Slovenská elektrizačná prenosová sústava, a. s.		

DAMAS ENERGY

User Manual

	Name	Date
Drafted by:	Patrícia Brhlíková	08.12.2021
Approved by:	Michal Kečkéš	08.12.2021

Contents

Disclaimer: Please note that some of the screenshots in this document may contain original translations since the particular functionalities/features are only available in Slovak language.

1. Damas Energy

Damas Energy (DaE) is a comprehensive information system for business management of the transmission system. Damas Energy information system implemented in the conditions of Slovenská elektrizačná prenosová sústava, a.s. (hereinafter referred to as "SEPS") is used to automate business and technical processes associated with the management and operation of the electricity system of the Slovak Republic. It ensures flexible communication between transmission system operators and other market participants - nominated operators of electricity markets, electricity producers, domestic and foreign traders, large electricity customers or providers of ancillary services and, finally, effective communication between internal users. Damas Energy system ensures the two-way transmission of business and technical data on a daily basis and performs their processing and evaluation.

The system is based on a standard three-tier architecture.

- The system interface features thin client (HTML5) and web services, including support for international ETSO standards, WSS security and support for PKI certificates.
- Business logic is built on the Damas application platform, gaining flexibility and scalability.
- The data layer is represented by the Oracle 19c database.

The development technologies used:

- Microsoft ASP.NET for the presentation layer
- C # for the business logic layer
- PL / SQL for the data layer.

The framework uses:

- MS .NET 4.8
- Core.NET, UES
- NHibernate
- Log4NET

2. System access requirements

Public access

It is possible to enter the system without logging in - the so-called public access. As part of the public access, the user can view the publicly available data that SEPS must disclose under based on the applicable legislation.

Contractual approach

Contractual access to the trading system is granted only to entities that have a valid contractual relationship with the transmission system operator - SEPS. Access is enabled through an account. The condition for its creation is the completion and sending of the registration form to the email address: damas_registration@sepsas.sk

The registration form is part of the Damas Energy documentation and is available on the public website of the system.

The last condition for activating the account is the provision of the public part of the user's security certificate, through which the authentication in the system takes place. The public part of the certificate must again be sent to the email address: damas_registration@sepsas.sk.

Certificates are discussed in more detail in the chapter "Digital certificates"

Workstation requirements

The use of the Damas Energy system web interface is also subject to certain requirements imposed on the workstation from which we access the system. The basic ones are:

- Operating system type and version
- Type and versions of recommended internet browsers
- Cookie support

It is possible to work with the Damas Energy system via a web interface using the following browsers:

- Mozilla Firefox, the last two most recent versions
- Microsoft Edge, the last two most recent versions
- Google Chrome, the last two most recent versions

To ensure the operation of the application, it is recommended to perform regular check of browser versions and their updates.

Cookies must be enabled in your browser.

The web interface of the system is designed to maximally comply with the following web application standards:

- XHTML 1.0 (https://www.w3.org/TR/xhtml1/)
- CSS level 2 revision 1 (http://www.w3.org/TR/2006/WD-CSS21-20060411)

- ECMA-262(http://www.ecma-international.org/publications/standards/Ecma-262.htm)
- DOM level 1 (http://www.w3.org/TR/1998/REC-DOM-Level-1-19981001)
- XML 1.0 (https://www.w3.org/TR/xml/)
- TLS 1.2 (https://datatracker.ietf.org/doc/html/rfc5246)

For this reason, access to the system is not limited to the browsers listed above but should be available from all browsers that meet these standards.

2.1. Connection parameters

List of supported cipher suites that can be used to establish a secure connection:

- TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384_P521
- TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384_P384
- TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384_P256
- TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256_P521
- TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256_P384
- TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256_P256
- TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA_P521
- TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA_P384
- TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA_P256
- TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA_P521
- TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA_P384
- TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA_P256
- TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384_P521
- TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384_P384
- TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256_P521
- TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256_P384
- TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256_P256
- TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384_P521
- TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384_P384
- TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256_P521
- TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256_P384
- TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256_P256
- TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA_P521
- TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA_P384
- TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA_P256
- TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA_P521
- TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA_P384
- TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA_P256
- TLS_RSA_WITH_AES_256_GCM_SHA384
- TLS_RSA_WITH_AES_128_GCM_SHA256
- TLS_RSA_WITH_AES_256_CBC_SHA256
- TLS_RSA_WITH_AES_128_CBC_SHA256
- TLS_RSA_WITH_AES_256_CBC_SHA
- TLS_RSA_WITH_AES_128_CBC_SHA

Supported cipher suites may change in the future (updates, deactivation for security reasons, ...).

2.2. Digital certificates

A user security certificate is required to log in to the system. The list of currently supported certification authorities is in Appendix no. 1.

If the subject decides to use a certificate from an authority that is not on the list, it is necessary to first contact the DaE system administrators and to send the required user certificate together with all parent certificates (root authority, etc.). The system supplier will then perform the required compatibility tests and, if successful, the certificate will be included in the system together with the certification authority.

For the certificate to be used for the purpose of communication with the Damas Energy system, it must be valid. A certificate is considered valid if all of the following conditions are met:

- It is released in the format defined by the standard X.509 v3
- It is issued to the end entity. The Basic constraints attribute has a value of End Entity.
- The current date and time are between the certificate start and end values, i.e. the certificate is valid for a period of time.
- The certificate is not on the list of revoked certificates, i.e. is not revoked.
- The certificate is issued by a certification authority (CA), which is on the list of trusted certification authorities supported by the system (Appendix No. 1 - List of supported certification authorities in the Damas Energy system), or the CA will be requested to be added to the Damas server servers.

To be able to use a valid certificate in the Damas Energy system it is necessary that the following conditions are met in addition to the above conditions:

- The certificate has the CN (Common Name) attribute filled in and this attribute contains the name of the subject or person.
  - One of the supported signature algorithms must be used:
    - sha256WithRSAEncryption, sha384WithRSAEncryption, sha512WithRSAEncryption.
- The certificate is assigned to a user registered in the Damas Energy system. This user can represent a person or a system. In the Damas Energy system, certificates are registered for two ways of their use:
  - Certificate for authentication:
    - Such a certificate must have the information specified in the Enhanced Key Usage attribute of the X.509 v3 standard: Client Authentication - 1.3.6.1.5.5.7.3.2.
  - Certificate for data signing:
    - Such a certificate must have the information specified in the X.509 v3 Key Usage attribute: Digital Signature and Non-Repudiation.
  - A certificate designed to communicate through web services:
    - Such a certificate must have the following information in the X.509 v3 Key Usage attribute: Digital Signature and Key Encipherment.

Technically, it is possible to use the same certificate for communication with the system via web services and for access via a browser. Communication via web services and the necessary certificates are not the subject of this document.

The required certificate parameters (such as the minimum key length) are defined by the operating system and its updates.

The conditions stated here apply to the verification of validity and applicability from the point of view of the Damas Energy system. If the validity is verified from the client's point of view

(user or system), these conditions may be evaluated differently. This depends on the settings or implementation on the client side, such as a different list of supported certification authorities etc.

Supported certification authorities

The group of supported certification authorities represents a set of certificate issuers that are considered to be trusted (the parameters and the process by which they issue certificates comply with defined standards). This set consists of certification authorities that are considered trusted by the operating system and certification authorities that are considered trustworthy and are specific to the region in which the Damas system is operated.

User communication with the Damas system

When connecting to the Damas Energy system (displaying a website representing the Damas system), the Damas Energy system proves its identity with a server certificate. Authentication is provided by the user's browser. In order for the user's browser to consider the Damas server server certificate as trusted, the conditions stated in the beginning of the chapter must be met from the user's point of view:

- the CN (common name) server certificate attribute must contain the name of the Damas server - the name used in the URL
- the certificate must have the information specified in the Enhanced Key Usage attribute of the X.509 v3 standard: Server Authentication - 1.3.6.1.5.5.7.3.1.

The user must prove his identity with a certificate designed to verify the user identity. Also, for the verification of user identity, the certificate must meet the conditions defined in the introduction of this chapter (2.2) **from the Damas Energy system point of view**. The user signs the entered data with a certificate intended for data signing. Even in this case, for the Damas Energy system to verify the data signature, the certificate used by the user to sign the data **from the Damas Energy system point of view** must meet the conditions defined in the introduction section of the chapter 2.2.

3. Persons responsible on behalf of SEPS

Subsystem	Module	Responsible person	Telephone
System administration		P. Franek P. Čišecký M. Benedik	0908 906 548 0917 108 691 0908 979 350
Support services	Tenders, contracts, business evaluations of PpS, contractual penalties	I. Šulc	0907 845 922
Support services	Contracts	P. Rihák	0906 762 439
Support services	Operation preparation, requirements, daily purchase, equipment certification	M. Kret	0917 864 551
Support services	PpS evaluation	S. Dudášik	0907 817 269
Regulating electricity	Business evaluation of regulating electricity	S. Dudášik	0907 817 269
Losses and own consumption	Purchase and evaluation of electricity for losses and own. consumption	J. Vatľak	0905 656 364
Transmission services	NTC capacities	M. Rusnák	0905 253 399
Transmission services	Intraday cross-border trade, capacity auction, international scheduling	M. Benedik	0908 979 350
Regulating electricity	Purchase of non-guaranteed regulating electricity	P. Vico	0907 889 017
Disclosure		S. Dudášik	0907 817 269

A detailed list of responsible representatives of the transmission system operator is available to contractual users of entities on the system **homepage**.

4. Basics of working with the system

4.1. User login

The user logs in via the user login interface. From the users' point of view, there are two login modes: anonymous (with access to publicly available data only), user (access to the system within the scope of user rights).

Steps to log in as anonymous for public access:

- Enter the Damas Energy system address into the browser:
  - Production environment: https://dae.sepsas.sk
  - Test environment: https://test-dae.sepsas.sk
- Certificate is not required
- Click on the "Public Access" link.

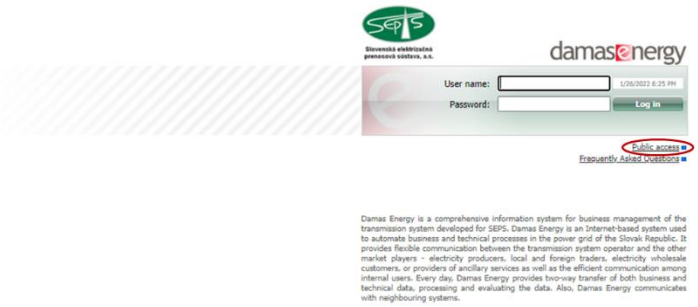


Fig. Public access - login

Note: An anonymous user is not authorized to use scripts to automatically download published data.

Steps to log in with an account:

- Certificate selection (if only one certificate is available, the browser can select it automatically)
- Enter the Damas Energy system address into the browser:
  - Production environment: https://dae.sepsas.sk
  - Test environment: https://test-dae.sepsas.sk
  - Trial environment: https://trial-dae.sepsas.sk
- **Login name must be pre-filled** – if not, it is a sign that the selected certificate was not recognized by the Damas Energy system (often because the browser itself chose the wrong user certificate), and the login will fail even after manually filling in the login name
- Fill in the password
- Confirm with the "Login" button.

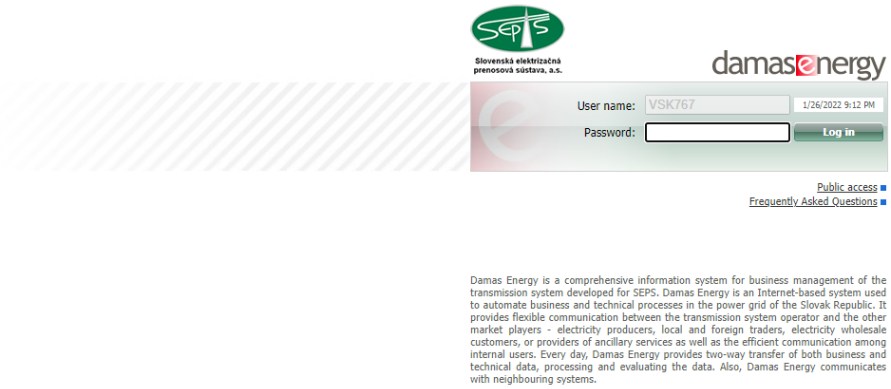


Fig. Damas Energy – User login

4.1.1. Publicly available data

In public access mode, there is a menu on the left side of the main screen that contains two sections – Publishing Data and System Tools.

