B. Using the PCT interface and data

This section introduces the user to the PCT interface and to the data that can be downloaded from it. Screenshots are used to demonstrate the PCT features, but please remember that minor improvements may be made to the interface during the coming months. Where data downloads are shown, the software used is Microsoft Excel and QGIS (these are not the only programs that could be used).

Please see the manual part C for description of the methods, for instance how the scenarios are defined.

1. Introduction to the interface features

The PCT front page is distinct from the tool itself. The front page shows a national map where the user can view results for all areas for Census 2011 data and for all four scenarios. Hover over a region to see the relevant cycling levels.

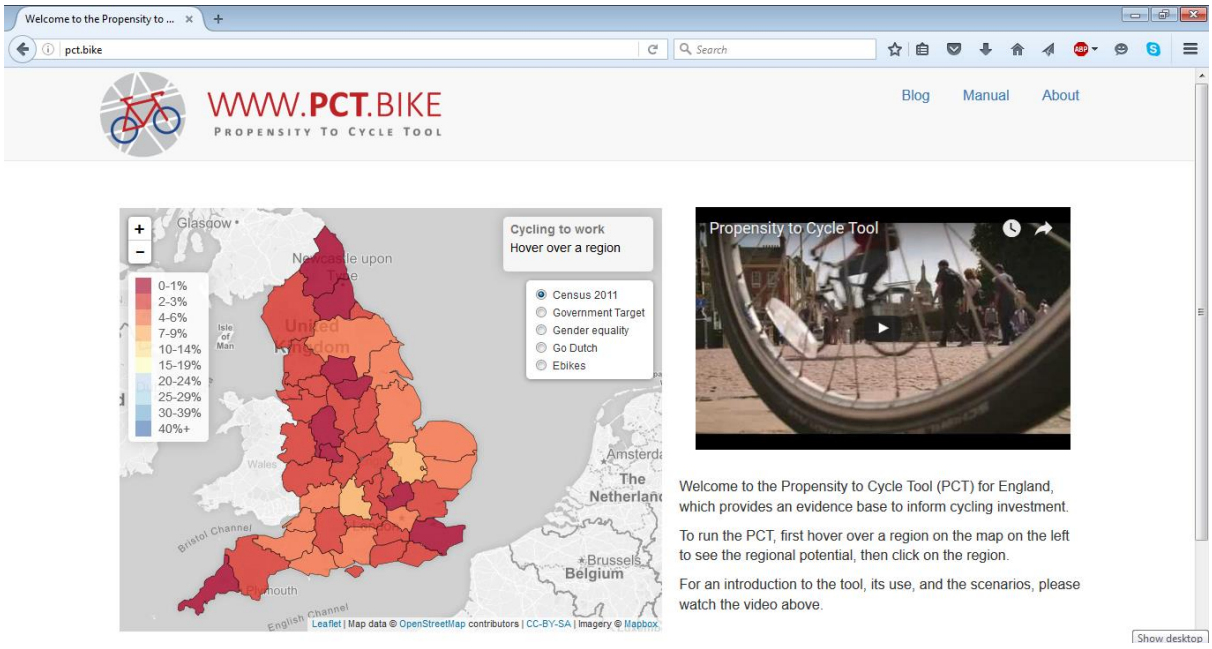


Figure 1: The PCT Front Page

You will also find here a short introductory video about the PCT project.

To access the PCT itself, you need to click on a region. Here we will be using Lancashire as an example.

2. The map tab

On clicking upon Lancashire, you will first of all be taken to the map tab, which is the main PCT page for that area. The URL for the PCT Lancashire area is http://www.pct.bike/lancashire/ and the downloads and model information relate to that area.

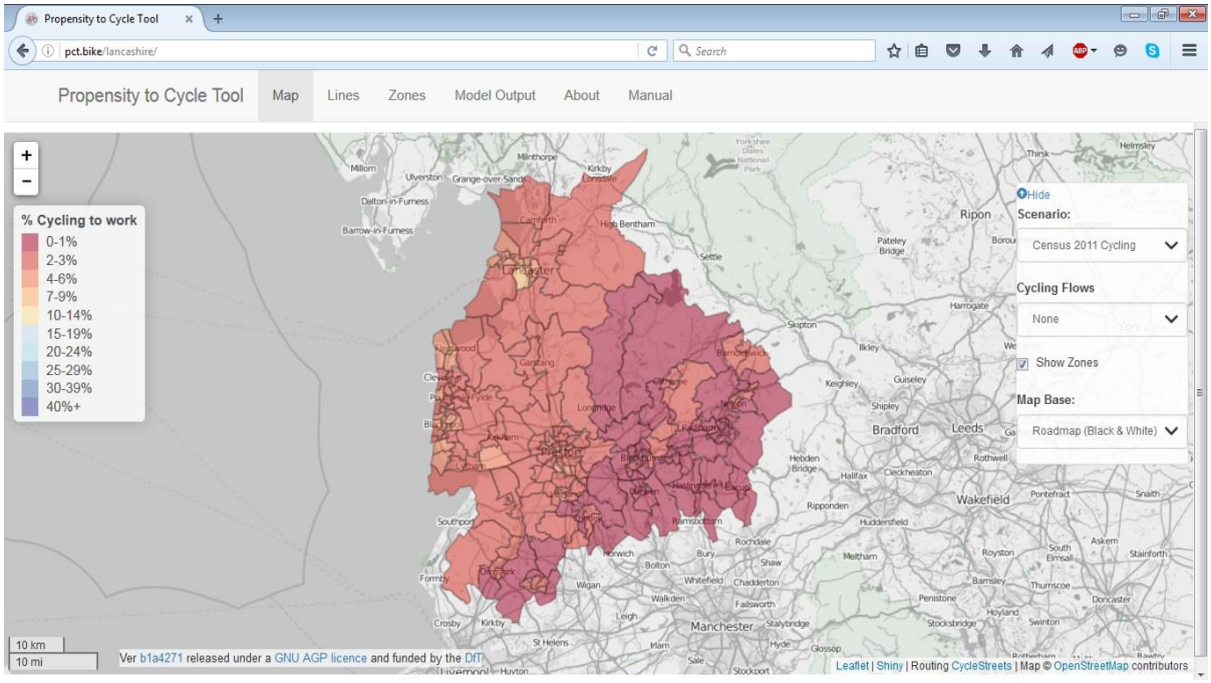


Figure 2: The PCT front page for Lancashire

A. Finding your way around the map tab

To the left you will see a legend, which relates to the area-level information and categorises levels of cycling in each MSOA (Middle Level Super Output Area, average population around 7500 individuals, 3325 commuters). To the right, you will see an options menu, the options in which change depending on whether you are viewing flows, and whether you are viewing scenarios or the Census data. There is also the option to entirely hide the options menu by clicking 'Hide'; click again on 'show' to get it back.

Figure 3: the legend on the left (only displayed when 'Show Zones' is checked), and the options menu on the right

You can also click on areas or lines, as described below, to get more information about them.

B. Choosing scenarios

By default, the map will show Census 2011 data for the selected area. To change this, click on the 'scenario' dropdown in the options menu and choose your scenario. Below we show the 'Go Dutch' scenario results for Lancashire.

