Biorefinery 2030: Partnerships for the Bioeconomy

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Content

Biorefinery 2030: case study of an integrated biorefinery, Bazancourt-Pomacle, Champagne, France

What can we learn from case studies?

Publication::

Biorefinery 2030, Pierre-Alain Schieb et alii.
- in French by L’Harmattan, Paris, 2014
- in English by SPRINGER Verlag, 2015
Figure 2.3. Raffinerie et Bioraffinerie d’après Kamm et al. (2008)
Figure 2.2. Inputs et outputs d’une sucrerie ayant intégré la bioraffinerie
Bazancourt-Pomacle biorefinery: profile

- 11 industrial and R-D actors on the same site
- 160 has, 1200 jobs (direct), 600 indirect
- Cumulative investment in 2012 Euros: 1 bn Euro
- 700 million Euros turnover
- 2 million metric ton of sugar beets and
1 million ton of wheat as inputs
- Built over 70 years
- TRL covered: 1 to 9 (only case in France, one of two or three in Europe)
Figure 2.6. Vue panoramique de la plateforme de Bazancourt-Pomacle
### Fiche synoptique des entreprises présentes sur le site de Bazancourt-Pomacle

<table>
<thead>
<tr>
<th>NOM</th>
<th>Métier</th>
<th>C.A. en 2011</th>
<th>Effectifs en 2011</th>
<th>Date arrivée sur le site</th>
<th>Volume produit en 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.R.D.</td>
<td>Recherche et développement</td>
<td>10 144 749</td>
<td>90</td>
<td>1989</td>
<td>n.c.</td>
</tr>
<tr>
<td>BIOAMBER</td>
<td>Producteur d’acide succinique</td>
<td>395 759</td>
<td>n.c.</td>
<td>2008</td>
<td>n.c.</td>
</tr>
<tr>
<td>BIDEX</td>
<td>Démonstrateur</td>
<td>n.c.</td>
<td>n.c.</td>
<td>2009</td>
<td>n.c.</td>
</tr>
<tr>
<td>BLETANOL</td>
<td>Union de coopératives céréaliers</td>
<td>84 406 086</td>
<td>12</td>
<td>2006</td>
<td>n.c.</td>
</tr>
<tr>
<td>CHAMTOR</td>
<td>Amidonnerie</td>
<td>153 400 000</td>
<td>198</td>
<td>1992</td>
<td>347 000 t</td>
</tr>
<tr>
<td>CRISTAL UNION</td>
<td>Sucrière</td>
<td>200 000 000 (estimé)</td>
<td>279</td>
<td>1948</td>
<td>206 282 t</td>
</tr>
<tr>
<td>CRISTANOL</td>
<td>Producteur d’éthanol de première génération</td>
<td>213 553 021</td>
<td>131</td>
<td>2006</td>
<td>2 359 387 hl</td>
</tr>
<tr>
<td>FUTUROL/ PROCETHOL 2G</td>
<td>Pilote industriel d’éthanol de seconde génération</td>
<td>150 060</td>
<td>12</td>
<td>2011</td>
<td>n.c.</td>
</tr>
<tr>
<td>SOLIANCE</td>
<td>Producteur d’ingrédients cosmétiques</td>
<td>16 288 033</td>
<td>60</td>
<td>1994</td>
<td>n.c.</td>
</tr>
<tr>
<td>WHEATOLEO</td>
<td>Producteur de tensioactifs</td>
<td>304 914</td>
<td>n.c.</td>
<td>2010</td>
<td>n.c.</td>
</tr>
<tr>
<td>AIR LIQUIDE</td>
<td>Collecteur de CO2</td>
<td>n.c.</td>
<td>n.c.</td>
<td>2009</td>
<td>120 000 t</td>
</tr>
</tbody>
</table>

**Table 2.1. Fiche synoptique des entreprises présentes sur le site de Bazancourt-Pomacle**
Why is it an innovation platform?

- Large industrial site: sugar plant + starch plant + bioethanol plant (largest in Europe)
- R-D corporation from 1990 (belongs to two of the largest French cooperatives)
- Scaling up facilities: pilot and demonstration levels
- National Pilot projects: FUTUROL Project
- 4 Chairs on site (Graduate Schools of Engineering, GS of Business, and University)
Figure 2.7. Coupe instantanée de l’évolution de la plateforme de Bazancourt-Pomacle de 1980 à 2012 – périodicité : tous les 10 ans.
Figure 2.23. Application des TRL à la plaque de Bazancourt-Pomacle
Typology of partners:

- Local: within the bio-cluster Bazancourt (IB)
- Local: within vicinity (citizens, farmers, mayors, schools/univ...)
- Sub-national: public authorities (Department Marne, Regional council, Competitiveness Center-Pôle IAR across two regions..)
- National: regulators, Ministry of industry, AGR
- International: EC DGs, companies, prof. associations
Typology of scope/field:

- Externalities (positive or negative)
- Strategic foresight/vision/roadmaps
- R-D-I initiatives
- Industrial ecology /circular economy
- Funding
- Lobbying, group of interest
I- Industrial ecology, bio-cluster:

_Strictly defined_: cascading process of products, co-products. shared inputs/outputs.

