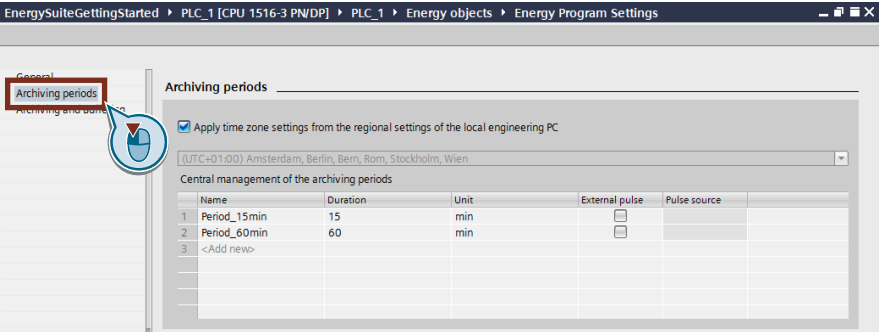
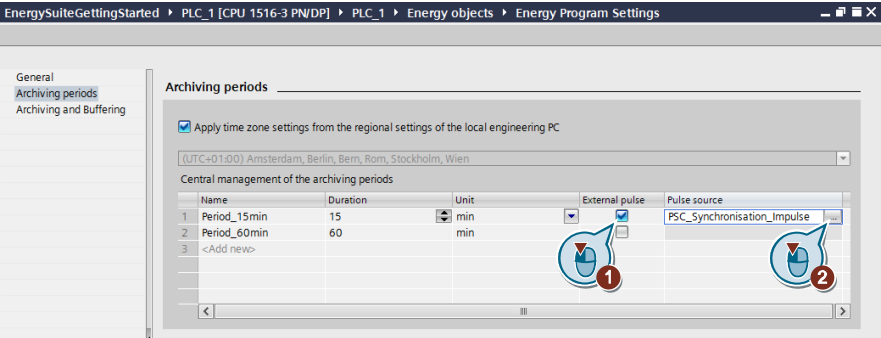
Furthermore, you have the option to define a synchronization pulse for the individual periods. This is mainly useful for electric variables, in order to acquire the energy data at the same interval as the energy suppliers.

Other settings for the archiving of data can be found in chapter [5.5](#).

Synchronization pulse

The table below describes what steps are required for the adjustment of the archiving periods and how you realize a synchronization pulse.

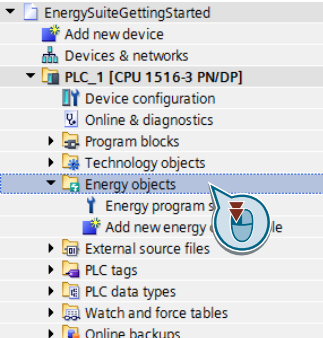
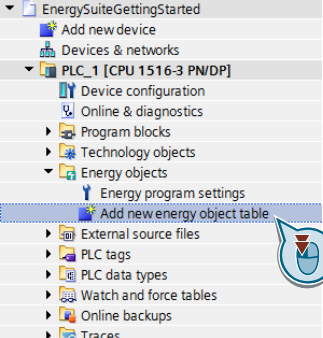
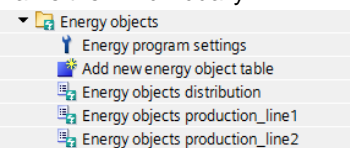
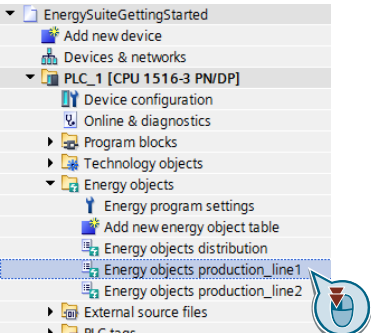
Table 5-9

No.	Action
1.	<p>Open the “Energy program settings” in “Energy objects”.</p> 
2.	<p>Select “Archiving periods” in the area navigation and enable the check box in order to accept the time zone of the engineering PC. The time zone setting is only valid for the synchronization of the archiving periods with the duration of 24h.</p> 
3.	<ul style="list-style-type: none"> • Enable the “External pulse” (1) check box. • Select the “Pulse source” (2). 

5.3.2 Electric variables

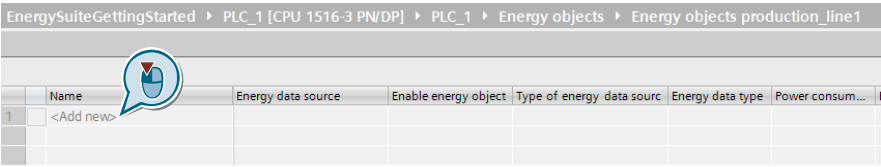
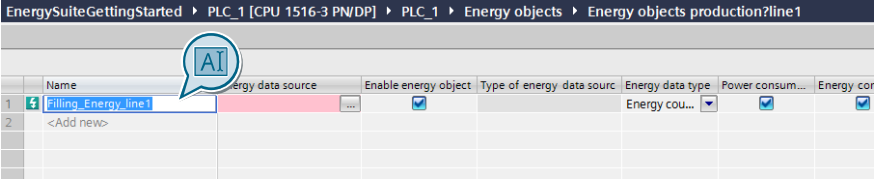
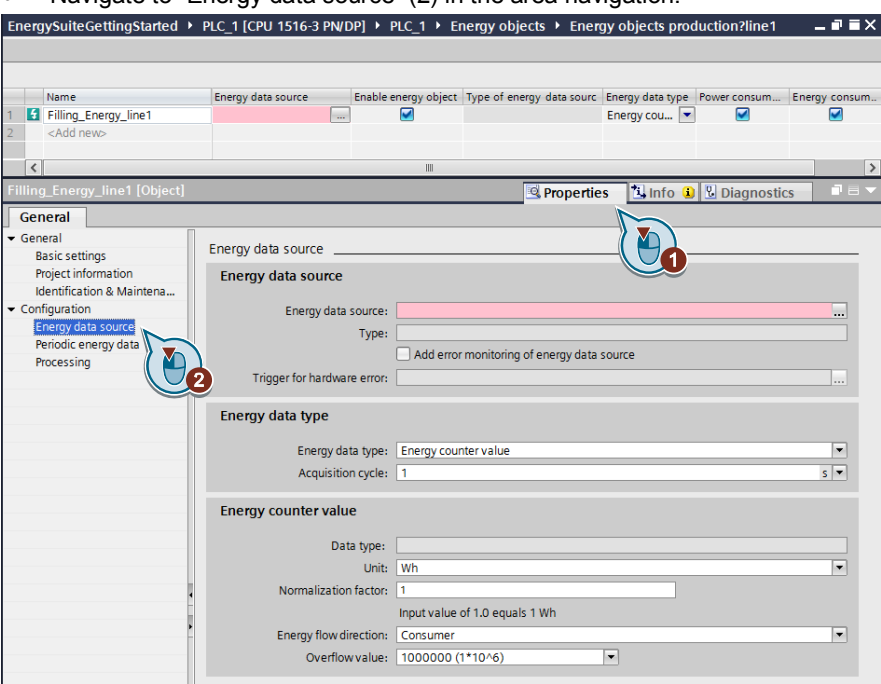
This chapter shows you how to create an energy object using the example of the Energy Meter and how to configure it for the energy program.

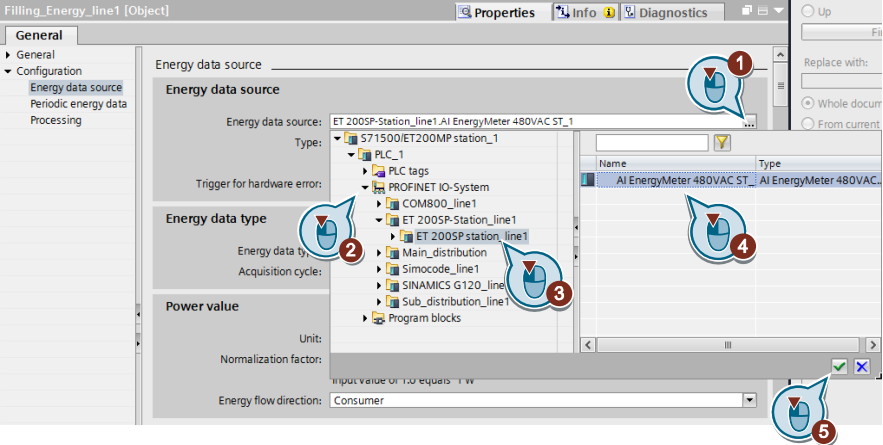
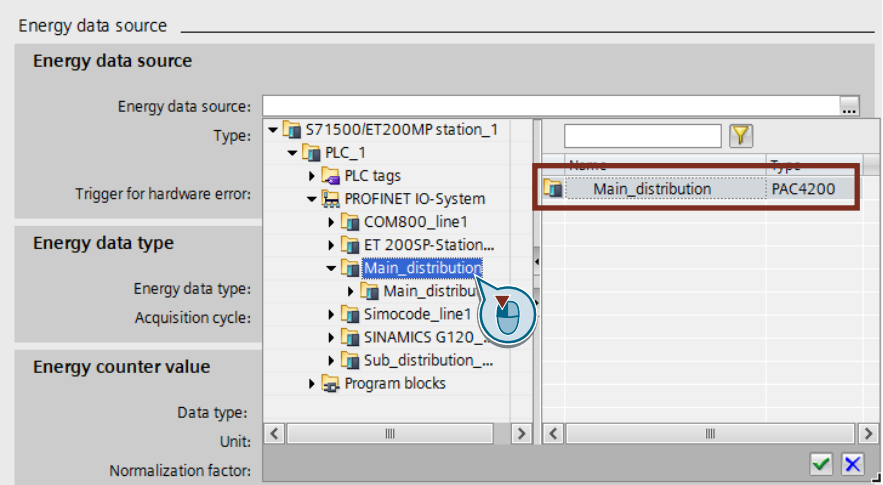
Table 5-10