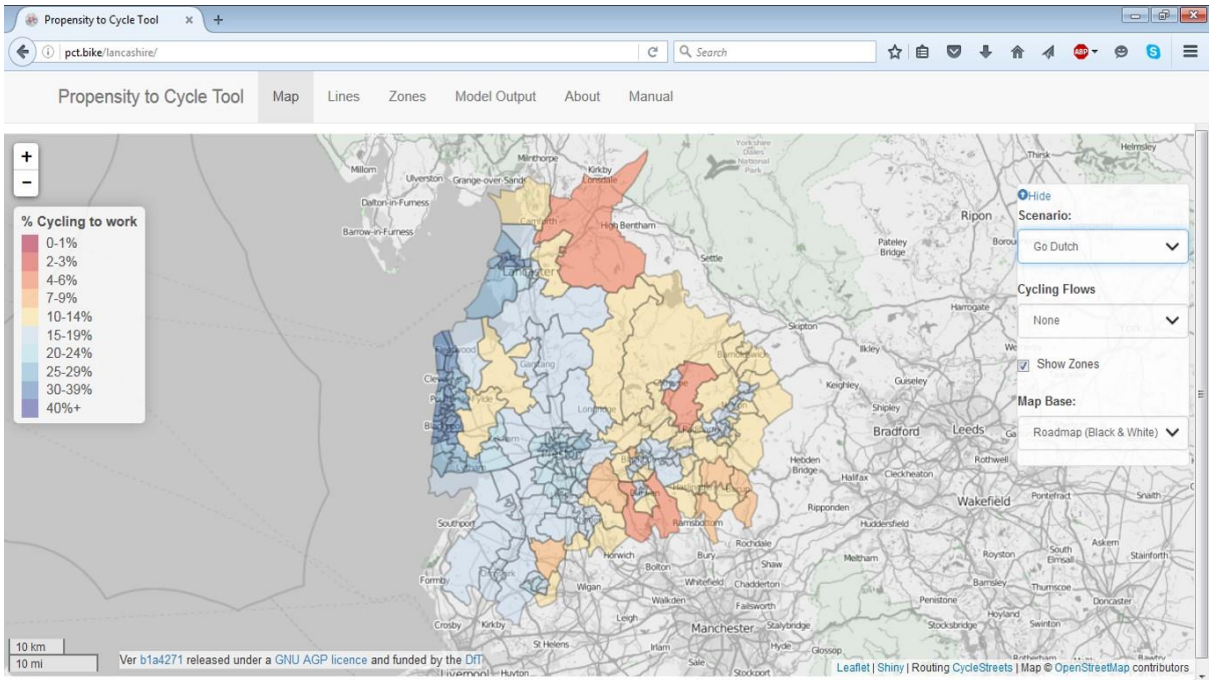


Figure 4: Lancashire, 'Go Dutch' scenario

Different basemap layers are available, including showing OpenCycleMap routes or showing levels of deprivation. These can be selected at the bottom of the options menu.

C. Area popups

Clicking on an area will produce information about that MSOA. The information provided differs depending on whether you are showing the Census 2011 data, or a scenario. As can be seen by comparing Figure 4 and Figure 5, the scenario information gives you some additional information about change, for example related to health benefits and CO_2 savings if scenario levels of cycling were realised in that MSOA.

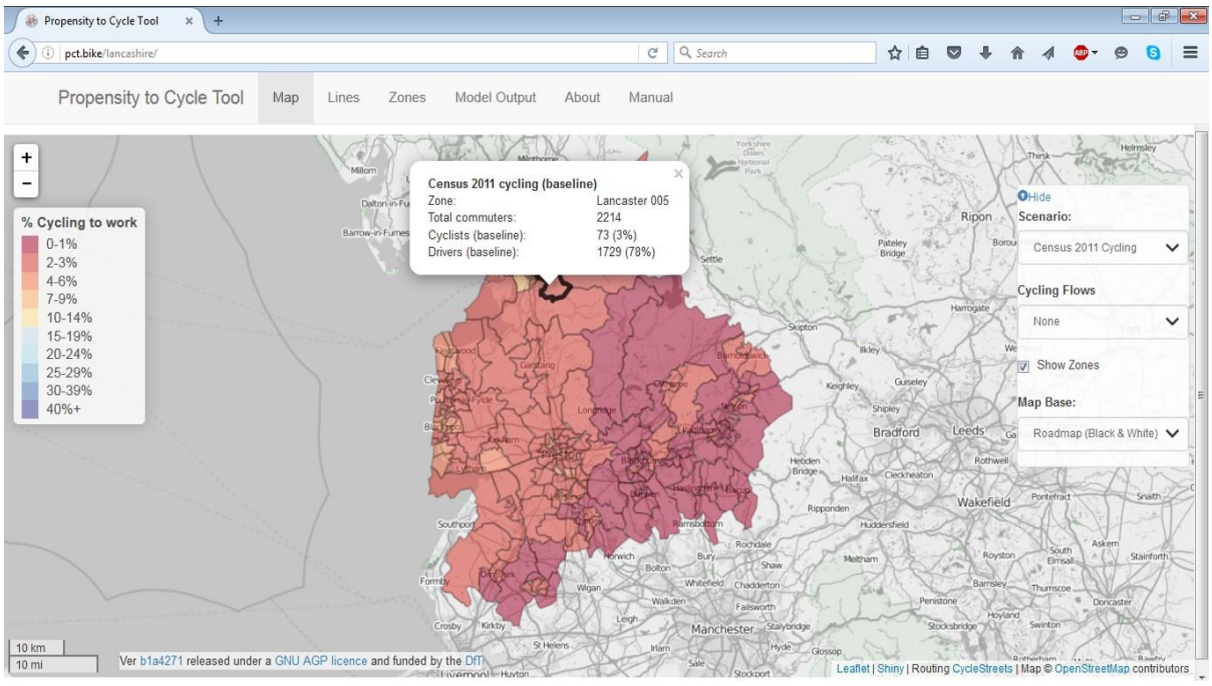


Figure 5: popup zone information for Lancaster 005, Census data

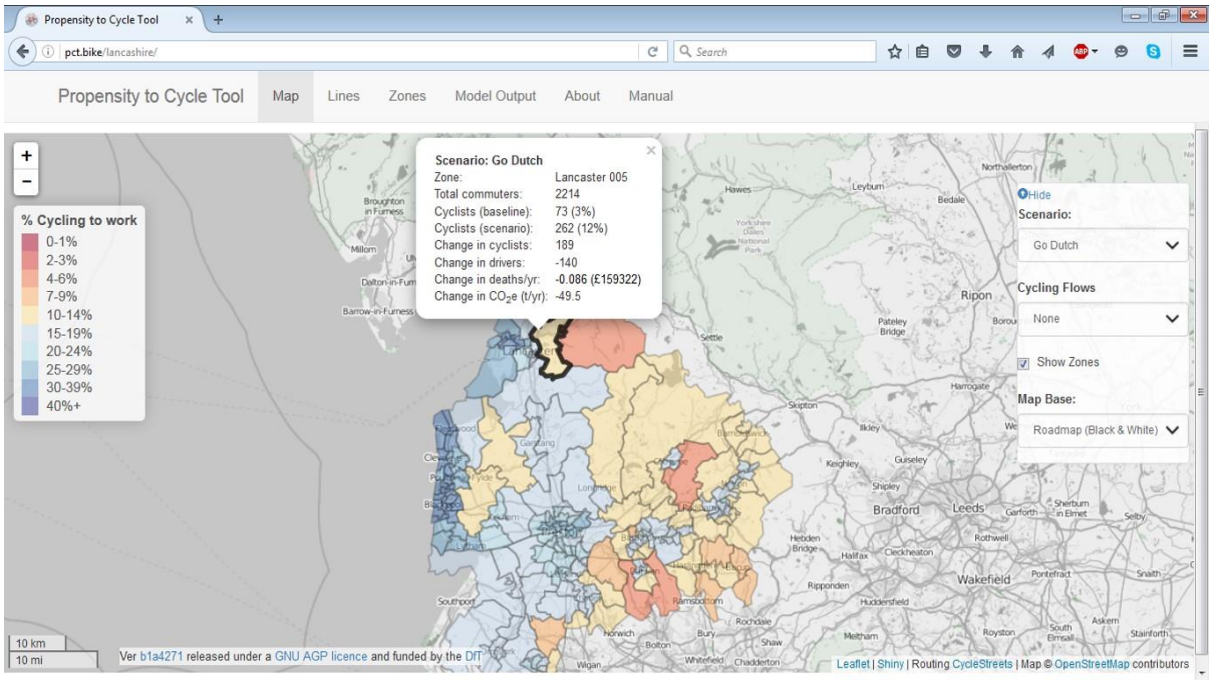


Figure 6: Lancaster 005 zone popup, Go Dutch scenario

D. Showing the cycling flows

Straight Lines

As well as the area data, the PCT allows you to look at where cycling flows go, and which parts of the route network might be busiest. Please note: the 'flow data' cannot visualise all the commuter cyclists – for instance, it does not include those travelling outside the regional boundary (Lancashire in this case), and does not include those with no fixed workplace. More information about the exclusion criteria can be found in the Model Output tab.