Data is accessible to the public user to the extent provided by applicable legislation, such as:

- Dataflow values
- Load and production of ES SR
- Load of ES SR (EMFIP)
- Production of ES SR (EMFIP)
- System regulation (EMFIP)
- Outages (EMFIP)
- Transmission (EMFIP)
- Congestion management (EMFIP)
- Monthly statistics for implicit auctions
- Monthly review of Ancillary services evaluation
- Filling rates of water reservoirs
- Offered capacity from the daily explicit auction
- Offered capacity from the monthly explicit auction
- Offered capacity from yearly explicit auction
- Unplanned unavailability of generation units over 100 MW
- Overview of capacity allocation and utilization
- Summary results of daily explicit auction
- Summary results of monthly explicit auction
- Summary results of yearly explicit auction
- Statistics for implicit auctions

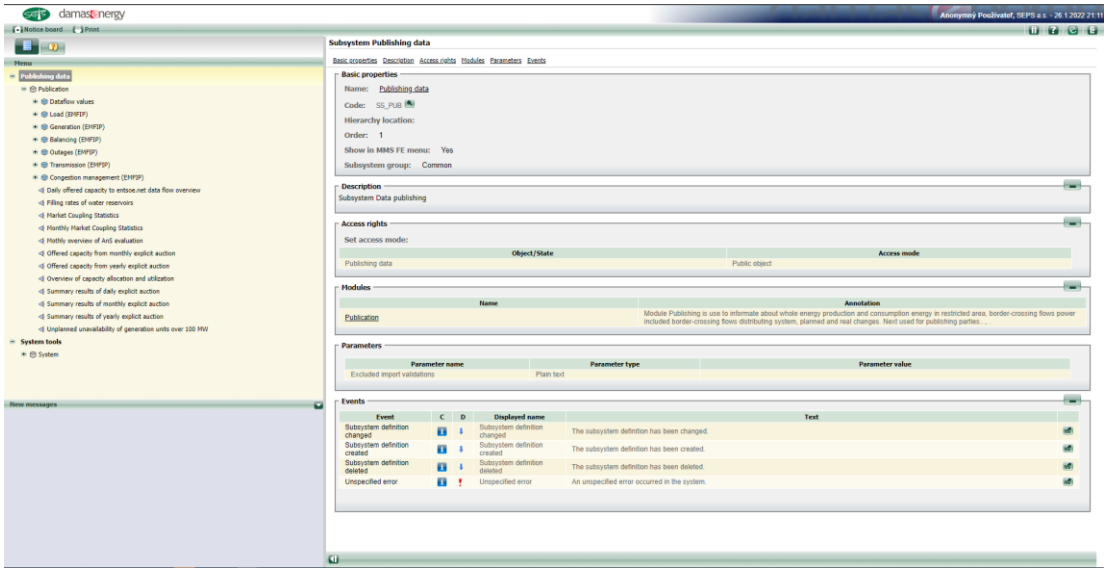


Fig. Public access

4.2. Automatic logout

After a certain time, the user will be automatically logged out.

The limit is set to 1440 minutes = 24 hours. When the limit is exceeded, the user is automatically logged out of the system.

4.3. Maximum limit for current logins

The maximum limit of the number of sessions of the logged-in user at one time is set in the application. Currently, the limit is 10 sessions.

4.4. System outages

In the event of a system outage due to service maintenance, the user will see a notification about the ongoing service intervention and the expected date and time when the normal operation will resume (date and time are added to the {dateTo} and {timeTo} fields, see the figure below).

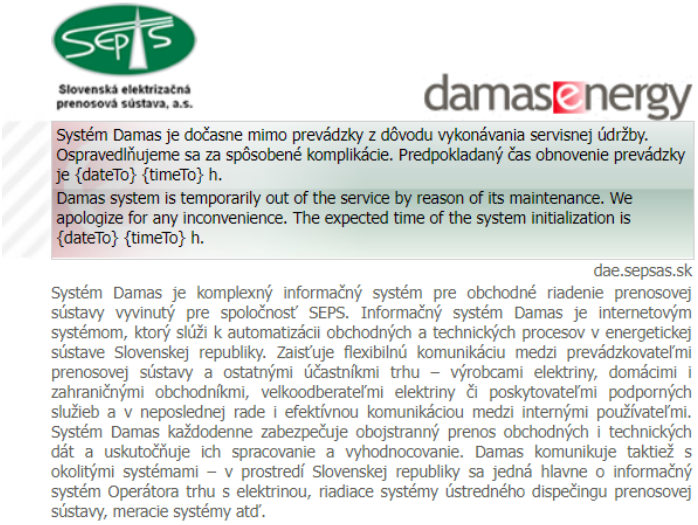


Fig. System outage

Currently, there is a regular service outage every Tuesday from 19:00 to 22:00.

4.5. Main page

After logging in the user is redirected to the main screen of the application, which consists of five main parts:

- Application header
- Navigation bar
- New messages panel
- Main information space
- Control elements.

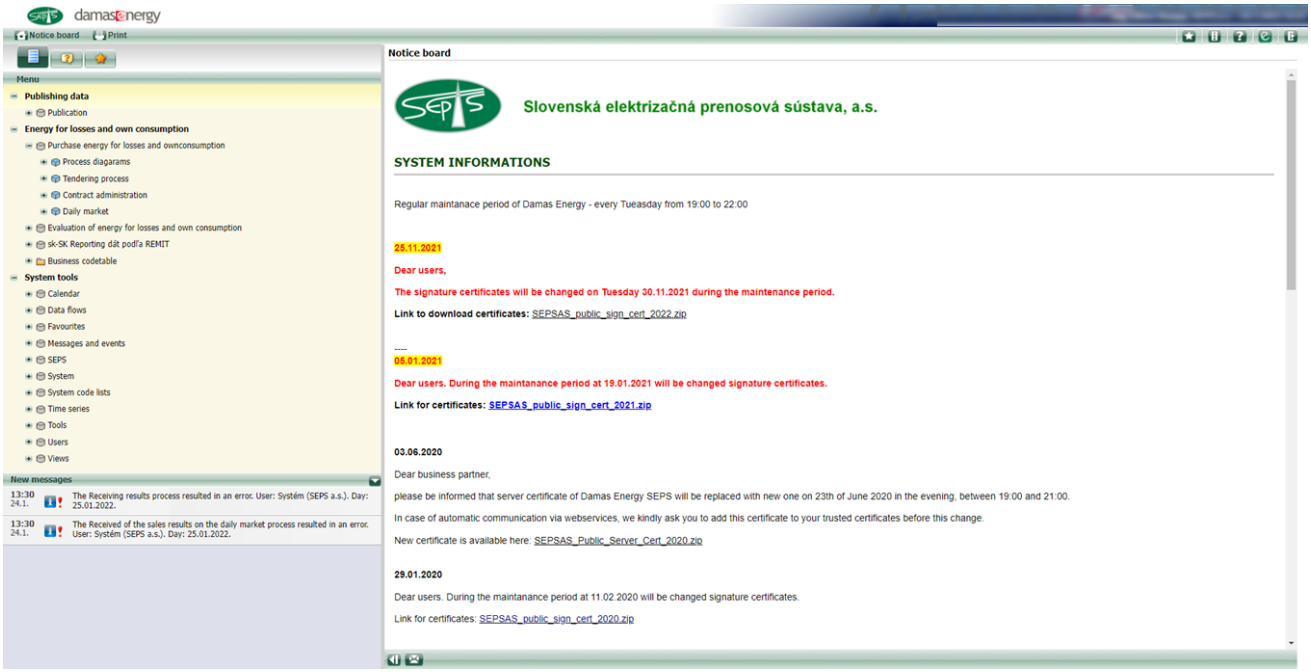


Fig. Damas Energy – Main page

4.5.1. Application header

The application header contains information about the system and the logged in user. It also includes a toolbar that allows the user to access important system functions (left – Notice board, Printing, Object search; right (toolbar) - Tasks, Adding a favourite system item, Semaphore, Quick help, About the application and Log out)

Obr. Damas Energy – Application header

The Quick help function is accessible at any time using the button (graphically represented by the question mark symbol) in the toolbar (i.e.in the application header).

Fig. Damas Energy – Toolbar

After clicking on the button, a brief description appears in the main window above the currently displayed functionality.

4.5.2. Navigation bar

The navigation bar is the main signpost of the application, which provides several modes of access to the system.

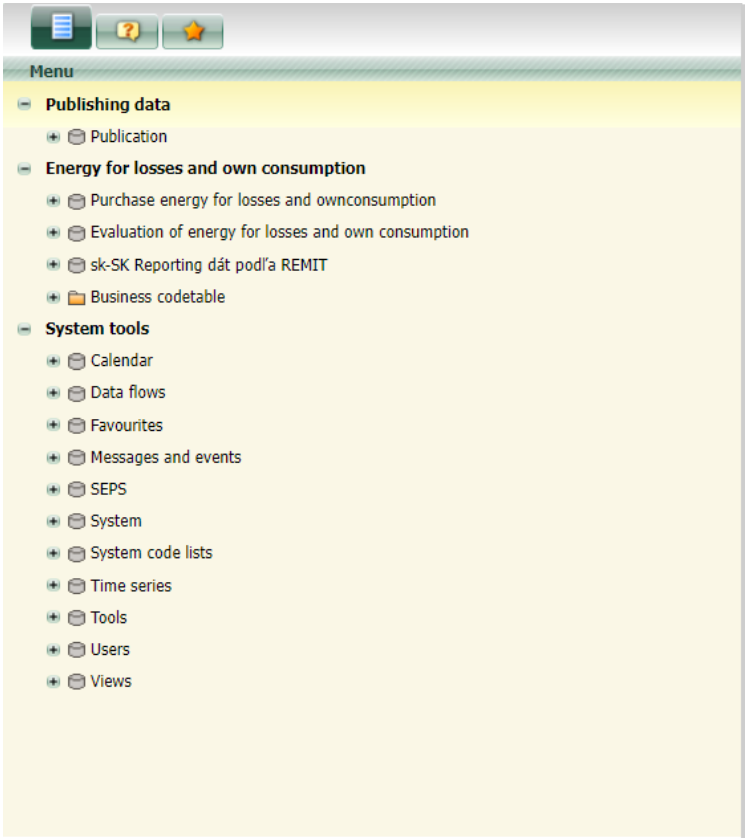


Fig. Damas Energy – Navigation bar

Basic access is user-defined, in which the panel provides access to system functionality for regular users.

Fig. Damas Energy – Navigation bar (Controls)

The second navigation option is the "Favourites" tab, which allows you to save the views that the user works with most often.

Another option is "Help", which provides access to the helpful guidance and descriptions of individual objects in the system.

The Help function is also accessible through the so-called "Quick help".

4.5.3. New messages panel

The New Messages Panel displays the most recent messages received by the logged-in user on the system. The user can then click on the selected message to go to the complete message list, where the user can work with a specific message.

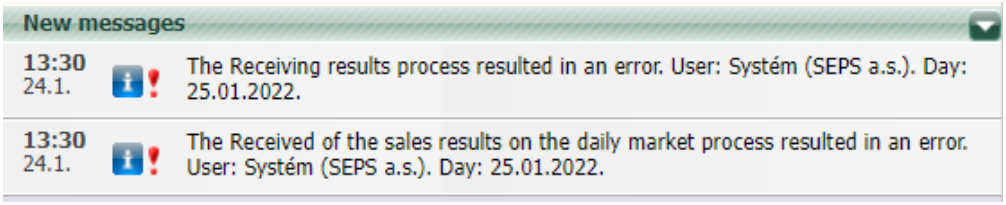


Fig. Damas Energy – New messages panel

Sound notification may be turned on for incoming messages.

4.5.4. Main information space

The main window of the application is a place for displaying the functions that the user invokes with his activity. Therefore, the currently displayed page is redrawn once a new page is selected. The whole page is never updated, only the main window. After the user logs in to the system, a message board will automatically appear in the Notice board.

Unless otherwise set, after logging in, the main screen is in the default "Wall" mode. The bulletin board contains key system information and current system status messages. To return to the board, you can use the "Notice board" button (graphically represented by the house symbol), which is located on the left in the application header.

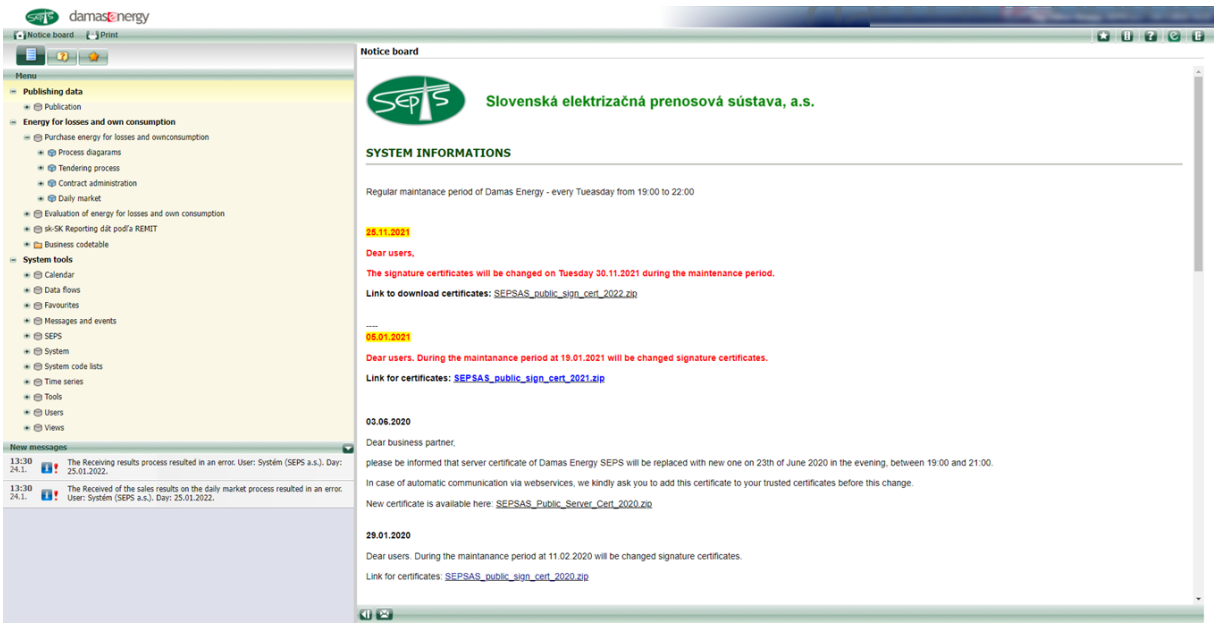


Fig. Damas Energy – Main information space

4.5.5. Control elements

The functionalities displayed in the main window are supplemented by controls, which are always displayed in the lower part of the main window. The controls are different for each type of system functionality. However, they always contain buttons to hide the navigation, an icon to indicate new messages and go to the message list.

