

Future Energy Tool for communities – Introduction

Welcome to the Future Energy Tool!

The tool has been designed to help whole communities to establish a community scale picture of domestic energy usage, carbon emissions and energy costs and understand what type of low carbon interventions and scale of action is required to achieve a local net zero energy system by 2050. The tool is as much about engaging a community in a vision to reach net zero as it is about setting ambitions, facilitating community scale planning and proposing collective and individual household action for a net zero future.



This step-by-step guide has been produced to help community groups and other users to navigate their way through the different stages of the Future Energy Tool and provide guidance on what information is required about your community and where to find it. Examples are included to demonstrate how this process has been applied by WREN to the Wadebridge and Padstow Community Network Area.

Once a community has been created in the tool, users can explore what impact different decisions, and the importance of the timing of those decisions, will have on the communities pathway to net zero. The tool estimates current and future annual energy requirement of the whole community, the associated cost and carbon emissions.

When a pathway has been defined and agreed upon by a community, the bespoke model can be shared with individual members within the community, so they can plan their own individual journey to net zero and take action.

A complimentary Guide for Communities has also been produced and can be downloaded here:

https://www.wren.uk.com/images/documents/NZCom/NGED_Net_Zero_Community_Guide.pdf

This tool is an output of Net Zero Community (NZCom) work package of 'Project Vulnerability and Energy Networks, Identification and Consumption Evaluation (VENICE)', National Grid Electricity Distribution's first innovation project focussed wholly on customers, and in particular those with vulnerabilities. For more information about Project VENICE visit: <https://www.nationalgrid.co.uk/innovation/projects/vulnerability-and-energy-networks-identification-and-consumption-evaluation-venice>



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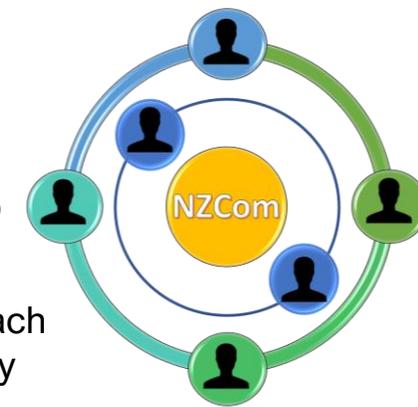
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Future Energy Tool for communities – User guide

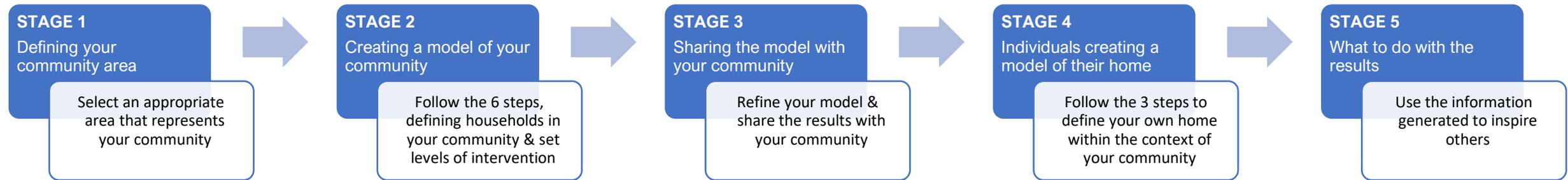


How to use this guide

There are 5 stages to complete the full process of establishing both community and individual plans to achieve a local net zero energy system, as outlined below.

The data required to complete this process comes from a wide range of sources. This guide takes you step-by-step through each of the questions posed by the tool and suggests where to find the data, either from a reliable source or through general enquiry within your community. A questionnaire to capture data from your community is included at the end of this guide.

Remember poor data in will lead to poor data out, so try and be as accurate as you can with the figures you use.



Limitations of the tool

The outputs of this tool are estimations based on the inputs provided. Due to the underlying methodology and data that is required to create models within this tool, only communities in England and Wales can be modelled, and results will be more accurate for rural communities and for smaller defined areas. The tool only has the most common combinations of heating and hot water systems and only factors the main system used and at present only allows the comparison of a selection of carbon reduction interventions. The calculations are based on stationary household emissions, therefore embedded carbon (scope 3) and other emissions that occur outside the defined area boundary (i.e. flights) are not included.

We hope to develop this tool further with improved accuracy and additional functionality. If you have ideas of how this tool might be improved in the future please contact: nzcom@wren.uk.com



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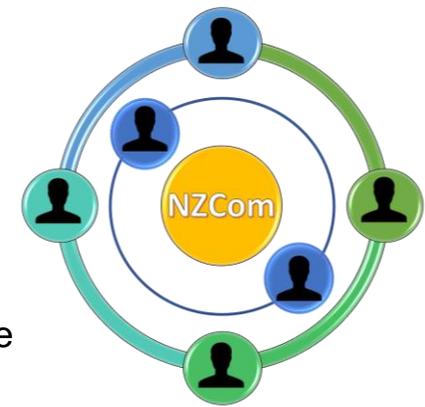
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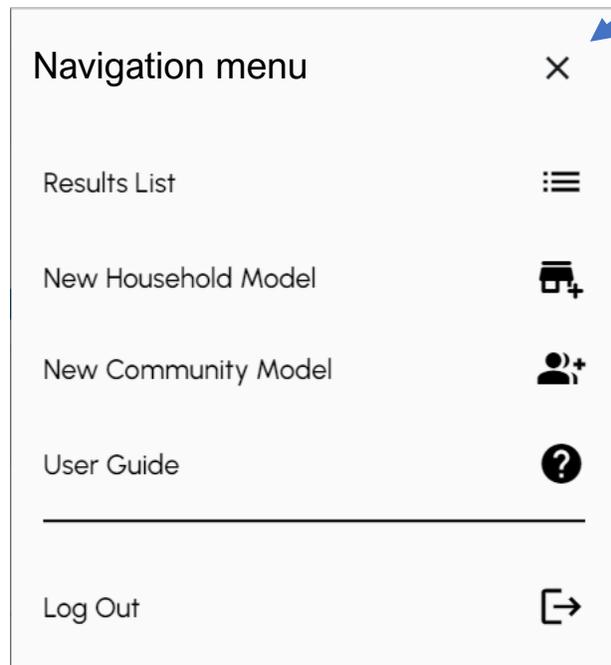
Future Energy Tool for communities – Getting started



