



Fourth Call for Research Proposals (2009)

Deadline for receipt of proposals: 15 April 2009

Identifying and supporting the development of innovative, competitive methods for upgrading biomass for biofuels, power and/or bioproducts

1. PREAMBLE

The Enerbio dedicated fund was created to finance research projects and dissertations geared primarily toward *helping to identify and foster the emergence of innovative, competitive methods for upgrading biomass for biofuels and/or power and bioproducts over the intermediate term (beyond 2010) and long term (beyond 2020)*. Research may take the form of prospective studies or exploratory research and may be carried out via partnerships at national and European level with the involvement of manufacturers and research institutions.

The Enerbio fund is acquainted with the existence and achievements of the main national and European programmes already underway in these same fields, and thus seeks to play a complementary role. The fund encourages cooperation among those European research teams actively involved in these same subject areas.

The Enerbio fund dedicated to this research programme (which falls within the purview of the *Fondation Tuck* – Tuck Foundation) was established via the joint efforts of four manufacturers: Axens, Diester Industrie, Renault and Total.

The Tuck Foundation, a state-approved public-interest foundation, was established in 1990 by the *Institut Français du Pétrole* (IFP) and the *École Nationale Supérieure du Pétrole et des Moteurs* (ENSPM). The Foundation's bylaws provide for a research foundation concentrating on hydrocarbons, petrochemicals, engines, related activities and environmental effects.

While its focus was previously on teaching, the Tuck Foundation recently began diversifying its work in response to opportunities arising from the Act of 1 August 2003 related to patronage and foundations, a process that included the creation of dedicated research funds. Further information can be found online at: <http://fondation-tuck.fr/indexGB.htm>.

Developing research foundations and corporate patronage is a response to Europe's firm goal of increasing national efforts to foster research via private-public research partnerships.

2. ENERBIO: BACKGROUND

Situated upstream from and complementary to the main French and European R&D programmes, such as those directed by the ANR, OSEO and European Commission, Enerbio is in a position to fund various types of research:

Technical/economic and prospective studies: Analyses include scenarios relating to potential changes in the production and upgrading of biomass, potential competitive dynamics among various current and future uses, the conditions necessary for societal acceptance of new methods, and adaptation of the agricultural and forestry sectors, among others.

Basic and exploratory research projects: Adapting biofuel supply to market needs, particularly within the European context, including innovative methods for producing diesel fuel and gasoline base components, engine- and vehicle-based assessments, substantial improvements to the energy efficiency of biofuel subsectors in relation to bioresource production as well as logistics and industrial processing, and innovative methods for integrated biofuel/bioenergy and bioproduct production, among others.

Communications and media: Dissemination of Enerbio-funded research findings and work to further societal acceptance of current research findings.

Enerbio's role is thus twofold:

- To conduct exploratory studies drawing from upstream research while also seeking identification of any opportunities for rapid market release. As such, Enerbio can prepare certain programmes to be subsequently conducted in separate frameworks.
- To also provide the opportunity to support efforts at both national and European level. In doing so, Enerbio facilitates contact with the major European and international research programmes along with access to Europe's best research teams.

This text constitutes the fourth call for research proposals issued by the Enerbio fund. The call for proposals focuses on specific subject areas and follows, almost year-for-year, on the heels of the three preceding calls for proposals, some of which covered different subject areas.

3. THE 2009 CALL FOR RESEARCH AND DISSERTATION PROPOSALS: SUBJECT AREAS

The following subject areas were established by the Scientific Board of the Tuck Foundation and approved by its Board of Directors.

Given a significant increase in the use of biomass for non-food purposes, including biofuels, bioenergy and bioproducts, the Enerbio fund seeks to foster innovative scientific research related to the five following subject areas. Preferred areas of study for each subject area are also indicated below.

Subject Area 1: Biomass resources. Given today's expanded use of renewable energy, biomass-produced energy will play an important role. Existing data is insufficient, and work to develop models describing the potential of these resources in relation to energy recovery, along with consideration of issues related to their implementation and competition between their various uses, would be beneficial. Studies should be conducted at regional level and cover areas that appear most promising in terms of potential for expanded use of biomass:

- Prospective analysis of biomass resource potential, including traditional plants, waste and crops intended for energy recovery (the most energy-efficient resources, with solid environmental performance as well).
- Study of the socioeconomic impact of the expanded use of such resources in relation to energy recovery.
- Analysis of competition between food- and energy-based uses of such resources and fluctuations in biomass markets, in relation to expanded

production of biofuels and bioenergy. Proposed projects should include consideration of the biomass market's international character.

