

Performance and self-consumption

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Performance task

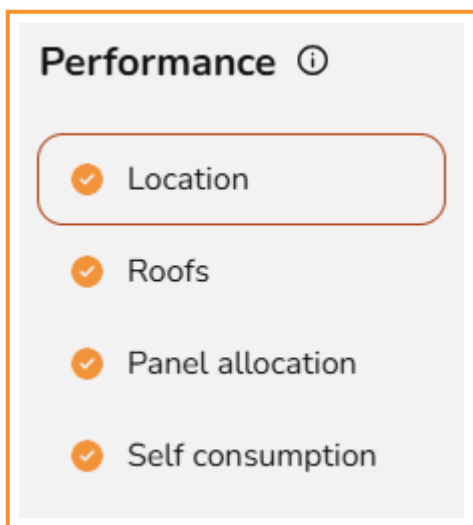
This guide applies to easy-pv.ie and easy-pv.co.uk versions of Easy PV. The information provided here may not be accurate for easy-pv.com.

The performance task uses the system data, location and shading information to estimate the annual output of the system. This is then used in self-consumption calculations to estimate how much of what is generated will be used directly, used to charge a battery or exported to the grid, which is needed to estimate the financial benefits of the system.

Getting started with the Performance task

You can access the Performance task via the '**Tasks**' **drop-down menu** or from the **task list** to the left on the project overview page.

When the Performance task first opens, you'll be shown a popup that lets you **configure the settings** you want to use. You can use the left hand navigation to choose the settings you want to edit. More information on each of the settings is available below.



When you have finished configuring these inputs, click **Done**.

Navigating the performance task

The right hand sidebar contains options to switch between the **Sunpaths** and the **Performance results**:

Sunpaths

Performance Results

As well as the following:



Edit inputs

Update the location, pitch and orientation of the roofs and panel allocation

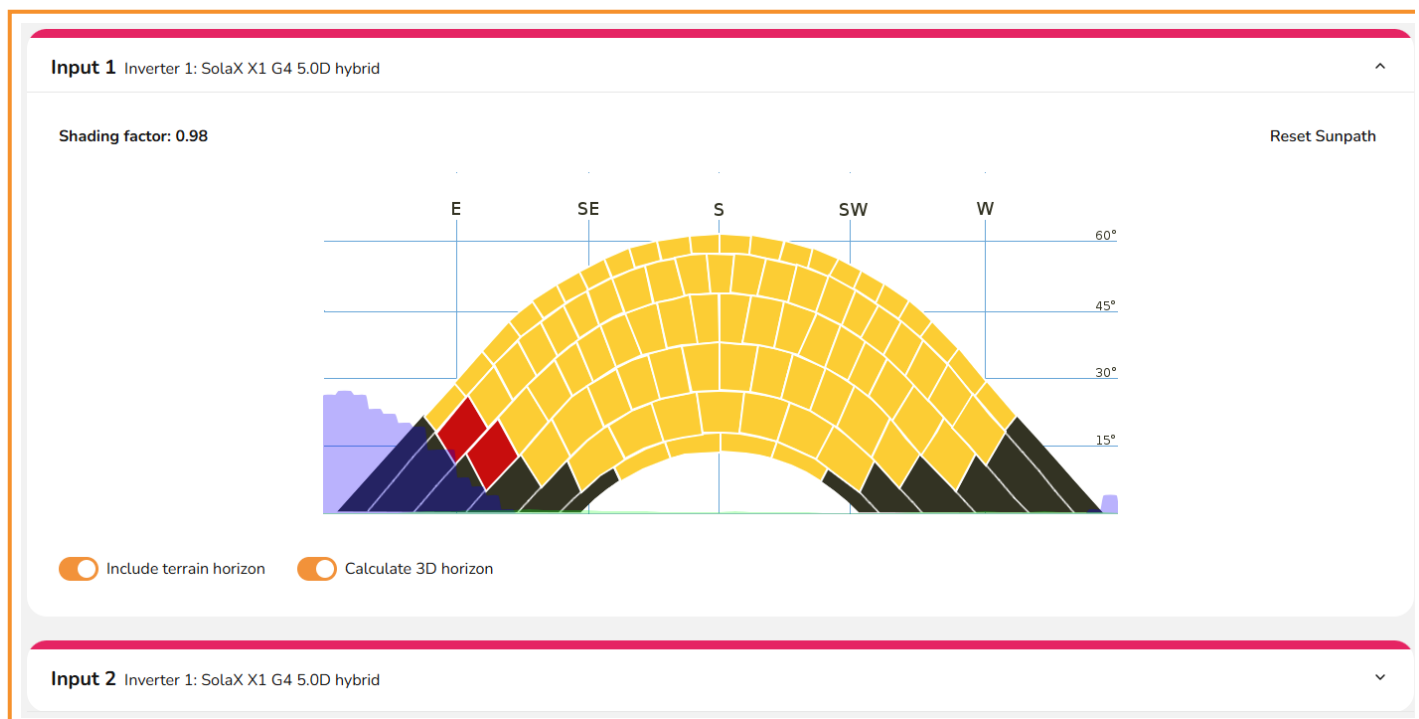


View all options

Including editing performance preferences and opening the help page

View and edit Sunpaths

The sunpath diagrams maps the path of the sun across the sky at different hours in the day for different months of the year. For each point on the sunpath diagram, Easy PV calculates the amount of solar radiation reaching the panels from direct and diffuse radiation. For shaded regions, where direct radiation is radiation is fully blocked, the system calculates how much diffuse radiation still reaches the panels. The shading factor is the proportion of solar radiation that reaches the panels after accounting for these shading losses.



Automating with 3D

If designing in 3D or magic design mode, the shading can be calculated automatically, provided any trees or obstructions have been modeled. Otherwise, you will need to manually draw on the sunpath diagram what shade is on the panels at different points in the year. Click between the inputs to expand the sunpath diagrams for each inverter.

Navigating between inverters and inputs

On the right you will see each of your inverters, when selecting between them you will see each input or shading group for that inverter on the left. Once each sunpath diagram has been calculated, a green tick will show on the inverter.

View the Performance results

These results will depend on which version of Easy PV you are using, below you can expand for information on each version:

MCS performance and self-consumption results

The performance estimate calculated here is based on the method detailed in Appendix B of [MIS 3002: The Solar PV Standard \(Installation\)](#). See the end of [this section](#) for more information on the methodology used for the self-consumption calculation.

The MCS performance report can be accessed from the forms (and then reports) drop down menu.

A. Installation data

This section details the installed capacity, orientation of the system, inclination of the system and the location. These inputs can be adjusted by clicking the pen icon in the top right or by adjusting the panels on the system.

B. Calculations

Using the installation data and the shading factor, an estimated annual output is calculated. To adjust the shading factor, navigate to the sunpaths diagrams tab.

C. Estimated PV self-consumption - PV only

The estimated self-consumption for the system with PV only is taken from the MCS lookup tables, depending on the values above and those input in the task. Click the pen icon to adjust these inputs.

D. Estimated PV self-consumption - with EESS

The estimated self-consumption for the system with PV **and** battery storage is taken from the

MCS lookup tables. This section will not show if there is no battery storage, navigate to the inverter task to include battery storage.

E. Additional benefits from PV and EESS

If additional consumption is anticipated or some of the battery capacity is reserved for ancillary services, that will be detailed here. This section will not show if that is not the case, to edit those inputs click the pen icon in the top right and navigate to the self-consumption tab.