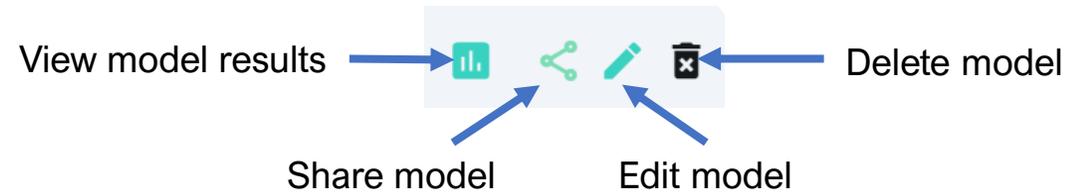
To begin the process you will need to create account here: <https://nzcom.cee-uk.com/createAccount>

This account will allow you to create a bespoke model for your community or a household model, linked to a community. When a model (community or household) has been created it will always be linked to your account and you will only be able to edit the model through this account. You can return to your saved models at anytime by selecting the log in option on the home page: <https://nzcom.cee-uk.com/login>

In your account you can create as many community models as you like by selecting 'Add New Community Model' from the bottom of the page, or from the navigation menu in the top right hand corner of the screen.



These will then appear as a list of communities for you to choose from, with the dates of when the were created. Once a community model has been created you have four options:



Lets get started and create your community!



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Future Energy Tool for communities – Stage 1

Before you can start to create a community model you need to first decide on the scope of the area that you will be basing your model on. Defining your community area can be a relatively simple or, conversely, complex task and depends very much on who you are representing. For organisations such as Town or Parish Councils, geographical boundaries are fixed, whereas for community groups this may be less well defined.

Be led by the data. The smaller the region the more accurate the modelled outcome.

A useful way to define your community is to use Lower Layer Super Output Areas (LSOA). These are geographical regions which typically contain 400-1200 households and are used by the Office of National Statistics (ONS) to report small area statistics in England and Wales.

Your defined community may be made up of one or more LSOA. Each LSOA has a reference name that is required to access the data, for example 'Cornwall 007A'. You can find out the LSOA references that make up your community by typing in a post code from that area into www.nongasmap.org.uk and selecting the relevant section of the map.

The LSOA reference will be shown on the left hand side of the screen.

Please note that other information on this website is not necessarily up to date as it is based upon the 2011 census data.

The screenshot shows a web browser at <https://www.nongasmap.org.uk>. On the left, a data panel for 'Cornwall 007A' is displayed. The title 'Cornwall 007A' is circled in yellow. The data includes:

- Region type: LSOA
- Rural-Urban: E1
- Properties: 631
- Non-gas properties: 94.9%
- Fuel poverty: 28.2%
- Claimant count: 9
- I.M. deprivation: 25.1
- ECO eligible: No

Below this are two bar charts: 'Distances from gas grid' and 'Central heating'. The map on the right shows the Wadebridge area with a legend for '% homes off the gas grid' ranging from 11-20% to 86-95%.



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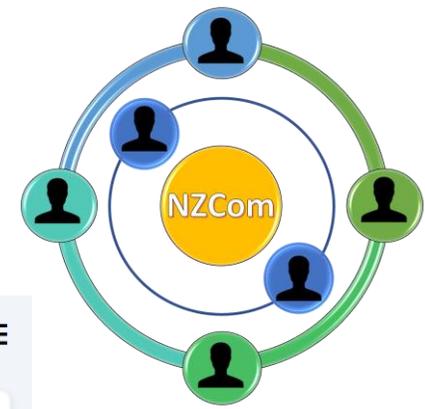
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Future Energy Tool for communities – Stage 2

Now you know what area you are going to model, there are six steps you need to follow to create a community model.

Step 1 sets out the basic information that will identify your community model.

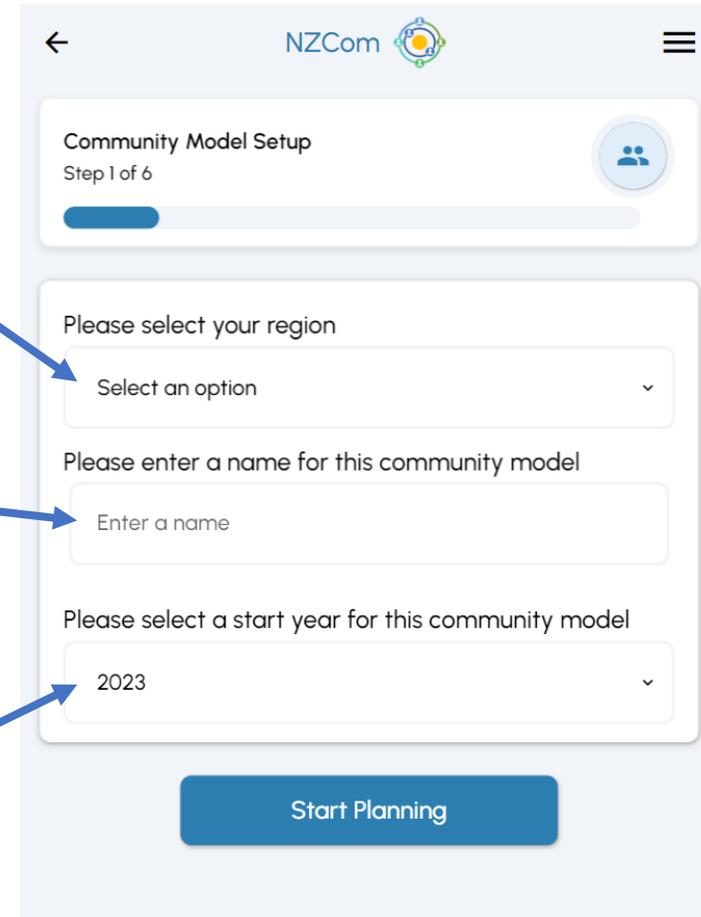


Select where your community is located from a drop-down list of regions in England and Wales.