To show the cycling flows, click on the dropdown 'Cycling Flows' box, and you will find a series of options. The first option is 'Straight Lines'. You will notice that on selecting this, lines appear and an expanded set of options is available on the option menu.

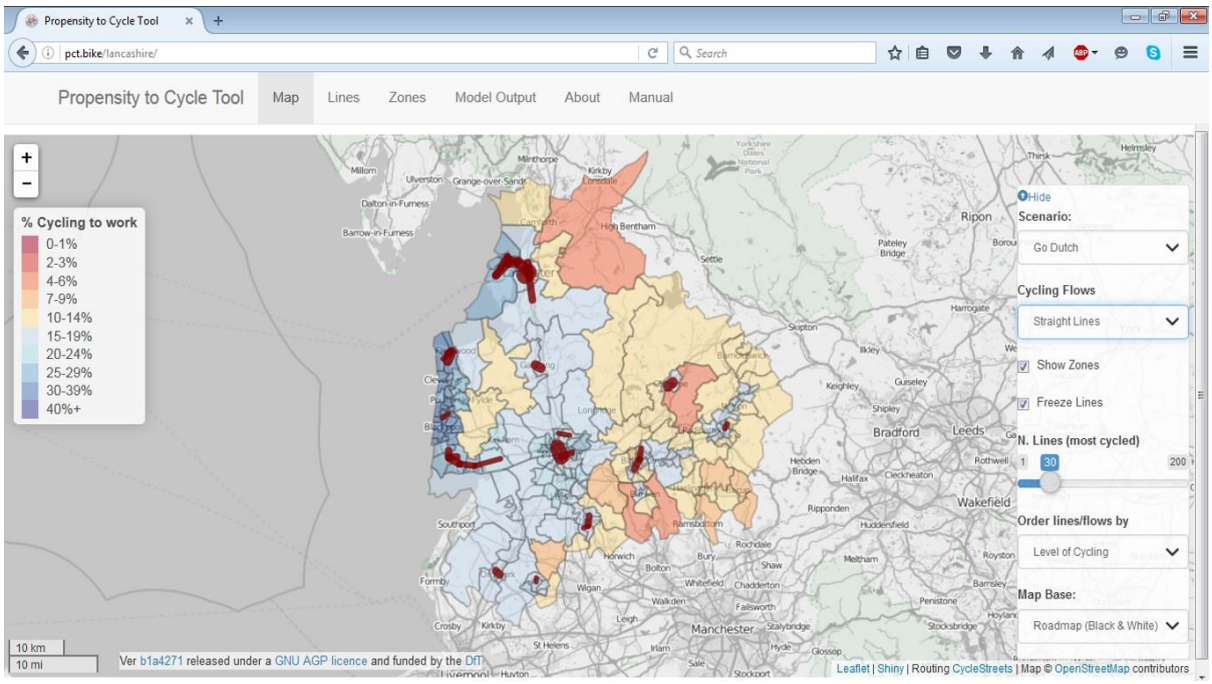


Figure 7: Straight line flows, Lancashire

Some points to note about expanded options menu:

- 'N. Lines' refers to the number of lines shown. The default is to show the top 30, but you can show any number up to 200.
- 'Order lines/flows by' allows you to choose the criteria used to select the top N. of lines. The default is level of cycling, but you can also choose the increase in cycling, the health economic benefit (HEAT value), or the CO_2 reduction.
- If you wish to remove the zone information, you can untick the 'Show Zones' button.
- The 'Freeze Lines' button means that if you navigate around the area, the originally selected lines will remain visible. If you untick the 'freeze lines' button, then as you move the map, the top N. of line will be recalculated for the new visible area (NB this includes the part of the screen behind the legend and options menu, if present).

The two images below illustrate examples of these combinations, zooming in on the Preston area:

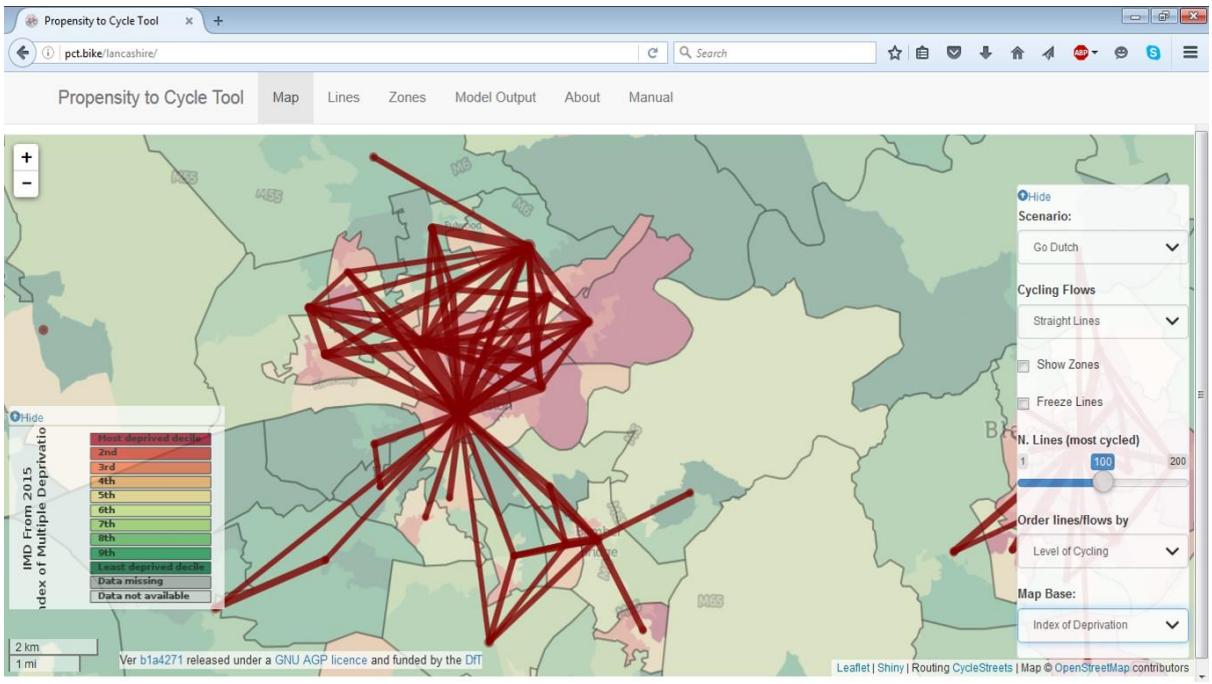


Figure 8: Preston area 'Go Dutch' scenario, top 100 lines shown against IMD, ordered by level of cycling

