

■ 2008 ANNUAL REPORT

A WORD FROM THE CHAIRMAN



As a pivotal feature of the French research and innovation system, the ANR (French National Research Agency) in 2008 pursued its mission of funding research projects through competitive calls for proposals, within a largely renewed programming framework. Based on a broad system of consultation with research organizations, universities, engineering schools, enterprises and Competitiveness Clusters, and public administrations, the eight ANR Strategy and Planning Boards generated 47 calls for proposals of which 13 were entirely new and 15 were new but focused on themes that had been addressed by previous programs. Nearly half of these calls were strongly oriented toward environmental and sustainable development objectives as a reflection of the social demand expressed in the recent national assizes (Grenelle) on the environment.

Several events took place during 2008 that will serve as the foundation for ANR action in years to come both in terms of the content of its programming as well as of the effectiveness and transparency of its procedures.

A Foresight Council was established at the beginning of the year, bringing together experts from the major areas of Agency involvement - energy, environment, and biology - along with economists, thus reflecting the ANR's desire to anticipate the tomorrow's research themes in order to respond to future demands by members of society.

Achieving and maintaining high quality and exemplary characteristics for ANR-selected projects is the Agency's chief concern. Among the key facts of the year 2008, it seems to me important to point out that the ANR obtained the ISO 9001 certification by AFNOR for the whole of its selection process. This certification embodies the concerted efforts of the Agency's staff to develop rigorous and optimized working methods.

Also in 2008 the ANR organized a summit of major international research funding agencies from Europe, the US, Japan, China and Taiwan. This international meeting marked the recognition of the National Research Agency by the international community, which in turn will result in a larger international role for the ANR as well as in new and increased trans-national cooperation.

The summer of 2008 saw the implementation of a review of the first three years of Agency programming, carried out by International Advisory Boards consisting of prominent scientific figures from Europe and abroad. Each Board, working in its field, produced an opinion on the pertinence of ANR programs and generated recommendations for future directions. The results largely corroborated the Agency's procedures and criteria.

2008 marked the first dissemination of research results achieved by projects funded since 2005. Several follow-up seminars on ongoing projects (of a program) were organized both in the Paris region and throughout France, often in partnership with Competitiveness Clusters, as a way to establish a collective assessment of progress in each of the research areas concerned by these calls.

Therefore, by listening to scientists, by streamlining procedures, and through multiple ties and exchanges both with socio-economic actors and with major international partner agencies, the ANR throughout the year 2008 pursued its vocation as a major actor in the development and increasing influence of the French research and innovation system.

Jacques Stern

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Overview

In 2008 the ANR issued 50 calls for proposals. Total funding represented by these calls amounted to 644.6 M€ of spending authorizations, or 76.8% of all programming in 2008 (compared to 73.6% in 2007).

I - Calls for proposals

Similarly to 2007, ANR calls for proposals in 2008 were organized around six themes: Social Sciences and Humanities; Ecosystems and Sustainable Development; Sustainable Energy and Environment; Health and Biology; Engineering, Processes and Security; Information and Communication Science and Technology. A seventh area of operations was the Non-Thematic Department.

In addition, the ANR continued to structure its programming around two types of calls for proposals:

- Calls related to scientific or technological target issues and which are therefore concerned with finalized research. Most projects submitted in response to this type of call are partnership projects involving consortia of research teams from both public and private sector (industry) laboratories.
- Bottom-up calls related to a broad scientific area, whose objective is to advance the state of knowledge in this area. These calls provide a wide margin of freedom to researchers. Projects submitted in response to this type of call are concerned with fundamental research questions and generally do not involve private sector partners.

So-called mixed calls are composed of both an open-ended or academic element and a public-private partnership element.

In 2008, 50 calls were issued, of which 12 were dedicated to international proposals. In reference to 2007, 18 research programs in 2008 were entirely new, while 12 were reconfigured programs in pre-existing sub-fields. Programs that were renewed in 2008 in the same form as 2007 represented 60% of the total volume of research programming.

In 2008 research teams were allowed on average 70 days to prepare their proposals, compared to 48 days in 2005 and 60 days in 2006 and 2007.

The 5,865 proposals submitted in 2008 constitute an increase of 4.1% compared to 2007. They were evaluated by:

- 12,017 external experts (2007: 10,350) of which 4,157 were international experts from abroad (2007: 3,000) and 853 from industry (2007: 670);
- evaluation committees made up of 1,300 members of which 260 were international experts from abroad, and 210 from industry.

External expert reviews conducted by international scientific figures	34.6%
External expert reviews conducted by industrial researchers	7.1%
International scientific figures in evaluation committees	20.1%
Industrial researchers in evaluation committees	16.2%

ANR strategy and planning boards

ANR governance does not include an overall scientific board. Instead, the Agency has recourse to "a Strategy and Planning Board" for each of the agency's eight fields, involving a total of 201 scientists on the eight boards. Board members are recognized figures in their field and represent all of the principal scientific communities (universities, research organizations, industry, and civil society). Public administrators participate as well. These committees play a key role in establishing ANR programming through reflection on new programs, permanent guidance of calls for proposals, or decisions to terminate programs. Their reflection is enriched by taking into account all propositions emanating from universities, engineering schools, research organizations, industry and public administration, as well as existing foresight studies, assessments of previous calls, and information about the international research scene.

The Strategy and Planning Boards are invaluable as crossroads for exchange on strategies, and in particular between private and public sector research.

Health and Biology

Chaired by *Philippe Sansonetti* - Professor, Collège de France

Chemistry, materials, processes

Chaired by *Jean-François Baumard* - Professor, laboratoire Science des procédés céramiques et de traitements de surface Ecole Nationale Supérieure de Céramique Industrielle de Limoges

Ecosystems and Sustainable Development

Chaired by *Bernard Chevassus-au-Louis* - Senior Scientist, INRA, Jouy-en-Josas

Energy

Chaired by *Jean-Bernard Saulnier* - Director of Energy program, CNRS/ENSMA

Environment, Climate and Urban Systems

Chaired by *Sylvie Joussaume* - Senior scientist, CNRS, LSCE

Nanosciences and Nanotechnologies

Chaired by *Philippe Laredo* - Senior scientist, Professor, Ecole Nationale des Ponts et Chaussées, University of Manchester

Information and Communication

Chaired by *Gérard Roucairol* - Research Director, Bull, Vice Président du réseau ITEA

Social Sciences and Humanities

Chaired by *Jacques Commaille* - Professor Emeritus, École Normale Supérieure de Cachan

As observed since 2005, reviewing by international experts or industrial researchers varies according to the nature of the call for proposals. International scientists are relatively more present in selection procedures for projects in the context of "open" programs, while industrial experts are more likely to participate in the evaluation of proposals within public-private partnership research programs.

This is also true when participation is observed at the theme level. The Non-Thematic Department, Social Sciences and Humanities, Ecosystems and Sustainable Development, and Health and Biology all contain a large percentage of open programs and thus have more frequent recourse to international scientists for review purposes and less to industrial researchers. The inverse is true for Engineering, Processes and Security, Information and Communication Science and Technology (ICST), and Sustainable Energy and Environment.

The participation of international scientists and industrial researchers as experts and evaluation panel members
by Theme:

	International experts (2007 comparison) %	Industrial researchers (2007 comparison) %	International members of evaluation panels (2007 comparison) %	Industrial researchers as members of evaluation panels (2007 comparison) %
Sustainable Energy and Environment	16.3 (11.3)	25.2 (32.4)	8.5 (5.3)	32.9 (35.8)
Information and Communication Science and Technology	17.3 (13.2)	16.1 (19.6)	25.6 (10.8)	25.5 (26.9)
Engineering Science, Processes, Security	17.1 (13)	16.4 (21.1)	3.4 (4.7)	42.4 (28.6)
Health and Biology	63.2 (50.4)	1.3 (1.6)	16.9 (17.9)	17.4 (14)
Ecosystems and Sustainable Development	57.2 (68.2)	9.1 (1.9)	36.4 (23.6)	4.2 (11.4)
Social Sciences and Humanities	34.2 (27.4)	- (0.5)	50 (36.5)	- -
Non-Thematic Department	34.1 (24.9)	2 -	10.4 (7.5)	0.4 (0.4)

The selection process resulted in the funding of 1,334 projects, with an average selection rate of 23% (2007: 25.2%). This rate varies by Theme from 20.4% to 28.6%, a narrower range than that observed in 2007 (20.7 and 31.7 %).

Selection rate by Theme			Funding grants by Theme		
	Selection rate (2007 comparison) %			Share by Theme (2007 comparison) %	
Sustainable Energy and Environment	26.6	(26.7)	Sustainable Energy and Environment	16.1	(14.5)
Information & Communication Science & Technology	22.5	(31.7)	Information & Communication Science & Technology	19.9	(20.9)
Engineering Science, Processes, Security	28.6	(27.2)	Engineering Science, Processes, Security	7.4	(7.1)
Health and Biology	20.4	(20.7)	Health and Biology	19	(22.1)
Ecosystems and Sustainable Development	27.6	(27.8)	Ecosystems and Sustainable Development	9.3	(7.3)
Social Sciences and Humanities	25.2	(24.7)	Social Sciences and Humanities	2.6	(3)
Non-Thematic Department	21.5	(25.2)	Non-Thematic Department	25.6	(25.1)

A typical project funded by the ANR in 2008 will run 37 months, the same as in 2007 and 1.5 times longer than 2006 funded projects. As in previous years, it brings together three partners and receives 483,000 € (2007 average: 425,000 €).

The average funding amount per beneficiary is 158 K€, a progression of 14% from 2007. The Agency continues to move towards a concentration of its funds in favor of a limited number of projects and partners.

	Average amount of funding per project (2007 comparison) K€	Number of projects selected for funding (2007 comparison)	Number of partners per project (2007 comparison)	Average length of project (2007 comparison) months
Sustainable Energy and Environment	776.5 (753)	134 (117)	5.1 (5.2)	38
Information & Communication Science & Technology	710.4 (654.3)	181 (208)	4.2 (4.4)	37
Engineering Science, Processes, Security	734.4 (692.7)	65 (62)	4.5 (4.8)	37
Health and Biology	484.9 (408.7)	253 (295)	2.7 (2.5)	35
Ecosystems and Sustainable Development	449 (530.3)	121 (109)	4.3 (5.1)	39
Social Sciences and Humanities	200.1 (176.2)	83 (102)	1.9 (2)	38
Non-Thematic Department	331.6 (281.6)	497 (525)	2 (2.2)	39

The characteristics of open projects continue nevertheless to differ from public-private partnership projects, with the latter involving a greater number of partners and benefiting from higher funding levels. The average funding level for open projects in 2008 was 400 K€ compared to 870 K€ for partnered projects.

Calls for proposals 2005-2008	
CNRS*	24.1 %
INSERM*	5.2 %
INRIA*	2.1 %
INRA*	4.1 %
IRD*	0.6 %
CEA*	5.8 %
Universities	24.5 %
Other institutions of higher learning	8.2 %
Hospitals	0.8 %
Various public organizations	4.9 %
Foundations	2 %
Not-for-profit associations	1.5 %
VSE**	2.7 %
SME***	5 %
Firms other than VSE and SME	7.7 %
International	-
Various private organizations	0.8 %

* Public research organizations

** Very small enterprises

*** Small and medium-scale enterprises other than VSE

Public research organizations and institutions of higher education obtained more than 80% of total ANR research funding, similarly to 2007. Universities alone accounted for 24.5% of all funding. The total share awarded to the major research organizations grew from 40% to 42% in 2008.