Assign your community a name. Please make this relevant to the area that you are defining so that is recognisable and meaningful to other users when you share it with them. Community names must be unique, so if a model has been created that already uses this name you will be asked to choose another.

If you would like to save multiple model variations of the same community to allow easy comparison of the outcomes, you can add an identifying number to the end of each community name, e.g. Wadebridge 1, Wadebridge 2 etc.

Finally select when you would like to start the community model. Typically this would be the current year.



Community Model Setup
Step 1 of 6

Please select your region
Select an option

Please enter a name for this community model
Enter a name

Please select a start year for this community model
2023

Start Planning

Lets start planning!





Future Energy Tool for communities – Stage 2

In order to understand the total amount of energy required and resulting carbon emissions, you need to give some scale to your defined community.

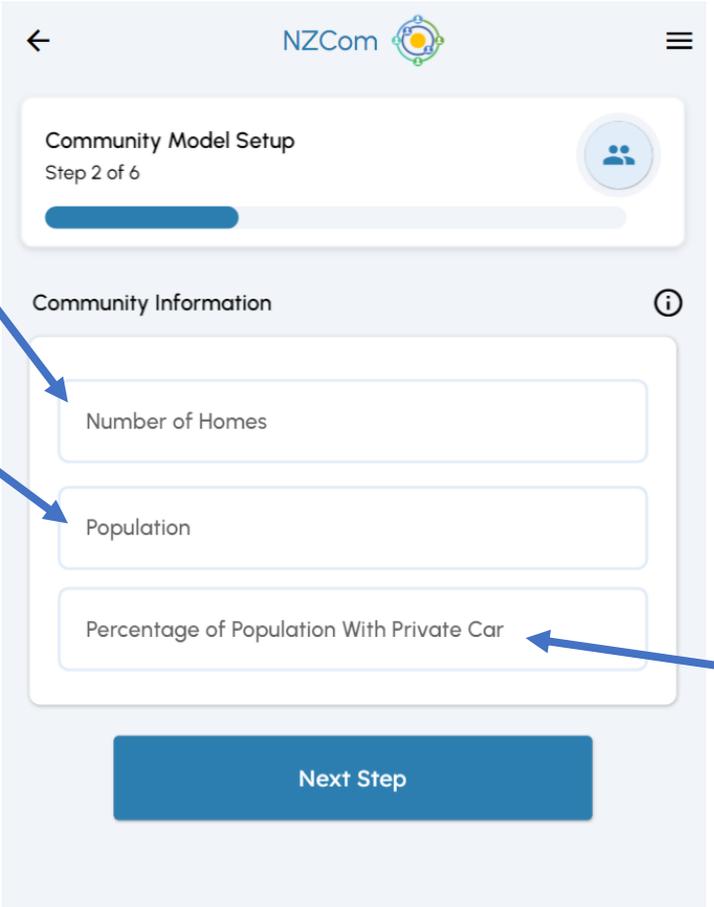
Step 2 requires you to define the number of homes, population size and percentage of population with a private car

Once you have all the LSOA references associated with your defined community you can find the number of homes in this area from the reference table TS041 found here: [Demography and migration data, England and Wales \(ONS\)](#) – selecting the Lower Layer Super Output Area version.

The latest estimated population (all ages) for your defined community can be found here: [Lower layer Super Output Area population estimates - supporting information \(ONS\)](#) – selecting the ‘Persons’ tab and ‘All ages’

For example, information for Wadebridge is as follows:

| LSOA Reference | No. of households | Estimated population size | No. of cars | % of population with vehicle |
|----------------------------|-------------------|---------------------------|--------------|------------------------------|
| Cornwall 007A | 527 | 1,340 | 879 | 66% |
| Cornwall 009A | 695 | 1,585 | 923 | 58% |
| Cornwall 009B | 885 | 2,071 | 1106 | 53% |
| Cornwall 009C | 887 | 1,982 | 897 | 45% |
| Cornwall 009D | 685 | 1,546 | 847 | 55% |
| Total for community | 3,679 | 8,524 | 4,652 | 55% |



This refers to the total population, not per household. The latest vehicle ownership data by LSOA is published in table VEH0142 found here: [Vehicle licensing statistics data files - GOV.UK \(www.gov.uk\)](#) – take the latest quarter’s figures for ‘Cars – Total – Licensed’





Future Energy Tool for communities – Stage 2

The next step is to define the mix of domestic building types in your community and their current level of energy efficiency. The best approximation is provided by the Energy Performance Certificate (EPC) ratings of the local houses.

Step 3 requires you to establish the percentage of housing stock with an EPC C and above, and EPC D and below

To find this information you will need to log on to the UK Governments EPC register: [Energy Performance of Buildings Data England and Wales \(opendatacommunities.org\)](https://www.opendatacommunities.org) This website gives you access to all EPCs that have been registered in England and Wales.

An example is shown for Wadebridge.

You can download details of those relevant to your defined community by typing the name of your town in the address box, or by selecting the relevant local authority/ constituency (however this may deliver results wider than the community you are interested in).

Department for Levelling Up, Housing & Communities

Energy Performance of Buildings Data England and Wales Domestic EPC Non-domestic EPC DEC Help

The Energy Performance Certificates dataset was updated on **11 Nov 2022** and includes certificates issued up to and including **29 Sep 2022**.

