



france**biogaz**

**IMPLANTATION DE CULTURES SOUS SERRES
SUR LES BERGES DE SAMBRE
ÉTUDE D'OPTIMISATION ÉNERGETIQUE**



Juillet 2015

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12. Synthesis in English

1) Context and objectives

The river Sambre was the source of the industrial boom in the Maubeuge area in the 20th century (1900 – 1970). The economic restructuring of the area, underway since the 1980s, has led to the river being left behind in favour of other priority development areas.

Today, local politicians and stakeholders in Maubeuge want to shift focus back onto using the waterway as a major factor of new development and allow the local population to reclaim this “blue space”, neglected for over 40 years. This project has a threefold aim: creating a new and innovative industrial activity, offering back-to-work jobs in order to enable social reintegration to people who need it, and developing a project which respects the environment.

2) Methodology of the study

This study aims to evaluate the feasibility of producing freshwater algae cultivated in greenhouses near the banks of the river Sambre. Two scenarios have been studied: the cultivation of spirulina (*Arthrospira platensis*) in open-pond raceways and the cultivation of chlorella (*Chlorella vulgaris*) in photo bio-reactors (PBR) called “Christmas trees”. The sizing of the equipment was done and the energy requirement evaluated, for each scenario. Then, two solutions were proposed in order to cover the heating needs:

- Using condensing boilers fueled by natural gas ;
- Using the heat produced by a Combined Heat and Power (CHP) plant coupled to an anaerobic digestion plant. This second solution can only cover a part of the total energy requirement.

The project economy was studied for each scenario, as well as the current regulations and possible locations for the project implementation.

3) Conclusions of the study

The conclusions of this study are the following:

- Cultivation of spirulina in open-pond raceway is not suitable regarding the expected production volume. Indeed, if this scenario presents lower investment costs (half the costs of the Christmas Tree solution), its energy requirements are much higher, and so are the corresponding operating costs. This scenario is therefore not economically viable. An industrial scale production needs industrial means to be reached: the tools must match the objectives!
- Cultivation of chlorella in Christmas Tree reactors is economically feasible, but this scenario doesn't fit all the project goals. The use of a mainly automated process leads to decreasing manpower needs, particularly less back-to-work jobs.

4) Possible project reorientations

These conclusions point out the apparent impossibility to satisfy all the project objectives at the same time, and therefore lead France Biogaz Valorisation to suggest possibilities in order to reorient the project. Two orientations are suggested:

i. Develop further the industrial aspect

A possible option is to increase the added value of the product by extracting of the raw material (such as fatty acids or pigments), to sell those products to pharmaceutical and/or cosmetic industries. In this way, jobs, and in particular back-to-work jobs can be created if the transformation is made on-site.

ii. Diversify the activities

On the contrary, this option consists in moving away from a purely industrial logic to focus on shorter distribution channels (direct selling for instance) with smaller production volumes. Guided and educational tours may be organized, and part of the created jobs, that involve an important social aspect, can be dedicated to professional reintegration. This option could also include the creation of a Research & Development "cluster", to involve industrialists in the project.

Those two propositions are of course not the only possible project evolutions, and discussion is open to precise how to follow up the project.