No.	Action
1.	<p>Open the “Energy objects” folder in the controller.</p> 
2.	<p>Double-click on “Add new energy object table”.</p>  <p>A new energy object table is created.</p>
3.	<p>Optional</p> <p>Depending on project size you can create up to ten energy object tables and name them individually.</p> 
4.	<p>Double-click on the created energy object table to open it.</p> 

5 Configuration and Settings

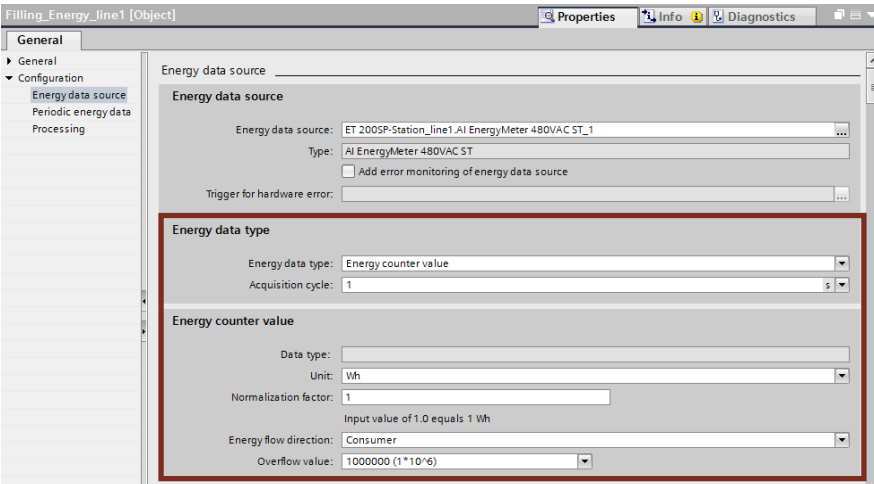
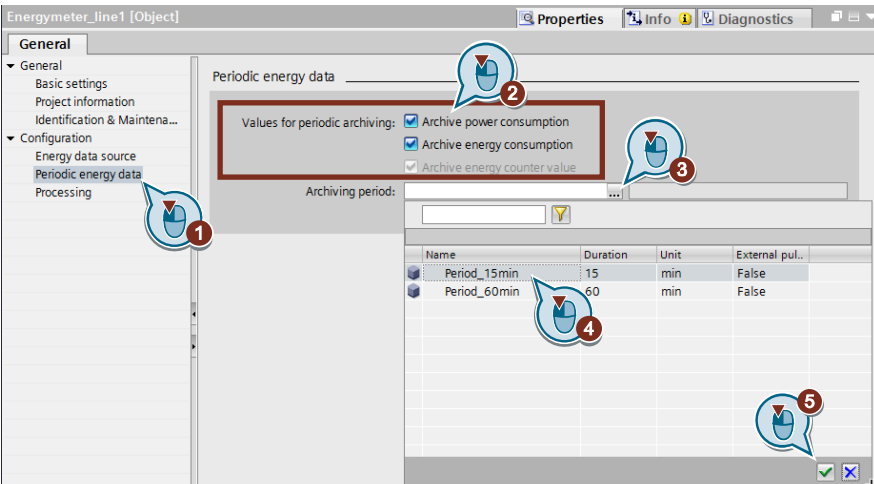
5.3 Creating and editing energy objects

No.	Action																								
5.	<p>Click on "<Add new>" to create a new energy object.</p>  <table><thead><tr><th></th><th>Name</th><th>Energy data source</th><th>Enable energy object</th><th>Type of energy data source</th><th>Energy data type</th><th>Power consum...</th></tr></thead><tbody><tr><td>1</td><td><Add new></td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table>		Name	Energy data source	Enable energy object	Type of energy data source	Energy data type	Power consum...	1	<Add new>															
	Name	Energy data source	Enable energy object	Type of energy data source	Energy data type	Power consum...																			
1	<Add new>																								
6.	<p>Rename the energy object to "Filling_Energy_line1".</p>  <table><thead><tr><th></th><th>Name</th><th>Energy data source</th><th>Enable energy object</th><th>Type of energy data source</th><th>Energy data type</th><th>Power consum...</th><th>Energy cor</th></tr></thead><tbody><tr><td>1</td><td>Filling_Energy_line1</td><td></td><td><input checked="" type="checkbox"/></td><td></td><td>Energy cou...</td><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td>2</td><td><Add new></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table>		Name	Energy data source	Enable energy object	Type of energy data source	Energy data type	Power consum...	Energy cor	1	Filling_Energy_line1		<input checked="" type="checkbox"/>		Energy cou...	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2	<Add new>						
	Name	Energy data source	Enable energy object	Type of energy data source	Energy data type	Power consum...	Energy cor																		
1	Filling_Energy_line1		<input checked="" type="checkbox"/>		Energy cou...	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																		
2	<Add new>																								
7.	<ul style="list-style-type: none">Open the properties of the energy object (1).Navigate to "Energy data source" (2) in the area navigation.  <p>EnergySuiteGettingStarted > PLC_1 [CPU 1516-3 PN/DP] > PLC_1 > Energy objects > Energy objects production?line1</p> <table><thead><tr><th></th><th>Name</th><th>Energy data source</th><th>Enable energy object</th><th>Type of energy data source</th><th>Energy data type</th><th>Power consum...</th><th>Energy consum...</th></tr></thead><tbody><tr><td>1</td><td>Filling_Energy_line1</td><td></td><td><input checked="" type="checkbox"/></td><td></td><td>Energy cou...</td><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td>2</td><td><Add new></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table> <p>Filling_Energy_line1 [Object]</p> <p>Properties Info Diagnostics</p> <p>General</p> <ul style="list-style-type: none">General<ul style="list-style-type: none">Basic settingsProject informationIdentification & Maintena...Configuration<ul style="list-style-type: none">Energy data sourcePeriodic energy dataProcessing <p>Energy data source</p> <p>Energy data source: <input type="text"/></p> <p>Type: <input type="text"/></p> <p><input type="checkbox"/> Add error monitoring of energy data source</p> <p>Trigger for hardware error: <input type="text"/></p> <p>Energy data type</p> <p>Energy data type: <input type="text" value="Energy counter value"/></p> <p>Acquisition cycle: <input type="text" value="1"/></p> <p>Energy counter value</p> <p>Data type: <input type="text"/></p> <p>Unit: <input type="text" value="Wh"/></p> <p>Normalization factor: <input type="text" value="1"/></p> <p>Input value of 1.0 equals 1 Wh</p> <p>Energy flow direction: <input type="text" value="Consumer"/></p> <p>Overflow value: <input type="text" value="1000000 (1*10^6)"/></p>		Name	Energy data source	Enable energy object	Type of energy data source	Energy data type	Power consum...	Energy consum...	1	Filling_Energy_line1		<input checked="" type="checkbox"/>		Energy cou...	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2	<Add new>						
	Name	Energy data source	Enable energy object	Type of energy data source	Energy data type	Power consum...	Energy consum...																		
1	Filling_Energy_line1		<input checked="" type="checkbox"/>		Energy cou...	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																		
2	<Add new>																								

No.	Action
8.	<div><ul style="list-style-type: none">• Open the selection for the “Energy data source” (1).• Open the “PROFINET IO-System” folder of the assigned CPU (2).• Select the “ET 200SP_line1” IO device and select the subordinate component (3).• Select the supporting measuring hardware in the selection window (4).• Confirm your selection with the green tick (5).</div> <div></div> <div><p>Note</p><p>From a topological view, there is no subordinate component for the selection of a SENTRON PAC as energy data source. In this case, the selection of the measuring hardware is done by selecting the main folder of the IO device.</p></div> <div></div>

