spenergynetworks.co.uk

Driving the way to a more sustainable future

Design Information Guidance Pack for Customers – February 2022



Introduction

SP Energy Networks are proud to launch the Energy Data Hub, which has been created to house all the data that we currently share to help our customers understand more detail about how our network operates.

This can be found on our website at: spenergynetworks.co.uk/energy_data_hub

The purpose of having an open data platform is to share data to create opportunities for future development including new connections to our network, innovation, optimisation and decarbonisation. This may be of interest to a number of parties: customers who may want to locate Electric Vehicle (EV) charging points, flexibility providers who may be interested in local capacity and potential for development, and anyone interested in SP Energy Networks' long-term development statement and data-oriented strategies.

Network Tools

Facilitating Low Carbon Technology onto our Network ADMD (After Diversity Maximum Demand) Calculator

What is the ADMD Calculator?

ADMD is used in the design of electricity distribution networks to determine the amount of power required by a number of customers, by considering each customer's individual demand requirements.

This tool is designed to calculate the amount of power (in kW) Low Voltage (LV) mains feeders and substations will need for new and existing housing developments, by including the effects Low Carbon Technologies (LCT's). These technologies, which include electric vehicle (EV) charging and heat pumps, are power intensive and will put a significant strain on the network, so it is important to consider them when planning new developments.

Version 1 of the tool can be used for the development of 20 houses or more. It is our intention to add a function for less than 20 customers in future as well as incorporating other technologies.

trial projects, academic research, technical datasheets from Low Carbon Technology manufacturers and monitoring data, amongst others. This tool has been designed for use on desktop computers / laptops with sufficient screen size and is not optimised for mobile devices. Hence, we strongly suggest using the tool on a desktop / laptop PC.

How do you use the ADMD Calculator?

ADMD Calculator for 20+ Properties

Variables	Options / Ranges	User Input
Number of Customers on Feeder ?	20 to 100	100
How many have EV Chargers ?	0 to Number of Customers	0
How many have EV Chargers AND Heat Pumps ?	0 to Number of Customers	0
How many have Air Source Heat Pumps ?	0 to Number of Customers	0
Average size of ASHP? (kW Heat)	0, 5, 8 or 16	8
How many have Ground Source Heat Pumps ?	0 to Number of Customers	0
Average size of GSHP? (kW Heat)	0, 5, 8 or 16	16
How many have Hybrid Heat Pumps ?	0 to Number of Customers	0
Average size of HyHP? (kW Heat)	0, 5, 8 or 16	5

This tool has been created as a downloadable Excel spreadsheet, and can be seen in the table above.

To use the tool to calculate the ADMD for a development:

- Simply fill in column D (User Input), cells 4-13, prompted by the questions in column B (Variables) to enter the details vou reauire.
- The outputs from your "run" can be viewed A more detailed breakdown of your "run" in cells D17-20 (kW Output).
- from the 3 individual feeder "runs". • The options / ranges for your answers can be seen in column C.

Our ADMD Calculator is available to download at: ADMD calculator - LCT Ready Housing Developments - SP Energy Networks

The tool has been designed using a live

Why use the ADMD Calculator?

This calculator has been designed to help the user better estimate the power requirements of housing developments, both new and existing.

By using of the calculator, our customers will gain a more precise value for the required capacity of a development, which will make the quotation process for any required works easier and more accurate.

The tools focus on the effects of LCTs will allow our customers to plan their developments to incorporate the demand required by "homes of the future".

	kW Output
Average HH ADMD Standard	1.80
Total Feeder ADMD Standard	180.00
Average HH ADMD Cold Load	1.80
Total Feeder ADMD Cold Load	180.00

• Each "run" is for one feeder. To calculate total demand on a substation (with for example, 3 feeders) simply sum the results

- can be seen from row 29 onwards.
- A standard example is already populated when the user opens an unedited version (V1.6) of the tool.
- All other cells that are locked should not need edited by the user.
- Drop down menus in some cells are to assist/reduce error. Otherwise, type your value in.
- This Guide is also available to view on the "User Guide" tab on the calculator.

ConnectMore Interactive Map

What is the ConnectMore Interactive Map?