Fig. Damas Energy – Control elements

4.5.6. Warning message

In the event of emergency, the operator can use the option to send an alert message.

The alert message will appear in a red bar in the page header similar to the Quick help bar. The functionality can be used e.g. during system outages.

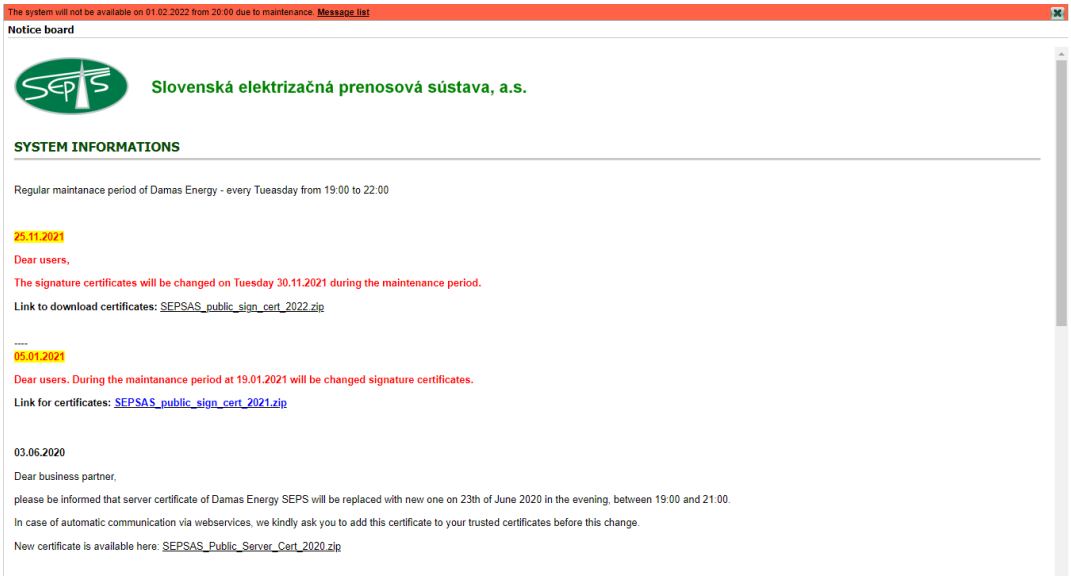


Fig. Damas Energy – Warning message

4.6. Favourites

To make it easier to work with objects in the menu the Favourites functionality can be used. This functionality enables the used to add a Favourite object by pressing the star symbol on the right in the application header while viewing the object.

After clicking the button, a window will appear on the screen that will allow you to change the name of the Favourite item. To confirm the name and save the item to the Favourites list, press the "OK" button. The default name corresponds to the name of the selected object.

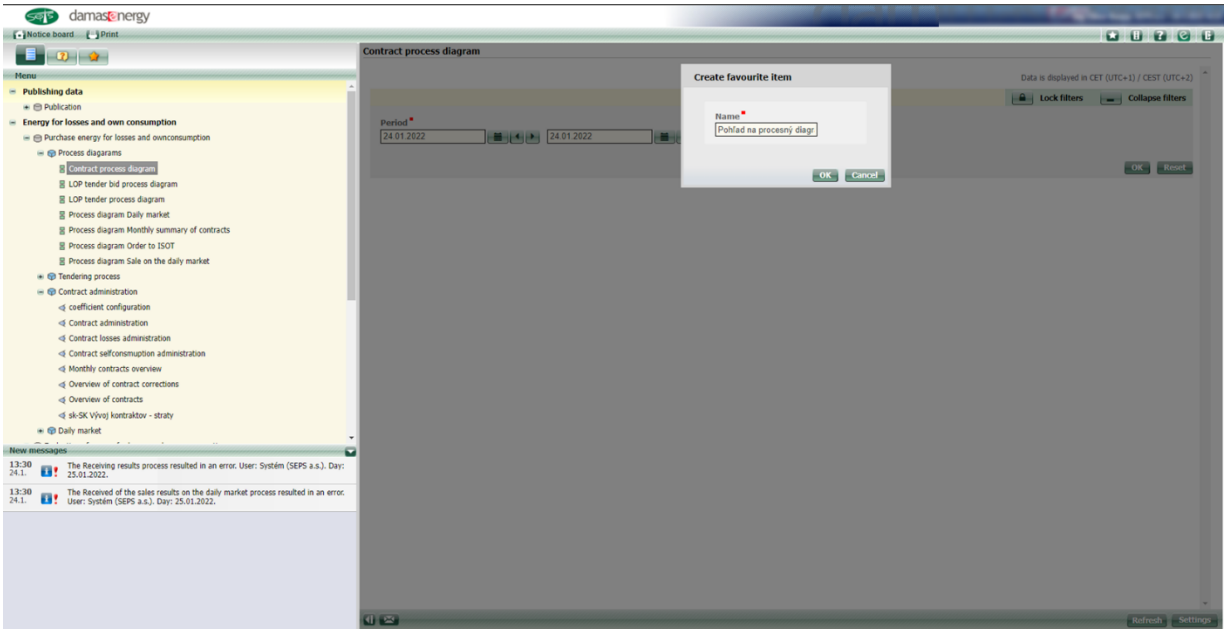


Fig. Damas Energy – Adding item into a Favourites

To view your Favourites, you need to select the Favourites view from the navigation bar on the left.

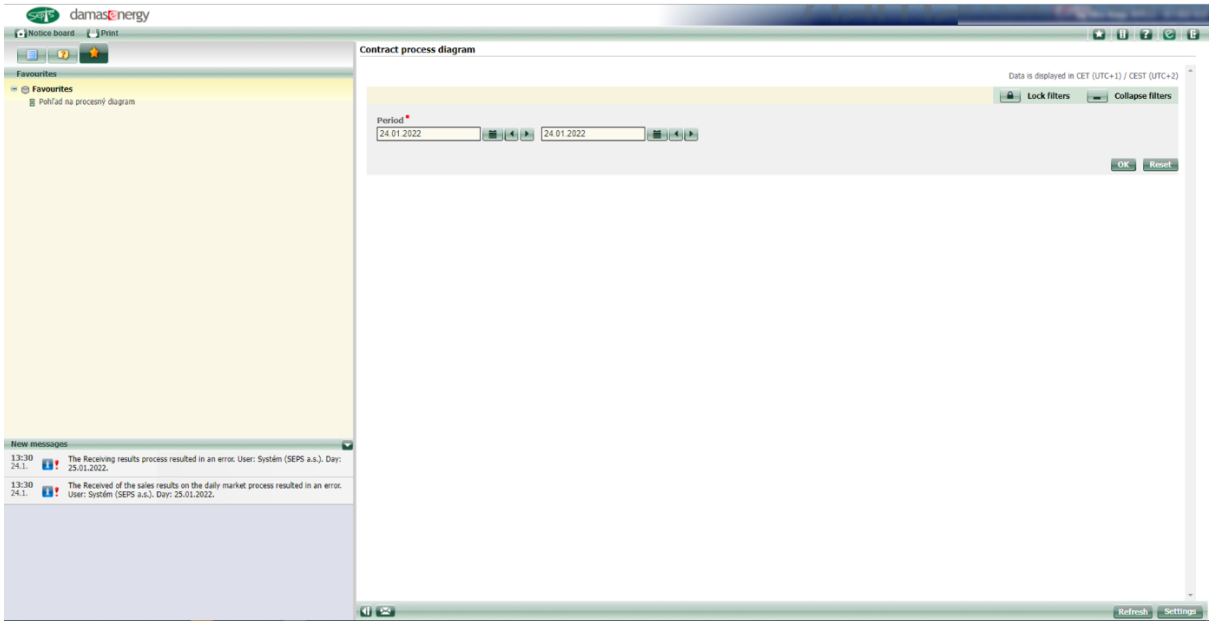


Fig. Damas Energy – View Favourites

Favourites can be managed (renamed, reordered, deleted) in the Menu via the use case System Tools / Favourites / Favourites Management.

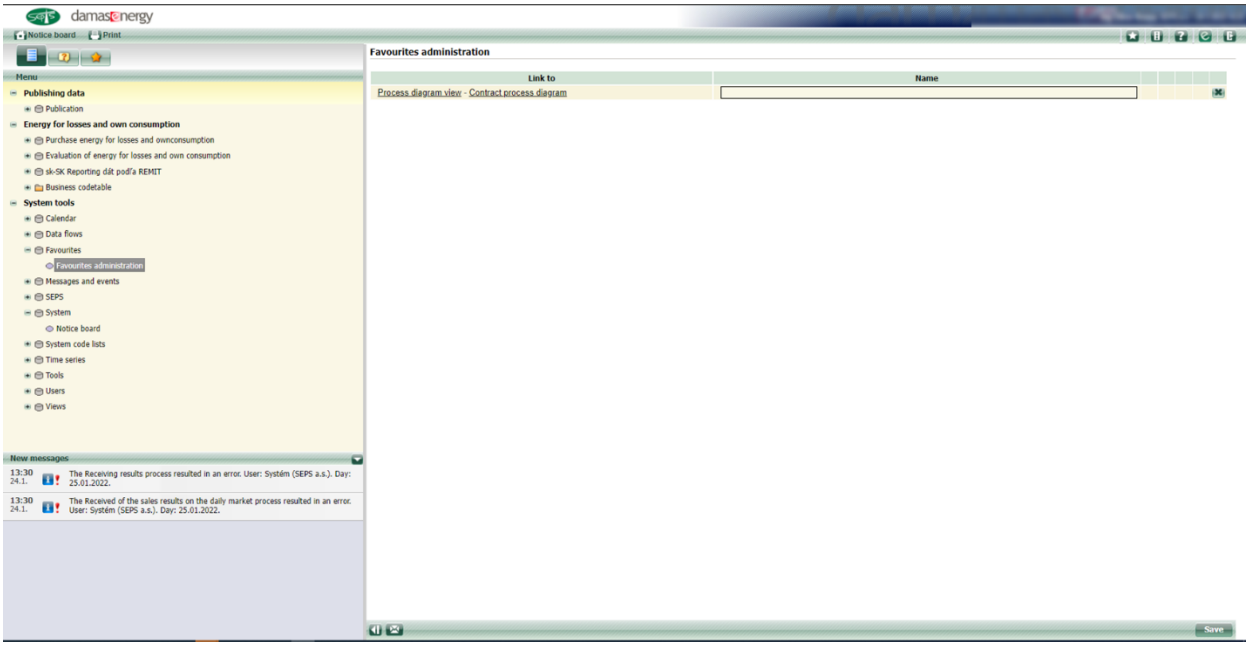


Fig. Damas Energy – Favourites management

4.7. Working with time series views

View on time series is the main display tool of the system. Views are typically displayed from the menu, from a list (e.g. Messages) or via external links. Typically, the display is initialized from the context of the user and the time and business filter is filled in automatically (see chapter Filters).

There are several types of views, but the basic logic and functioning of the views is identical for all types. Nevertheless, the control elements can differ in case of certain sections, e.g. Detail. The following section of the document will describe the individual sections of the view, their basic functions, control, and data display.

4.7.1. General description of the time series view

The time series view allows basic management of time series values in the system. Value management is performed using a special component for editing values.

As a first function, the displayed values are filtered using several types of filters. Each view consists of several sections, which in most cases have the same functionalities and controls.

The main sections of the view are:

- Filter
- List
- Detail
- Control Elements

4.8. Filters

Filters are used to select the displayed values within the view. The set of values to be displayed can be limited by the components for selecting the date or time period and determining the business scope of the data, i.e. time and business filter. The filters are in a separate view section at the top of the screen.

4.8.1. Overview of filter controls

Fig. Example of minimized view filters

Component	Description
Filter header	The filter header contains of selected values in the time and business filter. After the filter is minimized, only this part of the filter is displayed.
Filter body	The filter body represents the form for filter selection. The content of the filter body is very diverse given the needs of the view.
Button 	The button causes the filter to collapse.
Button 	The button expands the filter.
Button 	Filter lock button allows the filter not to collapse after reading data from the filter.
Button 	Calendar recall button to select a date. It is only displayed when selecting a date, or date and time.
Button 	Filter confirmation button. The button can be displayed before selecting the time or business filter.
Button 	Button to reset the filter to the default state.
Button 	Button to move the date forward and backward.

