28 : The socio-economic ambitions assigned to the PIAs (1)
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Summary

- Equipex FIGURES: remodeling faces
- MSC Scanning: the 3D scanner unit used by Figures
- PIVERT: an Investment for the Future ahead of its time
The socio-economic ambitions assigned to the PIA and to UTC’s research activities
Railenium, high speed rail innovation
25 : The Health&Care Technology cluster

PIVERT : an Investment for the Future ahead of its time

PIVERT is an acronym for Picardie Innovations Végétales, Enseignements et Recherches Technologiques (Plant Innovation, teaching and technological research in Picardie) is one of the ITEs. Selected in 2011 in the framework of the French government programme Investments for the Future, PIVERT is far ahead of the other ITEs in respect to its budget. “In fact PIVERT is as important as all the other ITEs taken together and the budget envelopes are respected, both public and industrial funds” underlines Daniel Thomas. PIVERT is the centre for research, innovation, experimentation and training in plant chemistry based on oil-bearing biomass (colza, sunflowers, etc.). PIVERT is developing the bases for a future bio-refinery. There are three pillars: a precompetitive
research programme called Genesys, the Biogis Centre (hall for development and demonstration) and competitive, demonstration projects conducted by the industrial partners.

Genesys : 3 calls to tender, 36 projects, 5 patents

The Genesys programme, based on calls to tender, marked the beginning of PIVERT’s activities”, explains Gilles Ravot, CEO of PIVERT SAS. The first two calls, in 2012 and 2013, led to a selection of 36 projects to which an overall budget of 30 Meuros has been allotted. The 35 projects selected in the 3rd call are currently under analysis by experts from the Agro-Resources and Industries cluster (IAR) and they will publish their results in Autumn 2014.

The research themes are sub-divided into 7 sub-programmes, viz., new crops, field to industrial units, biomass fractioning; catalysis and bio-catalysis for oil-bearing plant chemistry; lipid auto-assembly; formulation and nano-structures; nutrition and health; bio-refineries – industrial metabolism. “The only area where PIVERT is slightly behind others is in thermal and thermochemical processes used to fraction the biomass” notes Daniel Thomas. “We are experiencing some difficulties to mobilize operational projects via calls to tender and we shall be coming up soon with some proposals to improve the situation.”

Prof. Thomas then analyzed each programme in turn: new crop systems have progressed well, catalysis and bio-catalysis offer encouraging prospects, “notably thanks to the active participation of the catalysis laboratory in Lille” and very novel projects, in lipid metabolism. In this sub-programme, the UTC team under Isabelle Pezron, has carried out “excellent work” in formulation, for example, reversible nano-object construction using biodegradable lipids. “We can envision replacing liquid crystals in screen assemblies by these nano-objects”, forecasts Daniel Thomas.

The nutrition/health sector is interesting for industrialists to control precisely the composition of edible oils so as to improve their sanitary properties and the sub-programme devoted to the bio-
refineries involves UTT (Troyes) “where we have the best French teams in industrial ecology” underscores Daniel Thomas. Gilles Ravot adds “The 36 projects under analysis have already generated scientific papers and the PIVERT group has registered 5 patent claims. Three new claims are being prepared currently. The programmes selected are becoming increasingly transverse and span several of the sub-programmes. Thanks to the results obtained, we are now running ahead of schedule. Subsequently, we must valorize the research at the Biogis Centre.”

The Biogis Centre, innovation go-between

The Biogis Centre, a technological hall designed to act as a go-between between research and industry is under construction. It will be commissioned in Spring of 2015 “It is a technology transfer facility, where research programmes end and industrial prototyping begins”, says Gilles Ravot. “It will also be an important training centre, reinforcing the position of the Picardie Region in the field of agro-resources. It will attract and stabilize demonstrators and maturation projects and consequently will create jobs locally. As Daniel Thomas sees it, this technical platform will obviously induce new industrial activities in the neighborhood.

“PIVERT will prove to be an efficient tool, bringing UTC and the local industrial sectors closer together. Today the UTC research teams TIMR (Integrated transformation of renewable matter) and GEC (enzyme and cell engineering), the Roberval and COSTECH Laboratories, ESCOM, etc., are all involved in PIVERT projects that unite almost all the chemical sector actors in France, including Solvay (cf. insert). Tomorrow, when the competitive phase projects begin, the industrialists will naturally approach UTC to assist them to finalize the work”.

With approval from Brussels

The management team of SAS PIVERT is composed of 10 persons: “an excellent team that set its marks fairly quickly”, feels Daniel Thomas. Gilles Ravot underscores: “We take care to listen
to the stakeholders and we really try to come up to their expectations, avoiding seeing the soufflé go flat, so to speak. We have set many things in motion to help build and strengthen links with and among the PIVERT actors; the club of industrialists welcomes these efforts that reinforce the credibility of the structure as a whole”. The other factor conducive to success is the work in the direction of Brussels.

“We are almost the only project in the framework of the French government programme Investments for the Future to have notified our activities to the European Union officials who approved the State aids we were receiving, also our road-map and the collaborative structure of our research programme. The procedure lasted for a whole year, but the approval by Brussels allows us to work safe in the idea that the public subsidies are guaranteed and will run the risk of a demand for reimbursement. This facilitated and accelerate no end the way PIVERT worked. The industrialists showed a very high degree of enthusiasm at the way things were turning out. Indeed they estimate that PIVERT will generate an extra 1 billion euros of annual turnover. Sofiproteol and Teros have increased their involvement in the R&D programmes over the past few years” adds Daniel Thomas.