257 Domestic EPCs found [All results \(.zip\)](#)

| Housing Type | Property Type | Built Form/ Total Floor Area | EPC A-C | EPC D-G |
|----------------|------------------|---------------------------------|---------|---------|
| Large house | House & Bungalow | Detached | 15% | 19% |
| Medium house | House & Bungalow | Semi-Detached | 21% | 14% |
| Terraced house | House & Bungalow | Mid/ End Terrace | 8% | 8% |
| Large flat | Flat/ Maisonette | 80m ² + | 1% | 1% |
| Small flat | Flat | Up to 79m ² | 8% | 5% |
| Park home | N/A | N/A | N/A | N/A |

ADDRESS
Wadebridge

Type a full or partial address
Postcode
Postcode

LOCAL GOVERNMENT

Local Authority
Cornwall

Constituency
North Cornwall

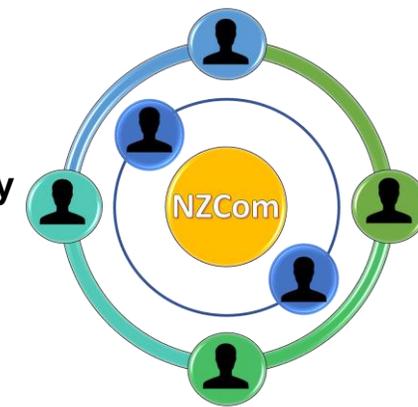
If your defined community covers more than one town/ parish you can search each one individually and combine the results.

Click on 'All results.zip' to download the EPC register and select the file 'certificates.csv'. This spreadsheet will provide you with the 'Current Energy Rating' (an EPC rating of A-G), as well as the 'Property Type', 'Built Form' and 'Total Floor Area'.

From this information you will be able to determine the 'Housing Stock Percentages' for your defined community. The percentages across both tabs must add up to 100%. Park homes are exempt from EPCs and therefore the quantity would need to be obtained through enquiry.



Future Energy Tool for communities – Stage 2



Heating represents approximately 17% of domestic carbon emissions. It is important that information on heating system types is determined as accurately as possible for your community, to ensure that the tool produces valid results.

Step 4 requires you to breakdown the housing stock by percentage of main heating and hot water system type.

An example is shown for Wadebridge

| Heating & Hot Water Type | Main Heat Description | % of Housing Stock |
|--|---|--------------------|
| Gas Central Heating & Hot Water | Room heaters/ Boiler & radiators/ underfloor, mains gas | 54% |
| Electric Storage Heaters & Immersion Tank | Electric storage heaters | 12% |
| Oil Central Heating & Hot Water | Boiler & radiators/ underfloor, oil | 16% |
| Electric Radiators or Boilers & Immersion Tank | Room Heaters/ Boiler & radiators/ underfloor, electric | 7% |
| Heat Pump for Central Heating & Hot Water | Air Source Heat Pump & radiators/ underfloor/ warm air | 5% |
| LPG/ Bottled Gas for Central Heating & Hot Water | Boiler & radiators/ underfloor, LPG | 2% |
| Wood/ Biomass Central Heating & Immersion Tank | Boiler & radiators/ underfloor, dual fuel/ wood logs | 3% |
| Coal Central Heating & Immersion Tank | Boiler & radiators/ underfloor, coal/ anthracite | 1% |

Using the 'Main Heat Description' information provided in the EPC register for your defined community, calculate the percentage of each type of heating, ensuring these add up to 100%.

The adjacent table demonstrates how to correlate the 'Main Heat Description' with the heating & hot water types listed in the tool.

It is assumed that any property that does not have a permanent heating system is heated by electric heaters. Secondary heating systems are not covered by the tool.

Community Model Setup
Step 4 of 6

Housing Stock Heating Percentage (Main Heating & Hot Water System Type)

- Gas Central Heating & Hot Water: 0
- Electric Storage Heaters & Immersion Tank: 0
- Oil Central Heating & Hot Water: 0
- Electric Radiators or Boilers & Immersion Tank: 0
- Heat Pump for Central Heating & Hot Water: 0
- LPG/ Bottled Gas for Central Heating & Hot Water: 0
- Wood/ Biomass Central Heating & Immersion Tank: 0
- Coal Central Heating & Immersion Tank: 0

Total Percentage: 0.0%

Next Step



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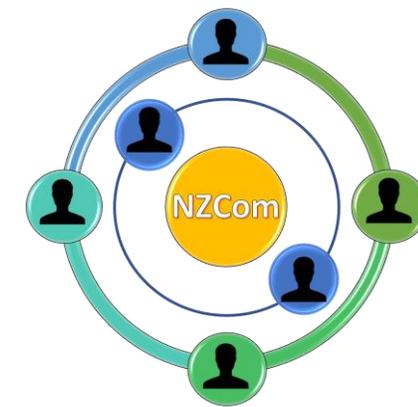
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Future Energy Tool for communities – Stage 2



At this point of the tool you start the planning process articulating the net zero vision of your community in terms of tangible actions that can be taken across the community. This is a great opportunity to gauge local ambition and gather support ensuring that your community are joining you on the journey.

Step 5 asks you to define the current carbon reduction actions already taken by your community and setting local target for when new actions should be taken.

There are two approaches to determine what current carbon reduction actions have already been deployed by your community:

- 1) by enquiry – engage your community in the modelling process by asking them what they currently have and/or what they think the community should be looking to achieve,
- 2) and/or EPC Register information - a positive number in the ‘Photo Supply’ column indicates a solar PV has been installed, and a heat pump is indicated in the ‘Main Heat Description’.

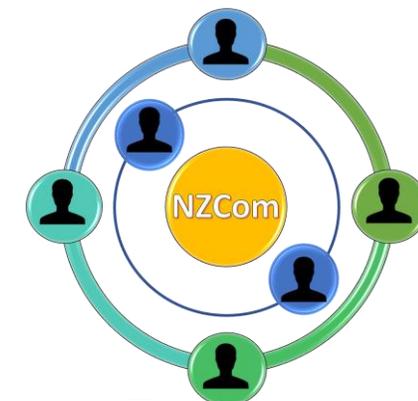
If you have already stated a % of heat pump systems in step 4, this field will be automatically populated.

Information on number of electric vehicles (EVs) is currently only available at a local authority level ([Vehicle licensing statistics data tables - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/statistics/vehicle-licensing-statistics-data-tables)) and therefore this will need to be estimated. Filtering to your local authority, use the VEH0142 table and take the latest quarter’s figures for ‘Cars – Battery electric – Total’, also use the VEH0105 table and take the latest quarter’s figures for ‘Cars – Total – Total’. Calculate the percentage of EVs as a product of all cars.