4.8.2. Time and business filter settings

Time filter

The time filter determines for which time period the data will be displayed. The filter can be pre-set according to the primary settings of the view or according to the user context, i.e. the parameters that the logged-in user has used last (also on other views).

The type of time filter varies according to the needs of the view. In its basic form, it can be a specific date or a date from-to (time period). However, the filter can also contain entries in other time units, such as year, month, energy week. The filter selection field can be supplemented by a control (see table above) that allows you to select a filter value (for example selecting a date from the calendar or selecting energy weeks).

The time filter can be supplemented with a confirmation button <OK>. The button is needed due to the dependencies of other sections of the filter (e.g. business filter). Only after clicking the <OK> button the relevant sections will be updated. The <OK> button may not be displayed filter section. In this case, the application will automatically update the relevant sections.

The following parts of the view depend on the time filters: subject filter, list, and detail.

Fig. Example of a time filter with a dependent business filter (added confirmation button <OK>)

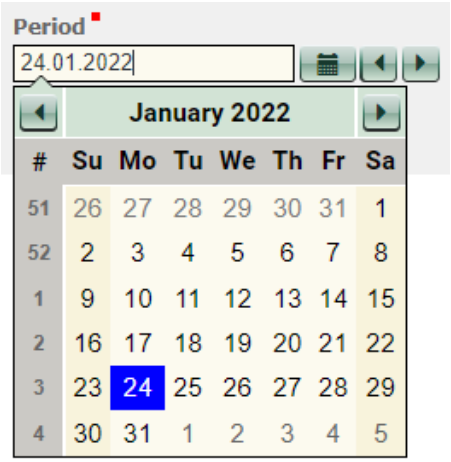


Fig. Example of selecting values from the calendar

Fig. Example date from-to with editable value

Business filter

The business filter allows the user to enter criteria for the displayed data and is composed of various controls. The individual filter elements can be dependent on each other. This means

that, for example, after selecting an entity, only the list of production units relevant for that particular entity is retrieved.

After clicking on the business filter, the search bar from the offered list and the list of filter items themselves will appear at the top. Click on the item to select it.

Confirm the filter with the <OK> key. This completes the filter selection and the other view sections (see below) are loaded according to the entered values.

The following parts of the view depend on the subject filter: list and detail.

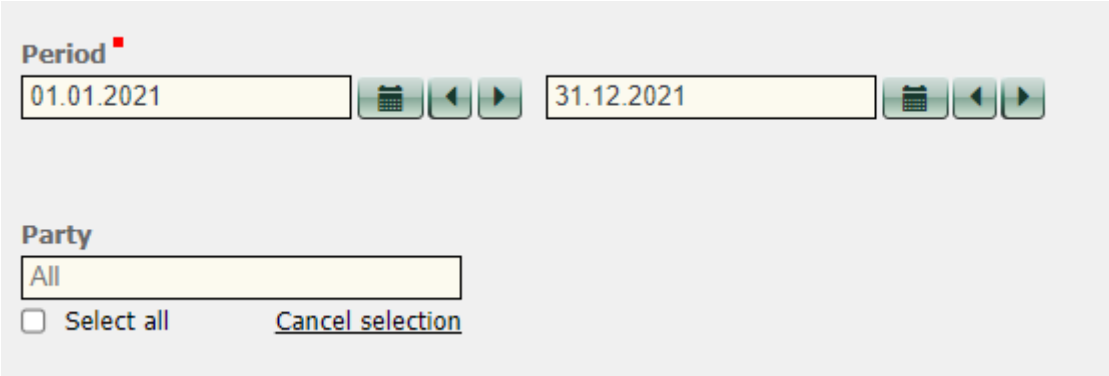


Fig. An example of a simple business filter without additional dependent parts of the view

In some cases, a business filter may not be used.

In certain cases, it is possible to select all items listed within the business filter (the "Select all" box from the list, and it is also possible to deselect this item by clicking on the "Deselect" button).

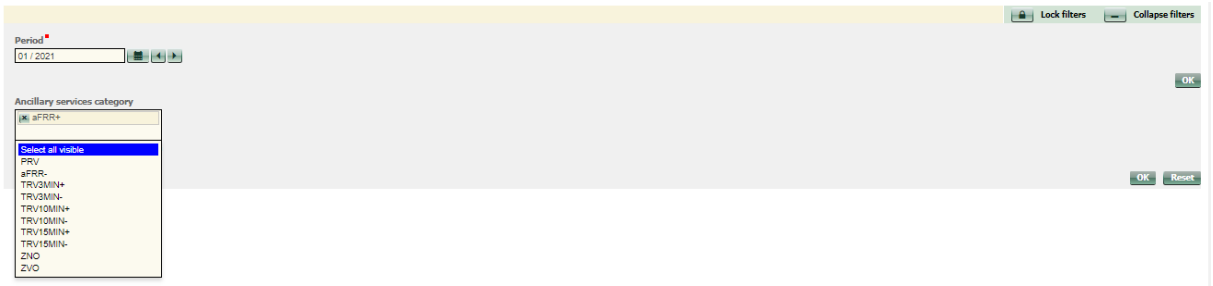


Fig. Business filter - Select all items from the list

Continuous saving of business filter settings

When working with the view, selected values of individual filter elements are stored when using a material filter. After logging in to the system again and the first time the view is opened, the values of the material filter are pre-set according to this setting of the User Context.

4.9. List

The list is a table that displays specific system data based on time and business filter settings. An example of a display can be a list of plant preparations. Detailed values are then hidden under the given data combination.

In the header of the List section there is a button for export to MS Excel and a button that can be used to expand the list and then minimize it. When exporting to MS Excel, the displayed list is exported based on the parameters specified in the filter section. After clicking on the button, it is possible to choose the location of the file and its name.

Fig. List

A simple selection or matrix is used to display the list:

- The selection represents the items that exist in the system for the selected parameter combination in the Filter section. Each row contains information that describes the data. One row represents one data combination. Controls can be placed at the end of a line to run processes on a given data combination.

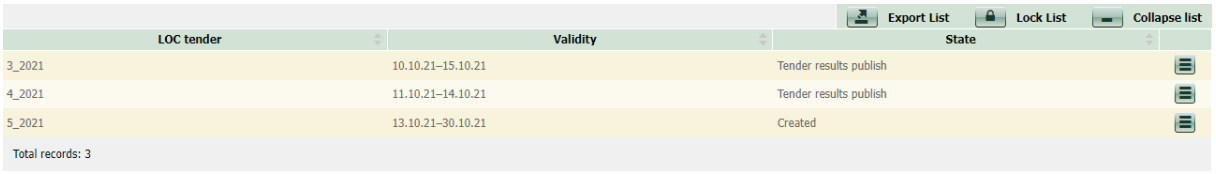


Fig. An example of a list as a simple selection of options for running processes using controls

- The matrix allows you to combine views for more complex situations where it is necessary to display the data corresponding with the user selection more clearly. One matrix cell represents one combination of data. Thus, there may be several combinations of data in one row of the matrix. The controls for a given data combination can also be displayed as part of the matrix cells.

If the output of the business filter is just one data combination the list will be displayed and the detail for the given data combination will also be displayed automatically.

If the list is displayed and multiple data combinations are found in the selection, the user must select the combination in the list to be displayed in the detail section. The user selects the data combination by clicking on a chosen line in the list. For a matrix, the selection is made by clicking on one cell. Once selected, the filter and list sections are automatically minimized and then the Detail section is updated according to the selected data combination.

Running processes from the list

If the list contains controls, the user is allowed to run particular processes using such list.

The selection is made via the icon to the right side of the line in the list section. If the list is minimized, it is possible to start the process on the selected item (row) from the list using the "Executable processes" icon  .

After clicking on the icon, an overview of executable processes will be displayed. After clicking on the selected process, a dialog box with a confirmation question will appear. Subsequently, the process is started.

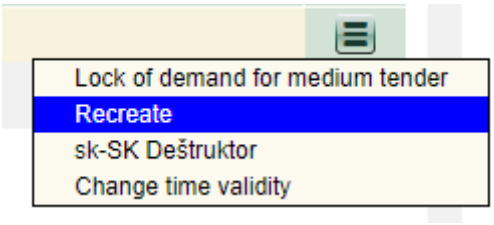


Fig. Example of process initiation via view controls

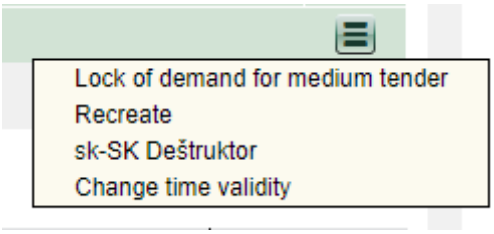


Fig. Example of process initiation for a selected list item

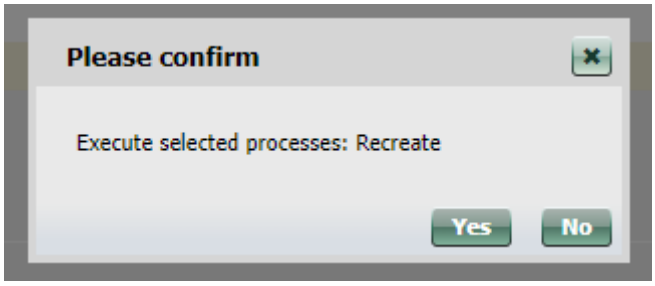


Fig. Example of a confirmation question

4.10. Detail

Next section is the Detail section, which represents the main display space. Data showed in the Detail is based on the selection of an item from the list or after confirming the filters if the list is not defined in the view. The display of details depends on the definition of the view. Based on this setting, the data will be displayed as desired. The Y-axis primarily displays the time data to which the displayed data relates. In some cases, a time unit is defined on the X-axis and, conversely, individual data (or time series) are defined on the Y-axis. Individual Details can be supplemented by aggregation rows that add up values in a dedicated row or a column.

Some data in the Detail may organised in separate tabs. The user then accesses the individual sections by clicking on the appropriate tab. The active tab is highlighted.

Obr. Example of bookmarks of view

Depending on the type of the view, buttons are available at the top left side of the detail section, which are used to control the detail display and export options. These are:

Button	Description	Icon
Options	After pressing the button, the list of available operations will be shown, resp. detail settings such as: Export, Export for analysis (see section Export values), Conditional formatting (see section Conditional highlighting), Additional information, History mode (see section Displaying value history).	
Maximize	The button allows you to display the Detail section on the entire main application window. To return to the original view, click on the icon in the left corner of the  "Default view" detail (see Enlarging the data display area).	
Edit	After pressing the icon, the detail section is switched to the editing mode and the cell in which the cursor is currently located is highlighted. After editing, the user chooses from Save, Cancel or Validate (see icons below). The edited data can be checked before saving using the "Validate" function. The "Cancel" function is used to cancel. In the case of the "Save" function, the data is validated and saved at the same time. 	

The available icons above the detail indicate a view mode that can be read-only, read-write, or write-only. The view updates automatically. automatic update defined. In this case, the displayed values are automatically refreshed at a given interval. The user can also refresh the view manually using the "Refresh" button in the controls section below the detail.

An integral part of the Detail is also the Controls section, which is displayed below the Detail itself. The section contains the buttons that are currently available to the user (see Controls)

4.10.1. Saving view settings

Autosaving view settings

If the user changes the view settings (e.g. chooses to display conditional highlighting of values or additional information in the Detail v settings), this setting is saved in the database as a user setting for each view separately.

Manual adjustment of the view

The view setting allows you to save the input value for displaying data and later use this saved setting for quick access to specific data.

The option to create settings is in the controls at the bottom right of the screen. After clicking on the "Settings" button, a dialog opens for entering the setting values.

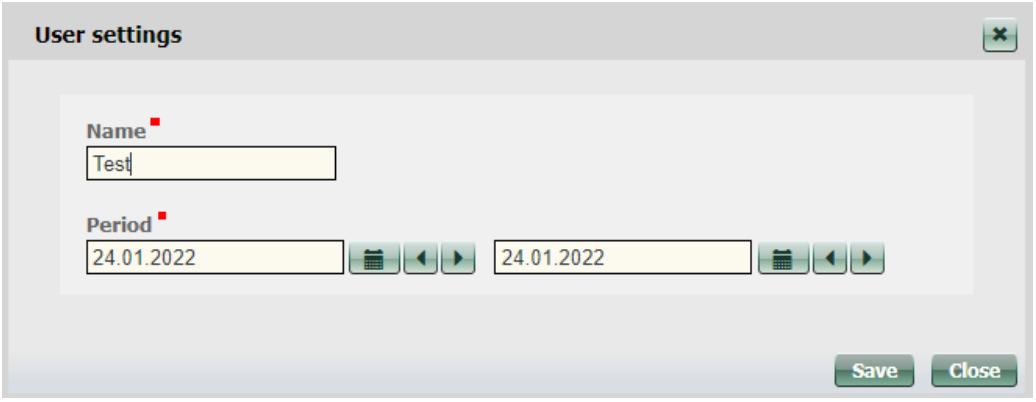


Fig. View settings - enter settings

In this step, the user must fill in the name of the setting. The period is pre-set according to the currently displayed data and can be adjusted. If the view also uses business filters, it is possible to select the option to save the business filter settings.