Subject Area 2: Certification of biofuel/bioenergy subsectors. There is strong demand, particularly in Europe, for progress toward certification of criteria for sustainability of the biofuel/bioenergy subsectors. This certification/validation process should result in a refined definition of the environmental benefits of each subsector, with particular regard to the following points:

- Analysis and modelling of data regarding the nitrogen cycle, involving N₂O in particular, in order to better understand how these compounds affect the greenhouse gas balance.
- Analysis, in terms of environmental balance, of the positive and negative consequences of changes in soil allocation (for example, a drop in soy meal imports combined with an increase in national rapeseed production, or the use of grasslands to plant crops intended for energy usage).
- Study of the qualitative and quantitative impact of expanded production of biomass for the bioenergy/biofuel subsectors on biodiversity and the water resources of relevant ecosystems.

Subject Area 3: Biomass-based power generation. Several possibilities for electrical and/or thermal power generation may be considered, whether combined with the production of biofuels or not, and would be worthy of study. Possibilities include:

- Prospective-type studies regarding coproduction of electrical power and biofuels.
- Analysis of the competing uses of biomass for the production of biofuels and power generation via direct combustion.

Subject Area 4: Innovative processes. The search for new biomass-based products (such as alcohols other than ethanol for use as fuel components) always makes for quite an interesting research topic. Furthermore, any ideas for improving the energy balance of processes for the manufacture of biofuels and bioproducts merit exploration:

- The search for new processes for the manufacture of fuel base components from lignocellulosic biomass.
- Development of high-performance, energy-efficient processes that may be applied, for example, when producing ethanol from lignocellulosic biomass or separating out and concentrating microalgae.
- Production and use of methane, obtained via anaerobic fermentation or other procedures, for the transportation industry.

Subject Area 5: Use of biofuels. In relation to their impact on pollution-producing emissions in particular, several aspects are worthy of study:

- Analysis and modelling of implementation of new fuel/biofuel mixes, including their characteristics, in internal combustion engines.
- Optimization of technical, economic and environmental performance levels of fuel/engine dynamics.

Appendix A

Process, eligibility and selection criteria Funding, monitoring, timetable and application details

1. Selection process

Following publication of the call for proposals and receipt of applications, the selection process includes the following steps:

- Projects are verified for eligibility.
- Eligible applications are sent for review to the two experts per project designated by the Scientific Board.
- One rapporteur per project is designated for compilation of project evaluations.
- For certain eligible proposals, additional scientific reviews are arranged and compiled, if necessary.
- The Scientific Board selects projects to receive Foundation funding on the basis of project reviews and application materials.
- Funding agreements are drawn up between selected project teams and the Foundation.

Note: The project coordinator will submit a list of four experts whom the Foundation may contact for project evaluation.

2. Eligibility criteria

Project assistance requests must fulfil the following criteria:

- Proposed research must fall within the proposed field of priority subject areas.
- Proposed projects must clearly differ from projects that have already received public funding (from such entities as the ANR or FPRD).
- A contract or letter of intent linking any proposed partners, particularly for issues related to intellectual property management, must exist.

3. Selection criteria

Projects will be assessed according to the following selection criteria:

- Relevance to the priority subject areas outlined herein and relation to the state of the art, which should be outlined as thoroughly as possible. Particular emphasis should be placed on **the project's innovative character**, which should be clearly explained and emphasized. Scientific and technical obstacles must be identified, and the proposed approach and methods for resolving said obstacles addressed. High-risk projects, inasmuch as they are properly assessed as such by applicants, are encouraged.
- Clarity of the proposed research schedule and implementation, with reference to the relevant state of the art and clarification of techniques, methods and tools to be employed, milestones and intermediate and final deliverables.
- The scientific and technical qualifications of each partner (skills, expertise in relevant subject area[s], etc.).
- Evidence of complementarities among partners. **Partnerships at European level** will be encouraged for R&D projects and dissertation proposals alike.
- The adequacy of technical and financial means with regard to project objectives.

4. Funding

A total of €1,000,000 is available for this fourth call for proposals, but actual project funding will largely depend on the quality of proposals received, in consideration of the following goals:

- €100,000 to €200,000 in funding for each R&D project selected.
- Financial support for three to five doctoral dissertations.

For R&D projects

Set in compliance with EU rules, assistance will be applied to eligible expenses, which include human resource and overhead expenses, travel and operating costs, and service-provision expenses (for research work subcontracted to third parties, for example). The same rules relating to assistance will apply in all European Union countries. Funding for companies, technical centres and public institutions of industrial or commercial nature will be capped at a rate of 50%. This same rate will apply to capital spending, limited to the purchase of equipment costing less than €15,000 per unit.

Assistance for public research institutions will not cover permanent staff, but may be applied to employees hired on temporary contracts for the duration of the contract. A maximum rate of 100% assistance will be applied to eligible expenses.

A contract's duration may not exceed two years, save and except for dissertation research, for which the duration is capped at three years.