As before, universities are particularly present in the non-thematic programs, but are also dominant in Health and Biology and Social Sciences and Humanities.

The share of total funding allocated to VSE/SME has been stable since 2006, as have allocations to larger enterprises, both types of actors attracting 7.7% of total Agency research funds. The number of projects involving at least one enterprise also remained stable at 26.4% of projects (2007: 27.8%), or some 333 projects in 2008.

Of the 644.6 M€ committed to calls for proposals in 2008, 99.7 M€ or 15.4% benefited industrial research (2007: 91.8 M€, or 15%). This amount was equally shared between VSE/SME and larger enterprises.

The average amount allocated to enterprises reached 54.1% of total cost (2007: 46.7%; 2006: 41%). It should be noted that the percentage of total project costs covered by the Agency award was 66.3% for VSE/SME (2007: 52.8%), which is significantly higher than the percentage of project

costs (43.2%) covered by Agency funding when the beneficiary enterprise has more than 250 employees (2007: 41.6%).

Overall, 240 VSE and SME received funding in 2008 (2007: 280). 11.4% of VSE/SME received more than one grant (2007: 8%) as they participated in more than one project. Of the 167 larger enterprises participating in 2008 calls, over one quarter were funded for more than one project.

This reinforced support to private sector research actors does not however represent a weakened commitment to fundamental research. Employing the classification system of the European Commission, it can be shown that the share of Agency funding allocated to fundamental research projects rose from 61% in 2007 to 65.5% in 2008, an increase of 52 M€ (2006-2007 increase: 13 M€). The share of total funds that was granted to projects placed further along the innovation chain was stable for experimental development and decreased slightly for industrial research.

Fundamental research	65.6 % (2007: 61 %)
Industrial research	31 % (2007: 35 %)
Pre-competitive development	3.4 % (2007: 3,9 %)

When ANR funding to public and private laboratories is added together it becomes clear that the relative weight of the main expenditure categories is similar to previous years. Remuneration remains the largest single funded item, accounting for 49.1% of total ANR research funding (2007: 46.7%). A total of 6,312 person/years was paid by ANR research funding in 2008, the equivalent of 1.6 three-year positions per project (2007: 1.4).

ANR Foresight Council

The ANR Foresight Council was created in February 2008 and consists of a restricted number of members from a range of sectors with experience in foresight and planning. The council's objective is to provide a continual set of guidelines for strategic positioning on the international research and development scene. In order to achieve this objective, the council listens to expert testimonies and examines future perspective reports submitted by ANR Strategy and Planning Boards as well as by the Foresight Workshops. The opinions produced by the Foresight Council Board contribute to the definition of the content of ANR programs over the long term. Chaired by Christian de Boissieu, the foresight council meets tri-annually.

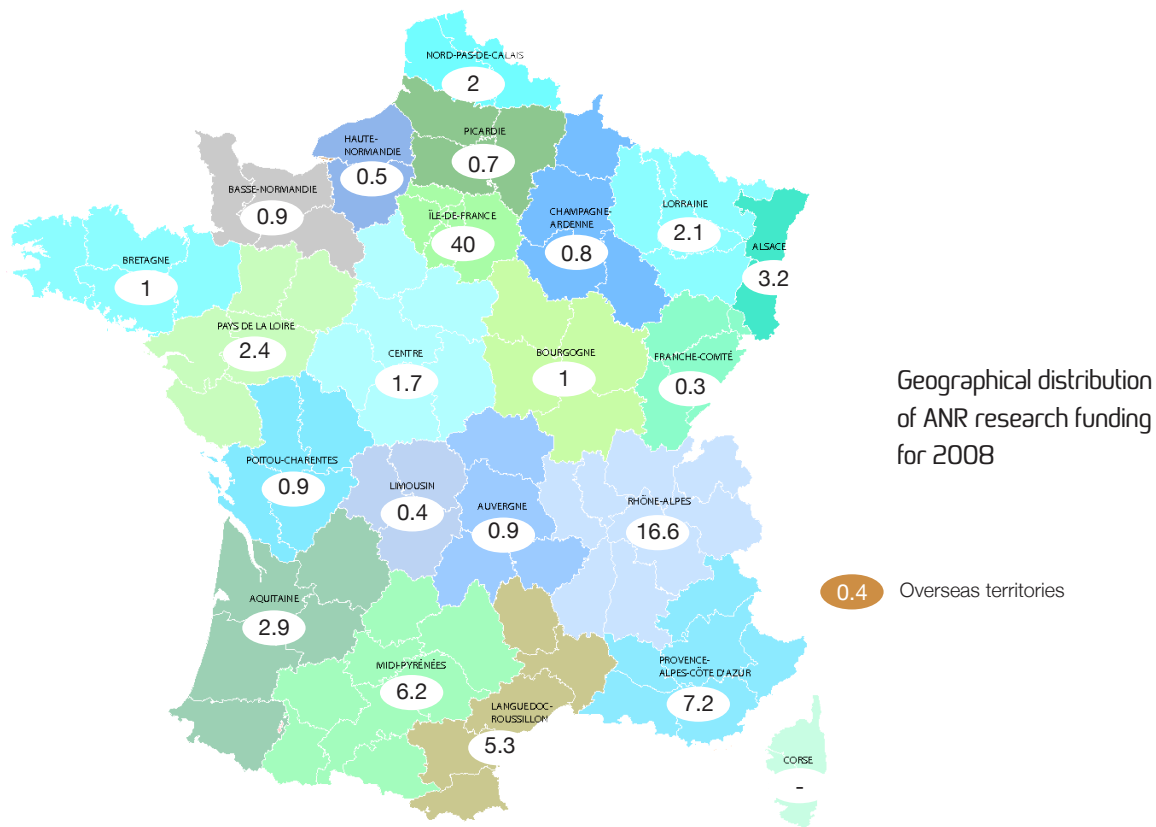
Chair: Christian de Boissieu

Members: Philippe Aghion, Thierry Chambolle, Jean-Marc Egly, Thierry Gaudin, Jean-Claude Lehman, Jean-François Minster, Pierre Veltz, Jean Weissenbach

Distribution of research funding under ANR calls by principal expenditure category (2007 comparison)	
Equipment	8.7%
Services	8.4%
Remuneration	49.1% (46.7%)
Other operating expenses	32%
Unspecified	1.8%

The geographical distribution of ANR call-allocated funds shows the same concentration as in previous years; in 2008 the Paris Region (Ile-de-France) led all other regions of France by attracting 40% of total funding (2007: 38%; 2006: 40.9%), ahead of the Rhône-Alpes region, which obtained 16.6% (2007: 14%), and the Provence-Alpes-Côte-d'Azur region at 7.2% (2007: 8%). At 63.8%, the cumulative share of these three regions was slightly higher than in 2007 (60%).

Out of a total of 4,081 beneficiary projects, women were the principal investigators of 1,110 projects or 27,2% (2007: 913 out of 4,383 or 21%). This is a clear increase over the stable level observed from 2005-2007. In addition, women accounted for 18.4% of external expert reviewers (2007: 17%), 19% of members of evaluation committees, 23.6% of project coordinators for proposed projects, and 21% of coordinators of projects selected for funding. These averaged percentages mask a wide variation among scientific fields.



	Women participating in expert external review (2007 comparison)		Women as members of evaluation committees (2007 comparison)		Women coordinating multi-partner projects selected for funding (2007 comparison)		Women coordinating multi-partner project proposals (2007 comparison)	
	%		%		%		%	

Sustainable Energy and Environment	15.2	(15.7)	18.3	(11.9)	14.1	(22.2)	17.4	(22.6)
Information & Communication Science & Technology	9.1	(8.5)	6.7	(20.5)	10.7	(16.8)	10.9	(13.4)
Engineering Science, Processes, Security	18.4	(15.6)	20	(19.1)	20	(12.9)	21.4	(10.1)
Health and Biology	16.5	(19.7)	15.6	(25.1)	28.4	(27.7)	28	(25.7)
Ecosystems and Sustainable Development	18.2	(21.4)	30.2	(17.1)	27.7	(34.9)	22/4	(33.3)
Social Sciences and Humanities	31.4	25.6)	31.5	(23.5)	47.8	(32.3)	37.2	(32.3)
Non-Thematic Department	20.6	(17.2)	15.3	(17.6)	23.4	(14.5)	27.8	(16.6)

2 - Other operations

Besides funding research projects, in 2008 the ANR devoted 202.2 M€ to other actions (2007: 207.6 M€), some of which were carried out jointly with the Ministry of Research, in particular those concerning enterprise creation around innovative technologies. At the same time, the ANR continued to award supplementary allocations to projects labelled by Competitiveness Clusters, and it also continued to fund research activities associated with the national Cancer Plan as well as activities related to the French micro-nanotechnology network.

Lastly, 2008 was the second consecutive year that the ANR accorded supplementary block grants to public research organizations or not-for-profit research foundations whose research teams participate in ANR calls for proposals.

	M€
Carnot Institutes (selected for funding 2006-2007)	59.6
Carnot Institutes (carryover from 2007)	1.1
Competitiveness Clusters (project funding supplement)	4.5
Events	1.9
OSEO - Firm creation competition	16.8
RTB : Basic technological research facilities for micro-nanotechnologies	14
INCa	40
Block grants 2008 (préciput)	50.2
Block grants 2007: carried over to 2008 (préciput)	0.4
Administrative expenditure in favor of research support units	13.7
Various other	0.06

NON-THEMATIC

The role of the Non-Thematic Department is to initiate research programs that will favor scientific progress in all disciplines and expand knowledge for a better understanding of our world. Project selection in programs launched by the Non-Thematic Department is only guided by the recognition of excellence and the encouragement of new and/or interdisciplinary approaches to tackle hard scientific problems.

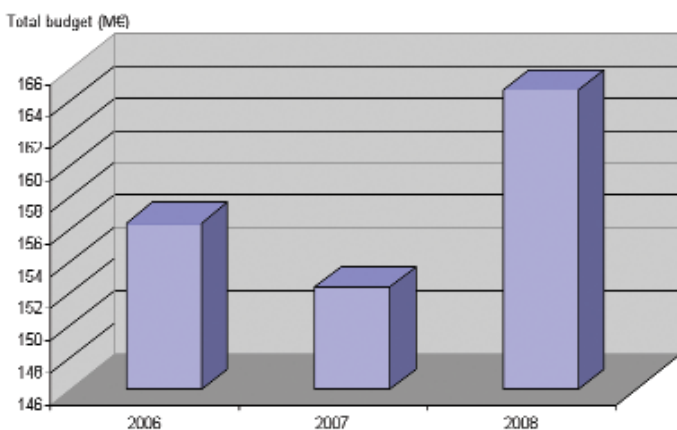
Three calls for proposals were issued in 2008: - Blue-Sky
 - Young Researchers
 - Chairs of Excellence

The objective of the Blue-Sky Program is to provide a significant boost to ambitious projects on the cutting edge of scientific knowledge and which are likely to promote French research in the context of international competition. This program offers the opportunity for researchers from any scientific field to submit a project on the subject of their choice. In addition, researchers from different research institutes can obtain common funding for a collaborative project.