5 Configuration and Settings

5.3 Creating and editing energy objects

No.	Action															
9.	<p>Adjust the other settings to the “Energy data source”. Please observe the overflow value of the energy counter of the respective measuring hardware.</p>  <p>Note For more information, please refer to the Online Help in chapter “Readme SIMATIC Energy Suite”.</p>															
10.	<ul style="list-style-type: none">• Open the “Values for periodic archiving” (1).• Select the values that are to be archived periodically (2).• Open the selection for the “Archiving period” (3).• Select the “Period_15min” archiving period (4).• Confirm the selection (5).  <p>Note The counted energy value can only be selected for the energy data type with the same name as for archiving the energy values.</p>															
11.	<p>Save the project and repeat the entries for all other electric measuring devices.</p> <table><tr><th></th><th>Name</th><th>Energy data source</th></tr><tr><td>1</td><td>Bootling_Energy_line1</td><td>COM800_line1.Breaker_1</td></tr><tr><td>2</td><td>Conveyor_Power_line1</td><td>Simocode_line1.IUM 0.3-3A</td></tr><tr><td>3</td><td>Filling_Energy_line1</td><td>ET 200SP-Station_line1.AI EnergyMeter 480VAC ST_1</td></tr><tr><td>4</td><td>Packaging_Energy_line1</td><td>SINAMICS G120_line1.Drive_1</td></tr></table>		Name	Energy data source	1	Bootling_Energy_line1	COM800_line1.Breaker_1	2	Conveyor_Power_line1	Simocode_line1.IUM 0.3-3A	3	Filling_Energy_line1	ET 200SP-Station_line1.AI EnergyMeter 480VAC ST_1	4	Packaging_Energy_line1	SINAMICS G120_line1.Drive_1
	Name	Energy data source														
1	Bootling_Energy_line1	COM800_line1.Breaker_1														
2	Conveyor_Power_line1	Simocode_line1.IUM 0.3-3A														
3	Filling_Energy_line1	ET 200SP-Station_line1.AI EnergyMeter 480VAC ST_1														
4	Packaging_Energy_line1	SINAMICS G120_line1.Drive_1														

5.3.3 Non-electric variables

General information

For the acquisition of non-electric energy data, all tags available in the PLC can be used.

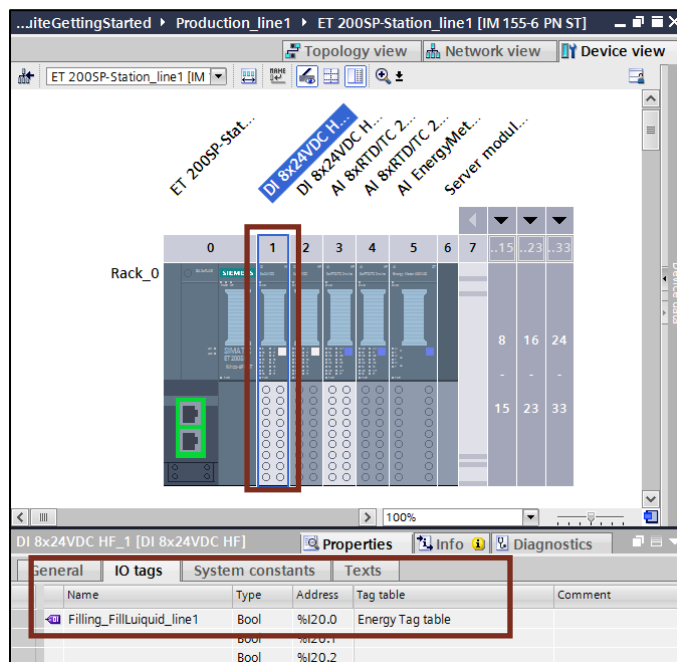
Note

In the Energy Suite you can create a tag and also an element of any data block as energy data source.

Example

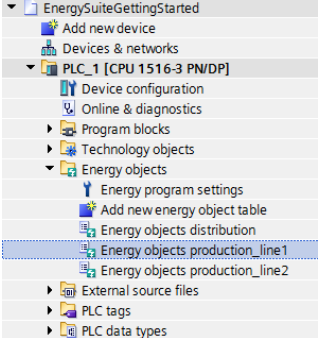
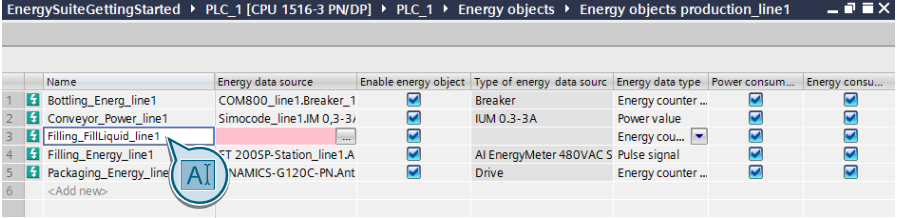
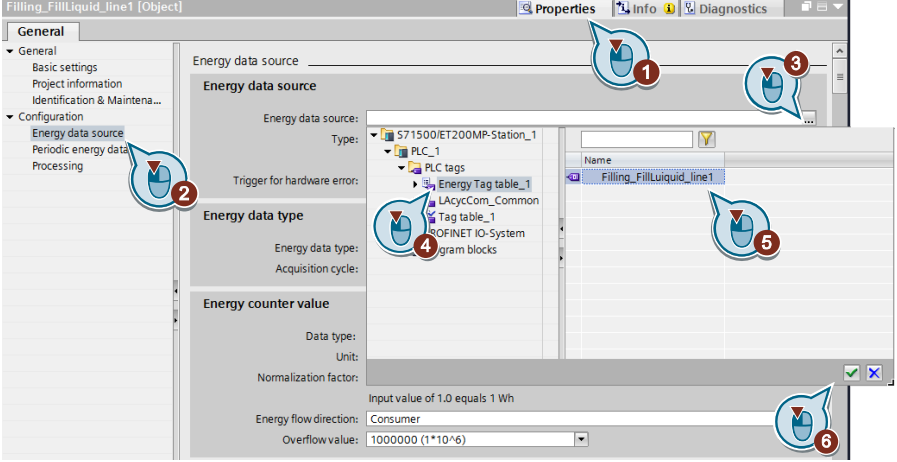
In this example the amount of the liquid that is filled in the filling station of the production line is acquired via the AI module of the ET200 SP and written to the "Filling_FillLiquid_line1" tag. For example, a flow rate measuring device is possible here as measuring device. A third-party connection would also be possible here.

Figure 5-2



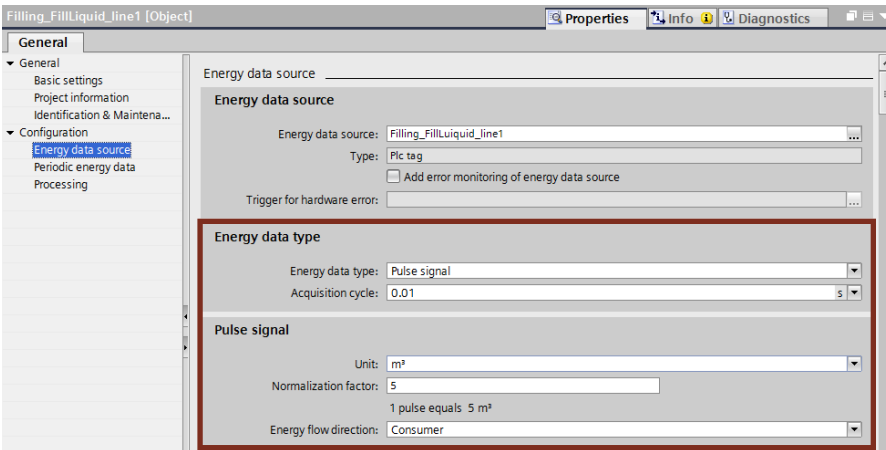
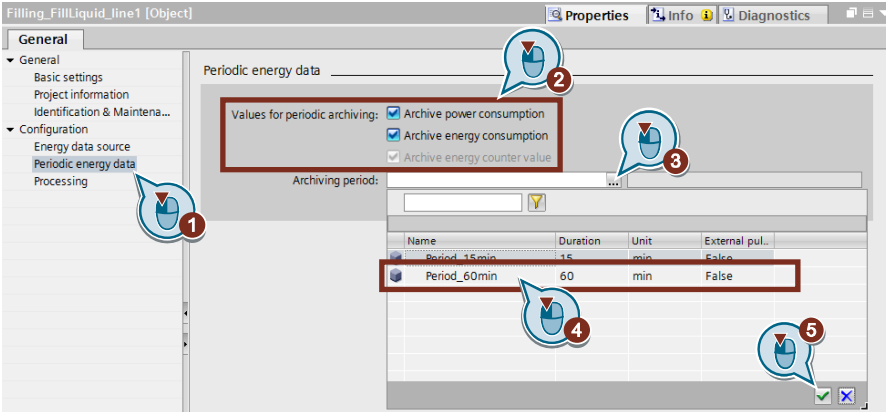
Procedure

Table 5-11

No.	Action
1.	<p>Open the energy object table of production line 1.</p> 
2.	<p>Click on "<Add new>" to create a new energy object and rename it.</p> 
3.	<ul style="list-style-type: none"> Open the "Properties" of the energy object (1). Select the "Energy data source" (2). Open the selection window of the energy data source (3) Click on "Energy Tag table" (4). Select "Filling_FillLiquid_line1" (5). Confirm your entries (6). 