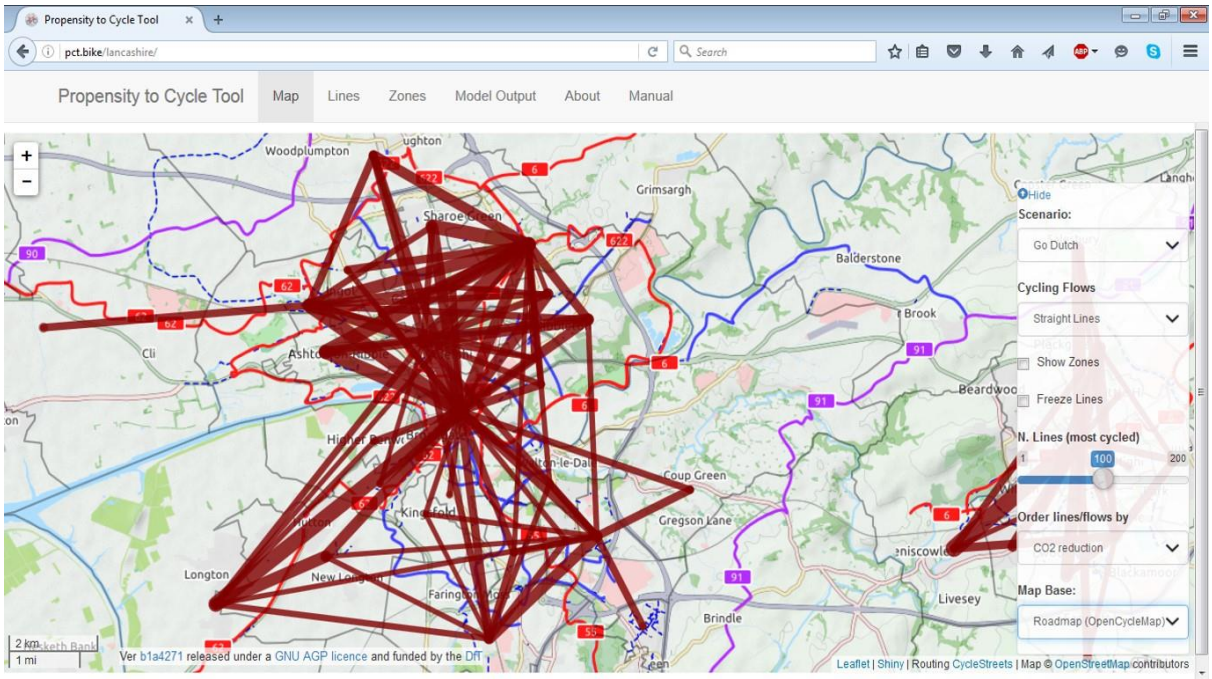


Figure 9: Preston area 'Go Dutch' scenario, top 100 lines shown against OpenCycleMap, ordered by CO2 savings

Lines, like areas, have popups associated with them. The image below illustrates the data available for one such line. (If clicking on popups, it's useful to have 'freeze lines' selected, as otherwise your newly selected line might disappear as the map moves to fit in the popup information).

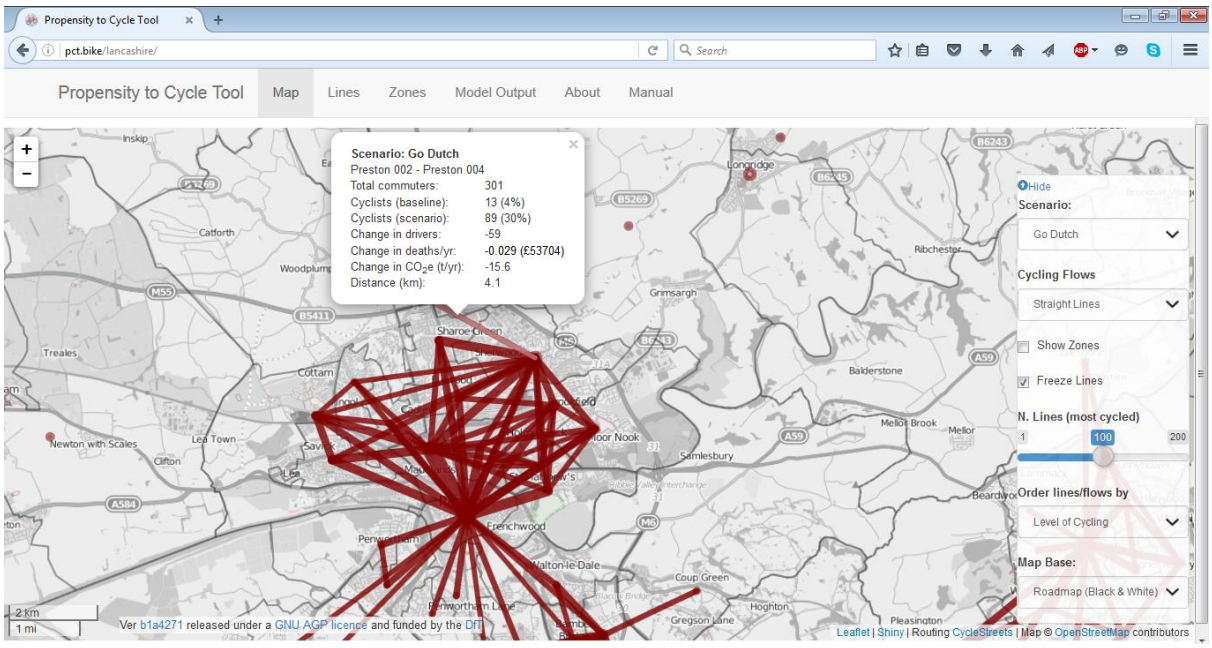


Figure 10: Preston 'Go Dutch' scenario, lines popup

In the figure above, the lines popup tells us that for the Origin-Destination pair comprising Preston 002 and Preston 004 there are 301 commuters in total. The distance between the two points is 4.1km. 4% of the 301 commuters currently cycle, but under the scenario 30% would cycle. This would lead to 59 fewer drivers, and a health economic benefit of £53,704 per year. The CO_2 saving per annum is 15.6kg.

Within-Zone Flows

As you will see in the Model Output page, not all cyclists can be shown in the flow data. One group which can't be shown are those travelling entirely within an MSOA – as we cannot show them as desire lines or allocate them to the route network. The circles that you will see at the centre of the MSOAs give you information about those 'within-zone cyclists'. See the image below, for Longridge to the North-East of Preston:

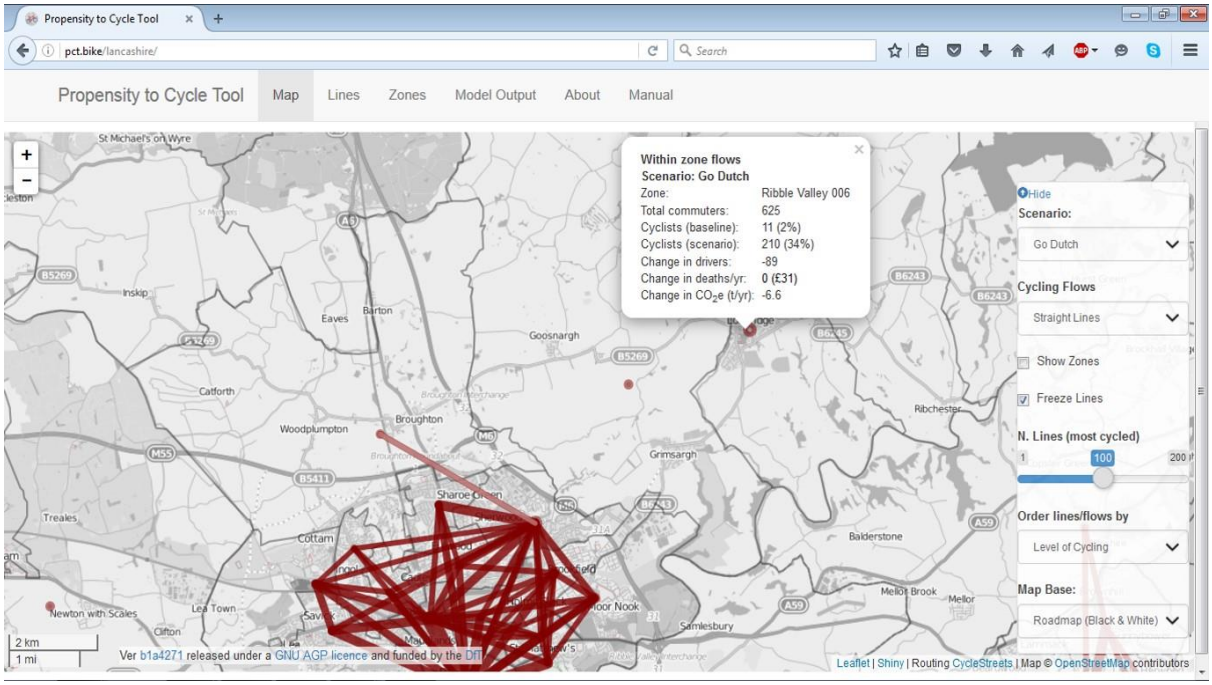


Figure 11: Within-zones flow, 'Go Dutch' scenario, Ribble Valley 006

It can be seen that these within-zone flows can sometimes be quite substantial. There are 625 people who commute entirely within the Ribble Valley 006 MSOA. Currently only 2% of them cycle, but under the Go Dutch scenario this would rise to 34%, taking 89 cars off the road.