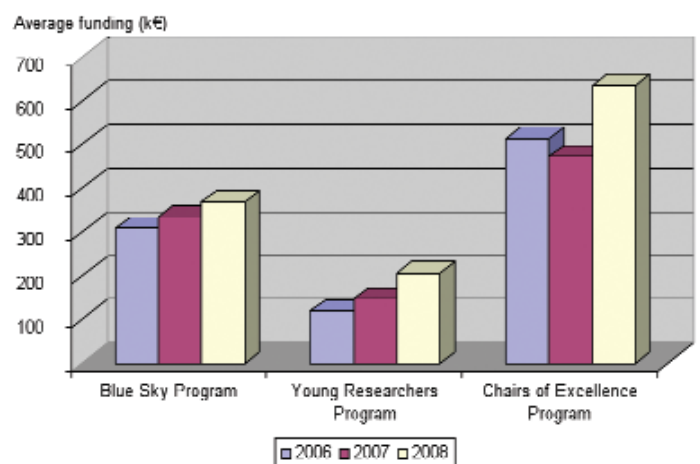
The objective of the Chairs of Excellence Program is to bolster the attractiveness of research in France for high-level scientists, either for foreign scientists or for French scientists working abroad, by offering project-based funding for a period of three to four years. In 2008, three versions of the program were proposed according to the associated research project: junior chairs, short-term senior chairs and long-term senior chairs.

The Young Researchers Program aims to support the projects of researchers under the age of 39 to promote new ideas. No theme is imposed and the goals are to facilitate young researchers' independence and encourage original research topics.

Finally, the international calls for proposals under the Blue-Sky Program, which are organized within the framework of bilateral agreements with international research funding agencies, reflect the ANR's desire to foster international collaborations in fundamental research.



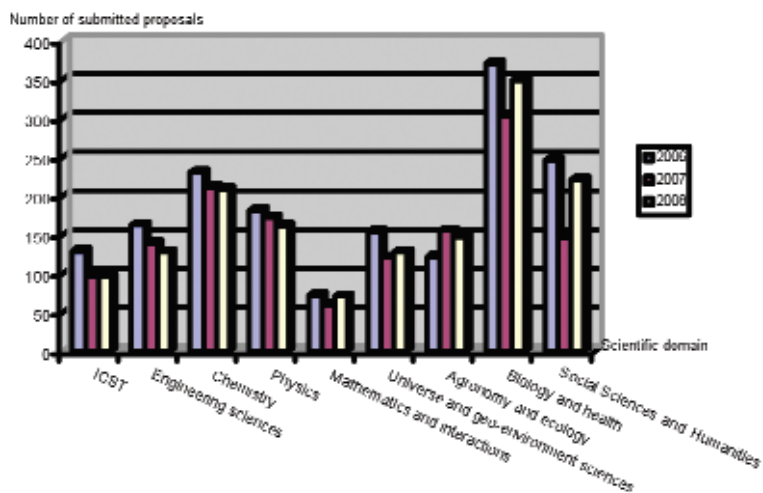
Evolution of the total budget of the Non-Thematic Department



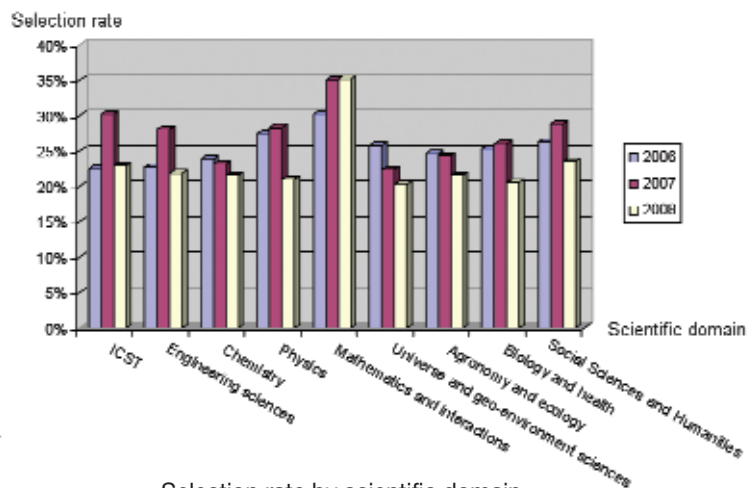
Comparison of average funding for a selected project per program

The following figures summarize the overall outcome of the three calls managed by the Non-Thematic Department.

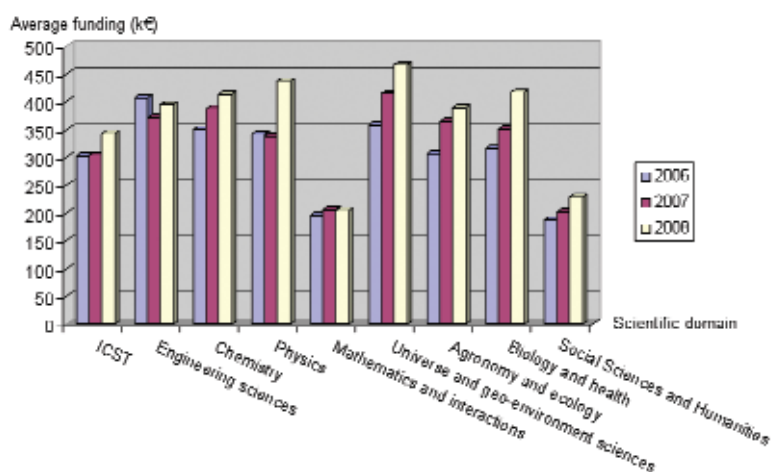
Blue-Sky Program



Number of submitted proposals by scientific domain

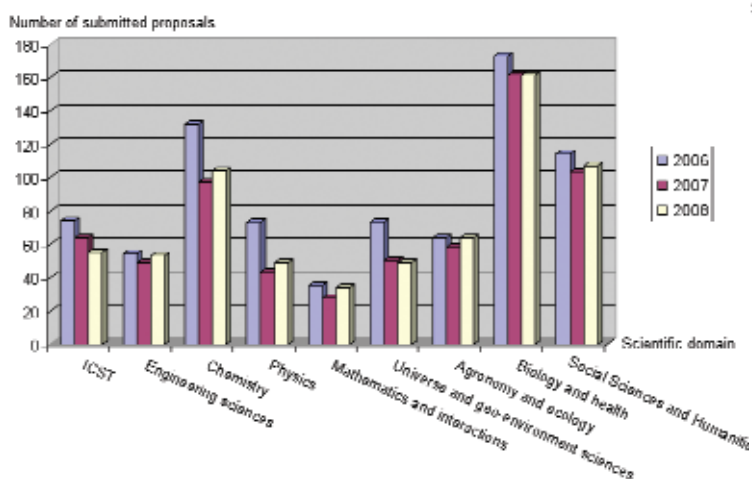


Selection rate by scientific domain

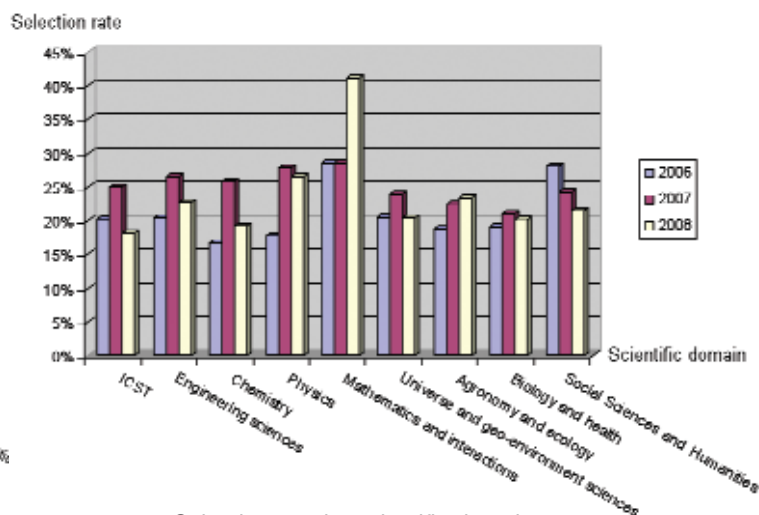


Selection rate and average funding for a selected project

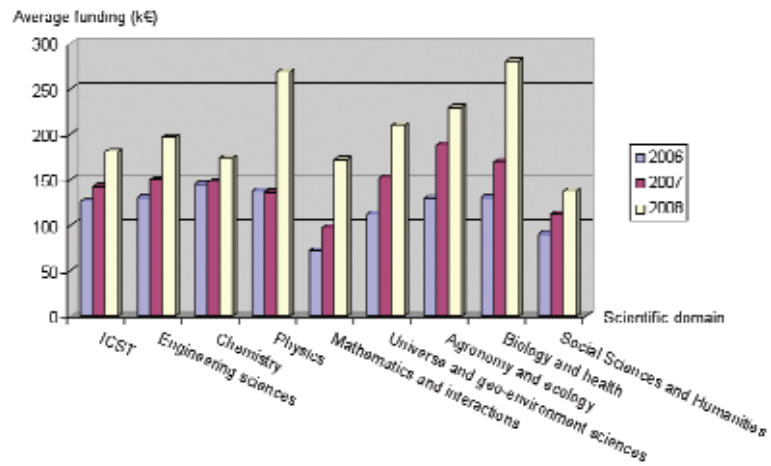
Young Researchers Program



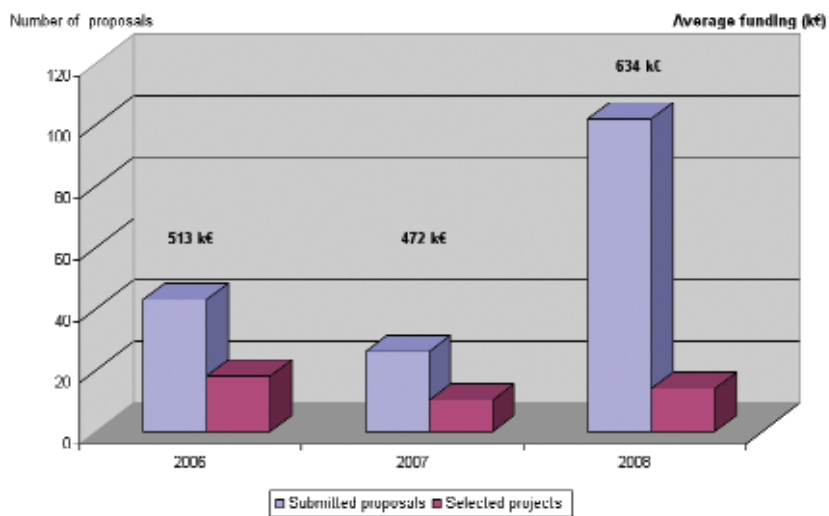
Number of submitted proposals by scientific domain



Selection rate by scientific domain



Average funding for a selected project by scientific domain



Average funding for a selected project by scientific domain

1 - Challenges

Research carried out in the field of Health and Biology aims at the twofold objective of improving our understanding of how living organisms function and increasing human wellbeing through a better response to disease and disability.

The programs launched in 2008 are aimed at meeting these objectives more effectively by providing researchers with the greatest possible number of opportunities to present innovative projects both in fundamental and finalized research. These programs can be divided into three major parts:

- interdisciplinary programs aimed at building fundamental knowledge in biology concerning not only disease but also human/environmental interactions. By their interdisciplinary nature, these programs foster projects that are complementary with those proposed under the Non-Thematic Program;
- programs to encourage the application of academic research by inciting public and private laboratories to join in partnerships in order to develop technological innovations and tools for improved disease prevention, diagnosis and therapy, as well as for reducing disabilities and increasing the autonomy of disabled persons;
- programs dedicated to international partnerships and collaboration as a way to encourage access to expertise and research tools missing in France while allowing the French partners of such actions to be better prepared and positioned for European and international competition. Such international actions are associated with priorities in national programs.