5 Configuration and Settings

5.3 Creating and editing energy objects

No.	Action
4.	<p>Edit the other properties as follows:</p> <ul style="list-style-type: none"> • “Energy data sources”: “Input signal” (digital input signal) • “Unit”: “m³” (unit for filler) • “Normalization factor”: “5” (depending on measuring device, meaning 5 m³/pulse)  <p>Note</p> <p>By default, the acquisition cycle is indicated as 0.01s (10ms), since the cycle time of a S0 pulse is at least 0.03s (30ms) and it has to be scanned with double frequency.</p>
5.	<ul style="list-style-type: none"> • Open the “Values of periodic archiving” (1). • Select the values that are to be archived periodically (2). • Open the selection for the “Archiving period” (3). • Select the “Period_60min” archiving period (4). • Confirm the selection (5). 
6.	Save your project.

5.4 Program code generation

5.4.1 First generation

Note

Observe the correct runtime licensing of the energy objects in the Energy Suite before you generate the energy program. A detailed description can be found in the “SIMATIC Energy Suite V14.0” function manual in chapter “Runtime Licenses for Energy Suite”:

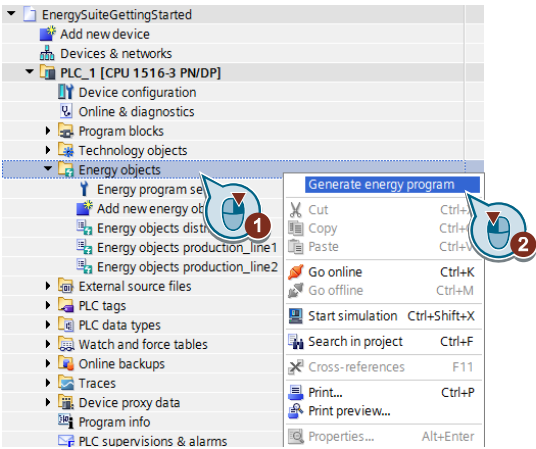
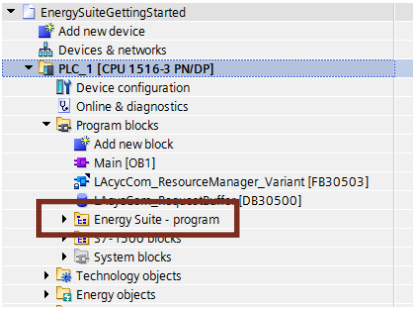
<https://support.industry.siemens.com/cs/ww/en/view/109741977/89885263499>

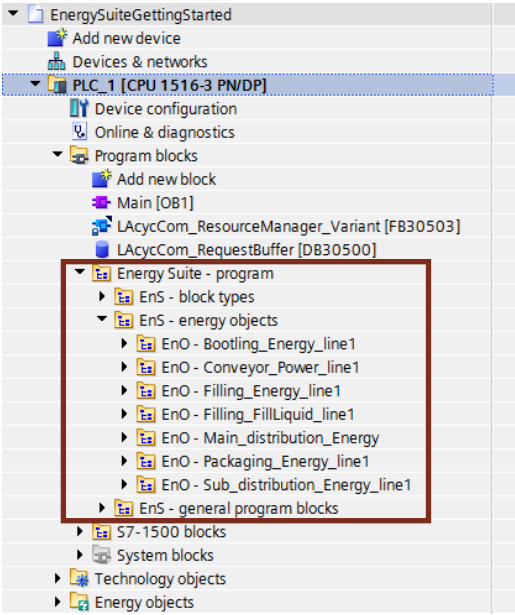
Missing or insufficient runtime licenses lead to cancellation of the program generation. Disabled energy objects are not considered in the Runtime licenses.

Once all energy measuring points have been created and configured, the energy program will be generated. In the process, all program blocks and interfaces required will be automatically generated by the program.

The following table shows which configuration steps are necessary for to achieve this.

Table 5-12

No.	Action
1.	<ul style="list-style-type: none"> Right-click on “Energy objects” (1). Select “Generate energy program” (2) from the context menu. 
2.	<p>A new “Energy Suite – program” folder is created automatically in “Program blocks”.</p> 

No.	Action
3.	<p>Three other subfolders are created in the “Energy Suite – program”:</p> <ul style="list-style-type: none"> • EnS – block types includes all function blocks from the Energy Suite library • EnS – energy objects includes a subfolder for each energy object, amongst others, the instance data blocks for the periodic energy values of the energy objects • EnS – general program blocks includes the program structure that is required for the operation of the energy program (organization and data blocks as well as FC functions)  <p>Notes</p> <p>An extensive description of individual subfolders and blocks can be found in the Online help in “Processing energy data > Generate energy program > Structure of the energy program”.</p>

NOTICE

Do not make any manual changes (for example, change block names) on the automatically generated blocks of the energy program. This causes inconsistencies.

5.4.2 Repeated generation of the energy program

If you want to change or expand an existing energy program, you have to adjust your energy objects or add new ones. Afterwards a new generation of the energy program is required, as described in [Chapter 5.4.1](#).

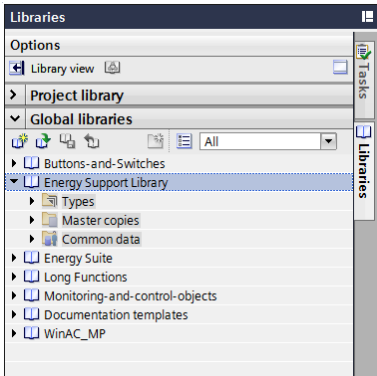
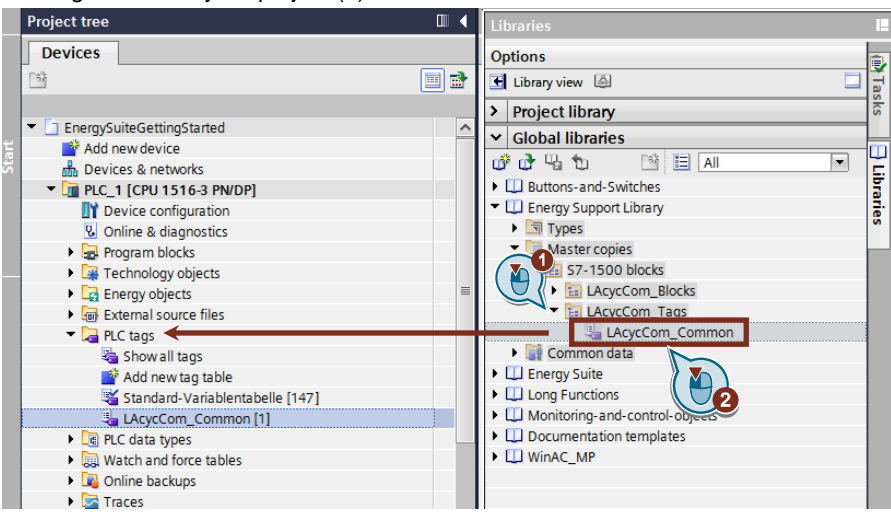
Note

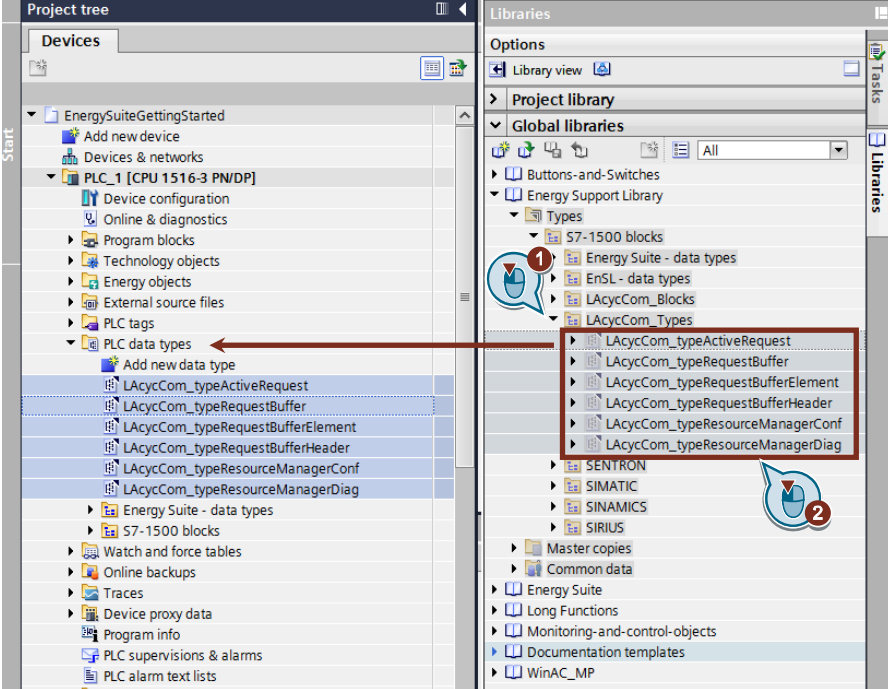
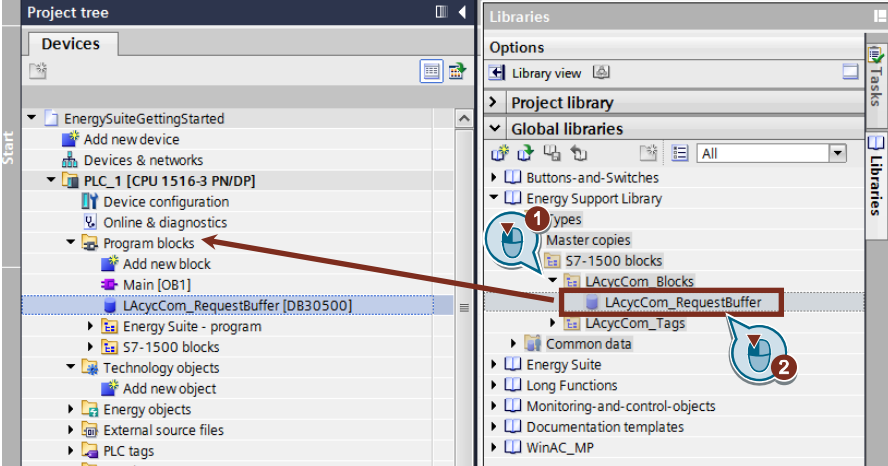
If the energy program is generated again, all blocks and folders of the already generated energy program are deleted and they are re-referenced or instantiated in the background.