These funding rules apply to all European partners.

For doctoral dissertations

A project's duration extends to three years, with funding taking the form of a monthly payment of €2,700 sent directly to the host laboratory (€97,200 in total over 36 months' dissertation work) and intended to cover laboratory expenses comprising the beneficiary's compensation and related expenses. Payment of this sum is contingent upon the doctoral student receiving gross compensation of at least €1,750 per month.

5. Timetable

The following timetable applies:

For R&D projects:

- Deadline for receipt of applications: **15 April 2009**.
- Announcement of applications selected and funding levels awarded: **1 July 2009**.

For doctoral dissertations:

- Deadline for receipt of applications: **15 April 2009**.
- Announcement of applications selected: **1 June 2009**.

6. Project monitoring

The Tuck Foundation's Scientific Board will monitor the progress of research on a regular basis. As such, the Foundation may assign an expert to attend project progress meetings, to be arranged in agreement with the project coordinator and in relation to the milestones and deliverables outlined in the funding request. The specifics of how monitoring will take place will be outlined in the agreement signed between the Tuck Foundation and the project coordinator.

According to the project's duration, one or two interim reports and one final report will be requested.

When so requested by project partners, applications will be kept confidential.

7. Information for compiling application packages

Application packages, compiled according to the submission guidelines detailed in an appendix hereto, must be sent:

- In hard copy, to the following postal address:

**Fondation Tuck Enerbio
1 & 4 Avenue de Bois Préau
92852 Rueil-Malmaison Cedex, France**

- And in electronic format (one PDF version and one Word/Excel version) to:
enerbio@fondation-tuck.fr.

Confirmation-of-receipt notices will be sent to the project coordinator for each package received.

Note: With a view to expanding the panel of experts to include non-Francophones, it is suggested that applications be drafted in English.

Contact information:

Technical: **Daniel Ballerini**
Enerbio Technical Secretary, Tuck Foundation

Organizational: **Thierry Chappat**
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Appendix B

Application Form - 2009 Enerbio Call for Proposals

1. Application summary (1 page)

Subject area: refer to the relevant subject area outlined in Section 3 of the Call for Proposals

Project title

Project summary: In 20-30 lines, describe:

- Objectives and innovative aspects
- Research schedule
- Partners
- Duration
- Overall cost
- Level of funding requested

Contact information and duties of the project coordinator and technical managers of research conducted by each partner.

2. Detailed application

2.1 Objectives and innovative aspects:

- Highlight the application's relevance in relation to the priority subject areas outlined herein.
- Outline the state of the art of the relevant subject area, with exhaustive bibliography and status of industrial property, if applicable.
- List the study's objectives, in such a manner as to situate the study in terms of existing research in the same field, including specification of the nature of remaining scientific and technical obstacles and the resources and means considered for resolving such obstacles, while emphasizing the unique nature of the proposed technical approach, the project's innovative aspects and the related risk level.

2.2 Research schedule

The research schedule should be outlined in detail and subdivided into clearly defined simultaneous or successive tasks.

The duration and partner involvement for each task should be estimated. Partners should be identified as follows: "C" for the coordinator, "P1" for the first partner, "P2" for the second partner and so on.

The scientific and technical obstacles related to each task should be outlined, as should any risks relating to their completion, along with associated milestones and deliverables expected throughout the project and upon completion. The final deliverable should be clearly defined.

Following description of the research schedule and with a view to improving readability, a chart (Gantt chart) may be used to summarize how tasks will fall. For each task, the duration, timetable, involvement of each partner, placement of deliverables and milestones should be indicated.

2.3 Partners

Previous research projects conducted by each partner should be listed, particularly those projects that fall closely in line with the selected subject area for this proposal. Details provided might include publications, conference papers and patents.

Following a review of each partner's skill set and level of recognition within the research community, this section should highlight the synergies expected to arise from collaboration among the proposed partners.

The following administrative details should be provided for each partner:

- Institution or company (subject to VAT?)
- Address
- SIRET number
- Research manager: contact information and position
- Administrative manager: contact information and position
- Individual authorized to sign the agreement with the Foundation: contact information and position

Where applicable, proposed distribution of intellectual property among partners should be indicated.

2.4 Costs

Costs should be calculated in euros excluding taxes for partners subject to VAT, and in euros including all taxes for partners not subject to VAT.

An initial chart should be included for each partner, listing eligible expenses by type of expense, with reference made to total costs and total amount of funding requested (see sample chart).

A second chart should indicate cost levels according to task, partner and year, along with overall costs and levels of funding requested (see sample chart).

Chart 3 should display a cost summary.

2.5 List of experts

The project coordinator should submit a list of four experts (including name, position and contact information) whom the Foundation may contact for project review.