Programs in 2008 focused on two research areas of obvious importance in the face of emerging lifestyles and new societal demands:

- the central nervous system, and neurological and psychiatric pathologies, with two programs, one of which is a national program, "Neurological and Psychiatric Disease", and the other an international program, "Transnational Program on Neurodegenerative Disease". Both of these programs focus on the priority theme of central nervous system diseases, both common and rare, in the hopes of leading to a better understanding of the fundamental pathological mechanisms involved, improved prevention and diagnosis and innovative new therapies;
- health risks associated with, on one hand, technological development and environmental and ecosystem modification and, on the other hand, the emergence or re-emergence of infectious diseases.

The Agency's focus on this latter area has spawned three programs with a particular emphasis on the epidemiological and toxicological aspects of these new risks as well as on associated molecular mechanisms. The aim of all three programs (described below) is to increase research in prevention, prognosis, diagnosis and therapy.

- The program "Contaminants, Ecosystems and Health" places an emphasis on risks engendered by new technologies, new chemical compounds (such as nanoparticles, therapeutic molecules, ...), and toxic biological compounds. As a cross-department program within the Agency, this program focuses also on ecosystem modification and is described in more details in the chapter on the Department of Ecosystems and Sustainable Cooperation.

- Two programs, the national program "Environment and Infectious Disease" and the international program "Pathogenomics", both focus on new health risks associated with environmental modification, with a particular emphasis on emerging and re-emerging diseases.

Alongside these programs, a large program entitled "From Gene to Physiopathology: Rare and common diseases" has been launched for the study of molecular mechanisms and physiopathologies that are at the origin of non-neurological human disease. This program aims at the development of an interdisciplinary set of approaches, from genetics to clinical research, for use across the board of human pathologies. The pathologies targeted may be common diseases like cardiovascular, metabolic or endocrine diseases as well as rare diseases. One of the challenges associated with this program, and shared with the neurological pathology program, has been to bring together two scientific communities, the one working on common diseases and the one working on rare diseases, in order to engender real exchanges of know-how, of tools and of expertise. In parallel to this national program, researchers have had the opportunity to present proposals within international consortia specifically on rare diseases, within the framework of the Era-Net E-RARE call for proposals. The results of this call, launched at the end of 2008, are not yet available.

As part of an ongoing Agency strategy, two interdisciplinary programs were opened to fundamental biomedical research: the Interdisciplinary Program in Physics and Chemistry for Life Sciences and the Cross-Department Program on Complex Systems and Mathematical Modeling that encourages projects in systems biology. This later program is managed by the Department for Information and Communication Science and Technology. Also in the systems biology field, an international call for proposals has been launched, together with 9 other countries, in the context of the Era-Net ERASysBio.

In the area of industrial application, two major programs have been launched: Biotechnologies, which aims at developing new research tools, new products and new diagnostic and therapeutic tools; and Technologies for Health and Autonomy, whose goal is to develop new technologies to assist medical and surgical acts or dependent persons. Each of these two programs comprises two separate sections which share two different objectives:

- fostering the application of public research in the area of biotechnologies and technologies for health with funding efforts "to prove academic concepts" which should result in an effective application by the end of the funding period of the project (this is the objective of the call "Emergence and Maturation of Biotechnology Projects with Strong Applied Potential" and the call "Emerging and Maturing Health Technology Projects with Strong Applied Potential");
- encouraging public/private partnership in this area through the call "Partnership Programs in Biotechnologies" and the call "Partnership Program in Technologies for Health and Autonomy".

For a period of five years beginning in 2008, the ANR is working in association with the CNSA ("National fund for solidarity and autonomy") to fund the program "Ambient Assisted Living - AAL169", launched as a European Commission Article 169 initiative (see chapter on "European and International cooperation").

2 - 2008 Overall Outcome

The Health and Biology Department is the second biggest department in the Agency after the Non-Thematic Department by number of submissions, with 1178 proposals submitted in 2008, although this figure is slightly lower than the 2007 total (1407). The predominance of Health and Biology over other scientific fields at the Agency is further accentuated when the 479 Health and Biology proposals submitted under the Non-Thematic Program are counted, yielding a total of 1657 proposals. This volume of proposals reflects not only the size but also the liveliness of the corresponding scientific community, and at the same time it partially explains the selection rate of 20.8%, which is slightly lower than the average in other Agency departments.

In 2008, 256 projects were selected for funding, with an overall selection rate close to 21% for national programs (not including partnership programs). The selection rate nevertheless varied from 10% to 31% (in cases of international and partnership programs). 17% of funded projects were officially sponsored by a Competitiveness Center, for the most part projects in partnership programs or in the interdisciplinary PCV program.

A total of 687 partners including 88 private enterprises were associated with projects selected for funding in 2008. The overall average of 2.4 partners/project varied from one program to another, ranging from 2 for the Emerging Disease call to 4.2 for projects selected under the TECSAN call which required projects to include academic, clinical and industrial partners. The number of companies involved in projects selected for funding increased from 2007 (68 to 88), while the total number of partners decreased (from 839 to 687). In the case of international programs these figures include only projects involving French partners. The ANR funding levels cited may be lower than those shown in the general table of the annual report which include co-funding from the CNSA.

Programs – Co-funders	Number of proposals ¹	Number of projects selected for funding ²
PCV Interdisciplinary Program in Chemistry and Physics for the Life Sciences - INCa	211	39
GENOPAT From Gene to Physiopathology: Rare and common diseases – AFM / DGS	218	43
MNP Neurological and Psychiatric Diseases - AFM	203	42
ERA-Neuron Transnational Program on Neurodegenerative Diseases	29	6
MIE Environment and Infectious Diseases - AIRD	117	33
Transnational Pathogenomics Programme for infectious Agents	32	10
Biotechs Public-Private Partnership Program in Biotechnologies	90	24
Emergence-Bio Emergence and Maturation of Biotechnology Projects with Strong Applied Potential	148	28
Tecsan Partnership Program in Technologies for Health and Autonomy - CNSA	83	22
Emergence-Tec Emergence and Maturation of Projects in Health Technologies with Strong Applied Potential	33	6
AAL-169 Transnational Program on Autonomy and Assisted Living - CNSA ³	30	3

¹ In the case of international programs these figures include only projects involving French partners

³ The ANR funding levels cited may be lower than those shown in the general table of the annual report which include co-funding from the CNSA

Similarly, it is interesting to note that over half of all companies participating in a research proposal submitted to the Health and Biology Department were participating in an ANR proposal for the first time. These data indicate a strong R&D commitment in this field (most were SMEs).

In 2008, the Health and Biology Department disposed of a budget of some 125 M€ (including co-funding). To this amount should be added the funds allocated to Health and Biology under the Non-Thematic Program (some 34 M€), under the Cross-Section Program on Contaminants, Ecosystems and Health (some 3 M€) and the Program for Complex Systems and Mathematical Modeling (also around 3 M€), as well as funding of biology and health related projects under other Departments such as Food and the Food Industry; Genomics; Functional Materials and Innovative Processes; Nanosciences, Nanostructures and Nanotechnologies; or Human Vulnerability.

French research funding in the field of health has historically drawn heavily upon a large number of agencies, institutes, not-for-profit associations with whom the Health and Biology Department works in close partnership. Accordingly, in 2008 several of these "funders" were involved in Department projects, for a total amount of 5 M€:

- Agence Inter-établissements de Recherche pour le Développement (inter-institutional agency for research and development - AIRD),
- Association Française contre les Myopathies (French association against myopathies - AFM),
- Caisse Nationale de Solidarité pour l'Autonomie (national fund for solidarity and autonomous living - CNSA),
- Direction Générale de la Santé (health ministry - DGS),
- Institut National du Cancer (national cancer institute - INCa).

Number of projects	Number of partners ²	Number of enterprises ²	Selection rate ² (%)	ANR funding ⁴ (M€)	Total funding including co-funding (M€)
8	113	3	18.5	15.9	16.6
4	114	6	18.8	19.6	20.9
4	101	4	20.2	17.9	18.5
0	8	0	20.7	2.3	2.3
4	91	2	18.6	11.8	12.1
0	16	2	26	2.5	2.5
8	77	25	26.7	24.9	24.9
9	55	0	18.9	6.7	6.7
4	93	43	26.5	16.4	17.4
2	12	0	18.2	1.6	1.6
0	7	3	10	0.6	1.2

² In the case of international programs these figures include only projects involving French partners

⁴ Total funding of AAL included co-funding of 0.6 M€ from the CNSA and 0.9 M€ from the European Commission

Assessment Seminar

The first assessment seminar of the Department took place on October 8, 2008 and concerned the Emergence Program 2005, which funded projects over an 18-month span. This seminar was held in Paris at the time of the European professional gathering Eurobio-2008, which brought together public and private partners in the field of biotechnologies. This day-long seminar not only contributed to a clearer understanding of the Program by the appropriate scientific community but it was also an occasion to call public attention to the encouraging final results of the program. A total of 30 projects were funded for a total of 4.2 M€ resulting in 60 publications, 13 national patents and 20 international patents, 7 start-up firms, 4 licensing agreements and 2 R&D partnerships signed. One of the projects of Emergence 2005 was selected and funded project in the BiotechS 2008 program.

3 - Looking Forward

During the Spring of 2008, a foresight exercise was carried out at the Agency concerning the funding of research in the field of biomedical imaging. This exercise took place across several occasions including a seminar that brought together 120 public and private researchers around the following themes: "multiple scales, multiple modes and interfaces"; "facilities, large instruments, platforms and networks"; "priority themes, international aspects and research applications"; and "data processing and analysis, data masses and archiving, modeling". The seminar demonstrated the importance of developing imagery for future biomedical research both fundamental and applied, while noting the deficiencies of the French industrial sector in this regard. These findings are already being taken into account in a number of Agency programs whether in fundamental research (Non-Thematic Program, Neurological Disease, Interdisciplinary Program in Physics and Chemistry for the Life Sciences) or applied research (Technologies for Health, Biotechnologies, Program for Nanotechnologies, etc.). In order to stimulate activity in this field, it was suggested that specific thematic lines be clearly posted for each program and that industrial partnership programs be encouraged, especially in the development of technologies related to medical applications, and to archiving and analysing images.

The national programs opened in 2008 by the Health and Biology Department and expected to run for 3 years will be re-opened in 2009. Discussion by the Steering committee of the Interdisciplinary Program in Physics and Chemistry for the Life Sciences (coming into its third year) underlined the importance of the fundamental research aspect of the program for understanding integrated biological systems. The value of applied research for biomedical innovation under this program is seen in the high percentage of projects that have been officially sponsored by Competitiveness Clusters. Such a program merits renewal.

Another point debated by the Board concerned the funding of research tools in public health. A Foresight Workshop has been set up to consider the idea of a program in public health. Moreover, at the international level, the ANR is participating in two Era-Nets: Euronanomed, for clinical and industrial applications in the field of nanomedicine; and Emida, for research in infectious diseases among farm animals. Calls for proposals are being launched in this area in 2009 as well as under the Era-Net Neuron program and, finally, in the area of assistance to elderly persons under the AAL-169 disposition.

In the longer term, the Health and Biology Strategy and Planning Board envisions funding research on evolution and on inflammation.



ECOSYSTEMS & SUSTAINABLE DEVELOPMENT

1 - Goals

Human population growth has entailed an increase in land area under cultivation, and food production has become a crucial issue. The well-being of current and future populations depends on a better use of both terrestrial and aquatic production zones including an increase in their productivity on both short and long terms.