X247 Meuros to ‘invent’ tomorrow’s bio-refineries

Thus, 70 Meuros (out of the provisional 247 Meuros budget), come from French State authorities, the rest provided by the industrial stakeholders. The role of the Picardie region must be underscored, notably in offering the site in the Techno-park “Rives de l'Oise” at Compiegne. “Without UTC, the setting up of the agro-resource cluster IAR- PIVERT would have been far more difficult” adds Professor Thomas.

“The flame lit by the academics has been revived beyond all our expectations by the economic and other institutional regional partners”. After 10 years of operations, the aim of PIVERT is to become profit-making, thanks to the Biogis Centre and the referral to competitive projects. But bot only this; “we must now invent a bio-refinery for tomorrow, capable of replacing fossil fuels by oil-
bearing plants, making use of processes that are neutral in terms of GHG emissions. All of this must now be written in an industrial metabolism where the waste material of a region become the raw material for a bio-refinery”. And as Daniel Thomas concludes: “There’s every chance that we shall succeed in this venture”.

**Key figures for PIVERT**

A provisional budget of 247M euros over 10 years, with:

- The precompetitive research programme GENSYS, with a budget of 120 Meuros;
- The 6 000 m² Biogis Centre, to conduct project development and demonstration with a budget allocation of 50 Meuros;
- Competitive demonstrators conducted by industrial partners (budget targeted-over 70 Meuros over 10 years);
- 150 research scientists recruited each year over 10 years;
- 5 000 industrial jobs created (direct or indirect positions) when the programme is completed;
- 28 academic and industrial partners;

The Founder members are:

- les industrialists: Sofiprotéol, Rhodia, Maguin, PCAS, SNC Lavalin
- the IAR cluster (Industry and agro-resources)
- the academic institutions: Université de Technologie de Compiègne (UTC), the Université de Picardie Jules Verne (UPJV) and the Université de Technologie de Troyes (UTT).

**What exactly is an ITE?**

Formerly called an IEED (Institute of excellence in carbon-free energies), the institutes for energy transition (ITEs) are interdisciplinary platforms that bring together the skills of industrial and public research establishments in a co-investment logic (public-private) and calling for close collaboration among all the actors. There are 9 ITEs today in France which will reinforce the
competitivity clusters and their eco-systems. An ITE is an excellence tool the finality of which is an industrial development and/or service developments. They suppose a critical mass in terms of means and skills preferably on a single site. They cover all innovation processes, up to and including the demonstrator and industrial prototyping.

ITEs relate to future energy sectors that will have a positive impact on climate, e.g., through better insulated buildings, more efficient transport rolling stock, energy control, facilities and equipment, geothermal engineering, renewable marine energies, smart energy grids and networks.

PIVERT was selected after a first government call to tender in 2011, as was INDEED (national institute for the development of ecotechnologies and carbon-free energy procurement), Lyon; after the second call to tender, 7 other ITEs were selected: France Energies Marines, Brest (Brittany), Greenstars in the Thau basin (Languedoc-Roussillon), l'Institut français des matériaux agro-sourcés (IFMAS), Villeneuve d'Ascq (Nord-Pas-de-Calais), l'Institut photovoltaïque d'Ile-de-France (IPVF), Saclay (Île-de-France), Supergrid, Villeurbanne (Rhône-Alpes), Geodenergies, Orléans (Centre) and l'Institut véhicule décarboné et communicant et de sa mobilité (Védécom), Satory (Île-de-France).

**Optimism at Solvay**

Solvay, is a shareholder (and founder) of the company PIVERT SAS represented by Thierry Vidal among the club of industrialists in the PIVERT venture. “The objective is to bring academic research closer to market realities and to define interests in common”

In the framework of Genesys, Solvay has interests in 3 research sub-programmes (catalysis, biochemistry and formulation) – which coincide with Solvay’s core business. “We also have interests in all the other programmes, apart from nutrition”, says Thierry Vidal. “As industrialists, we shall specify the research topics that interest us most, with the objective that they may be included in the calls to
tender”. The projects selected by Genesys involve only academic structures. But this is not a reason for the industrialists to just ‘wait and see’. For example, Solvay is conducting a joint competitive project with UTC on the subject of lipid auto-assembly processes. Solvay has set up an in-house research unit specifically oriented to bio-sourced chemistry, which is a market segment where Solvay aims at gaining points. “PIVERT is an excellent vector to encourage contacts between the academic and industrial spheres”, underscores Thierry Vidal, paying homage to the “very reactive and attentive team at Solvay SAS, a company that has invested considerable financial means and human resources to the PIVERT programme. It is difficult to put figures on these commitments, as the precise accounting has not yet been carried out. “PIVERT is still a young structure, and we are all in the learning phase”, explains Thierry Vidal. “We shall continue our level of commitment, both in Genesys and the Biogis Centre, because it is important that PIVERT leads to positive results and that the investments made by Solvay prove worthwhile. Personally, I am optimistic: the programme of activities for PIVERT are perfectly oriented in the right direction”.