EnAlgae DSTs

A short guide to Decision Support System Tools

Tool 1: The Map of Algae Initiatives in North West Europe

The map presents the data collected from landscaping studies of academic and industrial research on algae cultivation and its use in general as well as for associated commercial activities. The map is searchable based on a number of filters and features a user-controlled interface to display the location, contact names and miscellaneous information on the respective algae stakeholders and their activities.

Tool 2: Potential Production Sites in North West Europe

The GIS tool contains a prototype microalgae production siting tool, which allows the user to identify and select potential microalgae production sites through a map-based interface using data with a high spatial resolution. In addition, spatial data on waste nutrient sources that can be used for microalgae production is provided.
To give the user information on potential sites tailored to his needs, the results can be filtered using the following criteria:

- Areal biomass yield
- Site and reactor area
- Distance to road infrastructure
- Distance to nitrogen, phosphorous and CO2 nutrient sources

For further refining the results, the user can select different scenarios regarding the cultivation system (flat panel, tubular reactor, open pond), land use restrictions, and terrain restrictions that affect the outcome of the land availability and the yield calculations.

Statistics on national and regional levels on potential microalgae areal yields and number of nutrient sources are provided as color-coded maps to give the user an overview and to facilitate the identification of promising cultivation areas on a higher level.

To ensure consistency amongst the models used in the EnAlgae DST, the GIS tool is coupled to the techno-economic models used in the DST Dashboard for the calculation of the microalgae biomass yield and the demand for nutrients (nitrogen, phosphorous and CO2). The yield is calculated for each potential site using site-specific data on mean temperature and global radiation levels.

Tool 3: Algae Growth Modelling Tool

The growth modelling tool is based on a well-founded mechanistic model of algal physiology and enables rapid calculation of biomass and biofuel feedstock production under a range of dynamic environmental conditions. The user interface provides scope for experimentation to investigate how the interplay between these various factors can guide strategy to attain optimal solutions. The end

user has control over variables for light availability (whether artificial or natural), nutrient levels (in the form of dissolved nitrogen and phosphorus), harvesting rate and optical depth.

Tool 4: Economic Dashboards

The dashboard comprises a description of cultivation and processing systems in the form of bio-economic models that combine an estimation of biomass production and resource consumption with an economic assessment that provides a detailed cost price analysis. The dashboards have been developed for various cultivation methods including open pond system, flat panel system and tubular system, downstream processing including methane, biodiesel and ethanol wet milling and seaweeds. End-users will be able to input their own data in order to evaluate the economics of various scenarios.

Tool 5: Faceted Smart Search

This tool provides a search facility using simple keywords and filters for the project documents. Using the filters on the left side, users will be able to narrow down the documents based on their document needs. Users will be able to type keywords on the top box to identify the specific documents.

Tool 6: 3D Visualisation Tool for Virtual Algae Platform

The 3D visualisation tool is developed to demonstrate the concept of algae cultivation and downstream processing. The end-users will be able to interact with the production system and adjust the parameters to see the amount of biomass produced for a given set of inputs.

The whole process in triggered through the three parameter: CO2 + Nutrients, Dilution speed and Light source. Dials were used for triggering C02 and dilution speed; the dials input can be changed to low / medium / high - in altering their quality and speed. The light source is triggered by the switch with 'on' and ‘off' animation.

These three input parameters trigger the process tank environment, which simulated: (i) the process flow, (ii) reaction inside the tank and (iii) the output achieved. The process tank in under a glass roof which can provide both natural and artificial sunlight depending on the choice made. Apart from that users can use avatar to walk through in exploring and interacting with the environment.