Accordingly, research in fields related to ecosystems constitute a response to the major questions posed by contemporary society. Behind the rise of new outlets for agricultural raw materials in the energy or chemical industry lie major economic and environmental questions. While these new opportunities contribute to an improvement in living standards among certain populations they also increase the pressure among competing uses of arable land as well as on the use of agricultural goods up until now considered as food products. Also at stake in this question is the balance between tilled land and wildland ecosystems.

The programs of the Department of Ecosystems and Sustainable Development focus on a number of the issues related to ecosystems, whether they are subject to human uses or not, adopting an integrative approach to biodiversity, food supply, and plant-animal-microbial genomics along with agricultural matters.

2 - 2008 Overall Outcome

Programs opened by the Department in 2005 were pursued through 2007, i.e. the end of the funding period. These programs continue to operate, however, with new projects whose first wave of results are expected in the course of 2009.

2008 constitutes a pivotal year as previous programs are overhauled and new objectives are set forth in response to the most recent research questions while also taking into account policy development and societal change, such as the national assizes on the environment ("Grenelle") launched by the French government, the energy crisis, the food crisis, and the like.

In order therefore to achieve a synergy of the expertise and knowledge available in scientific communities, as well as to strengthen scientific exchange, the Department gathered existing genomic programs (animal, plant and large-scale microbial genomics) into a single program which also integrates vegetal biotechnological research.

A new program, entitled Systerra, sponsors research on eco-cultures and ecosystem services. This program raises questions concerning current agricultural practices, the intensification of the use of ecological practices and sustainable management of ecosystem functioning in an objective of promoting a new wave of knowledge, technology and good practices capable of ensuring yields while reducing environmental impacts and production system dependency.

The ALIA Program (food and food industry) has gathered food research together and provided a new set of research objectives. The goal is to strengthen ties among consumers, industry, and policy makers by organizing research along three thematic lines which take into account societal issues.

The CES Program (contaminants, ecosystems and health) is a cross-section program aimed at federating the various scientific disciplines covered by three ANR departments. The program will enable a better fundamental understanding of contaminants, their cycles and their effects on ecosystems as well as how they are transferred among various environmental compartments.

In line with the main concerns of the Department, the Agency has launched a Foresight Workshop around the theme of plants for sources of future biomass whose goals include producing an assessment of the state of the art for use by public and private decision-makers and suggesting research avenues.

Lastly, the year 2008 saw a major advance made in the international promotion of French research activities in those fields covered by the Department:

- the ANR contributed substantially to the funding of the first call for proposals of the program Era-Net Biodiversa;
- the ALIA Program opened up opportunities for collaboration with German research teams funded by the Deutsche Forschungsgemeinschaft (DFG) on research themes in human nutrition;
- the trilateral call for proposals KBBE involving agencies from France (ANR), Germany (BMBF) and Spain (MEC) was initiated.

3 – Looking Forward

The Ecosystems and Sustainable Development Department has sought to set in place a thorough-going process of reflection on the research areas it covers. After having funded a Foresight Workshop on future plant materials in 2008, it has continued to encourage this sort of activity with another Workshop on adapting agriculture and human-managed ecosystems to climate change. These two Workshops will likely have an impact on future programming in the Department.

On another front, the Agency has initiated in conjunction with the Ecosystems and Sustainable Development Strategy and Planning Board a working group responsible for the development of a pluriannual strategy (2011-2015) for the Department. In 2010, ongoing programs will be in their last year, and now is an opportune moment to begin to reflect on their renewal in light of the Department's area of responsibility, the recommendations from the national assizes on the environment, the national strategy for sustainable development, and the new strategy for research on biodiversity.

1 - Challenges

Global change and the oncoming end of abundance in fossil fuels are fundamental questions which inevitably will lead to thoroughgoing changes in ways of life, production processes and patterns of energy consumption. As for research goals, it is vital to devise and develop new modes of industrial production and new forms of urban organization and transportation, in order to shift to other energy sources and to drastically reduce greenhouse gas emissions and other pollutants.

The programming strategy of the ANR integrates these two objectives. After being proposed and discussed by each of two sector scientific boards, "Energy" and "Environment, Climate and Urban Systems", the programming meets the priorities set by the national assizes (Grenelle) on the environment. It is structured by three main strategic headings:

- developing new energy technologies;
- improving energy efficiency in industry, transportation and buildings;
- improving the management of environmental risk and pollution impact.

The ANR at its inception in 2005 took on the vast field of research that is energy and the environment, and today the Agency is a major actor in research funding for both of these topics. 2008 was an important turning point in this programming, as five new programs were opened for the period 2008-2010:

- Bioenergies;
- Ground Transportation Vehicles (VTT);
- Sustainable Cities;
- Smart Building and Solar Photovoltaics (HABISOL);
- Understanding and Controlling Natural Risks (RiskNat).

Programs that have been maintained and for which new calls were issued:

- Hydrogen and Fuel Cells (PAN-H);
- Carbon Capture and Storage;
- Ecotechnologies (PRECODD);
- Vulnerability: Milieus, Climates, and Societies (VMCS).

One of the ambitions of the Sustainable Cities Program is to integrate research themes at the level of urban systems, ranging from governance questions to technological issues.

Two fundamental objectives structure the program:

- energy efficiency at the urban level, with the aim of achieving the "factor 4" towards 2050;
- a better social and environmental integration of the city in the context of sustainable development.

The program structure is based on four components ("governance and services", "spatial dynamics and mobility", "constructions and infrastructures", and "environment and risks").

As an interface with the Sustainable Cities Program, the HABISOL program focuses on building technologies organized around the theme of the smart habitat and on the integration of renewable energy production into building construction, chiefly solar photovoltaic energy. This program in its new form takes up the study of patterns of social behavior in the face of new technologies, their uses, domotics, modelling positive typologies, insulation components, energy components, and the development and integration of photovoltaic cells.

The program Ground Transportation Vehicles (VTT) is the Agency's main contribution to the interministerial program PREDIT 4. The VTT is centered on one hand around clean and economical technologies for vehicles and on the other hand around technologies for improving transportation efficiency, quality, safety, and reliability. The program is structured in three parts: energy efficiency of vehicles; emissions reduction; and increased efficiency and quality of transportation systems.

The Bioenergy Program is the follow-up program to a previous cycle of calls for proposals (the PNRB Program 2005-2007). It focuses on the whole scope of biomass energy and in particular the development of both second generation biofuels (bio-ethanol and bio-diesel from ligno-cellulosic biomass) and third generation biofuels (bio-hydrogen and bio-lipids from micro-organic actions).

In the area of environmental research, the ANR has implemented a new program, Understanding and Controlling Natural Hazards (RiskNat), which represents a new approach to risk management by drawing upon a range of disciplines from the study of natural processes to legal, economic and social considerations of risk management, while also taking into account factors of vulnerability, tools for expertise and supporting the public policy process.

Overall, 504 proposals were submitted under 10 calls, resulting in 130 projects selected for funding, for a selection rate of 26%. The number of proposals in 2008 is an increase of 12% over 2007, particularly in the field of energy. The average funding amount per project rose by 11% to 862 K€ for energy related projects and 690 K€ for environment-related projects. The average number of partners per project was around 5, and was similar to previous years.

The Department of Sustainable Energy and Environment displayed a clear orientation towards public-private research partnerships with nearly 80% of funding being allocated to this type of project. In all, 680 research teams received grants, of which 28% were from the private sector. 26% of total funding was allocated to private companies.

Over 42% of funded projects were awarded a label by a Competitiveness Cluster, especially in programs devoted to transportation, new energy technologies and environmental technologies.

2 - 2008 Overall Outcome

- **Hydrogen & Fuel Cells (PAN-H program)**

The hydrogen and fuel cell program has issued 4 consecutive calls for proposals since 2005. In all, 73 projects have been funded with a total amount allocated of 84 M€ (11.7 M€ in 2008). In this way the PAN-H Program has contributed significantly to strengthening the French research community in hydrogen and fuel cells and enabling it to reach its currently strong position at the European level

in its field. While initially designed for automotive applications, the program has progressively moved towards a strengthening of stationary applications and technological niches that allow for the emergence of industrial applications of this technology. Research devoted to the Fuel Cell system represent 60% of total expenditure in this area by the ANR. The program's calls have generated however a low level of response in the area of safety, regulation and social acceptability or socio-economic studies, with only 2% of total funding allocated to these themes.

- **Energy storage (StockE)**

The StockE Program, implemented in 2007, constitutes the Agency's cross-section programming for the new technologies of energy. The program targets a major barrier for the implementation of the new energy technologies. The program encompasses all forms of energy, which makes it unique at the international level. Proposals in 2008 were up by 28% over 2007. More than 60% of proposals were about electrochemical energy storage and 20% thermal energy storage. Projects related to electrochemical storage tend to be specifically about technological bricks, while thermal storage projects have focused more on integrating systems.

- **Bioenergies**

The number of proposals submitted to this new program represents a significant increase over the previous cycle of PNRB calls for proposals (+35%). The average size as well as the overall cost of projects is up sharply as well. The share of private sector research remains moderate with 14% of total funding granted to private companies. 2008 saw a clear trend towards so-called third generation biofuel projects (micro-organic production). Projects in this field nonetheless remained exploratory in nature with few industrial partners. The research theme of thermochemical transformation of ligno-cellulosic biomass attracted proposals of a fundamental or upstream nature rather than projects of finalized research.

- **CO₂ capture and storage**

The 2008 call for proposals closed a cycle of 4 consecutive calls. The scope of the CCS program covers the entire technological field from oxy-combustion processes with chemical capture and transportation infrastructures to safety issues and the notion of geological storage. The first calls for proposals (2005 and 2006) focused particularly on finalized research which could begin to contribute as early as 2010 with industrial-scale demonstrations. As the program evolved, it opened to "breakthrough research" with longer term objectives. The 2008 call showed a decrease in the number of proposals submitted compared to 2006 and 2007.

Since 2005, 36 projects have been granted for a total of 26.8 M€ (of which 4.8 M€ in 2008). In 2008, four of the six selected projects dealt with geological storage, while two others focused on CO₂ capture processes. Two of the six projects were considered as potential breakthrough research. A preliminary evaluation of the program shows that too few projects dealing with safety analysis or socio-economic issues were selected. However, this program has clearly contributed to strengthening public-private partnerships in this area while also preparing the roadmap for national-scale demonstrator projects to be initiated in the near future.

- **Ground transportation (VTT program)**

The VTT program was launched in 2008 as a response to the priorities set by the national assizes (Grenelle) on the environment in the area of transportation. It is integrated into the framework of the

interministerial program PREDIT 4. The call for proposals covers two thematic areas: environmental efficiency of transportation in terms of reduction of emissions (greenhouse gases, pollutants, noise, etc.); and the transportation system efficiency in terms of regulating flows and in terms of security/safety. The results of the call for proposals are evenly balanced between these two themes. Projects selected for funding tend to be projects with a clear involvement by industrial companies. Eleven of 14 projects have been officially recognized by a Competitiveness Cluster.

- **Smart building & Solar Photovoltaics (HABISOL program)**

The program “Smart building and photovoltaics” was initiated in 2008. This thematic area constitutes one of the chief priorities to come out of the national assizes (Grenelle) on the environment. The aim of the HABISOL program is to bring together two research communities that are developing technological bricks designed to be used in buildings. The 2008 call was divided into three main thematic areas: systemic approaches; breakthrough concepts on some key technological bricks; and solar photovoltaic research. Twenty-one projects were selected for funding, for a total of 15.5 M€. This first call is characterized by a disparity in the number of projects in each thematic area; 11 projects out of 21 focus on photovoltaics while only 4 projects selected address the field of systemic approaches and technological integration.