A. Installation data	Inverter 1 SolaX X1 G4 5.0D hybrid	
	Input 1	Input 2
Installed capacity of PV system – kWp (stc)	2.610 kWp	3.480 kWp
Orientation of the PV system – degrees from South	23°	23°
Inclination of system – degrees from horizontal	32°	12°
Postcode region	1	
B. Calculations		
kWh/kWp (Kk) from table	963	900
Shade factor (SF)	0.98%	0.63%
Estimated annual output (kWp x Kk x SF) – kWh	2463	1973
Estimated total annual output – kWh	4436	
C. Estimated PV self-consumption – PV only		
Assumed annual domestic electricity consumption	3500 kWh	
Expected solar PV self-consumption (PV only)	1242 kWh	
Grid electricity independence / Self-sufficiency (PV only)	35%	
D. Estimated PV self-consumption – with EESS		
Assumed usable capacity of electrical energy storage device, which is used for self-consumption	2.7 kWh	
Expected solar PV self-consumption (with EESS)	2129 kWh	
Grid electricity independence / Self-sufficiency (with EESS)	61%	
E. Additional benefits from PV and EESS		
EESS capacity not used for self-consumption	2.7 kWh	
Total energy discharged per annum	1971 kWh	
Additional self-consumption from EV, heat pumps, diverters (only when present)	0 kWh	

NREL performance results

Section **A** details the installed capacity, orientation of the system, inclination of the system and the location. These inputs can be adjusted by clicking the pen icon in the top right.

In section **B**, the data in section **A** is used to estimate the output per kWp for the unshaded array using the NREL's PVWatts calculator. The percentage of output lost from shade is then

subtracted from this value. This is then multiplied by the kWp of the input to calculate the estimated generation per input. To adjust the percentage lost, navigate to the sunpaths tab.

Edit the Performance task inputs

Certain inputs are required for the performance estimate to be calculated. Designing in 3D and [configuring your settings](#) to automate panel allocation and sunpath diagram calculations will streamline much of this task.

Location

If not already input when creating the project, you will need to set the location. This is necessary for performance calculations since where in the world the system is located determines how much sunlight it will get. If there is no postcode for the location of your system, choose the most local one you can find.

This section may show as ticked and completed already if this information can be pulled from the start of the project.

Roofs

If you are creating a flat roof system or using quick roof mode, you will also need to input pitch and orientation. Both this and the location data are used to determine the output of the system.

This section may show as ticked and completed already if the pitch and orientation can be populated from earlier in the project.

Panel allocation

This section will depend on how you have configured your settings.

- If you have selected for your panels to be **automatically allocated**, then panel allocation will show as completed
- If you have selected **suggest allocation** then here you can choose to edit the allocation or select **Done** to accept the allocation and close the window.
- If you have **manual allocation** selected then you will need to allocate the panels here.

There are some cases where auto-stringing will not work and manual allocation will be required. Further information about manual panel allocation can be found [here](#).

Self-consumption calculation

A self-consumption model is available through the [Consumption Task](#). For UK users, this can be provided to customers in addition to the MCS calculation, which is completed here in the performance task.

MCS self-consumption calculation

This process follows MCS guidelines defined in [The Battery Standard MIS 3012 ISSUE 0.1](#) to predict self-consumption of the generated PV electricity. UK companies installing under MCS will need to provide this calculation when it can be used.

Annual electricity consumption of the property

The lookup tables for this calculation only permit values between 1500kWh and 6000kWh. Use the [consumption task](#) for more detailed consumption calculations or for values that fall outside this range.

For the most accurate results use a value from past electricity bills. Where possible, consumption data should be taken before the installation of electric heating / hot water or electric vehicle charging.

Occupancy archetype

Properties that are occupied during the day will typically consume more PV-generated electricity directly. Properties that are empty during the day may benefit more from battery storage that can store PV-generated electricity for later use.

Proportion of battery used for ancillary services such as backup power or arbitrage

If there is a battery on the project, this question will appear. If the entire battery capacity is to be used to increase self-consumption, this value will be 0%.

The lookup tables for this calculation only permit that the usable capacity is less than 15.1kWh, in this case use the [consumption task](#) for more detailed consumption calculations.

Is additional self-consumption anticipated?

The MCS calculation does not account for consumption arising from "non-typical domestic loads" such as electric space heating, swimming pools, heat pumps, electricity power diverters, electric water heating and electric vehicles.