An example for Wadebridge is shown.

| Total EVs in Cornwall | Total cars in Cornwall | % of EVs in Cornwall |
|-----------------------|------------------------|----------------------|
| 2,756 | 310,400 | 0.9% |

Future Energy Tool for communities – Stage 2



The final step in the modelling process which is critical to understand how energy prices may increase in the future.

Step 6 requires you to allocate prices for different fuel types and set how these costs will increase annually.

In order to set an energy price for each of the fuel types, follow:

- 1) Import typical price data – this will give you a value for each of the fuel types shown. These values have been set at the average price in May 2022, or in the case of electricity and gas, the price cap level set in May 2022.
- 2) Overwrite any of these values with what is typical for your community – make enquiries with your community to find out what they currently pay for the different fuel types. This can be typically done by looking at the latest energy bill. Examples have been provided.

If an energy bill does not provide the costs as a £/kWh, £/l, £/kg etc. Divide the cost of the bill by the quantity of the energy provided e.g. for an electricity bill of £100 that used 500 units or kWh of electricity, the Grid Electricity Import Fixed price would be:
 $\text{£}100/500 \text{ kWh} = \text{£}0.20/\text{kWh}$
For a 500 litre tank of oil that costs £600, the Oil price would be $\text{£}600/500 \text{ litre} = \text{£}1.20/\text{litre}$

For households that have economy 7 or dual rate electricity meters, an additional step is required to establish a single value for 'Grid Electricity Import Economy 7 weighted average'. For example, day time electricity costs £150 for 600 units and night time electricity costs £60 for 300 units. As per Ofgem guidance a total unit price should be split 58% on the day rate and 42% on the night rate. Day = $\text{£}150/600 \text{ kWh} = 0.25 \times 0.58 = 0.145$ Night = $\text{£}60/240 \text{ kWh} = 0.25 \times 0.42 = 0.105$. 'Grid Electricity Import Economy 7 average' = $0.145 + 0.105 = \text{£}0.25/\text{kWh}$

Once you have established values for each fuel type, agree on the percentage increase in cost to be applied each year. To provide context energy prices have remained relatively stable over the last 10 years, fluctuating between +/- 10%. Over the last 12 months energy prices have been very volatile, which is not normal. Gas increased by 130% and electricity by 65%. The percentage increase will be applied every year to 2050 so these figures will have a big impact.

Now run your model and see your results!



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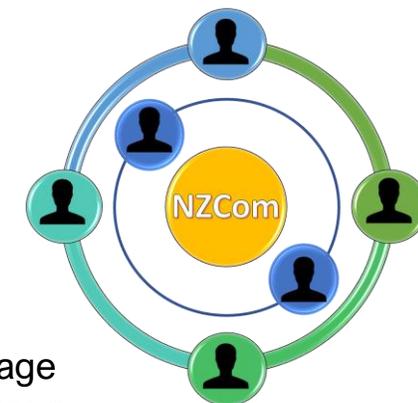
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Future Energy Tool for communities – Stage 3

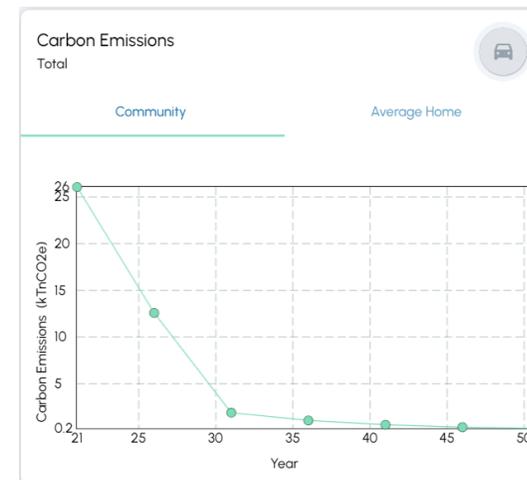
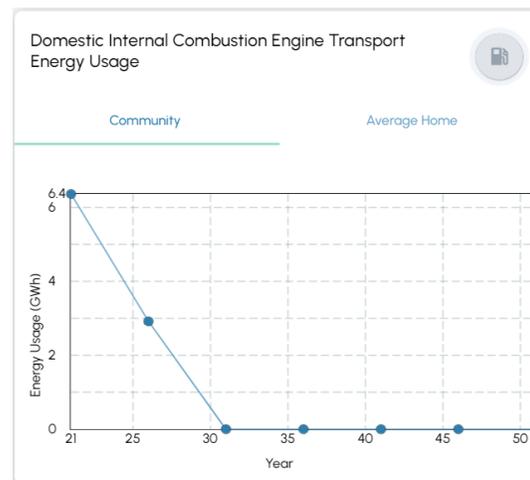
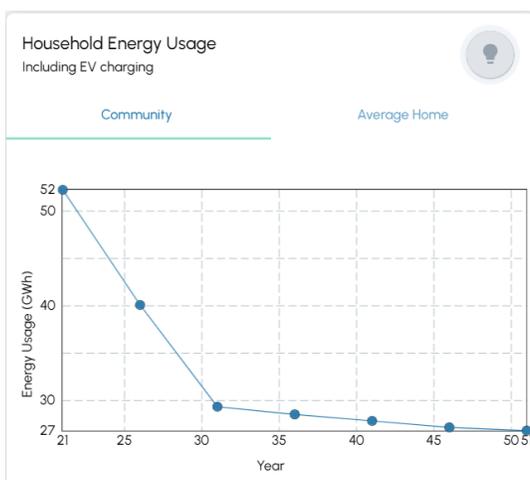


You can run the community model multiple times, trying different levels of up take of solar, heat pump and electric vehicles, and seeing what difference changing the future energy price increases might have on the future costs of energy for your community.

What results do you get from your community model?

You will be presented with 4 graphs displaying household energy usage, domestic internal combustion engine (ICE) energy usage and the associated carbon emissions and costs out to 2050. The results are given for both your whole community and an average home, as well as a summary of what the annual emissions will be in 2050.