- **Sustainable Cities**

The Sustainable Cities Program, initiated in 2008, aims to improve the sustainability of cities by helping local authorities and companies involved in the urban management (engineering, services, infrastructure design and maintenance, etc.) to integrate into their development all of the dimensions of sustainable development. The call for proposals was structured along four main research priorities: new services, spatial planning and governance; spatial dynamics and mobility; urban environment and risks; infrastructures, networks and construction. 11 projects were selected for funding for a total amount of 8.2 M€, of which 30% was allocated to research teams of private companies. The program's overall design is highly oriented toward systemic research requiring strongly pluri-disciplinary consortia. It is noteworthy that a third of proposals submitted reflected a truly systemic approach. The other two thirds were still characterized by a sectorial approach.

- **Sustainable production process & environmental technologies (PRECODD program)**

The PRECODD Program was launched in 2005 and closed its cycle of four calls for proposals in 2008. It represents the first national-scale program to bring together the entire eco-industry under one research program. Results include a clear increase in public-private partnering and a much greater visibility for this sector and its capacity for innovation. The program stimulated a strong scientific response with more than 80 proposals submitted each year. Over the life of the program 75 projects were selected for funding for a total amount of 47 M€ grants (of which 13.9 M€ in 2008). 2008 saw a marked increase in private sector involvement with 47% of total funding going to research teams of private companies, compared to some 30% in previous years. Among the 19 projects selected for funding in 2008, a clear priority for sustainable processes in industrial production can be observed, with 8 projects in this area and 7 others devoted to methodological approaches for environmentally integrated management, including interdisciplinary projects involving social sciences inputs.

- RiskNat

The RiskNat Program was implemented in 2008 and considers the whole thematic area of natural risk associated with climatic and telluric hazards. The program aims to stimulate various research communities to develop transdisciplinary projects involving practitioners of risk management, companies, local authorities and scientists. The response to the call was satisfactory, with 44 proposals submitted, but coverage was somewhat skewed with 75% of proposals dealing with the study of hazards processes, 30% with vulnerability, and 30% with socio-economic aspects. Similarly, 70% were focused on telluric events while only 23% concerned climatic risks.

- Global Change (VMCS program)

The Vulnerability Program for Milieus, Climate and Society (VMCS) aims at the study of the vulnerability of natural or anthropic systems in the face of global change. The program encourages projects focused on the analysis of induced disturbances, retro-actions, adaptability or resilience of various systems related to the impact of some processes due to global change. In 2008, VMCS closed up its first cycle of three calls. For 2008, the number of proposals was up markedly over 2007 (from 39 to 50). The average project size has grown steadily since 2006 (up by 20%), demonstrating a movement toward more structured and more elaborated projects. The 2008 call also showed an increased effort for research with partnerships between research teams in the social sciences on one hand and teams in Earth and life sciences on the other hand, with 30% of total proposals being cross-disciplinary projects. Another recent development is that the analysis of the vulnerabilities and resiliency of both continental and marine ecosystems is better taken into account than previously, as well as water and soil resources. Few projects, however, were connected to the European initiative GMES. Similarly, no proposal combining and making better use of national environmental databases was submitted.

Programs	Number of proposals submitted	Number of projects funded	Number of Competitiveness Cluster projects	Number of partners	Number of private companies	Selection rate %	Total funding (M€)
RiskNat	44	12	4	55	4	27.3	6.5
VMCS	49	14	2	67	5	28.6	8.1
PRECODD	85	19	8	102	39	22.4	13.7
CO ₂	18	6	1	31	8	33	4.8
Bioenergies	39	13	9	63	11	33.3	10.6
PAN-H	56	14	5	70	19	25	11.7
STOCK-E	36	10	7	51	20	27.8	8
HABISOL	74	21	5	109	34	28.4	15.5
VTT	59	14	11	65	32	23.7	16.8
Sustainable Cities	44	11	5	67	22	25	8.2

3 - Looking forward

Following the national assizes (Grenelle) on the environment, policies to encourage research have contributed greatly to support R&D in the areas of low carbon energy and global change. The ANR's programming strategy will remain strongly oriented by these priorities. Funding for large demonstration projects, managed by ADEME, will stimulate the emergence of new experimental facilities in France. This will also raise new opportunities for research. The ANR will have to take into account in its future programming research questions that will be generated by these new facilities.

Beyond the technological avenues already explored by the ANR in the area of low carbon energy, it will be important to strengthen integrated research in energy systems including production, distribution and use. The growing share of renewable energies, their decentralized production, and the increase in the share of electrical energy in transportation (hybrid or electric vehicles) will require breakthrough technologies. Research will define the most relevant new technologies for energy through detailed studies of energy consumption patterns and economic models associated with these patterns at the society level.

In the field of environmental research, a systemic approach in Agency programming will clearly stimulate pluridisciplinarity. The effects of global change will in the years to come represent a major research objective especially concerning vulnerability of natural resources and urban environments.

1 - Challenges

Information and Communication Science and Technologies (ICST) along with nanotechnologies are scientific domains where research provides significant added value that directly impacts the society and all economic sectors. Both areas are the scene of multiple technological revolutions, for example the availability of the Internet everywhere, the introduction of embedded systems in a large number of products, petaflop calculators, massive digitization of print, audio and video material and the like. Meanwhile nanotechnologies are considered as a corner stone for future ICST where the added value will be obtained at a system level by introducing more functionalities. It is important to continue the investment in research and technology in order to continue to compete with giant clusters that are emerging in Asia for instance. The massive introduction of nanotechnologies must be accompanied by a deep investigation of the societal dimensions.

With regard to the organization of research and development ICSTs and nanotechnologies have similar features, which are taken into account in the ANR research programming:

- they are **diffusing technologies**, for which applications are numerous in trade, health, production, transportation, intelligent materials;
- they require **interdisciplinary research activity**, as the objects/artifacts under study result from a convergence of several fields or the integration of multiple technologies;
- in these sectors, there is a convergence between **fundamental and applied research**.

By the end of 2007, the ANR ICSTs work program was organized around eight collaborative research programs:

- five were continuations and extensions of programs existing in 2006 when the ANR was created, including the public-private partnership Programs Software Technologies/Telecommunications, Audiovisual and Multimedia, and two fundamental research programs, Security and Safety of Information Systems and Massive Data and Knowledge;
- one fundamental program on High Power Computing and Simulation;
- two programs were implemented in 2006 in order to take up questions not already being dealt with: Future Processors Architecture, and Robotics - Interactive and Cognitive Systems.

The need to refresh research programming in these areas has been made increasingly clear by, on one hand, the ongoing technology convergence that is making the standard cleavage between different fields obsolete and, on the other hand, a reconsideration of the separation between fundamental and applied research in calls for proposals. In 2007, the ICST Strategy and Planning Board proposed new programs for the period 2008-2010 and issued a report, which is available on the Agency's website. In the report, the Board concludes with an important re-formulation of the objectives of research programming, which insists on the following goals:

- maintain and enhance competitiveness by mastering the techniques and methods that facilitate, accelerate creation and design, and reduce the costs of discovery;

- move towards a user centric design as is already being done in industries such as audio-visual content, automobile or airplane design, design of ICT systems;
- become a global reference for new scientific, applications and usage concepts.

The new thematic lines proposed by the ICST Strategy and Planning Board and implemented in 2008 divide the research area into five programs:

- Emerging Technologies (DEFIS)
- Embedded Systems & Large Scale Infrastructures (ARPEGE)
- Future Networks and Services (VERSO)
- Content and Interaction (CONTINT)
- Design and Numerical Simulation (COSINUS).

In addition to these programs, there is also an interdisciplinary call on Complex Systems and Mathematical Modeling (SYSCOMM), which is situated upstream to the Design and Numerical Simulation Program.

Lastly, in 2008 the ICST Department initiated a Foresight Workshop on cognitive science and technologies in collaboration with the departments of Health and Biology and Social Sciences and Humanities.

- **Nanoscience and nanotechnologies**

The field of nanoscience and nanotechnologies is the subject of major research and development efforts around the world, as can be seen by (among other indicators) the large growth in the number of both publications and patents. Scientific and technological advances over the last decade have brought a great change in all areas of research on nanotechnologies from passive nanostructures (which are now products on the market) to nanostructures loaded with functions integrated in increasingly complex architectures which are known as nano-systems. Such developments allow for new approaches for communication and information processing which in turn will carry over into many fields with a strong industrial and societal impact.

Accordingly, analysts are calling for nanotechnology-related markets to be worth between 1,000 and 3,500 billion dollars with accelerating growth as of 2010. These markets break down into 46% for tools, 21% for nanomaterials, 6% for nanobiotechnology, and 27% for nano-devices. Today competition in nanotechnologies is fully globalized, and recent studies find major clusters developing in the United States, Europe and Asia with extremely high growth rates.

In the field of nano-electronics, Europe and France in particular are in a difficult situation because of high concentration in Asia of factories that will be used for this future wave of production. The strategy, nonetheless, is to consolidate and develop R&D capacity in this field. In addition, Europe and France are well positioned in the field of embedded systems and architectures. A redesign of these architectures will be required in order to take into account new effects (multiple physical coupling, energy quantification fields enhancement). All road maps agree that the right strategy going forward is to emphasize the "system" dimension, or even "system of systems".

From a technological point of view, it will soon be feasible to develop so-called intelligent miniature systems based on new approaches of heterogeneous integration, a field in which a great deal of

innovation is expected and where products will be developed by small and mid-scale high-technology companies. Such firms are less inclined in a globalized context to flee towards emerging regions with lower labor costs.

It is important to note that these technologies for system integration will be dual systems and will therefore be particularly applicable to those strategic sectors, like transportation or defense, where political and economic independence is vital.

To this end, the 2008 version of the PNANO Program stresses several strategic points designed to revitalize the program:

- introduce an aspect "system and function" into the program;
- shorten the loop from knowledge to innovation by attracting firms as partners to fundamental research;
- ensure a sustainable and responsible development of nanoscience and nanotechnologies.

Six research themes:

- Theme 1: Interaction and Self-Assembly
- Theme 2: Miniaturization and Complexity
- Theme 3: MEMS
- Theme 4: Biology and Environmental Sciences
- Theme 5: Instrumentation, Metrology, Simulation
- Theme 6: Impact and Regulation

Besides, the program emphasizes public private partnership research with a target of 40% of selected projects representing 25% of total funding allocated to private sector research.

• **Complex systems and mathematical modeling: SYSCOMM**

In 2008 the ICST Department also issued a call in the area of mathematical modeling. The goal of the interdisciplinary program SYSCOMM is to bring together "methods" (applied mathematics, statistical physics, computing, etc.) with "users" in biology, health, engineering sciences, agronomics, ecology, social and human dynamics, earth science and astronomy, etc. The objective is to get a better insight into complex systems through "simplified" modeling, without at the same time losing representative and relevant system behavior. This approach entails calling on interdisciplinary research for a better understanding of complex systems, and at the same time developing a true comprehension of such systems and not simply a description. Doing so will require developing tools for understanding systems and describing them quantitatively or for predicting system behavior that lies beyond the reach of experimental methods. Particular attention is being paid to those areas where a strong linkage exists between modeling and experiment.