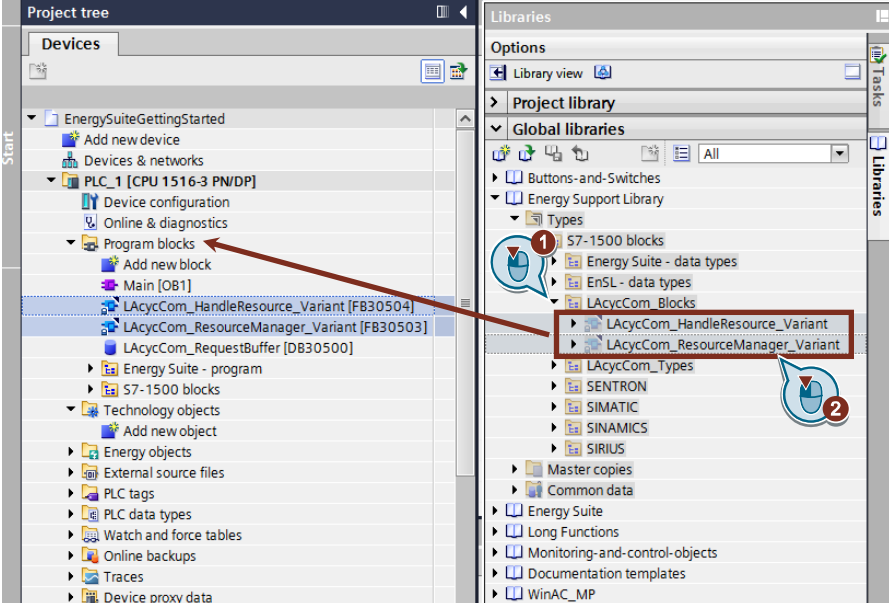
5.4.3 Adjusting 3VA molded-case circuit breaker before project download

Before compiling the project and loading it to the CPU, adjustments for the 3VA molded-case circuit breaker are required.

Table 5-13

No.	Action
1.	<p>Open the "Energy Support Library" in the "Global libraries".</p> 
2.	<p>Inserting tag table</p> <ul style="list-style-type: none"> Open "Master copies > S7-1500 blocks > LAcycCom_Tags" (1). Drag the "LAcycCom_Common" tag table using drag-and-drop to the "PLC tags" folder of your project (2). 

No.	Action
3.	<p>Inserting data types</p> <ul style="list-style-type: none"> Open “Types > S7-1500 blocks > LAcycCom_Types” (1). Select the six data types and drag them using drag-and-drop to “PLC data types” of your project (2). 
4.	<p>Inserting data block</p> <ul style="list-style-type: none"> Open “Master copies > S7-1500 blocks > LAcycCom_Blocks” (1). Drag the “LAcycCom_RequestBuffer” data block to the “Program blocks” of your project, using drag-and-drop (2). 

No.	Action
5.	<p>Inserting function blocks</p> <ul style="list-style-type: none"> Open “Types > S7-1500 blocks > LAcycCom_Types” (1). Drag the two function blocks using drag-and-drop to the program blocks of your project (2). 
6.	Save your project and load it into the S7-1500 controller.

5.5 Archiving the energy data

Before you generate the energy program, you can select the type of archiving. In order to have a reference period of the archived data, a synchronization of the module time is required first.

5.5.1 Synchronizing the time

Note

For the time to be right, the controller has to regularly check the time and, if required, adjust it. Alternatively, the time can also be synchronized via an NTP server. More information on time synchronization via NTP server can be found in the WinCC Professional V14 manual in:

<https://support.industry.siemens.com/cs/ww/en/view/109742302/92619728651>

Before you carry out the clock synchronization, make sure that your PG/PC is set to the current time of the respective country.

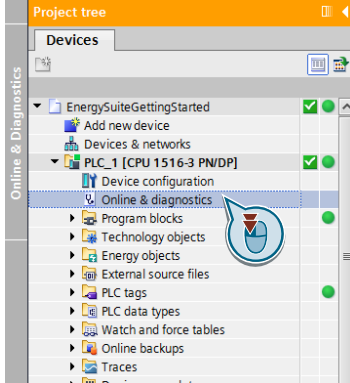
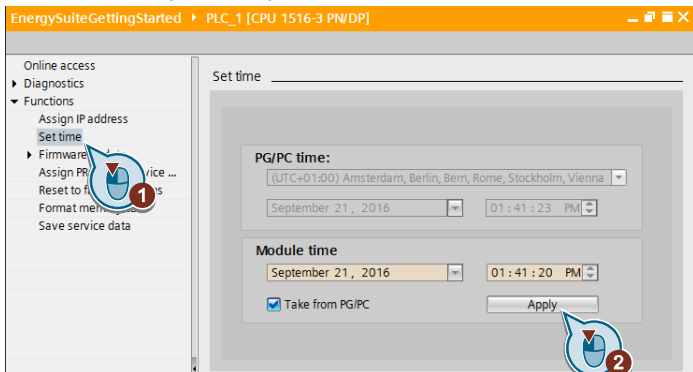
Below, setting the time is described.

To be able to display and archive the energy values meaningfully, a time synchronization of the CPU is required at the beginning. This is how you guarantee that all energy data is provided with the correct stamp that can also be compared with the time stamps of the energy supplier.

5 Configuration and Settings

5.5 Archiving the energy data

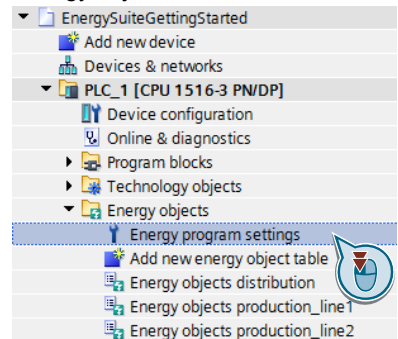
Table 5-14

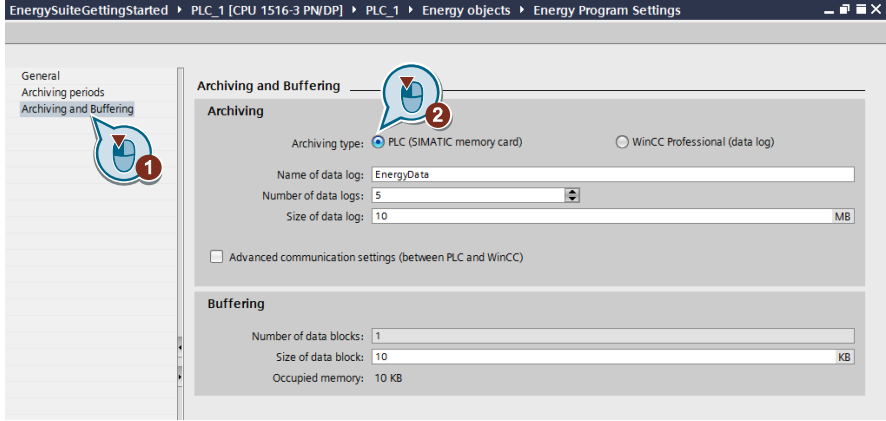
No.	Action
1.	Open the CPU and “Go online” with it.
2.	<p>Double-click on "Online & diagnostics".</p> 
3.	<ul style="list-style-type: none"> Open the “Set time” (1) in functions. Click “Apply” to apply the time of the PG/PC for the module (2). 

5.5.2 Archiving via SIMATIC memory card

The following table shows you how to set the SIMATIC memory card as archiving type.