You can enter any figure here, but the calculation assumes that a maximum of 95% of the generated electricity is available for self-consumption so the value in the results table will be capped to the remaining available generation capacity.

Manual panel allocation

Manually allocating panels is slightly different depending on whether the panels are optimised or not. All panels connected to an input must be within a certain pitch and orientation threshold and panels incompatible with the selected string will be unselectable. In this case you may need to add optimisers.

Without optimisers

1. Select the current roof and inverter input from the lists on the left.
2. Click or drag over panels to allocate them to an inverter input.
3. Once all inverter inputs have the correct number of panels, all inputs will be in green and a tick will show at the top. Below all your inverters and roofs, you can then click **next** to continue with the [performance task](#).

With optimised systems

You can add optimisers in the inverter task by clicking **Add optimisers +** to the top right of the inverter string. This will automatically add optimisers to all panels on that inverter, if you would like to remove some, this will have to be done manually in the financial task.


When you then come to allocating the panels the steps are largely similar to non-optimised systems:

1. Select the current roof and inverter input from the lists on the left.
2. Use the **Add group +** option to sub-divide the input into shading groups and select the group you want to allocate panels to. You should group panels that will get similar levels of shade or that are on different facing roofs.
3. Click or drag over panels to allocate them to an inverter input or shading group.
4. Once all inverter inputs have the correct number of panels, all inputs will be in green and a tick will show at the top. Below all your inverters and roofs, you can then click **next** to continue with the [performance task](#).

Adding optimisers in the inverter task will not automatically change the generation.

The generation is a product of the kWp of the inverter, the kk value (which is based on the pitch, orientation and location of the panels) and the shading factor. Putting panels in separate **shading groups** does not correspond to anything physical but allows Easy PV to factor in differences in the kk value and shading factor on the same string. Without shading groups the generation will not change because the kk value and shading factor will be the same on the whole string, as it would be without optimisers.

Other options

- Use the  icon to reset the allocation on the inverter or individual inverter inputs.
- Below where it says **Next**, you also have the option to use auto-stringing. This will not work for systems that require shading groups.

Consumption task

This guide applies to the easy-pv.co.uk and easy-pv.ie versions of Easy PV, references to MCS only apply to the UK site. The information provided here may not be accurate for easy-pv.com.

The consumption task is alternative to the MCS self-consumption calculation completed in the performance task. Unlike with MCS, the Easy PV self consumption task can be used for projects larger than 6000 kWh and with batteries larger than 15.1 kW.

If you would like to use the Easy PV self-consumption calculations as the basis for your financial projections and in the customer proposal, make sure it is selected in the [financial task](#).

Getting started with the Consumption task

You can access the consumption task via the '**Tasks**' **drop-down menu** or from the **task list** to the left on the project overview page.

When the consumption task first opens, you'll be shown a popup that lets you **configure the settings** you want to use for calculating generation and consumption of the system. It will open on the 'Annual consumption' and then you can use the left hand navigation to choose the settings you want to edit. More information on each of the settings is available below.



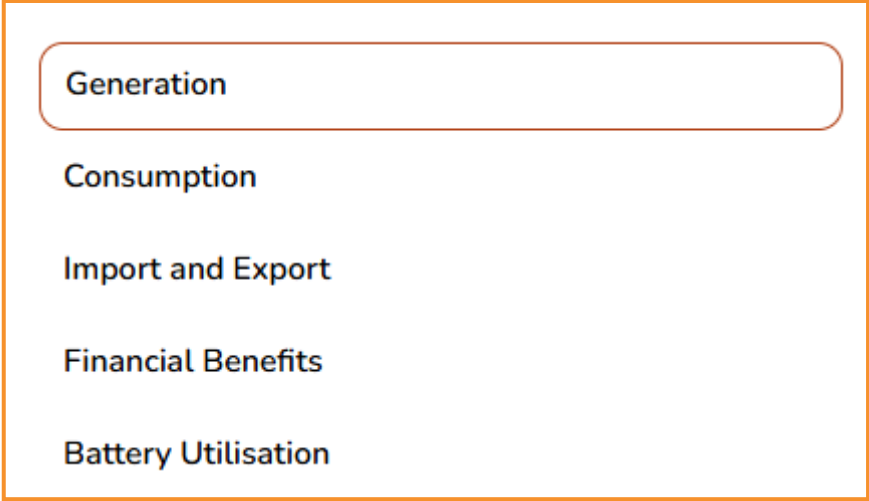
When you have finished configuring these inputs, click **Done**.