Fast and Quiet routes

In the 'Cycling Flows' drop-down menu, the options after 'Straight lines' show either the fastest legally cycleable routes, or alternative quieter routes recommended by the Cyclestreets journey planner. Choosing 'fast routes' shows only the fastest routes, while choosing 'fast and quiet routes' will also show the recommended 'quieter' routes that Cyclestreets offers for those origin-destination pairs. A couple of caveats should be noted:

- 'Quieter' routes may differ in the extent to which they are truly quiet. Many will still include what Cyclestreets describes as 'very busy sections', so it should not be assumed that a 'quiet' route is necessarily a high quality cycle route.
- In some cases, there is no reasonable quieter alternative to the fast route. In those cases the 'quieter' route shown will simply be the same as the direct route.

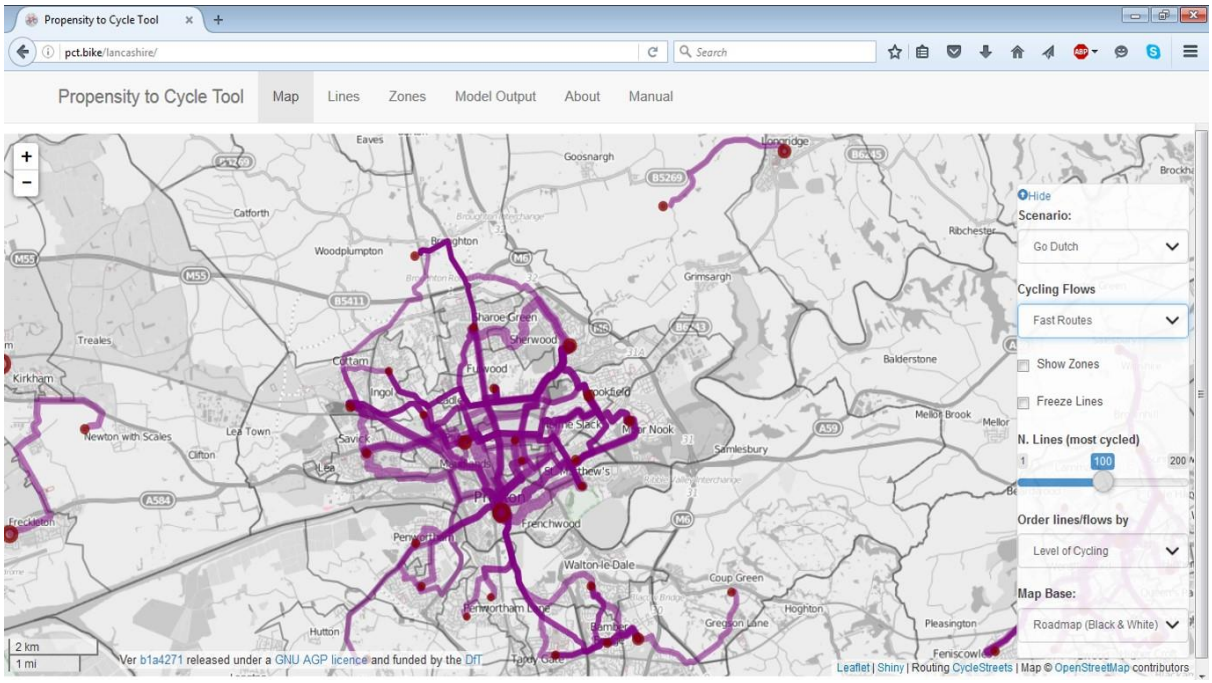


Figure 12: Preston 'fast routes', 'Go Dutch' scenario, Top 100 lines

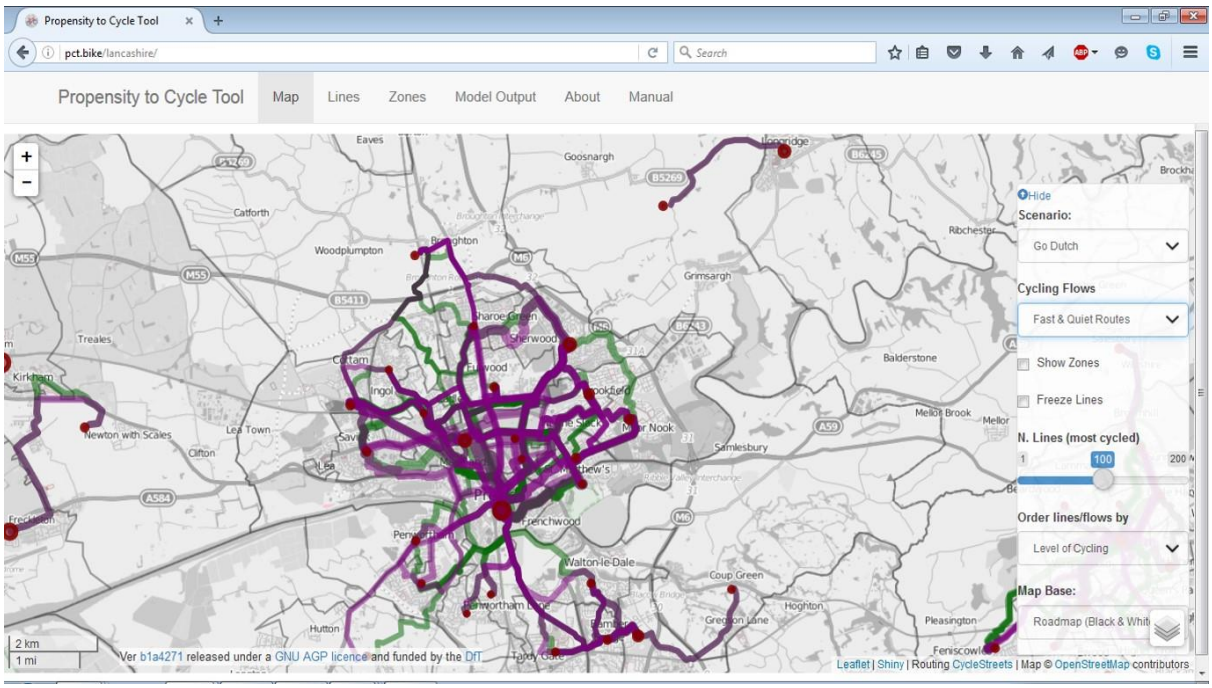


Figure 13: Preston 'fast' and 'quieter' routes, 'Go Dutch' scenario, Top 100 lines

Again additional information for each route type can be seen by clicking on the line in question:

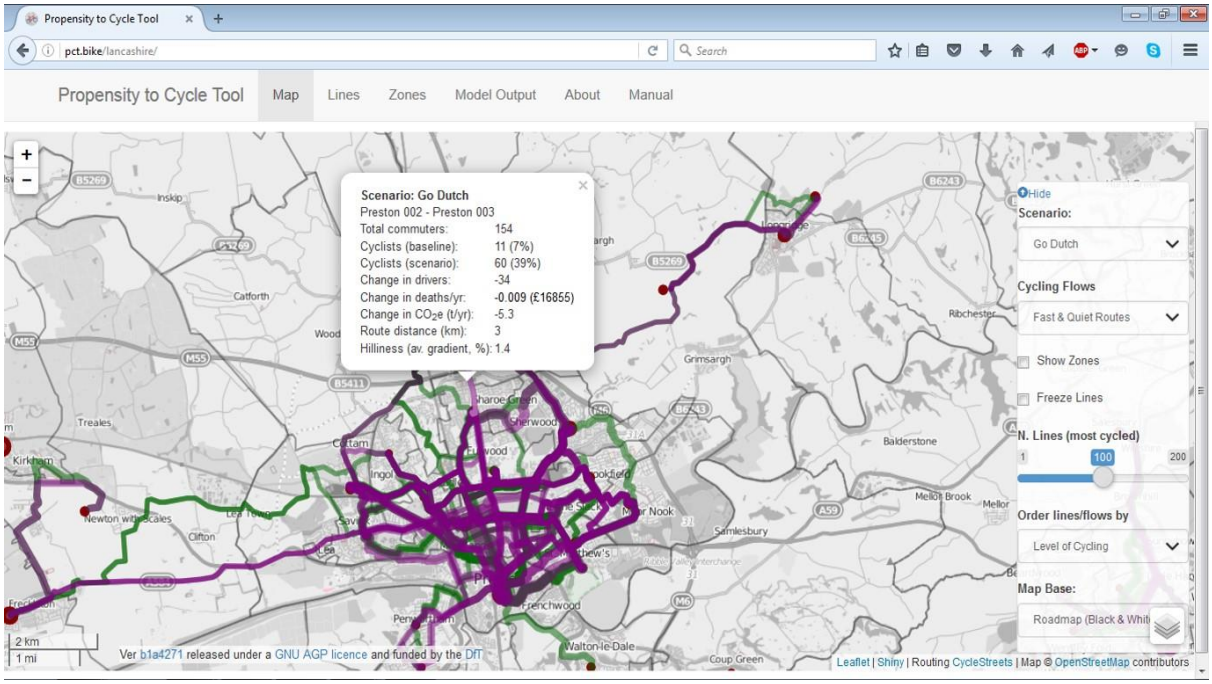


Figure 14: Preston 'fast route' popup example, 'Go Dutch' scenario

In the image above, information is given for the ‘fast route’ between Preston 002 and Preston 003, based on the ‘Go Dutch’ scenario. The popup gives details about the route (distance, hilliness), the cyclists (baseline and scenario), the health economic and carbon benefits.