SYSCOMM is positioned upstream of the programs "Design and Simulation" and "Emerging Technologies" in the sense that it is concerned with systems for which the obstacle has been identified as mostly a problem of a mathematical representation of the phenomenon under investigation. In the field of Biology, SYSCOMM is a continuation of the Systemic Biology Program (ANR 2006-2007). SYSCOMM is also compatible with the reflection being carried out on how to respond to complexity in science, whether at the national level in France (actions by research organizations, the

Complexity and Sustainable Development Program, The National Network of Complex Systems, regional institutes in the Paris Region and Rhône-Alpes, and others) or at the European level (the program "Tackling Complexity in Science" FP7, the GIACS action - General Integration of the Applications of Complexity in Science - in the NEST-Pathfinder Program - <http://www.giacs.org/>, or the ONCE - CS action - Open Network of Centres of Excellence in Complex Systems - in the IST-FET program - <http://once-cs.csregistry.org/>).

2 - 2008 Overall Outcome

The table below displays the overall results of the ICST Department in 2008. A total of 686 proposals were submitted (plus 119 for Era-Net NanoSci-ERA). The Department's calls continued to attract proposals, at levels comparable to 2005-2007. Out of these 686 proposals, 362 were in ICST, 241 in nanotechnologies, and 83 in the crossdisciplinary program SYSCOMM. In all, 181 projects were selected for funding (98 in ICST and 54 in nanotechnologies), for a total funding amount of 128 M€. The total funding for ICST selected projects was 79 M€, i.e. 20% less than in 2007.

Program	Number of proposals	Number of projects selected	Number of Competitiveness Cluster projects	Number of partners	Number of companies	Selection rate %	Budget (M€)
ARPEGE	77	22	10	117	34	28.6	19.6
ARPEGE Défi SEC&SI	6	3	-	-	-	50	0.3
VERSO	63	18	9	90	57	28.6	17.9
CONTINT	110	27	11	126	36	20.4	24.5
COSINUS	56	16	2	99	30	28.6	14.6
DEFIS	50	13	3	46	2	26	6.4
PNANO	241	54	10	204	32	22.4	40.3
SYSCOMM	83	19	-	69	6	22.9	7.2
NANOSCI-ERA	119*	9	-	9	-	7.6	1.9

* Projects with French partners

The four ICST programs ARPEGE, VERSO, CONTINT, COSINUS are mostly made up of redistributions of ICST programs in the 2005-2007 cycle and represent a total budget of 15-20 M€ each. The PNANO Program, which received a great number of submissions, was budgeted at 40 M€, i.e. one-third of the Department budget. The newest programs, DEFIS and SYSCOMM, funded about thirty projects for a total amount of 7 M€ for each program, which represents a satisfactory amount for the first year of a program.

Particular attention has been given to projects concerning Security and Safety of Information Systems. This theme, which is distributed across the various new calls, was well covered in terms of number of proposals (8% of Emerging Fields submissions, 22% of Embedded Systems and Large Infrastructures, 17% of Future Networks and Services, and 8% of Content and Interactions), but

showed a decrease in total funding of selected projects similar to the decrease of ICST overall total funding.

The PNANO call experienced a good response in 2008 with 241 proposals submitted of which 42% were public private partnership projects and 25% were industrial type of research. The budget allocated to this program rose from 31 M€ in 2007 to 40 M€ in 2008, supporting 54 projects whose thematic distribution was as follows:

- Interaction and Self-Assembly 24%
- Miniaturization and Complexity 22%
- MEMS 11%
- Biology and Environmental Sciences 13%
- Instrumentation, Metrology and Simulation (26%)
- Impacts and Regulation (4%).

An in-depth analysis was carried out within the Agency in order to "measure" the overall effort by the Agency in this field. In 2008 the ANR funded 103 projects in the area of nanoscience and nanotechnologies from a dozen programs (including one from the Era-Net NanoSci-ERA and the program for large "nano" infrastructures) for a total funding of 83 M€ of which 14 M€ went to the Large "nano" Infrastructures Program (Research Program in Basic Technologies -- RTB).

During the National Nanoscience and Nanotechnology Week, 206 proposals were introduced to 500 people representing all scientific disciplines.

• International cooperation

NanoSci-ERA: In 2006 and 2008 the Agency joined forces with 18 other agencies from 14 European countries within the framework of the NanoSci-ERA consortium to issue two transnational calls in the area of nanoscience. A particularity of the 2008 call is that the European Commission joined in with the 14 member states to provide project funding.

The progress made by each of the 12 NanoSci-ERA projects funded in 2006 was assessed in 2008 by an international review panel including representatives from each agency as well as several international experts who participated in the selection process. At the time of this mid term review, the projects that stood out were NEDQIT (Nano Engineered Diamond for Quantum Information Technology) and SMMTRANS (Three-terminal transport through single – molecule magnets).

The 2008 call VERSO was opened to public-private collaboration with Brazil. One project out of the three proposed was funded.

Other international collaborations in the ICST field took place with Taiwan, Japan, and China and were implemented in the Non Thematic Blue sky Program.

3 - Looking Forward

The guiding principles for reflecting on the future of this field, which were taken into account in the design of the current set of programs, are expressed in the report "Propositions for Programming 2008-2010" by the ICST Strategy and Planning Board. This document lays out four major trends:

1. New consequences of Moore's law

- the motor of performance will be parallel processing
- a double tendency: towards larger processing infrastructure ("massive scalability" for content for simulation, etc.) and at the same time miniaturization and dissemination within objects;

2. New infrastructure for the Information Society

- the Web as a distributed application platform available worldwide -- everything becomes an online service
- technical convergence among computing, audiovisual and communications, for example web services, IMS, the internet of objects
- huge growth in digitized information, user generated content
- safety and security as key factors in deployment;

3. New relationships between users and systems

- always connected
- each individual becomes author of his personal or a collective (social networks) digital environment
- respect for private life
- moving frontiers between material and virtual worlds;

4. Renewed world economic context

- positioning more toward the downstream end of the value chain (importance of content)
- new business models as well as Long Tail Theory (Chris Anderson), Reed's Law, etc.
- break with the standard economic model for software production (Open Source, SaaS)
- globalization of the development of ICST and its applications.

These contextual considerations were further developed by the Foresight Council, which found several scientific and technical challenges to be of particular importance:

- algorithms (for large scale data, images, sound, questions of logic, of proof, of parallelism, etc.);
- design and verification of electronic circuits of tomorrow (component safety, software/hardware interactions, energy saving, integrated multi-core architectures, new basic technologies like spintronics, quantum information, etc);
- programming and verification (developing languages that are inherently safe, mastering languages and parallel models, taking formal verification up to the next scale-level);
- embedded systems (mastering the production and certification of critical software, interactions between embedded and the Web, etc.);
- digital science (large-scale formal calculation, large simulations and virtual experiments in particular in biology);
- e-health (imaging, modeling and simulation, intelligent prostheses, robot-assisted surgery, intelligent medical files, etc.)

Foresight Workshop (ARP) on Cognitive and Science and Technologies

The PIRSTEC project (networked interdisciplinary foresight for cognitive science and technologies) was selected under the ARP call, which was common to the Departments of Health and Biology, ICST, and Social Sciences and Humanities. Coordinated by the CNRS laboratory RISC (information relay for sciences of cognition), and seconded by a steering committee and a scientific board whose members constitute a broad spectrum of the cognitive science field, the workshop has proposed a foresight exercise to be carried out over 15 months.

This exercise aims at identifying and specifying the themes, issues and cognitive technologies which will constitute the future core of research on interfaces among the structuring disciplines of this scientific field. The task of the Foresight Workshop is also to reflect on how these research themes and issues respond to societal objectives in health and education and what will likely be the economic and industrial impact of such research.

The results of the Foresight Workshop are expected at the end of 2009, notably in the form of a final report seminar presenting proposals for action to the ANR.



1- Challenges

ANR programming in the realm of Social Sciences and Humanities is set in the broader context of an overall policy of support for fundamental research. In this way Social Sciences and Humanities (SSH) programming is indissociable from Non-Thematic calls for proposals of which it is a complementary, corrective and at times accelerating element. This programming serves to broaden the propositions offered to the (steadily growing) ANR scientific community through a dynamic international activity based in large part on bilateral agreements which by 2010 will likely account for 20-25% of Department funding.

Thematic research programs provide a framework for the articulation of fundamental research with the major societal preoccupations of the moment. Generally speaking they aim to support:

- the production of basic knowledge on essential SSH issues, by which such programming brings to light or reinforces new research themes or avenues stemming from the Non-Thematic and Young Researcher calls for proposals, as well as supporting innovative approaches in methods, research objects or fields of investigation;
- the constitution of scientific communities around new and relevant themes for new knowledge production and for responding to societal questioning, while staying true to the objective of thematic programs - more than any other type of program - of inciting interdisciplinarity;
- the encouragement of new collaborative links while strengthening research dynamics and scientific quality in fields which are increasingly better targeted, thus fulfilling the thematic program role of sponsoring the emergence of new scientific groupings who will put into play a common tool-kit developed in order to better respond to their ongoing research questions.

2 - 2008 Overall Outcome

The Department of Social Sciences and Humanities has opened 10 calls for proposals since 2006 on a very diverse set of themes. Research themes selected for calls all share a common, threefold objective:

- respond to demand from the scientific community in certain fields for overhauling old approaches or re-addressing epistemological questions - Corpora (2006-2007), Governance (2008);
- incite research in certain fields which seem to be needing attention, accelerate the pace of reflection in others, and help to build new scientific communities - Enterprises (2007), Communication, Creation (2008);
- foster attempts to respond to the large questions of the contemporary world while treating the major problems of the day - War, Conflicts and Violence, Learning and Knowledge (2006), Global Souths Today (2007).

In 2008, out of the 917 proposals submitted, 213 were selected for funding (or 23.22%) for a total funding amount of 40.8 M€ (or an average of 191.5 K€ per project). To this set of projects should be added projects selected under two calls issued in collaboration with the DFG; in 2007 and 2008, 163 proposals were submitted within this framework, of which 46 were selected for funding (28.2%) for a total amount of 7.3 M€ (French funding alone).

But beyond these figures, which show that the share of thematic program research and international collaborations together account for approximately 45% of all ANR spending on SSH research since 2005, it is important to underline the research results obtained. To do so, the Department has implemented follow-up committees for each program, whose role is to assist the leaders of those projects selected to attain their objectives with advice on functional issues. These committees also establish a scientific audit of the program, bringing together results obtained and important discoveries achieved.

Program	Number of proposals	Number of projects selected	Number of Competitiveness Cluster projects	Number of partners	Number of companies	Selection rate %	Budget (M€)
French-German	70	19	0	25	0	27.1	3.2
Governance and Administration	73	17	0	41	0	23.3	3.7
Creation	85	21	0	41	3	24.7	4.4
Changing Forms of Communication	50	13	0	32	0	26	2.7
Vulnerabilities	51	13	1	25	0	25.5	2.6

3 - Looking Forward

In defining its objectives, the SSH Department must not only take into account the whole set of factors that mobilize the scientific community today and in particular in the field of social sciences and humanities, but it should also take heed of the general remarks and suggestions which come out of the various meetings of national or international consultative groups organized by the department or which arise from the community of researchers.

The links and interactions among various types of calls (thematic, non-thematic, international) are particularly evident in the social sciences and humanities, and frequently the same project participates in more than one type of call. It is unquestionably important that the Department takes this phenomenon into account when defining research themes that will respond to researchers' expectations. But it is also essential that the Department encourage and accelerate pluridisciplinary initiatives, or research initiatives in forgotten or threatened themes. This perspective sheds light on the necessity for the Department to strengthen collaboration with the CNRS and especially with academia, which represents 80% of the research personnel, if it hopes to implement a scientific policy that will achieve the support of the largest number of researchers.