Navigating the Consumption task



Once you have configured the Consumption task inputs and submitted them, you can then explore the calculated information.

The left hand side shows the full results of the consumption task calculations and detailed insights. Read the 'View and understand the calculated consumption task data section' of this guide for more information about what's included.

The right hand sidebar on the page includes options to help you navigate through the different sections of insights.



It also allows you to:

Edit inputs Update the annual consumption, tariffs and export limitation used for the calculations.	
Show inverter clipping Choose whether to show and hide the inverter and export limitation clipping on the generated graphs.	

View and understand the calculated consumption task data

Once you have configured the consumption task inputs and submitted them, you can then explore the **estimated PV generation, how energy will be consumed by the property, how much energy is imported and exported, the financial benefits and information about battery usage** (if a battery is included). This includes annual insights and charts to show changes through the year and over the course of each day.

The left hand side of the page allows you to navigate to the different sections of the consumption data and also shows detailed insights, and the right hand side of the page shows info the calculations are based on. You can use the toggle on the right side menu to show and hide the inverter and export limitation clipping on the generated graphs.



Show inverter clipping

Generation

This shows the estimated annual generation of the system and whether the generated energy is used directly in the house, used to charge the battery or exported to the grid. It will also show inverter and export limitation clipping if you've turned on this toggle.

Consumption

This shows the total annual energy consumption of the property and where this energy will come from. It shows how much energy is expected to be supplied directly from the solar array, via the battery or imported from the grid.

Import and export

This shows the likely flow of energy to and from the grid over the course of a year. It's likely that there will be more energy exported during summer when the solar array is generating more energy, and more energy will be imported from the grid during winter months.

Financial benefits

This shows the money spent and earned on electricity flowing to and from the grid over the course of a year. It allows you to see the total money earned from export payments versus the money spent on imports, and how would compare to having no solar installed.

Battery utilisation

This helps you understand the modelled utilisation of the battery over the course of the year based on the amount of the the available battery capacity that is actually charged and discharged each day. Utilisation of over 100% is possible at times where a battery is charged and discharged more than once during a day. Low battery utilisation can be due to either insufficient PV generation to charge the battery (often the case in winter, or on cloudy days), or because loads are small overnight and the battery does not fully discharge. If you have low battery utilisation you may want to reduce the size of the batteries or recommend forced charging of the batteries on an overnight tariff to the property owner.

Edit the consumption task inputs

Set the annual consumption

There are a number of options for setting the annual consumption.

Annual consumption ?

Annual electricity usage for the property is required. Enter the value from an electricity bill or select a typical amount using the options below.

Consumption method



Annual usage ?

Enter the property's annual electricity usage



Meter Data ?

Upload a .csv of the half-hourly data



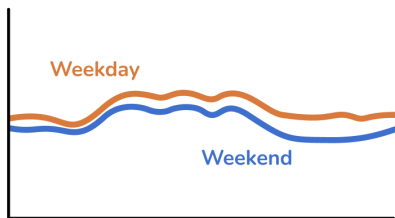
Not sure ?

Select the house size and we'll estimate usage

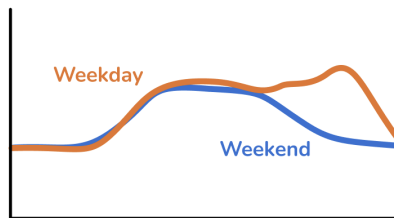
Option 1: Annual usage: If you know the annual consumption in kWh (for example from an electricity bill) you can enter it here in the annual usage field.