Didn't reach net zero? Then try again!

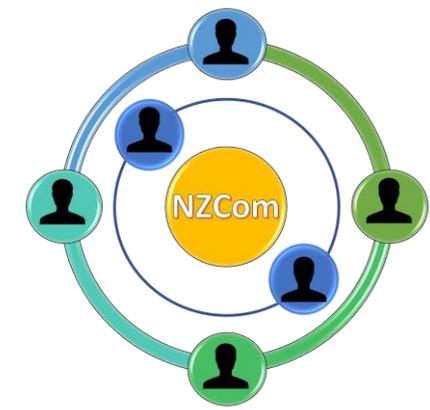


Once you are happy with the outcomes of your community model you can share it with your community.

Select the  option, copy the link and share through your social media channels and through direct engagement. Members of your community will then be able to complete their own individual plan based on your community model. Ask them to share their results with you, so you can verify if the community model accurately reflects the 'average' home.



Future Energy Tool for communities – Stage 4



Now a model for your community has been set up, individuals within the area can create a household model that reflects their own personal situation and compare it with the modelled community 'average home'. There are two routes to starting a Household Model: receiving a link (see stage 3) or creating an account and choosing 'New Household Model' from the navigation menu (see Getting started).

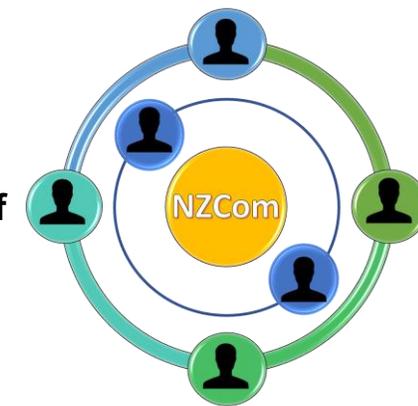
Step 1 select your community model and start planning!

A screenshot of a web application interface. At the top left is a back arrow, and at the top right is a hamburger menu icon. Below the navigation is a header area with the text 'Household Model Setup' and 'Step 1 of 3'. A blue progress bar is partially filled. Below this is a large text input field with the placeholder text 'Please select your community model'. Underneath the input field is a dropdown menu with the text 'Select a Community Model' and a downward arrow. At the bottom center is a blue button with the text 'Start Planning'.

If your community has not been modelled than you can select the relevant 'generic' community model for your region of the UK. The results will not be as accurate, but they will give a good approximation.



Future Energy Tool for communities – Stage 4



Similar to the community model, an individual household model needs to be provided with basic information about that has a significant bearing on the carbon emissions of a home.

Step 2 define the specific characteristics of your household.

- Select the heating and hot water system from the list that is most representative of the main provision for heating and hot water in your home. The model is unable to include secondary heating and/ or hot water systems. See stage 2, step 4 for comparisons.
- Provide how many people typically live in your home throughout the year.
- Select the property type that most represents the size of your home. The gross internal area is the total of all enclosed spaces measured to the internal face of the external walls. It does not include garages, loft spaces (that have not been converted into rooms) or any buildings external to the main house.
- Have you ever had an EPC produced for your home? These are typically

| Housing type | Gross internal area |
|----------------|------------------------|
| Large house | 130m ² + |
| Medium house | 93-129m ² |
| Terraced house | Up to 92m ² |
| Large flat | 80m ² + |
| Small flat | Up to 79m ² |
| Park home | 60m ² |

Energy performance certificate (EPC)

- Certificate contents**
- Rules on letting this property
 - Energy performance rating for this property
 - Breakdown of property's energy performance
 - Environmental impact of this property
 - Improve this property's energy performance
 - Estimated energy use and potential savings
 - Contacting the assessor and accreditation scheme
 - Other certificates for this property

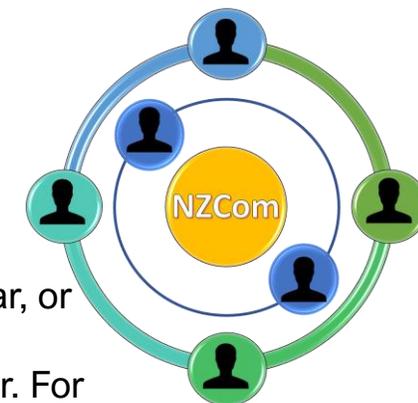
| | | |
|------------------|--------------------|---------------------------|
| Your address | | Energy rating B |
| Valid until | Certificate number | |
| Property type | Mid-terrace house | |
| Total floor area | 80 square metres | |

required when a property is bought, sold, let, or when a renewable energy system has been installed. You can find a copy of all EPC's relating to your property here: [Find an energy certificate](#)

Select the most recent EPC completed for your property and take note of the energy rating (A-G) found in the top right hand corner. In the tool, select the appropriate EPC rating.

- If you do not have an EPC, base the assessment of how well insulated your home is; A-C = high, D-G = moderate to poor.

Future Energy Tool for communities – Stage 4



Step 2 continued. The final section focuses on your car usage.

- Enter in the number of cars used by the people in your household. This number should not include any electric vehicles but should include any hybrids. If you do not have a car, or you only have an EV this number should be zero.
- Next calculate the average daily mileage of each of the cars that you have accounted for. For example, if you have 3 cars in your household, car A usually does 14,600 miles/ year, car B usually does 3,650 miles/ year, and car C is electric. The calculation will be: $14,600 + 3,650 = 18,250 / 365 = 50 / 2 = \mathbf{25 \text{ miles/ day}}$
- The final question is to find out whether or not your average daily mileage may change in the run up to 2050. Your average mileage could change for a number of reasons. For example, you may be planning to ween yourself off car-ownership and move to public transport, cycling or walking, or reduce to only one car in the household as family move out. You may be planning to retire in the period and therefore will not use the car as often. Conversely you may foresee your mileage increasing due to a longer commute in the future. If you are planning to change **all** your cars to EVs enter your future mileage as normal as you will be asked this question in the next step.
- Enter in your assumptions as to how the mileage might change and press save.

