LocaGIStics user instruction

Note: *This version of the LocaGIStics tool is a first prototype. It now only includes the Burgundy case study. In a later stage the LocaGIStics tool will be developed further for regions in Finland and Spain.*

General information:
This tool supports the user to design biomass delivery chains at regional level (implemented for Burgundy and in 2016 for regions in Finland and Spain) and to analyse in a comparative way (for different biomass delivery chains) the economic and GHG emission and mitigation potential and the spatially explicit land use and environmental implications. It uses data about biomass supply, different biomass conversion and pre-treatment technologies and novel logistical concepts of biomass hubs and yards.

Getting started:
The starting screen below shows a map of the selected country and region (now only Burgundy region is included).

In the map displayed the grey diamonds refer to suggested power plant locations as analysed by the BeWhere Tool analysis (see in the main user interface the 'Tools' --->'BeWhere'). Each of these suggested locations refers to one power plant to which the biomass is directly sourced from the field without making use of intermediate collection points.

In the LocaGIStics tool the user is now invited to design one or more biomass delivery chains choosing the size and location of the power plant while designing the chain with or without intermediate collection points.

Use of LocaGIStics tool:
To <u>operate the tool</u> one starts specifying the choices in the top left hand pane ('**Countries**'), going down to '**Biomass types**' pane on the left side, and then moving to the top right panes specifying '**Biomass conversion plants**' and finally the '**Intermediate collection points'**.

Since this first version of the tool only contains one case the user does not need to make a selection in the '**Countries**' (France), '**Area of interest**' (Burgundy) and '**Cases**' (Burgundy straw and Miscanthus) panes. We therefore start with the '**Variants**' pane.

<u>Variants pane:</u> Click on the '**Create'** button and give a name for the variant of the chain you are going to design (e.g. 'only straw' or 'mixed straw and miscanthus'). Then click on the '*Submit*' button. You can see that the variant that you have just created is now highlighted with a yellow bar. If needed you can edit the name of the variant using the [✎] icon.

Note: Always check later on if the correct variant is still chosen (highlighted) because this might sometimes be accidentally changed in this prototype e.g. after a calculation.

Note: Unfortunately there is a limit to the width of the columns depending on the size of your screen. You can change the size of the columns in each pane by putting your pointer on the border of the column and dragging it to one side. This way you can better read the heading and/or the data.

Biomass types: This section shows the available biomass types (in the Burgundy case these are straw and Miscanthus). You can choose the actual amount of biomass you want to include in your analysis (this could be lower than the maximum). The choice could be e.g. to use only straw, then you need to put the amount of the other biomass types (now only Miscanthus is included) on '0'. Use the icon to edit the biomass availability and related properties (field moisture % and moisture content after intermediate collection/pre-treatment). After editing click on '*submit*' button.

Note: *All biomass properties have a default setting (in this case 33% straw and 100% Miscanthus), but can be changed by the user.*

Note: *The map shows the biomass availability in a grid pattern. Deep coloured grids have higher biomass availability then light coloured grids. The 'active' biomass type (highlighted with the yellow bar), for which a biomass conversion plant is selected is shown on the map. In the Burgundy case straw is yellow-brown and Miscanthus is purple.*

Biomass conversion plants: In this pane you define the biomass conversion plant location and size By clicking the '*Create*' button one can add a new plant and specify its name and size in terms of amount of biomass (in ton d.m.) processed on a yearly basis. After clicking '*Submit*' a power plant is located on the map (red square) in the centre of the region.

Note: *in this prototype the plant data in the calculation module only refer to a power plant. They are based on cost data for a plant processing approximately 30,000 ton of biomass (d.m. ton), so only if small size deviations of about 10% are made the cost calculation results can be regarded as realistic.*
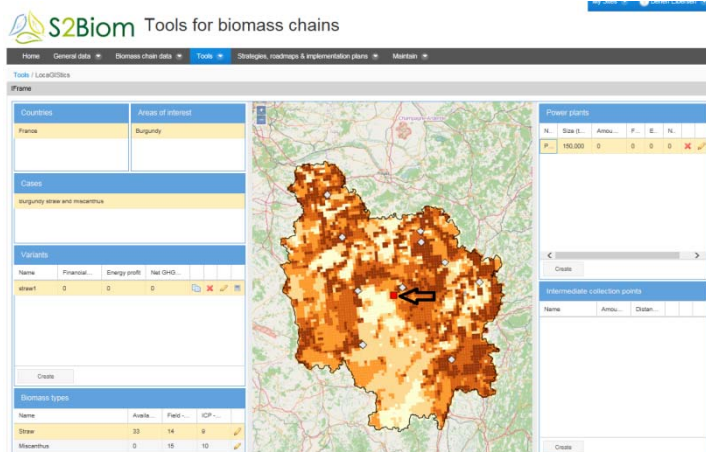
You can now move the red square to the location on the map where you want to locate the plant.