When you use this option you can now choose from a variety of domestic and commercial consumption profiles to build an accurate picture of energy usage throughout the year. A consumption profile calculates when energy is consumed—both annually and on a daily basis. For example, in a domestic home, most energy is typically used in the early morning and evenings. In contrast, an office profile reflects higher energy use during typical working hours, from around 09:00 to 17:00. The following commercial profiles are available

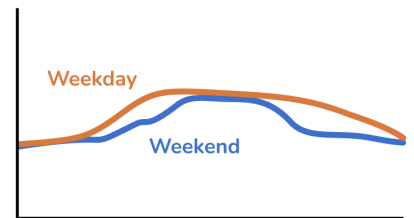
Warehouse



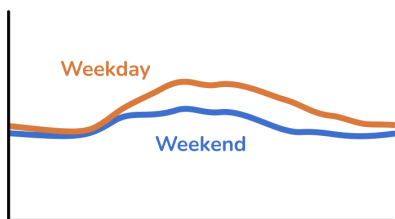
Sports



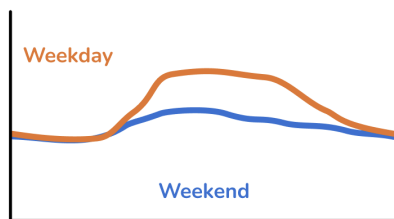
Retail



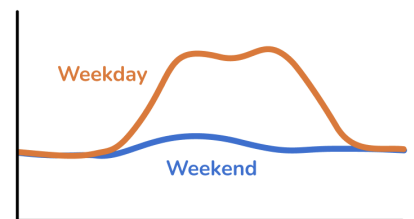
Hotel



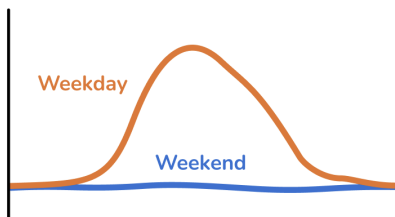
Health



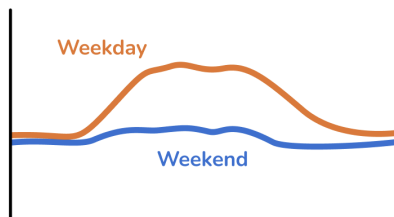
Government



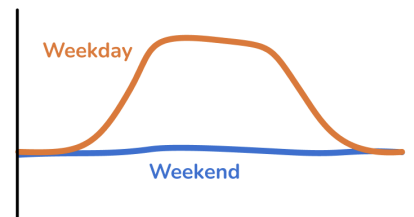
School



Transport



Commercial office



Option 2: Meter data: If the property has a smart meter you can upload **half-hourly** data to get a more accurate projections. The data should ideally span at least a year (but if it contains a **minimum of 6 months** our algorithm will automatically attempt to fill in gaps where they are detected). The file must have a .csv file extension. If your data is in another format you can export it as csv from Excel, Google Sheets, Libreoffice or any other spreadsheet editor.

Note that there are many different CSV formats for smart meter data, and we don't support all of them yet. If your upload doesn't work, please send us the spreadsheet at help@easy-pv.co.uk or help@easy-pv.ie and we will see if we can add the format. You can also download our sample spreadsheet [here](#) and change your data into this format.


Option 3: Not sure: If you don't know the electricity consumption in the property and it's domestic, you can use a typical values for the size of property provided here.

Set the import and export tariffs

Here you should select the tariffs this project will use. It is important to set suitable tariffs so the financial calculations for this project are accurate. By default, we'll calculate the financial benefits using your default flat tariffs which you can specify in your [financial settings](#). Alternatively, you can create and select a new tariff by selecting **+ New import/export tariff**. Click [here](#) for a full guide on creating tariffs in Easy PV.

Tariffs ?

By default, we'll calculate the financial benefits using the default tariffs set in your account's financial preferences. However, you also have the option to create or select a custom tariff.