Table 5-15

No.	Action
1.	<p>Open the “Energy program settings” of the CPU in the project navigation in “Energy objects”.</p> 

No.	Action
2.	<ul style="list-style-type: none"> Click on “Archiving and Buffering” (1). Select “PLC (SIMATIC memory card)” as archiving type (2).  <p>Note Number of data logs: The number of buffer DBs corresponds to the number of energy object tables. For newly created projects, the SIMATIC memory card is preassigned as archiving type by default.</p>

Note

The size of the data log can be calculated according to the following formula:
 Data log (size) = 45 byte + (number of data records x 190 byte)

A detailed description can be found in the “SIMATIC Energy Suite V14.0”
 function manual in chapter “Archiving and Buffering (S7-CPU)”

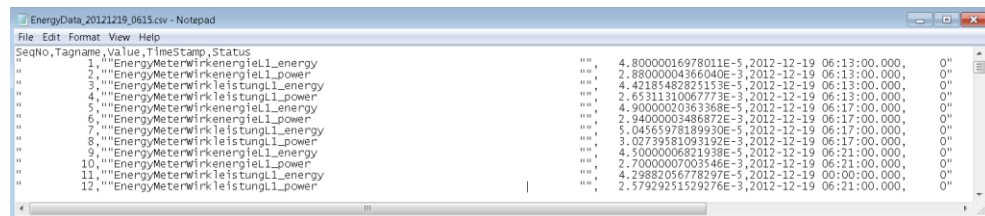
<https://support.industry.siemens.com/cs/ww/en/view/109741977/91806004619>

CSV contents

When archiving the energy data on the SIMATIC memory card, the data is saved in text format as CSV file. The following parameters are recorded:

- Sequence number (“SeqNo”)
- Tag name (“Tagname”)
- Energy value (“Value”)
- Timestamp (“Timestamp”)
- Status

Figure 5-3

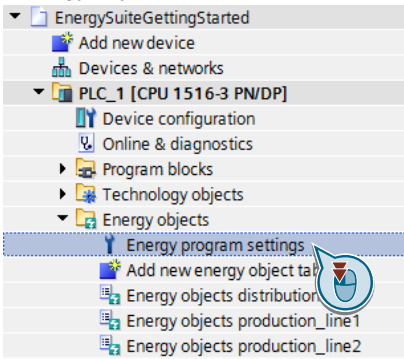
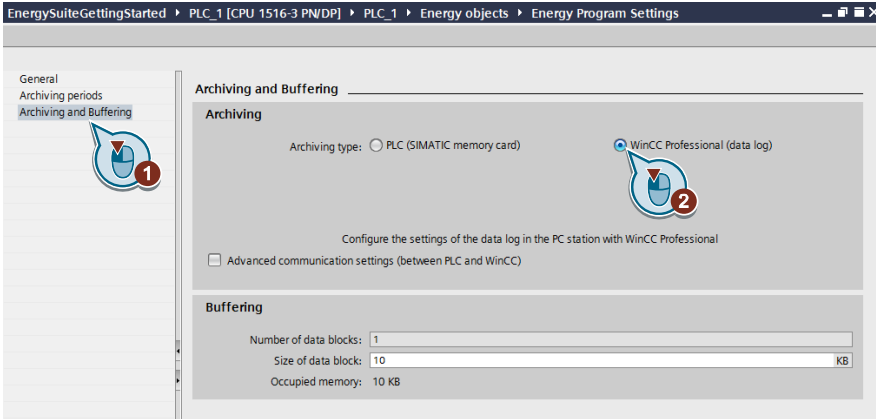
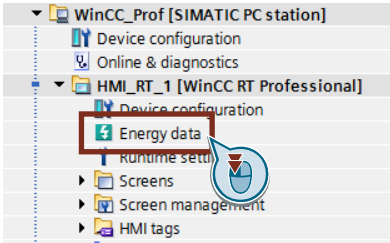


This raw data can then be processed further with various programs, for example Microsoft Excel.

5.5.3 Archiving in WinCC Professional

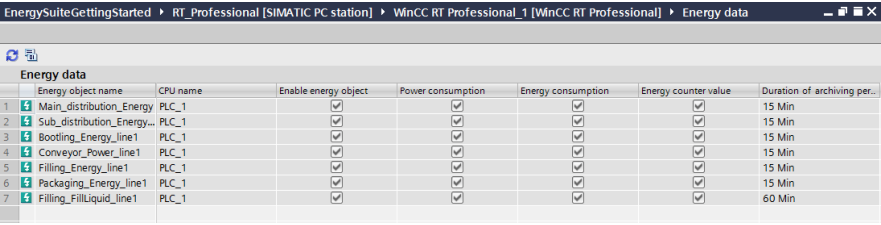
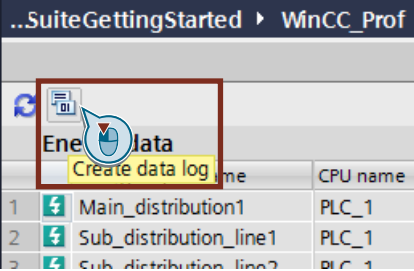
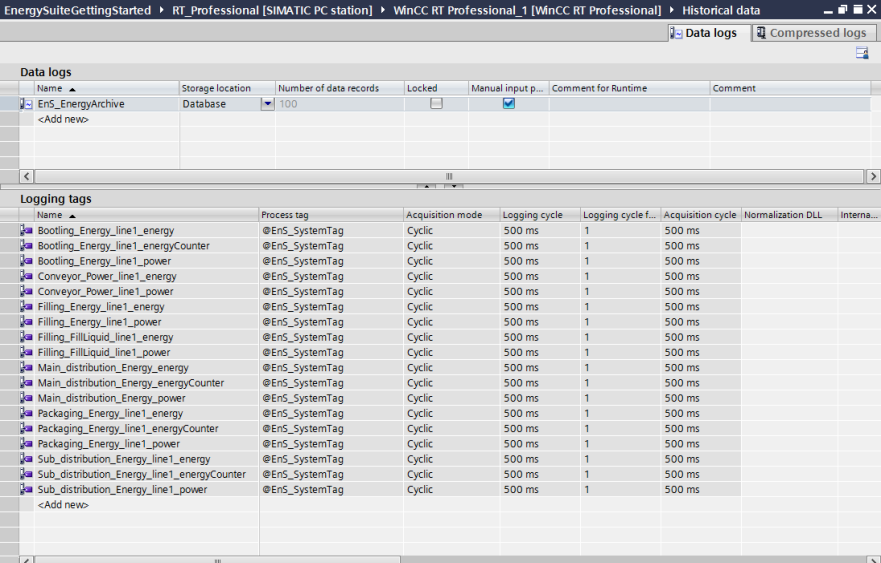
The following table shows which configuration steps are necessary to archive with WinCC Professional.

Table 5-16

No.	Action
1.	<p>Open the “Energy program settings” of the CPU in the project navigation in “Energy objects”.</p> 
2.	<ul style="list-style-type: none"> Click on “Archiving and Buffering”. Select “WinCC Professional (data log)” as archiving type.  <p>Optionally, you can adjust the expanded communication settings and the settings for buffering.</p>
3.	<p>After successful generation of the energy program, select the “Energy data” in the project navigation in the PC station by double-clicking it.</p> 

5 Configuration and Settings

5.5 Archiving the energy data

No.	Action
4.	<p>An overview of the energy data opens up in which all measuring points are listed that have been created in the energy program of the PLC when there is a HMI connection between S7-1500 and PC station.</p> 
5.	<p>Click on "Create data log" icon in order to store the data in an archive.</p>  <p>Note If the energy program is not up-to-date, no tag archive will be created. In this case, you will see a message in the status line.</p>
6.	<p>An archive in WinCC Professional is created automatically. Depending on the selection of periodic energy data in the energy program, up to three tag archives ("..._energy", "..._energyCounter", "..._power") are generated per energy object.</p> 
7.	<p>Save the project. The settings in WinCC Professional are thus completed.</p>

5.6 HMI visualization of the energy data

Apart from determining and archiving the energy data, the HMI visualization of the energy data is another central point. Siemens Industry Online Support provides you with a library as well as a visualization example with templates and image elements for free download.

Additionally, a documentation is stored that describes the connection of the visualization in a detailed step-by-step instruction.

The visualization example generally has the following functionalities:

- WinCC Basic, Comfort and Advanced
Visualization of online data as well as the course of energy data in the last archiving period, for example, 15 min.
- WinCC Professional
Visualization of online data well as archive data from the WinCC tag archive

More information, as well as the library and the example project can be found in the application example "SIMATIC Energy Suite – Visualization Example:

<https://support.industry.siemens.com/cs/ww/en/view/109739775>

5.7 Exporting of data

In this chapter, you find out what options you have to export the archived energy data from the SIMATIC memory card or the WinCC Professional tag archive.

5.7.1 SIMATIC memory card

You can export the data of the SIMATIC memory card via the web server of the S7-1500 CPU.

You can find out what steps are necessary for setting up the web server in the manual of the SIMATIC S7-1500 web server in chapter [Properties of the web server](#) and [Configuring web server](#).