The ConnectMore Interactive Map is a map which relates to the electrical network within the SP Manweb plc licence area (Merseyside, Cheshire, North Shropshire, and North & Mid Wales). The map is split into 1.985 sections. These sections are called the Lower Laver Super Output Areas (LSOAs) which are the areas used in the Census. These 1,985 areas make up the SP Manweb licence area.

The Map includes two tools: EV Charging Demand and Electricity Network Capacity. These tools allow the user to enter parameters that update the map, providing information about EV Charging Demand and Network Capacity across the entire SP Manweb area. These tools and how they are used are described in more detail below.



What is the EV Charging Demand tool?

This tool was designed to help users answer key questions about EV charging demand, such as where is demand highest, how does demand change over time and what type of chargers are required to meet customer requirements. It can also provide additional data including how many charge events may occur in a day, how much energy is required and what is the capacity required?

The tool allows you to define scenarios based on a selection of parameters. The tool also allows you to look at the effects of the options chosen up to the year 2050.

After entering all the parameters, the interactive map is updated, and each area is colour coded predicting what the daily energy consumption in kilo-Watt hours (kWh), due to EV charging will be. The colour coding system is shown on image 1.



Why use the EV Charging Demand tool?

The tool can be used to accurately forecast the power demand across all 1,985 areas of the map, caused by EV charging, up to the year 2050. The maps colour coding allows for a simple comparison of the EV charging demand across the entire SP Manweb area, which can be used to inform business case evaluations for a site.

How to use the EV Charging Demand tool?

Firstly, select the charger location options you wish to include. You can select all options if you wish. The options as they appear are shown on 2.

Public destination means charging away from home at public locations such as car parks and shopping centres. Public residential refers to charging at home. Private workplace relates to dedicated charging stations at a workplace for employees.

Select Charger Location type(s) Select a scenario and forecast year Public Destination ? EV uptake ? ublic Residential 3 Private Workplace ? 2025 3

What is the Electricity Network Capacity tool?

En-route 😯

The Electricity Network Capacity section provides a general overview of the network to identify whether there is existing capacity at a substation to install new connections.

The tool is currently able to show LV capacity, with a High Voltage (HV) capacity function being added shortly. The map includes all LV substations in the SP Manweb area.

The tool allows the user to input their required capacity from 25kVA to 150kVA.

The tool then colour-codes each substation, using a traffic light system, to show whether there is enough capacity for the user's power requirements. Green shows that there is plenty of free capacity for your connection, whereas amber and red show that there is little or no free capacity. It may still be possible to connect to these locations but would require works to reinforce the network and would increase the cost and time required. This traffic light system is shown on image 5.

Each area of the map can be selected to provide additional information about that area, allowing even more specific evaluations to be gathered.

The tool also generates a number of different graphs and charts which will aid any analysis being undertaken for

that particular area.

The number of parameters within this tool means it is highly customisable and specific to each user's particular requirements.

The tool also provides an option to download an Excel file for each scenario the user creates, to providing a precise breakdown of the results.

Finally, en-route is charging that takes place during a journey, where the main purpose of stopping is to charge the vehicle rather than because you have reached your destination.

Next select the EV uptake (a low or high number of total electric vehicles), Charging Infrastructure (a low or high amount of charging stations) and year for the scenario you wish to simulate. The options as they appear can be seen on image 3.

This will then update the map to show the charging demand in each area based on your inputs. You can then move the map to any location you are interested in.



From here you can click on any area to select it see image 4.

You can also download the Excel file (click on Download CSV) of the results or clear the map in order to enter new parameters for another scenario. Shown below is an example of a section of the map after the options have been selected.

A User Guide, found at the bottom of the Interactive Map page is available for you to read, which provides instructions on how to use the tool and further information on the charts and graphs that it creates.





Why use the Electricity Network Capacity tool?

The tool can be used to give an indication to users of locations where new connections based on their energy requirements are available. The traffic light system gives users a quick and easy to understand indication of the likely time and expense required to connect to a particular area of the network.

The tool also allows the user to select any substation to view more information about it.

How to use the Electricity Network Capacity tool?

Firstly, select whether you want to look at the high or low voltage network (image 1). Firstly, select whether you want to look at the high or low voltage network (image 2). The map will generate the results of your search, with each substation colour coded (image 3).