 Manage tariffs

Import tariffs

+ New Import Tariff

Octopus Go

User

9.00 p/kWh - 27.94 p/kWh



Export tariffs

+ New Export Tariff

Octopus Go

User

18.00 p/kWh



Apply export limitation

In this section you can limit the export rate if this is required by the DNO. **Switch the toggle on** and then **input the annual export limit in kW**.

Export limiting



Limit export rate

Export limitation

3.4

kW

Editing and creating tariffs

This guide applies to the easy-pv.co.uk and easy-pv.ie versions of Easy PV. The information provided here may not be accurate for easy-pv.com.

Setting tariffs is an essential part of ensuring the financial benefits can be calculated as accurately as possible for your customer. These can be created, viewed and edited in the [consumption task](#) or the [financial task](#).

You can also set up user level default tariffs in your [account financial settings](#) or if you are a member of a Pro team, this will be set by a Pro team admin in Pro account financial settings.

This guide will detail how you can manage and create tariffs in Easy PV.

Creating a new tariff

Name of tariff

If this is a variable rate tariff, this name will show on the consumption section of the customer proposal. Otherwise, it is just a way for you to manage and navigate your tariffs when selecting them.

Scope of tariff



Project

Project level

- These will only be viewable on the specific projects it's created for.
- A good option if you frequently change the tariffs on each project.



User

User level

- These can be used for any projects and set as a default in your financial settings.
- A good option if you aren't sure what tariffs your customer is on so want to use standard values.



Team

Team level

- If you are a member of a Pro Team, you will be able to create Team level tariffs.
- These will work much like the User level tariffs but will show for all members of your team.

Once the scope of the tariff has been set, this cannot be edited.

Price bands

Flat tariff

- Input a value for the base rate and select save.
- Ensure you're putting this in in the correct units, this value should be greater than 1 (i.e. 15, not 0.15).

Variable rate tariff and tariff periods

- The first band you enter will be used as the base rate - any time period that doesn't have a price band applied will be priced at this rate.
- Add any additional rates in the price bands section.
- In the **tariffs period** section you will be able to select the different price bands and indicate when they apply. For some tariffs different rates might apply at the weekend, you can select the days for which the tariff period applies.

Editing existing tariffs

You can view and edit your tariffs in three different places in your account:

- Within a project:
 - Consumption task
 - Financial task
- (Pro) Account settings > Financial (only User or Team-level tariffs)

When you select 'View and edit tariffs' you will see the following options:

Electricity tariffs

Import tariffs

The screenshot shows the 'Import tariffs' section. At the top right is a button '+ Add import tariff'. Below it, a card titled 'Variable example' has a pink 'Project' scope button. An arrow labeled 'Tariff name' points to the title. The card lists two rates: 'Base' at '23.5 p/kWh' and 'Night' at '15.5 p/kWh'. The 'Night' rate has a period '02:00 to 05:00 All week' next to it, with an arrow labeled 'Tariff period' pointing to it. A menu icon (three dots) is circled in orange, with an arrow pointing to a dropdown menu showing 'Edit' and 'Delete' options. Another arrow points from this menu to a comment icon (speech bubble with three dots). Below this card is another card titled 'Default flat tariff' with a red 'User' scope button. An arrow labeled 'Tariff scope' points to this button. The 'Default flat tariff' card shows a 'Base' rate of '20 p/kWh' and a menu icon (three dots) on the right.

Tariff Name	Scope	Base Rate	Other Rates / Periods
Variable example	Project	23.5 p/kWh	Night: 15.5 p/kWh (02:00 to 05:00 All week)
Default flat tariff	User	20 p/kWh	

When editing tariffs you can change any of the details except the tariff scope, but note that any changes you make will affect previous projects that use these tariffs.

Using your tariffs

Once you have created your tariff either for an individual project or set a user level default, you can then select these in the consumption task and financial task.

The tariffs set in the consumption task will pull through to the Easy PV and MCS consumption methods in the financial tasks only if they are flat tariffs - if you select a varied tariff then this will only be used in the Easy PV method and your MCS default value will be selected.