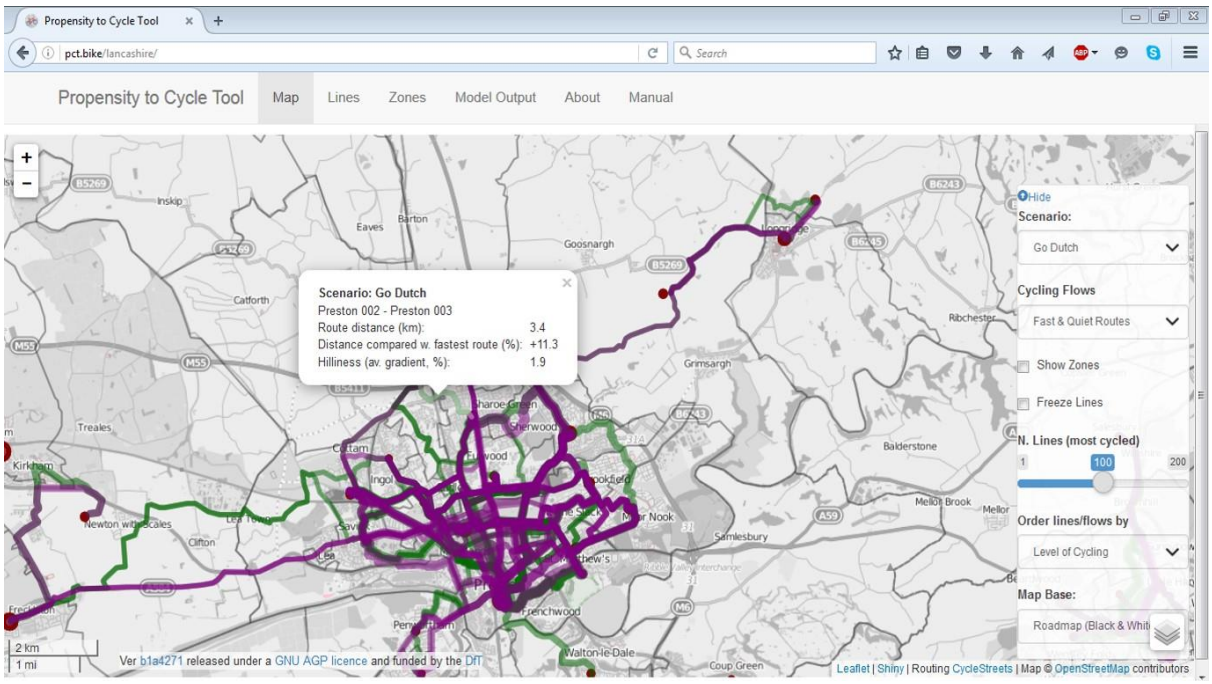


Figure 15: Preston 'quieter route' popup example, 'Go Dutch' scenario

For the quieter route popups, information about the hilliness and the additional distance (compared to the faster route) is given.

Route Network

The final option within the 'Cycling Flows' dropdown is the Route Network layer. This aggregates all the cycling flows, using the fastest legally cycleable routes. We prioritise these fast routes as it is likely that to achieve cycling potential, direct routes which minimise unnecessary distance decay should be prioritised: however, local knowledge is helpful in interpreting the resultant map, especially as we are using population-weighted MSOA centroids rather than actual origins and destinations. It is also worth noting that near the boundary of the PCT area (as defined in the URL, e.g. in this case Lancashire) flows will be suppressed as the route network will not include people travelling to or from an MSOA outside the area boundary.

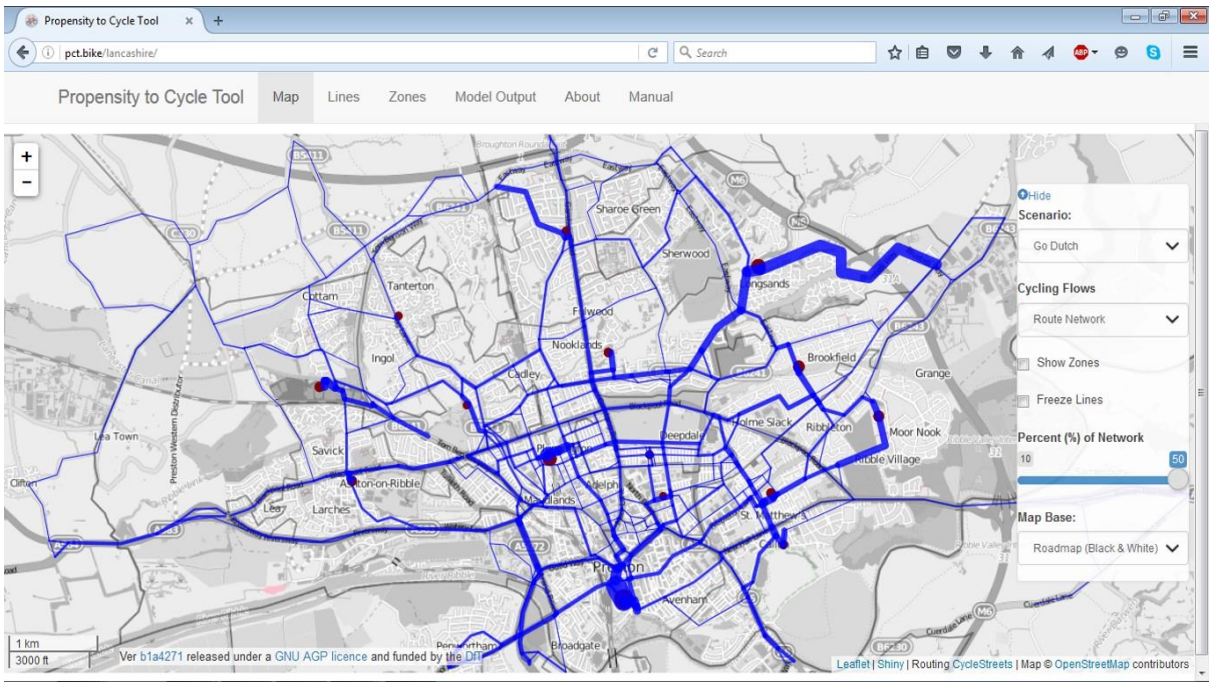


Figure 16: Route Network, Preston, 'Go Dutch' scenario

It is also possible to click on a route network section and see the impact the scenario makes in this case, compared with baseline (the baseline assumes that current Census cyclists are also taking the most direct cycleable route):