_More largely defined_: should include services and non tangible exchanges, modes of cooperation between partners:

- R-D contracts, maintenance contracts, waste water treatment
- strategic information, human capital

_Even more widely:_

- circular economy (closed loops with environment, return of nutrients to soil/farmers)
- environment services
<table>
<thead>
<tr>
<th></th>
<th>CHAMTOR</th>
<th></th>
<th>CRISTANOL</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Volume</td>
<td>Valeur</td>
<td>Volume</td>
<td>Valeur</td>
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<tr>
<td></td>
<td>2011</td>
<td>2011</td>
<td>2011</td>
<td>2011</td>
</tr>
<tr>
<td><strong>Alimentation humaine</strong></td>
<td>190 000</td>
<td>75,5 M€</td>
<td>670 090 h</td>
<td>43,8 M€</td>
</tr>
<tr>
<td><strong>Alimentation animale</strong></td>
<td>122 000</td>
<td>25 M€</td>
<td>178 554 t</td>
<td>34,7 M€</td>
</tr>
<tr>
<td><strong>Biocarburants</strong></td>
<td>257 000</td>
<td>11,5 M€</td>
<td>2 359 387</td>
<td>132,5 M€</td>
</tr>
</tbody>
</table>

*Table 2.2. Décomposition des productions de CHAMTOR et CRISTANOL*
Figure 3.2. Flux de produits, coproduits et de services entre les entreprises de la bioraffinerie.
Figure 3.3. Flux d’eaux (eaux de forage et traitées pour les procédés, vapeur et eau issue de la biomasse) entre les entreprises de la bioraffinerie de Bazancourt-Pomacle, Champagne-Ardenne. Les pourcentages indiqués représentent...
Figure 3.4. Flux des effluents de la bioraffinerie de Bazancourt-Pomacle, Champagne-Ardenne. Les pourcentages indiqués représentent la part de chacun des flux sur la totalité de l’eau.
II- Local partners (vicinity):

- Citizens: acceptability, negative externalities (odours, dirty roads, noise, risks), positive externalities (jobs), potential (heating)

- 6500 to 12 000 farmers: (diversification of outputs, option to fight volatility of global markets, industrial flagship, nutrients are returned to the farm)

- Cities (local taxes, jobs, high tech image)

- Universities, Eng. or B. schools (research, fieldwork)
Cooperatives in Champagne Ardenne (investment about 20 million Euros/year) or large family companies (Picardie-Nord) are the investors/operators/owners

S3: smart strategies at regional level

e.g. Champagne Ardenne 30 Million Euros of R-D subsidies within 7 years (Chairs, 2500 m² building on site, R-D projects)
III- National levels (France)

- BRI: the platform (ARD+Chairs) labelled by French Ministry of Industry


- National /regional development plan: some calls for R-D Project are funded
IV- International/EU

- PPP BIC: 2014-2020: 3.8 billion Euros (1 bn in R-D by EC, 2.7 bn by European industry, including Bazancourt actors)
- DG Research H2020: calls for R-D Projects (no overlap with BIC)
- FEDER funding to local projects in Bazancourt
- EUROPABIO: biobased industry association
- Bazancourt: two major US ventures (AMYRIS, and BIOAMBER, have started in Bazancourt with ARD R-D and pilot/demo. facilities)
- Active participation in BIOWORLD Congress in USA
- European MOU between competitiveness centres/bioclusters
## Partnerships: a matrix

<table>
<thead>
<tr>
<th>Partners Items</th>
<th>Farmers</th>
<th>Citizens</th>
<th>Industrial actors</th>
<th>Graduate schools</th>
<th>Cities Local publi Bod.</th>
<th>Pole IAR</th>
<th>Cooperatives</th>
<th>Regulators</th>
<th>Large companies</th>
<th>Ind. associations</th>
</tr>
</thead>
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<td>Externmalities</td>
<td>X</td>
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<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Foresight</td>
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<td>X</td>
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<td>X</td>
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<td>R-D-I</td>
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<td>X</td>
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<tr>
<td>Funding</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Some hurdles to innovations in Agricultural systems:

- **De-risking strategies**: horizontal partnerships. Anti-trust laws prevent open discussions between operators/industrialists. Only M&A can do the job.

- **Size of cooperatives**: if too big, local farmers will not endorse international projects by profes. managers.

- **Competitiveness of bioeconomy**: distortion of competition because of subsidies to fossil fuels (discussed by IAE, OECD, IMF)

- **Acceptability of bioeconomy**: scientific education (PISA), « ownership » of the issue of information/communication, lack of inclusive debates (asymmetry of information)
Next steps:

- OECD STI/BNCT: launch of a survey in OECD Countries and beyond about biorefineries (economic, social, environmental impacts). Target: a sample of 4 case studies by end 2016 (on a voluntary basis)

- Pierre-Alain Schieb & Mohamed Chelly: paper on distortion of competition to the bioeconomy (subsidies to international transport etc.). 2016, Submitted for publication.


- FLAGSHIP, FP7 Research Project, Case study on bioeconomy/biorefinery, Schieb, 2016 (forthcoming)
Thank you for your attention

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