The settings are saved after clicking on the save button and the screen reloads. The name of the created setting is displayed in the screen header next to the name of the displayed data and a new control element to select the saved setting (displayed as the icon ☰) is displayed in the control panel below. After clicking the button, a menu with a list of saved settings will appear. The setting is selected by clicking on an item in the list.

Fig. Saved view settings

Fig. List of view settings

Changes to the settings can be made in the given view by clicking on the "Settings" button. By clicking the “Delete” button in the dialog box the setting can be deleted.

The view setting is always valid for the given user in the given environment.

4.10.2. Data display

Column width

The columns are displayed at the maximum allowed width after loading and the cell contents may not be displayed entirely. In this case a symbol appears in the right part of the cell.

Fig. Placeholder in case of incomplete display in the cell

After hovering the mouse over the icon, the entire value is displayed in the context help.

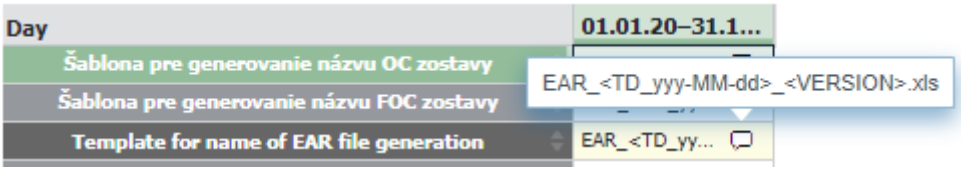


Fig. Display the entire value in the cell

The column can be expanded by hovering the mouse over the edge of the column in the table header. The column is expanded by drag-and-drop.

Display of the view in interval mode

Interval mode view is a view that has the "Show in interval mode" flag set positively. Thus, the values are not displayed in units, but in the interval from-to for which the given value is valid for. Such view is used especially in the case of views of trade registers and values, which change only occasionally over time.

Day	Hour	Original - losses [MWh	Actual supply [MWh	Energy price [€/MWh	losses payment [€	Zobchodovanie
01.01.2021	01	0	-1.511	45.54	-68.8109	19.10.2020 14:00:00
	02	0	-1.502	41.59	-62.4682	
	03	0	-1.511	40.05	-60.5156	
	04	0	-1.523	36.9	-56.1987	
	05	0	-1.522	34.47	-52.4633	
	06	0	-1.512	32.82	-49.6238	
	07	0	-1.536	27.7	-42.5472	
	08	0	-1.503	15	-22.545	
	09	0	-1.559	8.43	-13.1424	
	10	0	-1.615	20.77	-33.5436	
	11	0	-1.598	27.7	-44.2646	
	12	0	-1.443	38.91	-56.1471	
	13	0	-1.434	41.78	-59.9125	
	14	0	-1.452	41.3	-59.9676	
	15	0	-1.461	42.74	-62.4431	
	16	0	-1.509	43.06	-64.9775	
	17	0	-1.552	49.33	-76.5602	
	18	0	-1.586	54.81	-86.9287	
	19	0	-1.537	55	-84.535	
	20	0	-1.554	55	-85.47	
	21	0	-1.554	54.74	-85.066	
	22	0	-1.514	51.5	-77.971	
	23	0	-1.494	51.25	-76.5675	
	24	0	-1.514	46.83	-70.9006	

Fig. Display the view in interval mode

At the same time, it is possible to modify those values that are the same across business dimensions in one step.

Conditional highlighting

The user is notified by a different colour of a cell background, i.e. by means of conditional formatting, that some of the values in the time series are evaluated as suspicious by the system. Conditional formatting must be explicitly included in the design of the view.

Highlighting is displayed only in read mode and is activated by selecting an item in the context menu, which is available on the left above the data table (see chapter Detail).

Aggregation

By aggregation is meant an operation by which certain values are grouped into another value. We distinguish time or business aggregation depending on the grouped values.

If an aggregation function is defined within the time series, the cell with the calculation and the icon that corresponds to the given aggregation function is displayed in table of the Detail section.

Example of aggregation line display and overview of aggregation functions and their symbols:

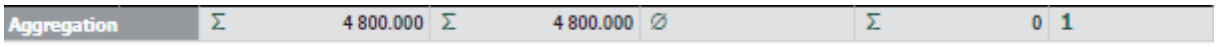


Fig. Aggregate row preview

Icon	Aggregation function	Description
Σ	Sum	Returns the sum of values, reflects the SUM or SUM2 function.
Σ_+	Sum of positive	Executes a sum of positive numbers.
Σ_-	Sum of negative	Executes a sum of negative numbers.
↓	Minimum	The return value is the minimum of the values.
↑	Maximum	The return value is the maximum of the values.
∅	Average	Returns the average value.
1	First	Returns the first value found.
n	Count	The result is the number of values.
⋈	All or nothing	If all values are the same, the function returns this identical value. Otherwise, the cell value is empty.

The cells of the aggregation rows or columns will contain the aggregated values of the defined table area.

View the history of values

The user can turn on "History Mode" in the setting of the Detail section if available.

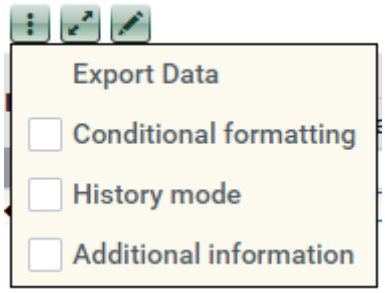


Fig. History Mode

When turned on, all values are marked as a link (i.e. underlined).

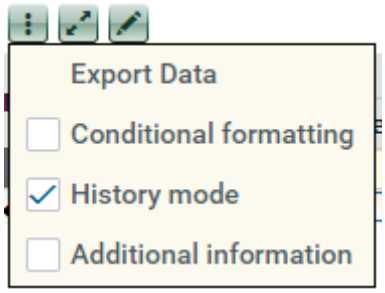


Fig. History mode - on

After clicking on the selected value, a pop-up window will appear with information about the last change.

Disaggregation

The values in the Detail section can also be displayed through a disaggregation function (time and business dimensions), i.e. via the "Repeat" or "Divide" function.

Increase data display space

If a large amount of data that does not fit in the dedicated part of the screen is displayed, the space can be increased by hiding unnecessary parts of the screen.

Hiding options:

Part of the screen	Approach	Icon
Navigation menu	The hide menu icon is located on the left side of the controls below the table. Click on the icon to hide the navigation menu. Click the icon again to display the menu again.	
Filters and controls	Filters and controls can be hidden under the table. When you click the icon, the displayed table expands through the filters and controls. The extension does not allow you to overlay menus that need to be hidden separately (see the procedure above).	

When you hide all of these sections, the view is maximized to the entire browser window space.

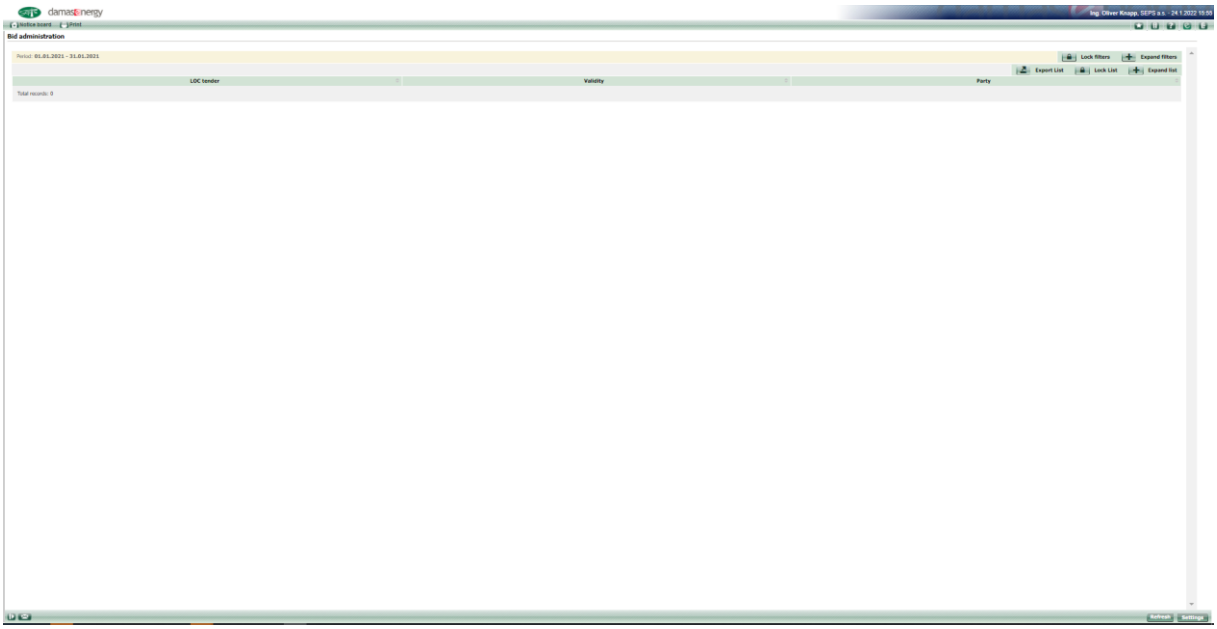


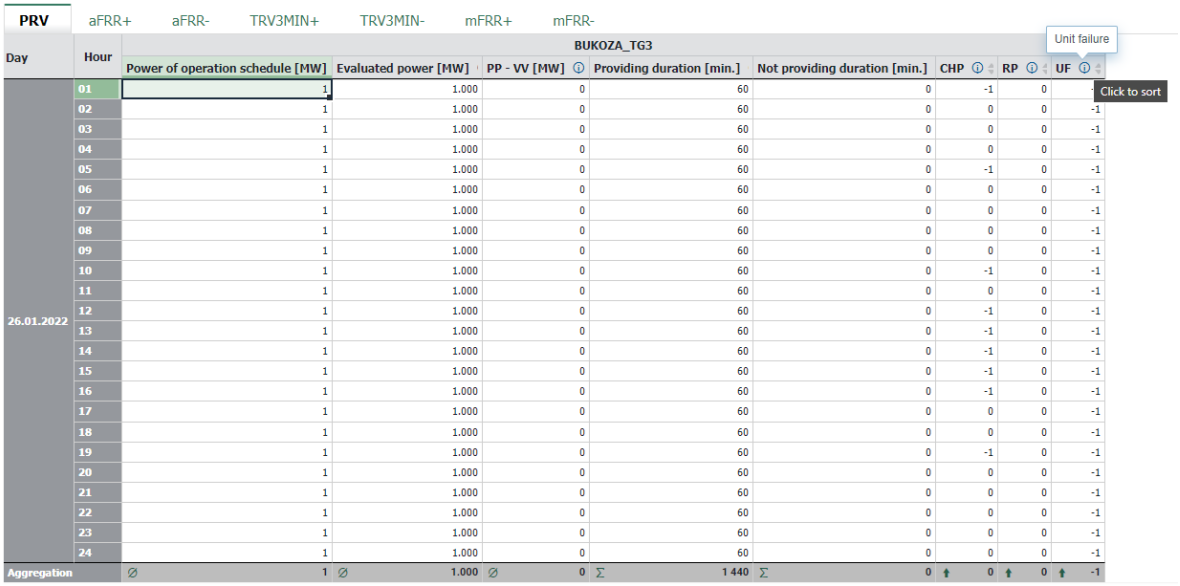
Fig. Full screen view

Graphical highlighting of cells

Highlighting	Name	Description
	The value is being recalculated	Indicates the status of the derived time series at the time the values are being recalculated.
	Mandatory value	Input with this label is a required value.
	Correction value	Indicates a value when the user has corrected the calculated value.
	Correction value older than calculated	Indicates a value when the user corrected the calculated value and it was subsequently recalculated.
	Signature highlighting by users	The value has been signed by the user certificate and therefore validated.
	Conditional highlighting (examples)	Highlighted cell based on a predefined colour in Conditional Formatting mode (after pressing the Options button  to the left above the view detail).
	Value not available	The requested value is not available. For example, it has not yet been calculated.
	Recalculation error	An error occurred while recalculating the derived time series value.
	Total row	The cell of the total row cell, if used in the detail.

Tooltip

In case the icon ⓘ appears in the cell a comment/description will appear after hovering the mouse over the icon.