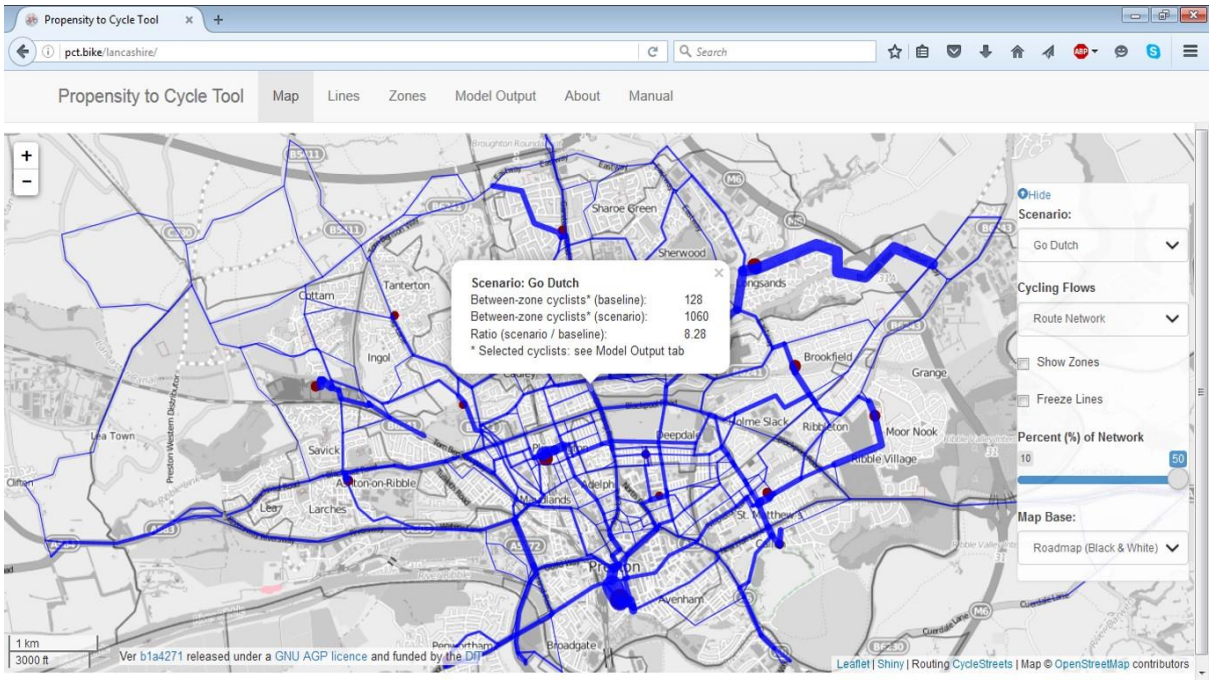


Figure 17: Preston 'Go Dutch' route network, with popup

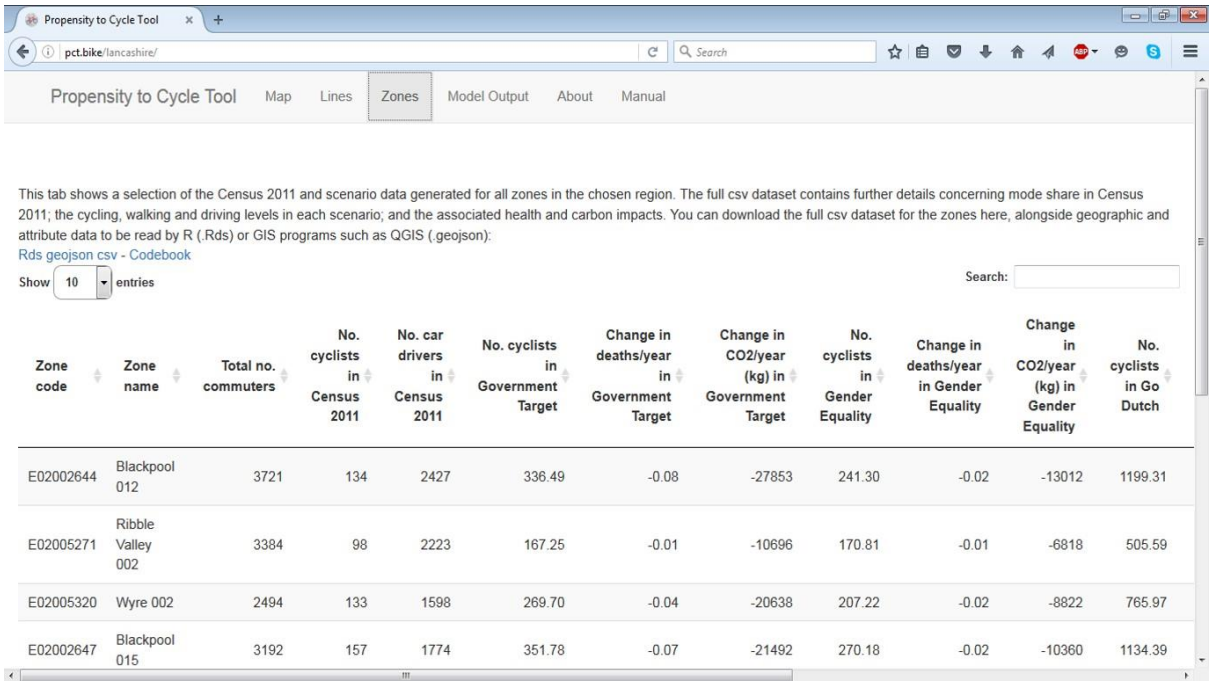
3. Downloading the data for bespoke analysis

While the user will gain much valuable information from the online tool, advanced use is likely to involve the need to download the underlying data. For example, bespoke analysis could aggregate particular areas, such as Preston district, in order to calculate health benefits of achieving the scenario cycling levels just in that area. More advanced analysis might involve selecting specific origin-destination pairs, and comparing the fastest and quieter route times for those journeys (for instance, in considering the potential impact on

cycling journeys of building a cycle path along an A road). Or you may wish to merge other local datasets with the information provided by the PCT.

See Manual Section D for some examples of more advanced use for business case purposes.

To download the data, navigate to the 'lines' and the 'zones' tabs. Here for example we can see and download the area data for Lancashire. For each type of data there is a corresponding .csv codebook which explains the different variables.



Zone code	Zone name	Total no. commuters	No. cyclists in Census 2011	No. car drivers in Census 2011	No. cyclists in Government Target	Change in deaths/year in Government Target	Change in CO2/year (kg) in Government Target	No. cyclists in Gender Equality	Change in deaths/year in Gender Equality	Change in CO2/year (kg) in Gender Equality	No. cyclists in Go Dutch
E02002644	Blackpool 012	3721	134	2427	336.49	-0.08	-27853	241.30	-0.02	-13012	1199.31
E02005271	Ribble Valley 002	3384	98	2223	167.25	-0.01	-10696	170.81	-0.01	-6818	505.59
E02005320	Wyre 002	2494	133	1598	269.70	-0.04	-20638	207.22	-0.02	-8822	765.97
E02002647	Blackpool 015	3192	157	1774	351.78	-0.07	-21492	270.18	-0.02	-10360	1134.39

Figure 18: Zones data for Lancashire: downloads page

The area data can be downloaded in three formats. The CSV file can be opened in commonly used software such as Excel or OpenOffice, and you can for example conduct analysis comparing the impact of the different scenarios. The Rds file can be opened in the free, open source software R. Finally, the .geojson file can be opened in GIS software such as QGIS (also free and open source).

If you wish to conduct analysis using other GIS programs, such as Mapinfo, this software may not be able to open a .geojson file directly. In this case we recommend that you open the .geojson file or files in QGIS (which can be freely downloaded) and then export them in the appropriate format for your program. For more information, see
https://docs.qgis.org/2.2/en/docs/user_manual/working_with_vector/supported_data.html

Lines data, like the zones data, can also be downloaded in these three formats:

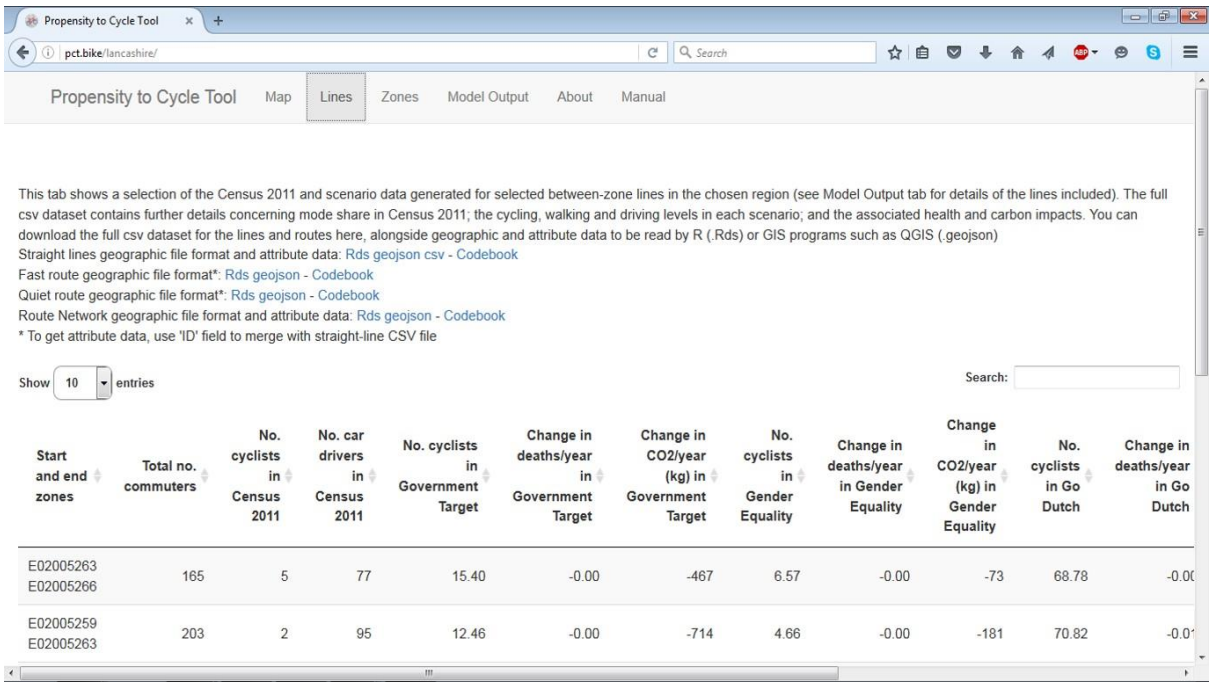


Figure 19: Lines data for Lancashire: downloads page

4. The model output tab

The model output tab provides background information on the area (in this case Lancashire), including details of what proportion of commuters are included within the flow data.

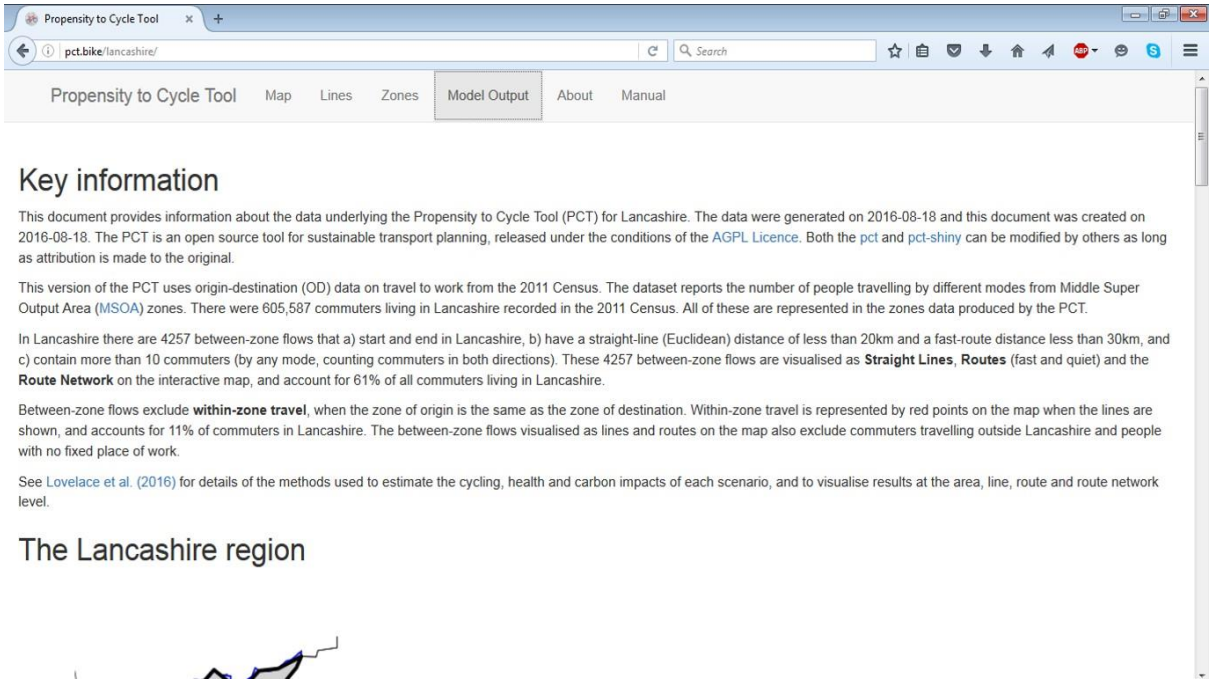


Figure 20: The model output page for Lancashire (top section)

5. Creating custom scenarios

More advanced users, going beyond the bespoke analysis of PCT data, may want to create custom scenarios. To do this, you need to 'build' new input data for the PCT and have a version of the tool running on your computer (not on a remote server). The steps to install working versions of the PCT and the build scripts on your computer are described in the README files associated with the

pct-load and pct-shiny GitHub repositories. These can be seen from the PCT team's GitHub page: github.com/npct.

To create custom scenarios, the key dataset to modify is 'l.Rds', a SpatialLinesDataFrame (an R object class) that exists in each region. In the *root directory* of the RStudio project for the pct-load folder (which can be opened by opening the pct-load.Rproj file), this could be loaded for Kent, for example, with the following commands, resulting in the following plot:

```
library(sp) # load spatial library
# Load the OD-based 'desire lines' for Kent
l = readRDS("../pct-data/kent/l.Rds")
plot(l) # plot the result
```

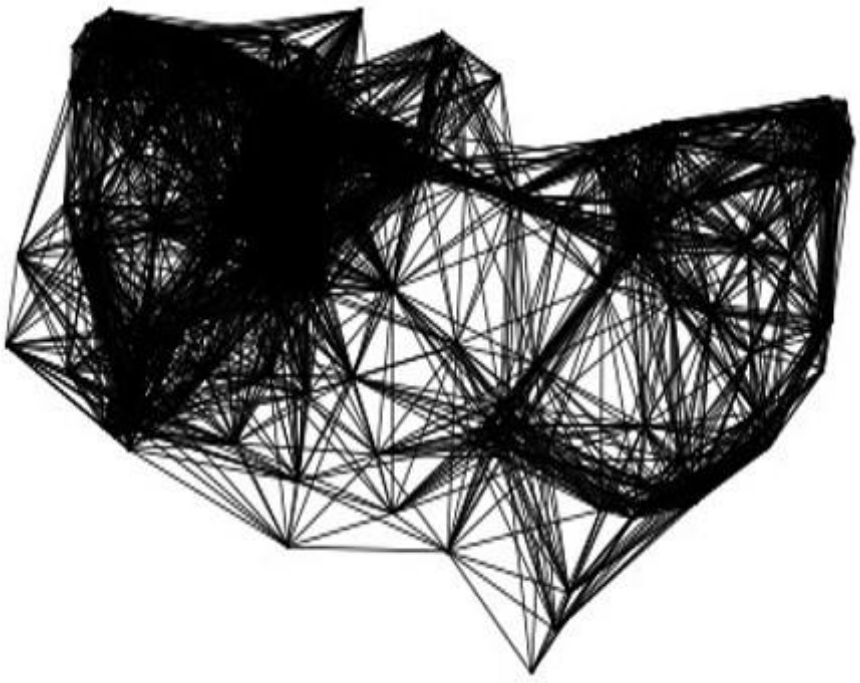


Figure 21: Kent data, plotted using Rds file

By modifying the values of the variables associated with each line (e.g. `l$Bicycle`, representing the current level of cycling) in this dataset, new scenarios can be created. Let's change the Government Target scenario so that the level of cycling is proportional to the inverse of distance, minus the average hilliness of the fastest route. This contrived example could be achieved with the following command:

```
l$govtarget_slc =       # modify the scenario level of cycling for Government
Target
  0.5 / l$dist_fast -   # set proportional to the inverse of distance
  l$avslope / 100       # minus the average gradient (percent)
```