From here the user can move the map to check a substation in any part of the SP Manweb area and can view additional information about any substation by clicking on the coloured circle. The User Guide for this tool can also be found at the bottom of the Interactive Map page, which provides some additional information.

Both the EV Charging Demand and Electricity Network Capacity tools can be combined, allowing you to identify areas where high EV charging is anticipated to be required in the future, and then to find locations within that area where there is available capacity to install additional EV charging points:

At all locations within the tool, the 'previous' or 'clear heatmap' buttons will take you to the previous screen, or reset the heatmap, as required.

The tool also allows you to submit a query if you have any issues or questions. Simply click on the blue and white speech bubble (shown in the top right of the image 4) to submit your query. Then simply select that capacity you wish to connect (image 4).

Our ConnectMore Interactive Map can be found at: spenergynetworks.co.uk/connectmore

Electricity Network Capacity



Select Network Voltage

LV Network Capacity ?

HV Network Capacity ?

load flow assessment, made with Debut 2.0, of the I and existing voltage capacity of the network





Mapping Data SPEN Distributed Generation Heat Maps

What are the Distributed Generation Heat Maps?

The SPEN Distributed Generation Heat Maps are two interactive maps of SPENs distribution licence areas: SP Manweb (Cheshire, Merseyside, N.Shropshire & N.Wales) and SP Distribution (Central and Southern Scotland). The SP Manweb map displays the HV 33 and 132kV network. The SP Distribution map displays the 11 and 33kV network. These maps allow the entire distributed network to be viewed, including all substations that are connected to the network. Each substation can be selected to display detailed information about each circuit connected to the substation.

SP ENERGY NETWORKS		
	ABOUT US POWER CUTS CUSTOMER SUPPORT GETTING CO	
Getting Connected		
DISTR	IBUTED GENERATION SP MANWEB HEAT	
This applica licence area	tion provides an indication of the potential opportunities to connect Dis (Cheshire, Merseyside, N.Shropshire, N.Wales).	
Each substation and circuit have been assigned one of the following categories:		
Category	Description	
Green	All operational factors are within tolerable limits and so opportunities (subject to detailed studies).	
Amber	At least one factor is nearing its operational limit and hence, dependition this can only be confirmed by detailed network analysis.	
Red	At least one factor is close to its operational limit and so installation o also require extensive reinforcement works or given the lack of a loca connection.	
Whilst all rea that may be	asonable care has been taken in the preparation of the information and attributed to the use of the data.	
By clicking 'OK', you acknowledge that you have read and understood the infe		

Why use the SPEN Distributed **Generation Heat Maps?**

The heat maps are designed for users who are thinking about installing a new generator to export electricity onto the SPEN distribution network.

This generation source will need to be connected to our network either through your existing supply or through a new electricity connection.

The heat maps provide users with a tool to find out more information about substations and the connections between them. The available capacity at each substation can be viewed and so the user can check to ensure that there is enough capacity for their project's requirements.

The cables or overhead lines connecting the network can also be selected and information about them can be viewed. The traffic light system provides a quick and simple visual indication of the available capacity.

If any additional information is required by you concerning connection options at a particular substation, then you can also find contact information for someone to speak to when selecting a particular substation.

The map uses a traffic light system for each substation and circuit, which indicates the potential to connect a new distributed generation source. The details for this system can be seen below. Features within the maps allow users to filter the layers of the map, measure distances and change the map style.

English V ScottishPower Iberdrola.com Q <	_
NECTED INVESTMENT & INNOVATION CORPORATE GOVERNANCE	_
home $>$ Getting Connected $>$ Generation $>$ Distributed Generation H., $>$ Distributed Generation S.,	_
MAPS TERMS	_
buted Generation (DG) to the 11kV, 33kV and 132kV network in the SP Manweb pic	
ay exist to connect additional Distributed Generation without reinforcing the network	_
on the nature of the application, network reinforcement may be required. However,	_
nost levels of Distributed Generation and a local connection is highly unlikely. It may onnection, require an extensive amount of sole user assets to facilitate such a	_
ata presented within these pages, SP Energy Networks is not responsible for any loss	
nation provided above.	