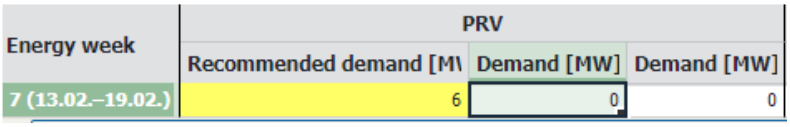


Day	Hour	BUKOZA_TG3							
		Power of operation schedule [MW]	Evaluated power [MW]	PP - VV [MW]	Providing duration [min.]	Not providing duration [min.]	CHP	RP	UF
26.01.2022	01	1	1.000	0	60	0	-1	0	
	02	1	1.000	0	60	0	0	0	-1
	03	1	1.000	0	60	0	0	0	-1
	04	1	1.000	0	60	0	0	0	-1
	05	1	1.000	0	60	0	-1	0	-1
	06	1	1.000	0	60	0	0	0	-1
	07	1	1.000	0	60	0	0	0	-1
	08	1	1.000	0	60	0	0	0	-1
	09	1	1.000	0	60	0	0	0	-1
	10	1	1.000	0	60	0	-1	0	-1
	11	1	1.000	0	60	0	0	0	-1
	12	1	1.000	0	60	0	-1	0	-1
	13	1	1.000	0	60	0	-1	0	-1
	14	1	1.000	0	60	0	-1	0	-1
	15	1	1.000	0	60	0	-1	0	-1
	16	1	1.000	0	60	0	-1	0	-1
	17	1	1.000	0	60	0	0	0	-1
	18	1	1.000	0	60	0	0	0	-1
	19	1	1.000	0	60	0	-1	0	-1
	20	1	1.000	0	60	0	0	0	-1
	21	1	1.000	0	60	0	0	0	-1
	22	1	1.000	0	60	0	0	0	-1
	23	1	1.000	0	60	0	0	0	-1
	24	1	1.000	0	60	0	0	0	-1
Aggregation		∅ 1	∅ 1.000	∅ 0	Σ 1 440	Σ 0	0	0	-1

Fig. Tooltip

Modified value in edit mode

The modified value is highlighted in the cell in yellow in edit mode:



Energy week	PRV		
	Recommended demand [M\	Demand [MW]	Demand [MW]
7 (13.02.–19.02.)	6	0	0

Fig. Cell editing

If the user makes a data modification the corresponding tabs is marked by a pencil icon next to the tab name. The icon identifies the change.

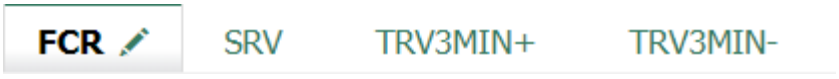


Fig. Edit - tab

If no data exists for the selected display combination, the cell background is hatched with gray bars.

53 (01.01.–01.01.)			27,0	27,0
1 (02.01.–08.01.)	27,0	27,0	27,0	27,0
2 (09.01.–15.01.)	27,0	27,0	27,0	27,0

Fig. Non-existent data

Data recalculation

If the values displayed in the table are recalculated when the data is saved and the system is unable to obtain the final value before the screen is refreshed it marks the recalculated values with an icon (purple triangle in front of the value in the cell).

Fig. Recalculated data

Additional display features

Functionality	Description
Sort by values	The columns in each table have a default sort tool by clicking on the column header.
Lazy-loading	Data for components that are not currently visualized is not loaded when the page loads, but only after the user decides to visualize them. An example is data on tabs, where the data on the second tab is obtained only after the user invokes the display of the content of this tab (by clicking on the tab).

4.10.3. Entering data into Detail section

In most cases, the data is displayed in the read-only mode when first loaded. If the view is read-only, the user must click the Edit button. If the button is not available, the user does not have the right to edit the displayed values.

The editing ban can be evaluated on the basis of the user rights to the displayed data or given the system status (the user may not have the right to edit the displayed data at a given time due to ongoing processes).

If the user switches to edit mode and has the necessary rights, time series values can be edited. The actual editing of values is performed by clicking on the given cell and the user can change the value.

Simply click on a cell to select it. In this state, it is necessary to double-click to switch the cell to edit mode (or by pressing the Enter key).

For each changed value, a check is performed upon saving the values.

The field for entering values can be different in case of:

1. text field
2. logical value
3. date and time
4. selection from the list

Text box

The text box is used to enter numbers, texts and dates. If the user edits a cell, he can move to a neighboring cell by pressing any of the arrow keys. Also, pressing the Tab key moves the

cursor to the right, and pressing the Shift key moves it to the right. The cell to which the cursor is moved opens directly in edit mode and the user can enter additional values.

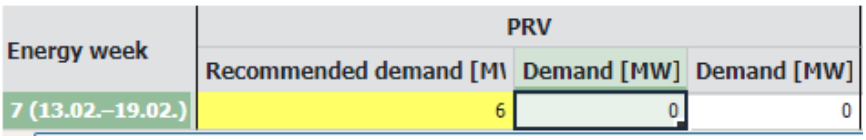


Fig. Edit text field (enter number)

Logical value

A logical value can have two states – one or zero. A check box is used for the graphical display. If checked, the value 1 (yes, true) applies and unchecked 0 (no, false). The change is made by clicking on the check box.

Fig. Example of entering a logical value (context help shows the entered value)

Date and time

The date and time are entered in the text box, which is checked according to the pre-set format. The value can be changed either by overwriting or by using a calendar that allows you to select a value.

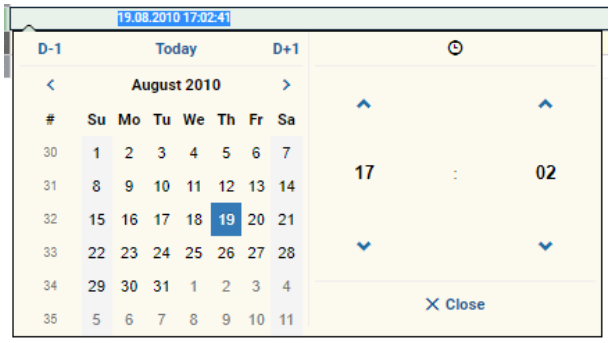


Fig. Example of entering a value using the calendar

Selection from the list

The system provides management of various registers. These registers can be linked to another register. The selection is made from the list of register items. In some cases, you can select multiple items of choice by holding down the CTRL key and clicking on the chosen items one at a time.

The list of items in the register contains only those items whose validity is wider or equal to the validity of the time series for which they will be a value.

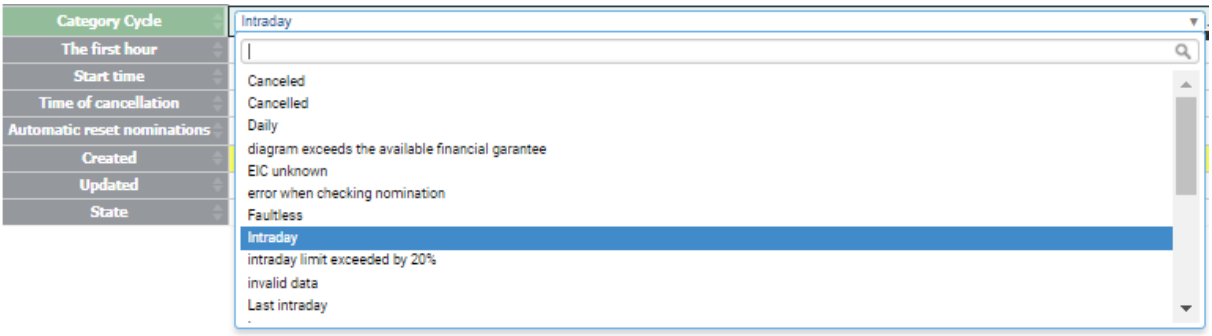


Fig. Example of entering a value by selecting from a list

Insert a file

The contents of the cell can be binary data, such as output reports, report templates or data exports. The data is displayed in the cell as a file name.

Fig. File insertion

In edit mode, an "Insert" button will appear above the file name.

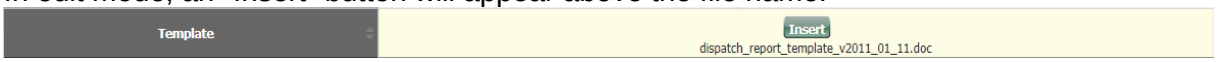


Fig. File insertion - editing

Clicking the "Insert" button will open a browser dialog to select a file on a disk. After selecting the file and confirming the dialog box, the name of the inserted file is displayed in the cell.

Fig. File insertion - save

When you save the data, the file is sent to the server and saved together with the other values.

Insert a new interval

In case of data with a continuous time unit and if some data are stored with a finer time unit granularity (e.g. continuous interval of days and day) it is possible to insert new time intervals[1].

If all the conditions for inserting an interval are met, the "Insert interval" button will appear in the controls above the detail table.

Fig. Interval insertion

[1] The adjustment is suitable, for example, if the telephone contact or correspondence address changes from a certain date.

Clicking the button opens a dialog box for selecting the new time interval.

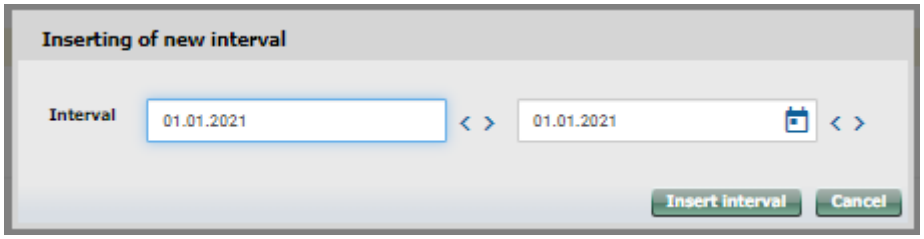


Fig. Interval insertion - selection

Click the "Insert Interval" button to insert new cells into the table.

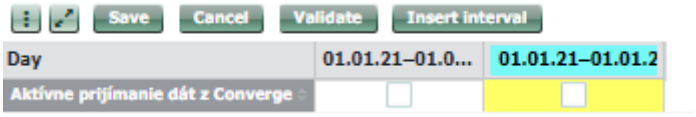


Fig. Interval insertion - insert

Values that are continuous (i.e., with a continuous time unit, e.g. a continuous interval of days) are not editable, and the cell background is hatched with gray bars.

After saving the changes a different value (e.g. phone number) is given for each interval separately.

The header then shows for which time periods the value is valid.

Since the same values can be merged into time intervals, if the same value is entered, the two consecutive intervals will be merged.

Change of the validity of a register item

If the appropriate rights are set, the user can modify the validity of the code values. This functionality is induced by clicking on the button in the controls. The control name is variable and refers to the values currently displayed. For example, in the case of codebooks, it may be called "Edit codebook entry".

Creating a new combination of values

If the user has the appropriate rights, he can create new combinations of values. This functionality is induced by clicking on the button in the controls. The name of the button is variable and relates to the currently displayed values (e.g. in the case of registers, it may be called "Create new register item").

Check of unsaved values

If the user is working with unsaved data in the Detail section and runs another use case, such data could be lost. In this situation, the unsaved data will be checked by the browser function. This is especially the case when the user tries to:

- Open another use case from the menu.
- View a list of messages.
- Display semaphore.

- Start the process from the list controls.

In this case, users are presented with a dialog with the notification about not saving the data. The dialog box may differ depending on the web browser you are using.

If you press the Cancel button, the application will display a warning dialog box with the options "Continue editing" and "Discard changes". If you select the discard changes option the modifications will not be saved and the user will leave edit mode.

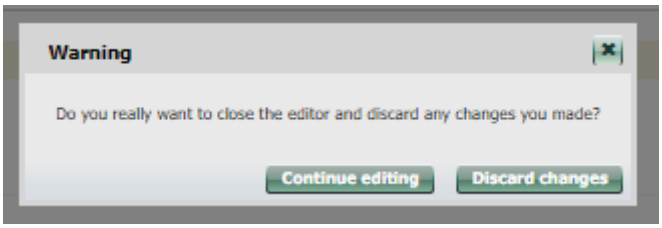


Fig. Warning – closing the editor mode

Saving the data

The operation is triggered by clicking the "Save" button. Then the Detail section will turn gray and the saving icon will appear:

Fig. Saving icon

At the same time the data are also validated by the system. Subsequently, the saving process is completed, and the validation result is displayed to the users. Otherwise, the system informs you that the data has been saved successfully.

If the user does not make any changes in the editing mode and still presses the "Save" button, the system informs that the data has not been saved as no changes have been introduced.

Consistency check

In addition to validations, the save operation also checks whether another user has changed the edited data. In such situation two or more users simultaneously open the table with data in edit mode, edit the same data and try to save it. In this case, unwanted values may be overwritten.

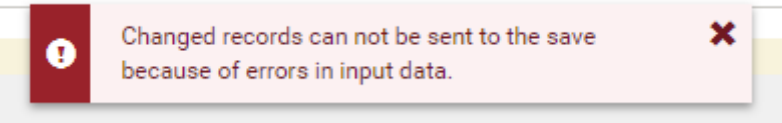


Fig. Consistency check

Validation of values

Validation is performed before the values are saved and the user always receives the resulting validation message.

Validation can also be performed separately before saving by clicking the Validate button in the Detail controls.

The system performs several types of validations. Based on the business type that is assigned to the time series, a basic validation of the value of a given cell is performed. This validation checks the correctness of the format against the business type. In most cases, it is necessary to perform further validation, e.g. based on the state of the system or based on filling in another value in the system. It is also possible to perform validation for the time series value obligation (the obligation can be defined for the whole time series). In this case, an entry obligation check is then performed for each changed value.

The validation result is displayed in a dialog box. At the same time, the result of the validation is given for cells that the control evaluated as invalid, and tabs to which the invalid data belongs are also marked.