Mileage per year estimate

Estimate your mileage per year for the next few years for any non-electric cars

| Year | Miles per day |
|------|-----------------------------|
| 2023 | Enter estimated mileage ... |
| 2027 | enter estimated mileage ... |
| 2032 | enter estimated mileage ... |
| 2038 | enter estimated mileage ... |
| 2043 | enter estimated mileage ... |
| 2047 | enter estimated mileage ... |
| 2053 | enter estimated mileage ... |

Household Model Setup
Step 2 of 3

Home Information

What is your main source of heating and hot water?
Select an option ...

How many people live in your home?
Enter a number ...

What type of home do you have?
Select an option ...

What is your EPC rating?
Select an option ...

How many non-electric cars do you have?
Select an option ...

What is your daily mileage for any non-electric cars (per car)?
Enter a number ...

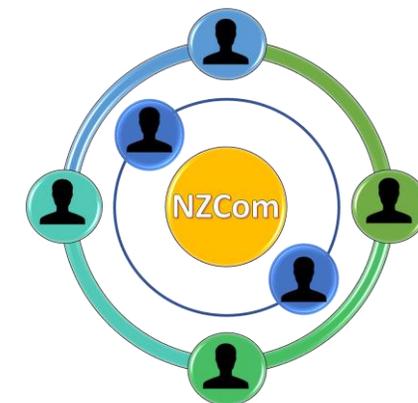
Do you plan to change your daily mileage in the future?

Next Step

You are now ready to move to the next step.



Future Energy Tool for communities – Stage 4



In the final step of the Household Model Setup you are asked to select options that will reduce your household carbon emissions and consider when you would consider to take these actions.

Step 3 define your own plan of action to get to net zero.

For each of the 5 technology options presented you can choose from the following options:

- Already achieved (i.e. you have already adopted this technology)
- Target year - in 5 yearly increments to 2050 (i.e. when you think you might be able to commit to this option)
- Never (i.e. this is an option that you would not consider for your household)

If you have already indicated in the previous step that you have a heat pump system already installed, that you have an EPC energy rating of C or above, or that you do not currently use a car, then these options will already be set to 'already achieved' or greyed out.

The order of the actions you have chosen will be provided in the results. You can revisit any of these options and your plan of action at any time through the Results List and selecting the edit icon  next to your saved individual model.

Now run your model and see your results!

Future Energy Tool for communities – Stage 4



NZCom

←

Estimated Current Annual Carbon Emissions

3410 kg CO₂ Equivalent

Estimated Annual Carbon Emissions in 2050

20 kg CO₂ Equivalent

Good effort. You're nearly there. Is there something else you can try?

99% Carbon Emissions Reduction by 2050

Congratulations, you have almost achieved a 100% reduction in carbon emissions

You can run your individual model multiple times, trying different technology options at different times and in different sequences, to see what difference they will make to your overall .

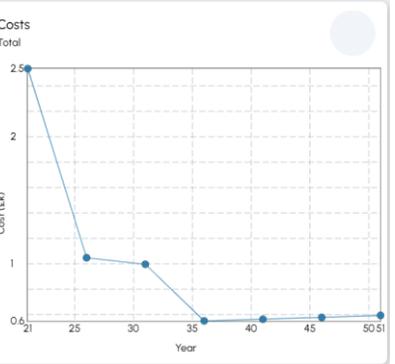
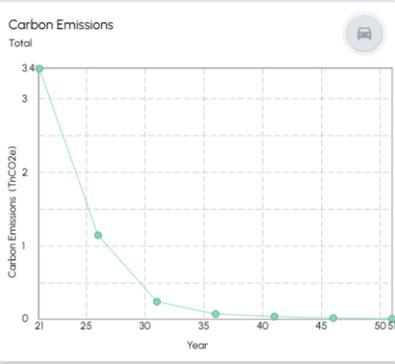
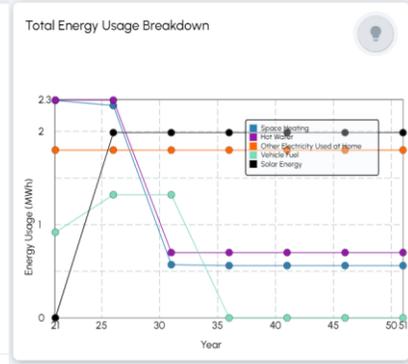
What results do you get from your household model?

You will be presented with a range of useful indicative information:

- Your estimated current annual carbon emissions – based on the information you entered for step 2 and the underlying assumptions from the community model that you selected in step 1.
- Your estimated future carbon emissions in 2050 – ideally you will get this as close to zero as possible.
- The percentage you have reduced your emissions by – more than 90% is fantastic!
- A list of the years in which you plan to achieve the technology options – as defined in step 3.
- 3 graphs showing you how your total energy usage (broken down into space heating, hot water, other electricity usage, vehicle fuel and generated solar energy), carbon emissions and energy costs will be impacted over time as a result of the actions you have chosen and the annual increase in energy costs as determined by the community model that you are using.

Carbon Reduction Implementation Years

| | | |
|--|--|------|
| | Install solar PV | 2026 |
| | Install a heat pump | 2031 |
| | Replace all cars with EVs | 2026 |
| | Moderate improvement in home insulation levels | 2021 |
| | High improvement in home insulation levels | 2021 |



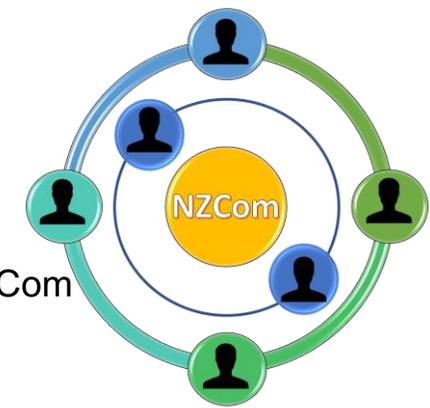
How does your household compare with the average household for the community?

Go back and take another look at your community's results from the Results List, selecting the 'Average Home' tab on the results graphs.