For projects smaller than or equal to 50kW there is generally no need to be concerned about network capacity, however for larger projects it might be necessary for us to carry out some work to connect your generator. Therefore, it is recommended that you engage with us at an early stage as it's important that you are aware of the timescales and costs involved before you begin your project.

How to use the Distributed Generation Heat Maps?

Main Tool Bar

Click 1 to collapse/expand the

side panel.

When opening the heat maps, you will find the main tool bar on the top left of the screen. These tools are used to control the side panel.

Below is an image of the SP Manweb heat map and the various tools used to control it. The tools and layout are the same for the SP Distribution heat map.



Click 2 to open the Legend, which gives information on the symbols and layers which are currently visible.

Click 3 to open the Layer Control which allows you to control how the layers are displayed – for example you can switch layers on and off and control what order they are shown on the map.

Our Distributed Generation Heat Mapscan be found at: spenergynetworks.co.uk/heatmaps

A User Guide for using the Heat Maps can also be found by scrolling down on the Heat Map page.







This SP Energy Networks application provides an indication of the potential opportunities to connect Distributed Generation to the HV, 33kV and 132kV network in the SP Manweb plc licence area.

Each substation and circuit have been assigned one of the following categories:

Category: Green - All operational factors are within tolerable limits and so opportunities may exist to connect additional Distributed Generation without reinforcing the network (subject to detailed studies).

gory: Amber – At least one factor is nearing its operational limit and hence, depending on the nature of the application, network reinforcement may be

6 Information

Click 6 to get more information on the constraint levels, and when the data was last updated.



Asset Information 9

Click 9 appears when an asset on the map is clicked on (either a circuit or a substation). The header of the pop-up indicates if information is available for more than one substation or circuit at that location. The arrows on the right of the header allow you to scroll through the information for each asset.

Asset pop-ups – clicking on a substation or circuit provides more information on the constraint for that asset, as well as contact details if you require further information.

Distribution Future Energy Scenarios

What are the Distribution Future Energy Scenarios?

The Distribution Future Energy Scenarios (DFES) are a series of documents that have been developed by SPEN to describe how electricity generation and demand may evolve in the two SPEN regions. Our December 2020 updates describe generation and demand may evolve over the next 30 years.

Given the uncertainty and ever-changing policy landscape in which we operate, we have created forecasts for four scenarios, which reflect differing levels of consumer ambition, government/ policy support, economic growth and technology development. Following the publication of our DFES forecasts in June 2020, we engaged with a wide range of our stakeholders.

We are grateful for the feedback received and look forward to continuing to engage with you and hear your insights. Such feedback is vital to ensuring that our forecasts reflect the plans and ambitions of the local communities we serve.

We also publish map views for both SP Distribution and SP Manweb which show our forecasts for customer demand and generation (peak demand, electric vehicles, heat pumps, generation capacity, etc.) for the selected combination of DFES scenario and year.

There are also downloadable Excel files available, which allow you to investigate the actual numbers used to generate these forecasts. The previous DFES publications as well as the summary of methodology paper for creating the DFES forecasts are also available to download.

Why use the Distribution Future Energy Scenarios?

The energy landscape is changing fast as the way our customers and communities generate, consume, and interact with energy evolves. Our role is to plan our distribution networks to facilitate their decarbonisation objectives and choices, and to enable their journey to Net Zero. To achieve this, we need to forecast and understand our customers' changing electricity requirements – this is the purpose of our DFES forecasts.

The different ways the DFES forecasts can be viewed make it useful in different situations. If you require in-depth explanation on the findings, then the papers make this possible. The maps provide a quick and simple way of visualising the forecasts predicted by the DFES. The Excel workbooks provide a precise breakdown of the results of the forecasts.

Where to find the Distribution Future Energy Scenarios?

The SPEN Distribution Future Energy Scenarios for both our SPD and SPM licence areas can be found at:

spenergynetworks.co.uk/pages/ distribution_future_energy_scenarios.aspx

On this page you will find the papers and maps available for SPD and SPM.

By scrolling to the bottom of the page, you will be able to download the DFES Excel workbooks, as well as the methodology paper and previous DFES publications.





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