Figure 5-4

Name	Size	Changed	Retrieve and clear
EnergyData_1_20160926_0945.csv	439	10:45:04 am 09/25/2016	[Icon]
EnergyData_1_20160926_0947.csv	12517	11:07:02 am 09/25/2016	[Icon]
EnergyData_1_20160926_1412.csv	1092602	06:33:04 am 09/26/2016	[Icon]
EnergyData_2_20160926_1436.csv	1092602	09:21:14 pm 09/25/2016	[Icon]
EnergyData_3_20160926_1513.csv	1092602	09:57:14 pm 09/25/2016	[Icon]
EnergyData_2_20160926_2021.csv	1092602	03:06:12 am 09/26/2016	[Icon]
EnergyData_3_20160926_2057.csv	1092602	03:42:12 am 09/26/2016	[Icon]
EnergyData_2_20160927_0206.csv	776995	07:36:16 am 09/26/2016	[Icon]
EnergyData_3_20160927_0242.csv	662947	07:36:16 am 09/26/2016	[Icon]
EnergyData_1_20160927_0533.csv	45583	07:36:06 am 09/26/2016	[Icon]
EnergyData_2_20160927_0933.csv	330109	03:05:08 pm 09/26/2016	[Icon]
EnergyData_2_20160927_1119.csv	786499	03:05:32 pm 09/26/2016	[Icon]
EnergyData_3_20160927_1128.csv	746107	03:05:32 pm 09/26/2016	[Icon]
EnergyData_4_20160927_1325.csv	48751	03:05:06 pm 09/26/2016	[Icon]
EnergyData_1_20160929_1003.csv	464749	10:30:02 am 10/09/2016	[Icon]
EnergyData_2_20160929_1023.csv	1092602	03:12:22 pm 09/28/2016	[Icon]
EnergyData_2_20160929_1412.csv	231703	10:27:06 am 10/09/2016	[Icon]
EnergyData_1_20161010_0939.csv	38455	12:15:02 pm 10/09/2016	[Icon]
EnergyData_1_20161010_1630.csv	45187	09:07:02 am 10/10/2016	[Icon]

Tool for data evaluation

Siemens Industry Online Support provides a free tool for evaluating your data.

You can read your CSV file via Microsoft Excel with this tool and then automatically have the individual energy data evaluated. A graphic evaluation of the course of the months as well as of the individual period is possible here.

More information as well as a more detailed description can be found in the application example “SIMATIC Energy Suite – Evaluation Tool for Energy Data with SIMATIC Memory Card Archiving Type:

<https://support.industry.siemens.com/cs/ww/en/view/109739772>

5.7.2 Exporting WinCC Professional data

General information

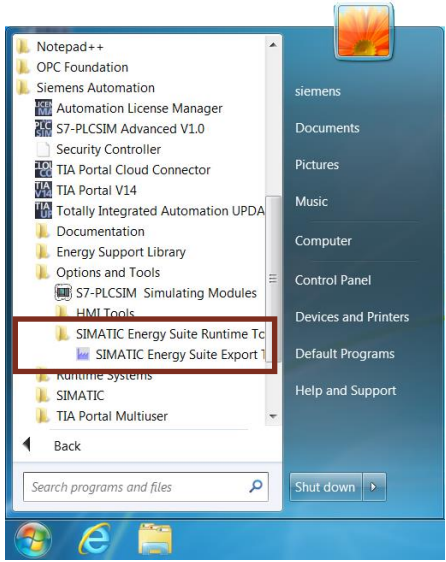
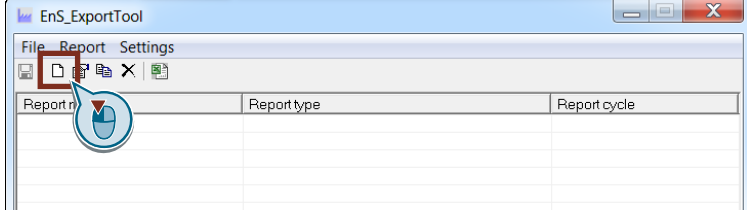
When you are using WinCC Professional you can also archive your energy data of the Energy Suite with the help of a tag archive, see chapter [5.5.3](#). The data can then be exported with the “SIMATIC Energy Suite Export Tool”.

This program is part of the SIMATIC Energy Runtime Toolbox and is automatically installed when installing the toolbox.

Description

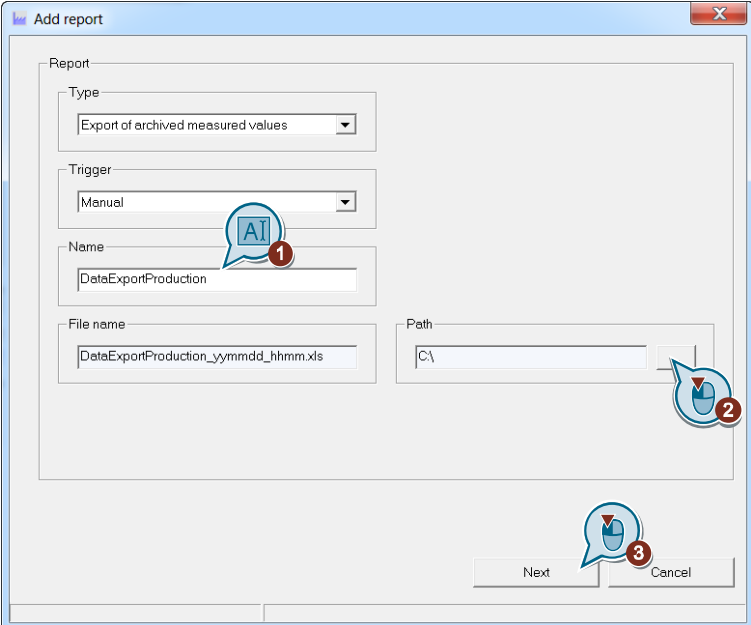
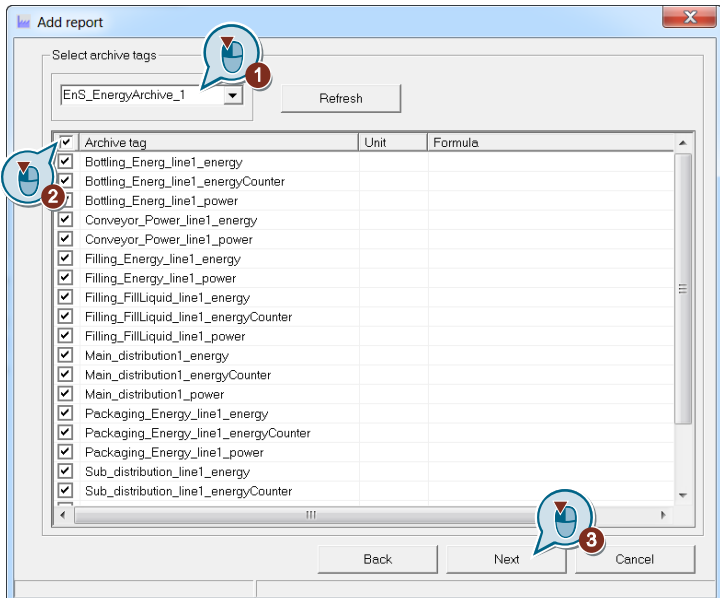
The [Table 5-17](#) below shows you how to export the energy data with the help of the SIMATIC Energy Suite Export Tool.

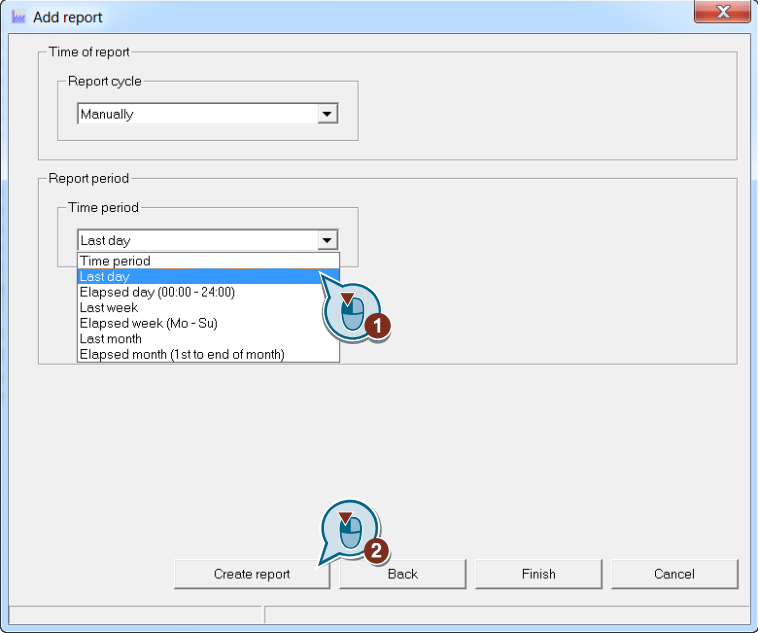
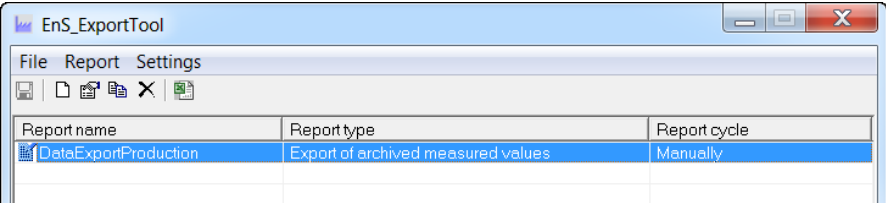
Table 5-17