Want to do better? Try again!



Future Energy Tool for communities – Stage 5



You've run your community model and you have a plan for your own home. So what next?

Start a conversation

Giving people the tools to make informed decisions is all part of the societal engagement required to reach net zero. In the NZCom Guide for communities ([https://www.wren.uk.com/images/documents/NZCom/NGED Net Zero Community Guide.pdf](https://www.wren.uk.com/images/documents/NZCom/NGED_Net_Zero_Community_Guide.pdf)), social learning, efficiencies and additionality in the transition to net zero are more likely to be achieved through coordinated engagement and convening communities around a collective plan of action.

Taking the results from your community model as a way of marking where you are now as a community and what still needs to be achieved is a powerful message and can give key stakeholders (i.e. local authorities, community leaders etc.) agency to make firm commitments to change. Running the model again in a few years time with the latest information, can start to show the progress made and whether you are on track to achieve your goals.

Through demonstrating the scale of change and how to achieve the reduction in emissions required to avoid irreversible damage to our planet, sensible action plans can be put in place at a local level, that collectively move everyone in the right direction without leaving anyone behind.

Share your stories

None of this is easy. So when there are successes, either at an individual household level or across the community, share these stories with others, inside and outside your community. It may be the trigger that makes someone else to take their first step, or help others to make theirs.

Help one another

Be vigilant of those who may need more support to engage and find ways to make the process as inclusive as possible. Digital tools are not always everyone's cup of tea, why not pop round your neighbour's house and run them through the process on your own device and help them to work out what they can do and what impact that might have.

This is a movement that requires everyone to act.



University
of Exeter



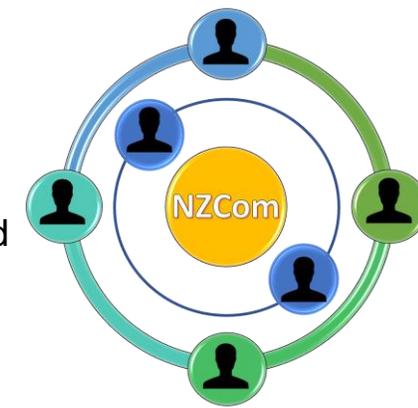
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Future Energy Tool for communities – Stage 5



What does 'good' look like?

Any action that is having a positive step towards reducing carbon emissions is a good start, however this needs to be balanced with keeping costs low. The model does not include the investment costs of the carbon reduction options chosen, only the ongoing energy costs as a result of it being installed/ used.

How do I improve my community results?

If we consider that the community defined in steps 2-5 is as accurate as it can be, the first most impactful change to the results can be made by increasing the rate at which carbon reduction actions are implemented (step 5) – the higher the annual percentage of deployment, the faster the carbon emissions reduce. The order in which these are deployed affects this too and will depend on where your community consumes the most energy/ carbon, e.g. because the homes are typically large and poorly insulated, because there are a lot of cars, because the typical heating systems use carbon intensive fuels. The second most impactful change, specifically to the cost results, is the annual percentage increase of fuel costs. This increase will be added on year by year, so if the rate is set unrealistically high, costs will rise rapidly.

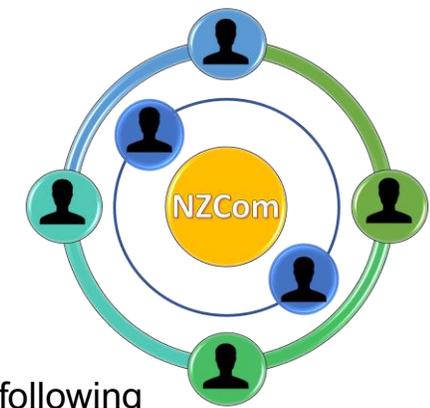
How do I improve my household results?

As with the community model, taking actions earlier will decrease carbon sooner, but may inflate costs if they are not done in an order that tackles your highest areas of energy consumption first. Remember that all the assumptions about how much energy costs and how much these energy costs are likely to rise year on year, comes from the community model that you have selected in step 1.

You can run the model as many times as you like to find out what the most efficient order of actions is for your household (in terms of carbon reductions or keeping running costs low).



Future Energy Tool for communities – Community questionnaire



The best way to verify if your model is accurate is to compare the data input with a sample of data from your community, captured by asking the following questions.

1. How many adults are there in your household?
2. How many cars does your household have?
3. What type of property do you live in (select one option)
 - Large house (>130m²)
 - Medium house (90-130m²)
 - Terraced house (<90m²)
 - Large flat (>80m²)
 - Small flat (<80m²)
 - Park Home
4. Do you have an EPC for your home, if so what is your rating (A-G)?
5. What type of central heating and hot water system do you have (select one or more option)?
 - Gas Central Heating & Hot Water
 - Electric Storage Heaters & Immersion Tank
 - Oil Central Heating & Hot Water
 - Electric Radiators or Boilers & Immersion Tank
 - Heat Pump for Central Heating & Hot Water
 - LPG/ Bottled Gas for Central Heating & Hot Water
 - Wood/ Biomass Central Heating & Immersion Tank
 - Coal Central Heating & Immersion Tank
6. Do you have solar panels on your home?
7. Are any of your vehicles electric?
8. How much do you currently pay per unit for the following fuel types (provide values for all that are applicable to your home)?
 - Imported grid electricity (£/kWh)
 - Economy 7/ dual tariff electricity (Day £/kWh, Night £/kWh)
 - Exported grid electricity (£/kWh)
 - Mains gas (£/kWh)
 - LPG gas (£/kg)
 - Coal (£/kg)
 - Oil (£/litre)
 - Wood (£/kg)
 - Petrol (£/litre)
 - Diesel (£/litre)
 - Other vehicle fuel (£/litre)
9. What percentage of the community do you think need to install solar each year in order to decarbonise our energy system?
10. What percentage of the community do you think need to install a heat pump each year in order to reduce our reliance on carbon intensive fuels?
11. What percentage of the community do you think need to move over to electric vehicles in order to limit the impacts of climate change?