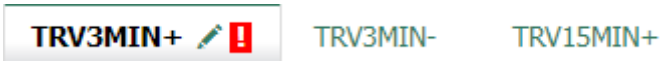


Fig. Validation - marking a tab with an invalid value

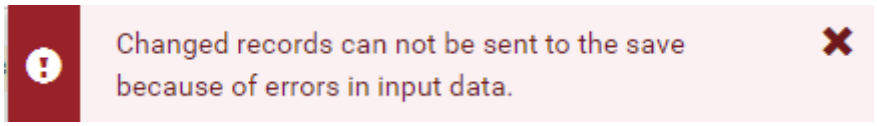


Fig. Validation result - dialog box

TRV3MIN+ TRV3MIN- TRV15MIN+

Day	Hour	Overall hour requirements [M'	Sumárny dopyt po DN [M'	Kontrakt za nulovú cenu [M'
	01	255	255	jsjsj
	02	255	255	0
	03	255	255	0
	04	255	255	0
	05	255	255	0
	06	255	255	0
	07	255	255	0
	08	255	255	0

Obr. Validation result – marking of invalid values

More information about the validation is available by hovering the mouse over the exclamation mark in the invalidly validated cell. The description will appear in an additional window above or below the line with invalid values.

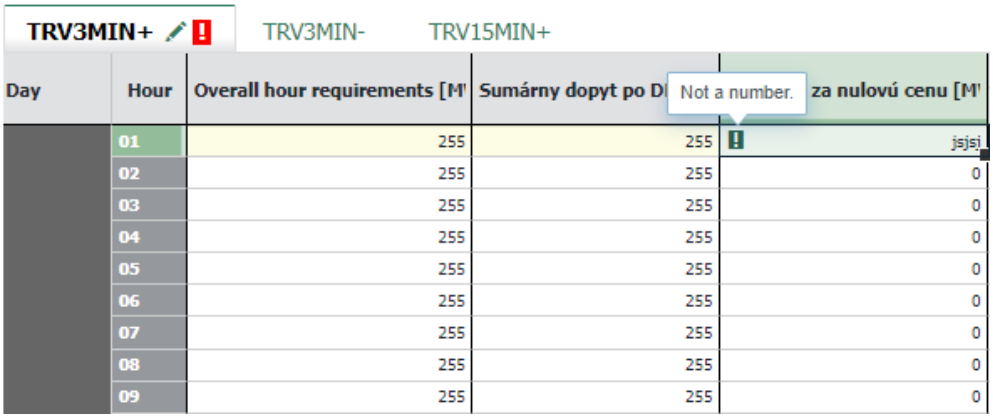


Fig. Validation result - description of the validation error in the view detail

Overview of displayed validations (Graphical cell labelling):

Icon	Name	Description
	Error	Indicates a serious error of the entered value with which it is not possible to process further.
	Warning	It represents an error that allows further processing.
	Weak error	Validation failed, but users with the appropriate rights can force data to be received. Acceptance is then available in the controls above the view detail using the check box.

File download

The content of the displayed cell can also be binary data, such as output reports and data exports. The data is displayed as a file name in the cell. Clicking on the name will open a browser dialog box to download the file to the user's device.

Fig. Download file

Export

The export of values is based on the displayed data and is created in MS Excel format. After creating the file, the user is offered the option to download the file using the standard browser function.

Export options are available in the controls above the detail table indicated by the icon . After clicking the button, a list appears, which offers the option to download the file.

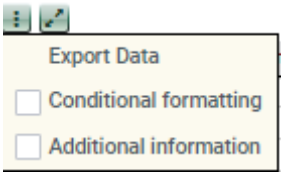
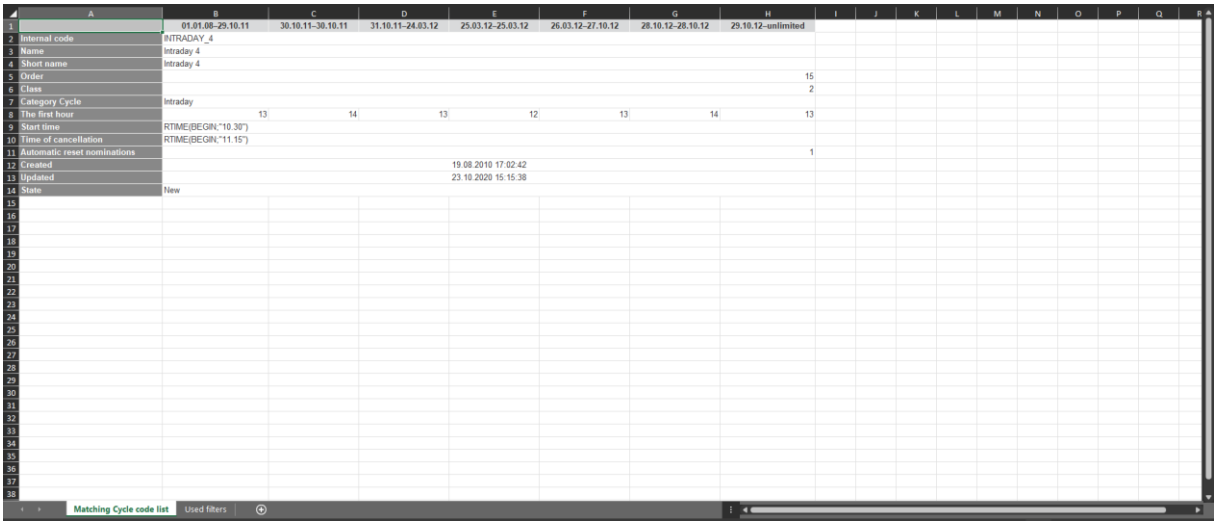


Fig. Export options

If you select Export, the data is exported as it is displayed on the screen. Highlights are not exported, calculated data is exported as result values, not as formulas.



	01.01.08–29.10.11	30.10.11–30.10.11	31.10.11–24.03.12	25.03.12–25.03.12	26.03.12–27.10.12	28.10.12–28.10.12	29.10.12–unlimited
Internal code	INTRADAY_4						
Name	Intraday 4						
Short name	Intraday 4						
Order							15
Class							2
Category Cycle	Intraday						
The first hour	13	14	13	12	13	14	13
Start time	RTIME(BEGIN;"10.30")						
Time of cancellation	RTIME(BEGIN;"11.15")						
Automatic reset nominations							1
Created				19.08.2010 17:02:42			
Updated				23.10.2020 15:15:38			
State	New						

Matching Cycle code list | Used filters

Fig. Export – document example

4.11. Working with process diagrams

Processes and states are defined by configuration based on requirements. These are then organized into process diagrams.

When monitoring the system status, the user can use a time filter to enter the time period for displaying the diagram, or he can further specify the displayed area of process control using a business filter and a list. The control of these sections works in the same way as in the case of the data view described in the previous chapters.

The detail of the process diagram is formed by graphical elements of processes, states and connections between them or related objects that affect the displayed process diagram.

After hovering the mouse over the individual graphic elements of the diagram, their name / description will be displayed.

Processes are distinguished on the basis of the current phase (e.g. waiting for start, ongoing process, start error, etc.) by the corresponding icon ("Process phase" icon in the figure below) and color. Specific icons define how the process starts and allow actions to be performed.

The individual icons and parts of the graphic display, including the control buttons, are described in the following figure:

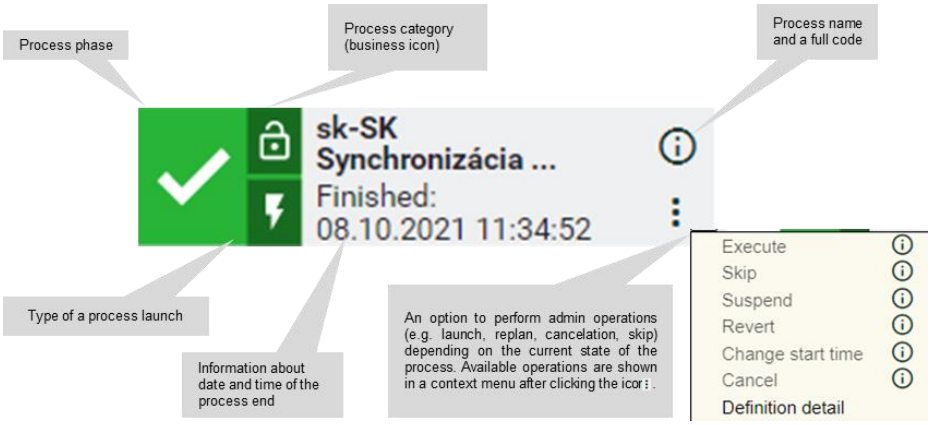


Fig. Graphic representation of the process - description

The ways to start the process are graphically represented by icons, and their color is derived from the phase of the process. The following image shows only the icons and not their possible color variations:

Icon	Methods
	Manual start
	Launch on event
	Automatic start
	Launch at a specific time

The process category icon, also called the business icon (above the process start icon), graphically shows the type of process. The color of the icon is derived from the stage of the process. The following image shows only the icons and not their possible color variations. Processes can have the following categories:

Icon	Process category
	Opening (e.g. opening of PpS bids)
	Disclosure (e.g. disclosure of the results of a particular business process)
	Deadline (e.g. time-limited shares)
	Sending (e.g. sending data to an external system)
	Control (e.g. validation of input data)
	Others

The process phase is represented by a specific image with a specific color design. The processes can take place in the following phases:

Icon	Process phase
	Ongoing process
	The process skip is being processed
	The process is being reverted
	The process has been paused and is awaiting a manual start
	The process has completed successfully at least once and is rescheduled for restart
	The process is scheduled to run
	The process was not established

	The process is not yet scheduled
	Process skip
	The process has been cancelled, not yet scheduled, or there is no data instance
	Process cancelled automatically (expired)
	Process completed successfully
	Process failed
	The process completed successfully; it can be started

If the process contains several entities, it is possible to perform a batch operation, which is represented by an icon  . When you click the icon a dialog box appears with a selection of threads and specific instances. You can start actions by pressing the button for individual instances or in the upper left year when selecting multiple instances (via the check boxes).

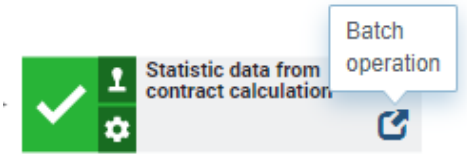


Fig. Graphical representation of a multi-instance process

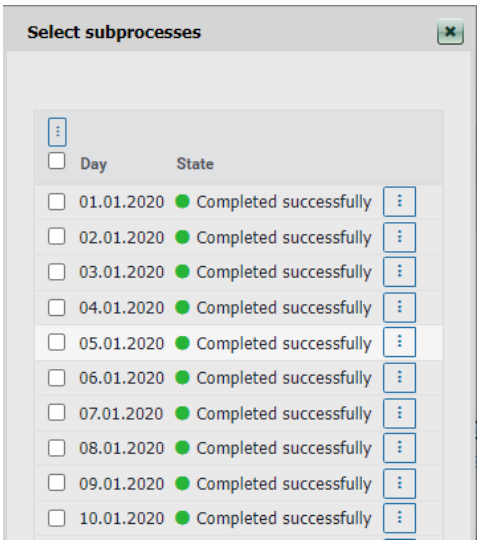


Fig. Process launch - dialog box

Entity states

The states in the process diagrams are graphically represented by a circle with the corresponding icon, while the icon corresponds to the given state of the entity. The color indicates whether the status has already been set:

Icon	Entity state	The colour of the current status setting
	Cancelled	
	Published	
	Locked	
	Open	
	Others	

5. Procedures

5.1. Procedure for exporting the public part of the certificate

1. in Windows, click Start and enter: mmc,
2. after finding launch mmc console:

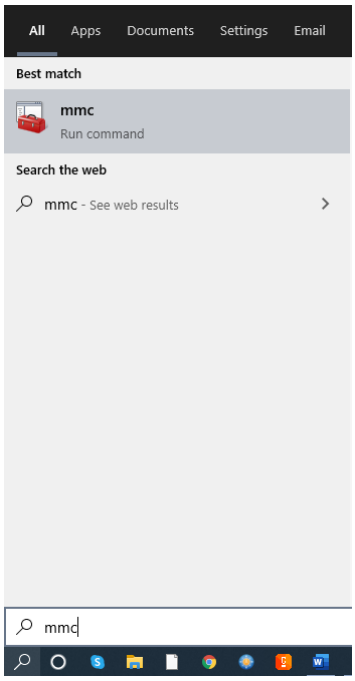


Fig. Procedure for exporting the public part of the certificate

3. Choose File - Add or Remove Snap/ins - check: Certificates, click: Add,
4. in the window that opens, select "My user account" and confirm: Finish,
5. then click: OK,