No.	Action
1.	<p>Open the SIMATIC Energy Suite Export Tool.</p> <p>It can be found in “Start > All Programs > Siemens Automation > Option and Tools > SIMATIC Energy Suite Runtime Toolbox > SIMATIC Energy Suite Runtime Tool”.</p> 
2.	<p>Click “Add report” in the overview of the SIMATIC Energy Suite Export Tool.</p> 
3.	<p>A dialog for adjusting the report settings opens.</p>

5 Configuration and Settings

5.7 Exporting of data

No.	Action																																																									
4.	<ul style="list-style-type: none">Enter a title for the report (1) in the “Name” field. In the “File name” field, a preview is displayed.Select the storage location of the report in “Path” (2).Click on “Next” (3) 																																																									
5.	<ul style="list-style-type: none">Select the “EnS_EnergyArchive_1” tag archive (1) from the dropdown list box, see also Table 5-16.Select all archive tags to export them (2).Click on “Next” (3)  <table data-bbox="542 1328 1201 1709"><thead><tr><th>Archive tag</th><th>Unit</th><th>Formula</th></tr></thead><tbody><tr><td><input checked="" type="checkbox"/> Bottling_Energ_line1_energy</td><td></td><td></td></tr><tr><td><input checked="" type="checkbox"/> Bottling_Energ_line1_energyCounter</td><td></td><td></td></tr><tr><td><input checked="" type="checkbox"/> Bottling_Energ_line1_power</td><td></td><td></td></tr><tr><td><input checked="" type="checkbox"/> Conveyor_Power_line1_energy</td><td></td><td></td></tr><tr><td><input checked="" type="checkbox"/> Conveyor_Power_line1_power</td><td></td><td></td></tr><tr><td><input checked="" type="checkbox"/> Filling_Energ_line1_energy</td><td></td><td></td></tr><tr><td><input checked="" type="checkbox"/> Filling_Energ_line1_power</td><td></td><td></td></tr><tr><td><input checked="" type="checkbox"/> Filling_FillLiquid_line1_energy</td><td></td><td></td></tr><tr><td><input checked="" type="checkbox"/> Filling_FillLiquid_line1_energyCounter</td><td></td><td></td></tr><tr><td><input checked="" type="checkbox"/> Filling_FillLiquid_line1_power</td><td></td><td></td></tr><tr><td><input checked="" type="checkbox"/> Main_distribution1_energy</td><td></td><td></td></tr><tr><td><input checked="" type="checkbox"/> Main_distribution1_energyCounter</td><td></td><td></td></tr><tr><td><input checked="" type="checkbox"/> Main_distribution1_power</td><td></td><td></td></tr><tr><td><input checked="" type="checkbox"/> Packaging_Energ_line1_energy</td><td></td><td></td></tr><tr><td><input checked="" type="checkbox"/> Packaging_Energ_line1_energyCounter</td><td></td><td></td></tr><tr><td><input checked="" type="checkbox"/> Packaging_Energ_line1_power</td><td></td><td></td></tr><tr><td><input checked="" type="checkbox"/> Sub_distribution_line1_energy</td><td></td><td></td></tr><tr><td><input checked="" type="checkbox"/> Sub_distribution_line1_energyCounter</td><td></td><td></td></tr></tbody></table>	Archive tag	Unit	Formula	<input checked="" type="checkbox"/> Bottling_Energ_line1_energy			<input checked="" type="checkbox"/> Bottling_Energ_line1_energyCounter			<input checked="" type="checkbox"/> Bottling_Energ_line1_power			<input checked="" type="checkbox"/> Conveyor_Power_line1_energy			<input checked="" type="checkbox"/> Conveyor_Power_line1_power			<input checked="" type="checkbox"/> Filling_Energ_line1_energy			<input checked="" type="checkbox"/> Filling_Energ_line1_power			<input checked="" type="checkbox"/> Filling_FillLiquid_line1_energy			<input checked="" type="checkbox"/> Filling_FillLiquid_line1_energyCounter			<input checked="" type="checkbox"/> Filling_FillLiquid_line1_power			<input checked="" type="checkbox"/> Main_distribution1_energy			<input checked="" type="checkbox"/> Main_distribution1_energyCounter			<input checked="" type="checkbox"/> Main_distribution1_power			<input checked="" type="checkbox"/> Packaging_Energ_line1_energy			<input checked="" type="checkbox"/> Packaging_Energ_line1_energyCounter			<input checked="" type="checkbox"/> Packaging_Energ_line1_power			<input checked="" type="checkbox"/> Sub_distribution_line1_energy			<input checked="" type="checkbox"/> Sub_distribution_line1_energyCounter		
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No.	Action
6.	<ul style="list-style-type: none">Open the dropdown list box (3) in “Time period” and select the desired period (1).Click on “Create report” (2). 
7.	A dialog appears, asking whether you really want to create the report. Confirm this with “Yes”.
8.	In the overview of the SIMATIC Energy Suite Export Tool, the created report will then appear. The report can also be viewed in the specified path as Microsoft Excel file. 

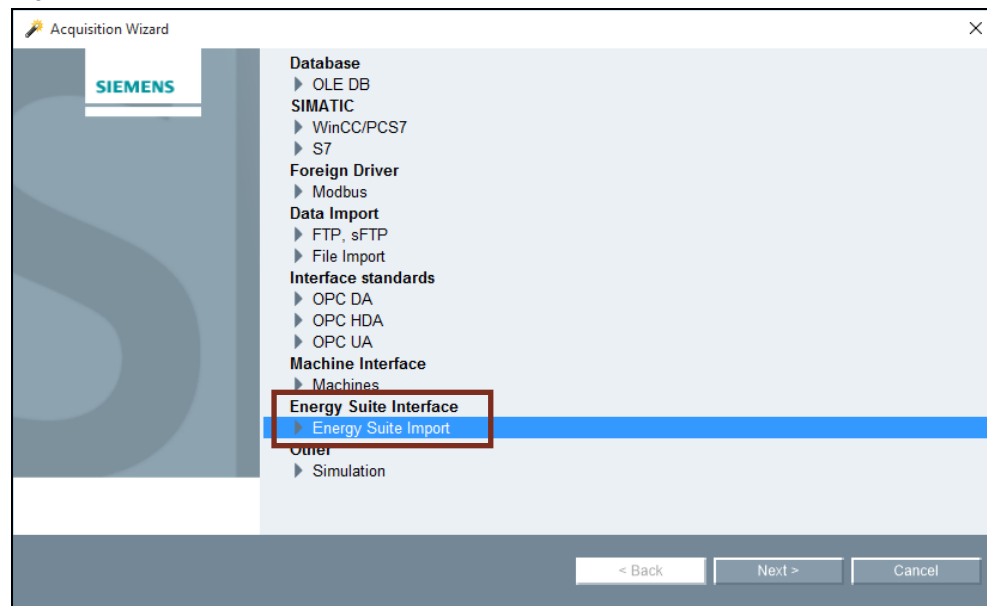
5.8 Connecting SIMATIC Energy Manager PRO

To be able to process the data of the Energy Suite further, an interface for the Energy Suite is available in the start menu of the SIMATIC Energy Manager PRO. You can import the data as well as the configuration from the Energy Suite via this menu item.

Note

The Energy Suite Import interface is only available in connection with WinCC Runtime Professional.

Figure 5-5



For more information regarding the SIMATIC Manager PRO topic, please refer to [SIMATIC Energy Manager PRO](#).

6 Further Notes, Tips & Tricks, etc.

More information and notes on the energy management topic can be found in the Siemens Industry Online Support in:

- SIMATIC Energy Suite in Online Support (Entry ID 109738104)
Link: <https://support.industry.siemens.com/cs/ww/en/view/109738104>
- Energy management with SIMATIC in Industry Online Support (Entry ID 68043160)
Link: <https://support.industry.siemens.com/cs/ww/en/view/68043160>
- Energy data acquisition in Online Support (Entry ID 109738130)
Link: <https://support.industry.siemens.com/cs/ww/en/view/109738130>

7 Links & Literature

Table 7-1

	Topic
\1\	Siemens Industry Online Support https://support.industry.siemens.com
\2\	Download page of the entry https://support.industry.siemens.com/cs/ww/en/view/109739102
\3\	Energy Support Library (EnSL) - Download https://support.industry.siemens.com/cs/ww/en/view/109741558
\4\	Which energy-measuring components and higher-level systems does the SIMATIC Energy Suite support? https://support.industry.siemens.com/cs/ww/en/view/109482454
\5\	SIMATIC Energy Suite – Visualization Example https://support.industry.siemens.com/cs/ww/en/view/109739775
\6\	SIMATIC Energy Suite – Evaluation Tool for Energy Data with SIMATIC Memory Card Archiving Type https://support.industry.siemens.com/cs/ww/en/view/109739772

8 History

Table 8-1

Version	Date	Modifications
V1.0	11/2016	First version