Note: *The suggested locations by BeWhere (grey diamonds in the map) can be used as a reference point, and the biomass density shown on the map (brown grids) are also meant to be a guidance.*

Intermediate collection points: In this pane the intermediate collection points supplying to the Biomass conversion plant that was just designed in the former pane can be defined. The first step is to click on '*Create*'

and then assign a name. Then click on '*Submit*'.
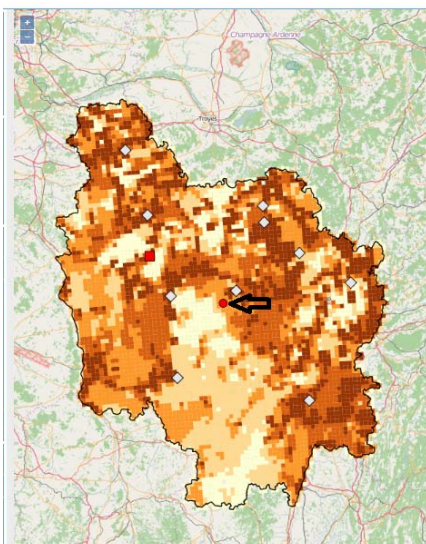
You will see a red circle on the map indicating the location of the intermediate collection point. You can now click on this red circle and drag it to the position where you want the intermediate collection to take place (most likely the place selected should be where the biomass is most concentrated spatially so that you obtain short transport distances to the intermediate collection point).

If you want the intermediate collection to coincide with the plant itself you can click on the icon in the 'Intermediate collection point' pane.
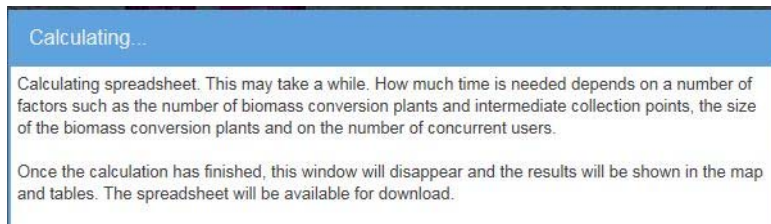
This definition of intermediate collection points can be repeated for a second intermediate collection point.

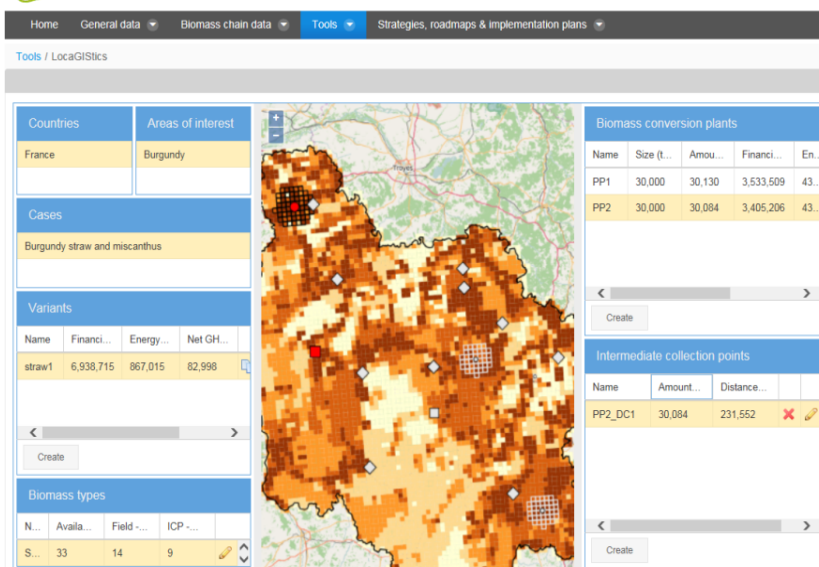*Note: a minimum of one and a maximum of two intermediate collection points per plant needs to be selected.*

After this step more power plants can be added together with their collection points by repeating the definition steps in the 'Biomass conversion plants' and 'Intermediate collection points' panes.

Calculation of results: If the user thinks all biomass types, power plants and intermediate collection points have been defined properly the calculation of the results can be generated. To do this the user needs to go back to the **'Variants'** pane and press the calculator icon.

Note: Only press the icon once. The system then starts to calculate. This can take a few minutes. You will get the following screen:

The results of the calculation will appear in several places:

1)   A grid pattern will appear on the map indicating the grid cells sourcing the defined power plants.

2)   In the '**Variants**' pane the *financial profit, energy profit* and the *GHG avoided* is specified as assessed for the defined biomass conversion plants.

3)   In the '**Biomass conversion plant**' pane the *financial profit, energy profit* and the *GHG avoided* are quantified but specifically for the biomass conversion plant

4)   In the 'Intermediate collection points pane for the amount and distance (=total ton/km).

Calculation of new variants and comparison of performance of biomass delivery chains: To make a new design there are two options:

- In the '**Variants**' pane click on '*Create*' and give your new design a name

- In the '**Variants**' pane click on the former variant created and click on the copy icon. The former design can then be adapted with new specifications by going through the definitions steps in the 'Biomass Types', 'Biomass conversion plants' and 'Intermediate collection points' panes as described above.

If a Variant or a plant specification or an intermediate collection point needs to be removed just click on the icon.

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Per design more biomass conversion plants and per plant more intermediate collection points can be specified and results displayed on the map.

Note: the dark grid on the map refers to the sourcing area of the plant that is active in the tool.

The calculations and the calculation results can also be displayed in an excel file. This can be accessed by clicking on the ☒ excel icon in the Biomass conversion plant pane. The system will then start up excel on your computer and display the calculation sheets and results.

Note: there are more working sheets showing the different input variables and calculation of the main indicators quantified in the tool on costs and revenues, energy use and returns, calculation of GHG emissions and avoided.