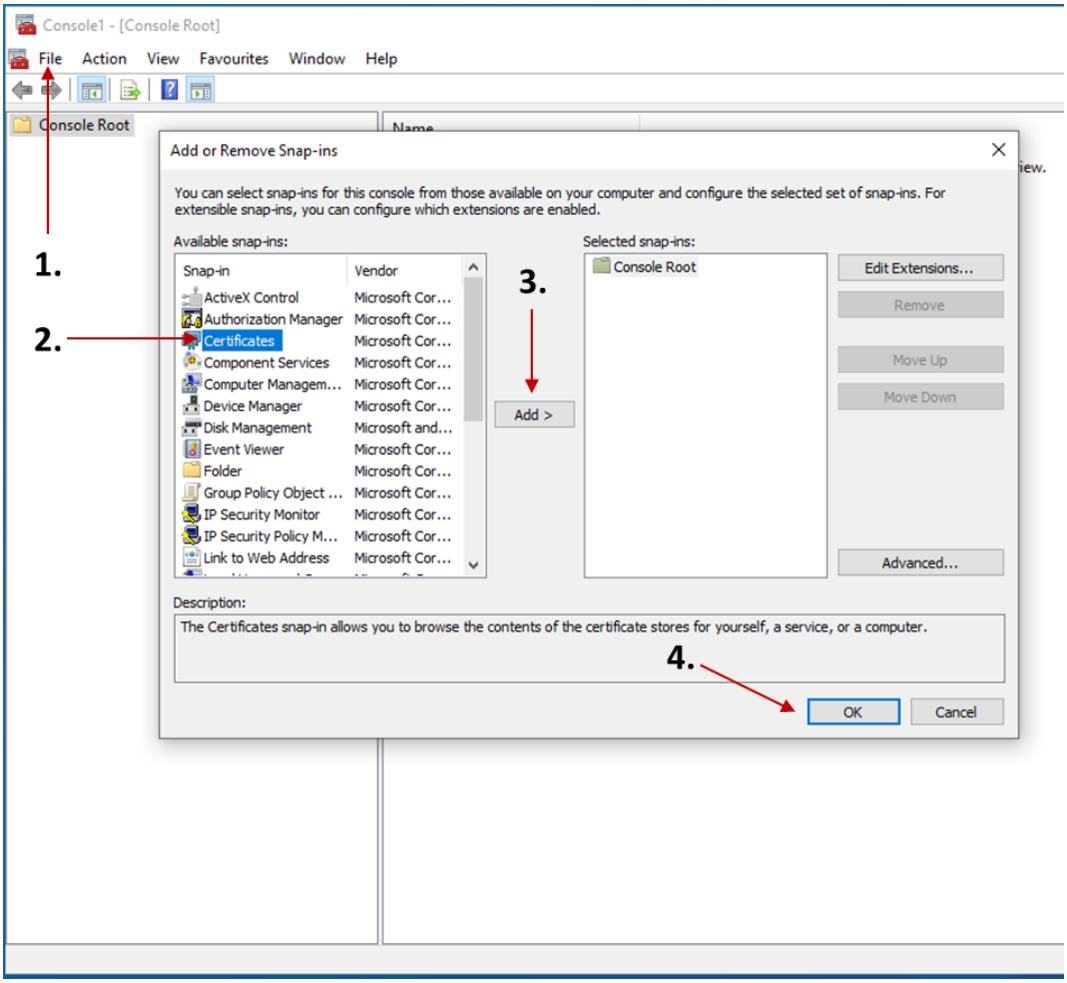


Fig. Procedure for exporting the public part of the certificate – addition

6. expand Current user - Personal – Certificates,
7. find the required certificate to be exported and open it by double-clicking,
8. on the worksheet: Details select: Copy to file,

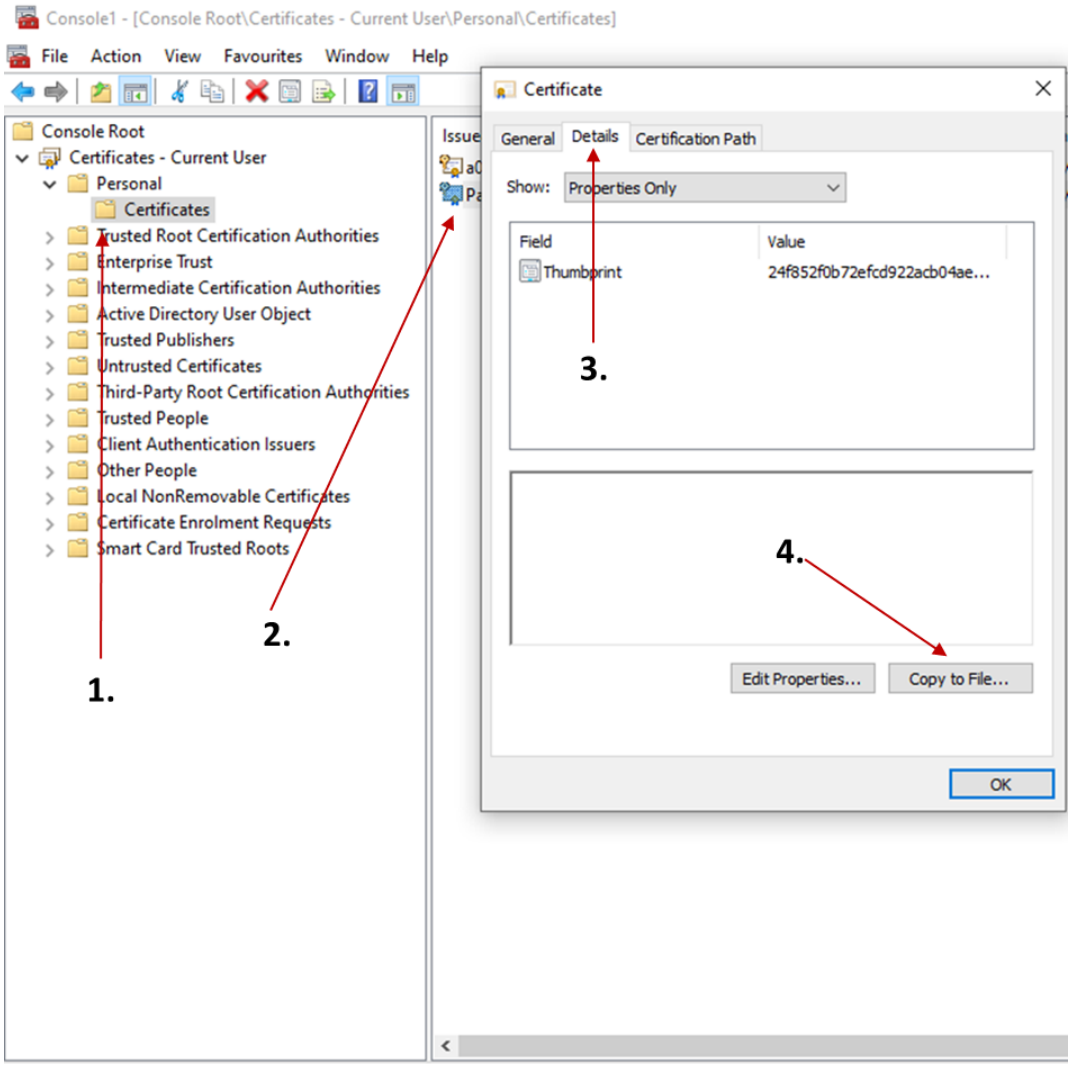


Fig. Procedure for exporting the public part of the certificate - copying to a file

9. in the certificate export guide:
    a. choose whether to export the private key (check option: no),
    b. click Next,
    c. nothing needs to be changed on the next screen,
    d. click Next again,
    e. choose the path and file name where the file will be saved,
    f. click Next again,
    g. click Finish.

6. Definitions

ENG	Abbreviation	Description
Damas Energy	DaE	Electronic portal of the transmission system operator for the purposes of the transmission system operation and it business processes.
Time dimension		An attribute that represents the time dimension of a particular object, usually an entity or time series.
Time series	TS	Chronologically arranged sequence of values of the same type.
Register		An object that combines structured information about specific objects in the real world (such as a power plant codebook) or abstract objects (such as a system language codebook). Dials are more static than other parts of the system.
Data flow		A process or set of processes that ensures the transfer of defined data between two systems using a defined interface.
Data type		An attribute that restricts the type of values that can be stored in an object (usually a time series). An example of a data type is a number or text.
Dimension		An attribute that represents the dimension of a particular object, usually an entity, time series, or file.
Entity		An object that has a certain business significance in the Damas Energy system. An example of an entity may be e.g. ancillary services demand - this is an object that combines certain properties (e.g. status - published / unpublished) or data (demand for the performance of specific ancillary services).
Historization		The process of saving value changes in the system. The function is available through a special mode within the time series views.
Instance		An object with attributed values of attributes or usually filled with specific content. An instance is created by a definition.
Component		A subset of the module that integrates time series, entities, forms, etc., in DaE, for example: Daily operational planning, Weekly operational planning, Current operational planning,…
Module		A subset of the subsystem, integrating components in DaE for example: Cross-border scheduling, Operational planning…
Derived time series	TS_DERIVED	Time series values calculated by a defined formula.
Ordinal number	ORD	A number that is part of a sequence of natural numbers.

Item		An entry in the register corresponding to one object in the real world or one abstract object (see also Register).
Primary time series	TS_PRIMARY	Time series values are entered by the user or another input (for example from another system).
Process		A process is an operation or sequence of operations that a system performs with entities according to predefined rules. An example of a process can be the execution of a calculation algorithm, the transfer of data from / to an external system or just a change in the status of an entity (opening or closing the possibility of entering data to the user, e.g. closing deadlines for an auction).
Role		The position of a person in the process with specified responsibilities and powers. A role is a means of ensuring the substitutability of users, where rights are tied to roles, not to specific users.
Semaphore		In the context of DaE, an use case providing an overview of the conditions within the system.
Set of time series		An object associating time series to be processed together by a visual or non-visual use case.
State		One of the characteristics of the object, e.g. entities, processes, items.
Entity state		One of the basic characteristics of an entity. The state of the entity indicates operations that can be performed with the entity at a given moment (e.g. whether it is possible to change time series data of the entity, etc.) and processes hierarchically above the entity that can be started at a given moment.
Process state		Each process has a defined possible course that determines what states an instance of that process can be in. The state flow is common to all processes in the system.
Subsystem		A subset of the system, integrates modules in DaE.
System time series	TS_SYS	Time series created within the implementation.
Validation		Verification process - for example, when storing time series values, validation determines whether the given values meet the defined criteria.
Subject dimension		An attribute represents the material dimension of a particular object, usually an entity or time series.

Appendix 1 - List of supported certification authorities in the Damas Energy system

AAA Certificate Services	MOL Root CA 1
AC RAIZ FNMT-RCM	Microsec e-Szigno Root CA 2009
APGRootCAGrid	Microsoft Root Certificate Authority 2010
Baltimore CyberTrust Root	Microsoft Root Certificate Authority 2011
CA Disig QCA4	NetLock Arany (Class Gold) FĹ‘tanĂşsĂ-tvĂ˝ny
CA Disig Root R2	NetLock Minositett Kozjegyzoi (Class QA) Tanusitvanykiado
CA EPEX SPOT NoPROD Client	OISTE WISeKey Global Root GA CA
CA EPEX SPOT NoPROD v2	OPCOM System CA
CA EPEX SPOT PRODUCTION Client	OPCOM Trading
CA2	OPCOM Trading System
COMODO RSA Certification Authority	POSTArCA
Certum CA	POSTArCA Root
Certum Trusted Network CA	PSE CA
Class 1 Public Primary Certification Authority	PostSignum Root QCA
Class 2 Public Primary Certification Authority	PostSignum Root QCA 2
Class 3 Public Primary Certification Authority	PostSignum Root QCA 4
Class 3 Public Primary Certification Authority	Posta CA Root
D-TRUST Root CA 3 2013	Pwx Dev Certificate Root
D-TRUST Root Class 2 CA 2007	QuoVadis Root CA 1 G3
DARRootCA	S-TRUST Authentication and Encryption Root CA 2005:PN
DaERootCA	SVK eID Root CA
DigiCert Assured ID Root CA	SZAFIR ROOT CA
DigiCert Global Root CA	SecureTrust CA
DigiCert Global Root G2	Starfield Class 2 Certification Authority
DigiCert High Assurance EV Root CA	StartCom Certification Authority
Disig CA External	TC TrustCenter Class 2 CA II

Entrust Root Certification Authority	TC TrustCenter Class 3 CA II
Entrust Root Certification Authority - G2	TC TrustCenter Universal CA I
Entrust.net Certification Authority (2048)	TGE DIN CA
GLOBALTRUST	TRUST2408 OCES Primary CA
GLOBALTRUST 2015	USERTrust RSA Certification Authority
Generic Root Trust CA	Unicorn CA
GeoTrust CA for UTI	VATTENFALL ENERGY TRADING NETHERLANDS NV CA
GeoTrust Global CA	VPNCA
GeoTrust Mobile Device Root - Privileged	VSE Holding Certification Authority
GeoTrust Mobile Device Root - Unprivileged	VeriSign Class 1 Public Primary Certification Authority - G3
GeoTrust Primary Certification Authority	VeriSign Class 2 Public Primary Certification Authority - G3
GeoTrust Primary Certification Authority - G2	VeriSign Class 3 Public Primary Certification Authority - G3
GeoTrust Primary Certification Authority - G3	VeriSign Class 3 Public Primary Certification Authority - G4
GeoTrust Universal CA	VeriSign Class 3 Public Primary Certification Authority - G5
GeoTrust Universal CA 2	VeriSign Class 4 Public Primary Certification Authority - G3
GlobalSign	VeriSign Trial Secure Server Root CA - G2
GlobalSign Client Authentication Root R45	VeriSign Trust Network
GlobalSign Root CA	VeriSign Universal Root Certification Authority
Go Daddy Class 2 Certification Authority	ca1
Go Daddy Root Certificate Authority - G2	priv.root.ca
I.CA Root CA/RSA	self billing
INDRA SK Root CA	smart.PKI.root
INETCERT	thawte Primary Root CA
KCA NBU SR 3	thawte Primary Root CA - G2
MOL Root CA	thawte Primary Root CA - G3