The establishment of a Social Sciences and Humanities Strategy and Planning Board composed of scientists of renown corresponds to this perspective and should enable the Department to develop programming that meets a twofold requirement:

- respond to the concerns stated in the general policy of the Agency, that is, to propose to the scientific community broad subjects for reflection that will incite interdisciplinary collaboration, overhaul old approaches to important questions while at the same time enabling a scientific community to take shape or, lastly, address large societal issues with a forward-looking approach;
- formulate and meet the expectations of a scientific community that has high expectations for the ANR, by taking care not to overlook research areas that could easily be marginalized in a system based on calls for proposals, such as the Humanities.

International considerations should be central to this program since it is of vital importance to strengthen French presence in international research consortia. The Department activity should intensify in the direction of bi- or multinational agreements signed with partner agencies abroad. To existing collaborative programs with Germany, the United Kingdom or Japan should be added those being negotiated with the US, Canada, or countries in Latin America, as well as a large program of cooperation that should be developed with other Mediterranean countries. At the European level, the Department joined the NORFACE ERA-NET as an associate member. All in all, international activity constitutes a vital sphere of involvement and at length will come to represent a quarter of all the Department activity.

1 - Challenges

The Department of Engineering, Processes, and Security implemented three programs in 2008:

- Functional Materials and Innovative Processes;
- Chemistry and Processes for Sustainable Development;
- Systems, Tools and Concepts for Global Security.

The first two programs fit in with the overall ANR thematic priority for sustainable development. Recent decades have seen the rise of "eco-efficiency", a theme which still remains very relevant today. But a new era of "eco-conception" should be initiated so that environmental parameters are taken into consideration right from product conception and design.

- In the field of materials, one of the goals is to unite research actors from a variety of fields like materials science, process engineering, chemistry, mechanics, physics, and mathematics together around a common aim, namely, the development of materials with better performances to respond to needs expressed by society for sustainability but also for extreme conditions. In addition to lighter and more energy efficient structural materials, other important aims include developing multi-functional materials, which are a source of innovation in many areas (housing, transportation, textiles), and improving processes to reduce waste, consumption of raw materials and energy use.
- In chemistry, both basic research and innovation need to take into account environmental criteria. The national assizes (Grenelle) for the environment have proposed a number of actions that directly or indirectly involve the chemical industry. The chemical industry itself is moving in several ways towards the chemistry of tomorrow, whether for greenhouse gas reduction or for increasing from 7% to 15% the share of renewable materials in its inputs by 2017. Gaining control over the impacts and risks for humans and their environment that are associated with chemical products and substances - in line with the European program REACH - has become a major goal for the industry and concerns tens of thousands of substances. The risk evaluation tools currently in use are outmoded and often very costly as well as ethically doubtful in terms of animal testing. New tools and new methods need to be developed for use by industry, especially by small and mid-sized enterprises and for suppliers of expertise. Lastly, new substitute products are required and in particular substitutes for CMR substances now requiring authorisation under the REACH program.
- The Systems, Tools and Concepts for Global Security Program takes an approach that is both systemic and future-oriented, and is intended to lead to innovative solutions in the face of security challenges including in their organizational, social, cultural, legal, economic and technological facets.

Three main aims are to be pursued in response to these various challenges:

- Decentralize security research. Bringing technologically innovative solutions to problems of public security will only be effective in bringing about a reduction in real and citizen-perceived risks if such innovations are applied in a broader context not only of technology use but also the overall legal, sociological and economic issues inherent in questions of security. The contribution to be made by the social sciences and humanities will be decisive, but the Anglo-American inclination to work across boundaries between fundamental and applied research on integrated research programs is unfortunately not yet a universal practice.
- Implement an approach that is truly based on foresight thus enabling all actors to work in a medium and longer term perspective, anticipating both threats and solutions. Such an approach, both incremental and systemic, is not yet a part of all mindsets, but it needs to become instinctive among security users and security policy makers in both public and private realms.
- Reorganize and streamline the security market, especially on the demand side, which would have the twin advantage of making this market more accessible as well as more attractive. This third aim is fully in line with a Europe-based approach, which is the only one that will be effective in creating a synergy of needs.

Like many ANR programs, these three programs take into account the need for interdisciplinary actions; basic research goes hand-in-hand with applications (two programs are for partnership research, the third is "open"). In addition, the interaction of natural sciences with social sciences should in the near future develop further for both chemistry and for global security.

2 - 2008 Overall Outcome

In 2007, the Materials and Processes Program, which requires collaboration between at least one public research laboratory and at least one industrial research laboratory, issued its third call for proposals. It was created in 2005 as a continuation of the RNMP (national network for materials and processes). The success of the program has never been in question, as seen by the response to the successive calls (82 proposals submitted in 2005, 99 in 2006 and 106 in 2007). For example, in 2006, out of the 25 projects selected for funding from 99 proposals submitted, 7 were officially recognized by Competitiveness Clusters. These 25 projects encompassed 148 partners including 70 private companies. At the time of reviewing the program after three calls, the ANR decided that this generic program on materials should be pursued.

	Number of proposals submitted
Functional Materials and Innovative Processes	103
Systems, Tools and Concepts for Global Security	53
Chemistry and Processes for Sustainable Development	71*

* of which 9 within the framework of the bilateral collaboration ANR-AKA (Finland)

** of which 3 selected for funding

The results of consultations undertaken at the beginning of the year with research organizations, ministries and universities substantiated this decision. Furthermore, the Chemistry, Materials, and Procedures Strategy and Planning Board issued a positive recommendation. In the course of several meetings it was proposed that a major overhaul of research themes was needed to make them more relevant to aspects concerning the functionality of materials while integrating the notion of multifunctionality with laws of scale (nano-meso-micro-macro). This clear change was reflected in a change of name; the 2008 version of the program is entitled "Functional Materials and Innovative Processes". Under this edition, 25 projects were selected for funding from 104 proposals, and 11 were recognized by Competitiveness Clusters. The projects selected encompassed 127 partners including 53 private companies.

The program "Systems, Tools and Concepts for Global Security" is also a program for projects in partnership, and it benefits from matching funding from the DGA (a branch of the Defence Ministry). As demonstrated statistically, its success is growing : 43 projects selected in 2006 of which 7 were recognized by 4 different Competitiveness Clusters, 52 projects selected in 2007 and 53 projects selected in 2008. This highly interdisciplinary program is in its third year, and it will very likely be continued into 2009 and aims to become more attractive to researchers in the social sciences and humanities.

Finally, the program Chemistry and Processes for Sustainable Development was implemented in 2007 and immediately attracted 70 proposals (71 in 2008), which is a clear indication of success. Unlike the other two programs, it is an open program, permitting both academic research and research in partnership to be funded. In all, 40 projects were funded in 2007-2008, with which 22 industrial research teams were involved. The 2009 call, issued at the end of 2008, was an opportunity to make minor adjustments to the "vegetal-based chemistry" theme and the theme concerning research needs for the European regulatory framework REACH. The Future Outlook Workshop "PRO-REACH" contributed to these modifications (physical chemistry analytic tools).

In the context of the program CP2D (theme 1), a bilateral collaboration with Germany was launched in conjunction with the Deutsche Forschungsgemeinschaft (DFG) resulting in a deferred call in 2008 (opened on April 9, 2008 and closed on June 6). It is solely focused on catalysis (environmentally-friendly catalysis or EFC).

Number of projects funded	Number of projects by Competitiveness Clusters	Number of partners	Number of private companies	Selection rate (%)	ANR funding (M€)
26	10	127	55	25.2	23.2
15	8	83	39	28.3	13.6
19	6**	56	11	26.7	9.9

	Number of submissions	Number of projects selected for funding	Total allocations (M€)	Selection rate (%)
EFC	17	5	1	29.5

Working with ANR support units, the Department undertook follow-up activities for two programs, a so-called classic review in the form of a mid-way seminar for the program MatetPro (the only program in the Department launched in 2005) and a new follow-up procedure implemented as a workshop for the program GSOSG launched in 2006. The workshop brought together a highly interdisciplinary group of researchers to examine program results. Projects under the CP2D program were implemented at the end of 2007, the year the program was launched, and a mid-way follow-up process is scheduled for October 2009.

In January 2008 the USAR (the support unit) and the ANR jointly organized the first seminar of the Materials and Processes program to examine the state of progress of projects funded in 2005. This follow-up seminar was organized as a series of sessions related to the main aims of the call: polymers, plasmas, thin films, metallurgy, processes and nanomaterials.

Two sessions of the International Workshop on Global Security (IWGS'07, January 30-31 2007, and IWGS'08, January 29-30, 2008) were held at the Technological University of Troyes. These meetings made it clear that a scientific and technical community is in the process of emerging and, in consequence, an annual event on the theme of Global Security would be needed in order for this community to come together, review latest advances, discuss scientific problems and new technological paths, build networks, create common projects, and meet industrial actors as well as policy setters and users who might participate in existing consortia or contribute to new consortia. An annual event is also the occasion for poster sessions by research consortia to present the projects selected for funding by the ANR under the CSOSG program during the preceding call (42 posters).

3 - Looking Forward

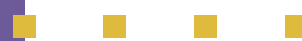
What is the future for these three programs over the next three years?

The program Functional Materials and Innovative Processes is a generic program; each year Chemistry, Materials, and Processes Strategy and Planning Board makes recommendations for thematic changes and new directions. Henceforth, themes such as the life cycle of materials and materials recyclability (e.g. the automobile industry is committed to reaching 95% recyclability by 2015), will be better taken into account. Similarly, the search for low-cost ecological materials with performance characteristics similar to conventional materials is likely to become a strong research theme in the near future.

The research themes of the CSOSG Program are renewed each year and are mission oriented. In the future national priorities, to be defined in 2009 by the French government, will be taken into account as will shifts in European policy in the area of civil and public research (in response to new societal challenges and also as a function of changing EU mandates). The Department will seek to consolidate and extend partnerships with the national research program BMBF on civil security while also exploring a possible collaboration with various agencies responsible for funding security research in the US (mainly the DHS Office of Science and Technology and the NSF).

In 2009 the program Chemistry and Processes for Sustainable Development will have completed its 3-year cycle and will very likely be significantly modified in order to increase research in partnership with industry. Preliminary discussions under the leadership of the scientific committee for Chemistry, Materials and Processes have led to plans for a program called "Sustainable Chemistry, Industry, Innovations" which would be organized along three major themes:

- Alternative resources, paths, and products;
- Efficient processes and reactions;
- Chemistry in the service of major environmental challenges.



1 - Challenges

The Partnerships and Competitiveness Department (PCD) promotes partnership research by supporting initiatives that establish ties between public research actors and socio-economic actors, and encourage the application and use of research findings.

On one hand the PCD focuses its efforts on collaborative research springing from research projects that have responded to ANR calls for proposals and on the other hand on contractual research which results from public laboratories and enterprises being closely linked by research contracts.

In order to extend both types of cooperation, the Department makes use of two mechanisms implemented within the framework of the research pact in 2005:

- first, the Carnot Program, whose aim is to foster partnership research as the core of public research organizations and to develop contractual research;
- second, support for the activities of Competitiveness Clusters and active promotion of public/private collaborative research.

In addition, the PCD is responsible for the coordination of a certain number of the Agency's cross-section actions:

- upstream, the Foresight Workshops are intended to lay the premises for new programs and future calls for proposals;
- downstream, the PCD carries out studies and technico-economic analyses for the scientific departments of the ANR in the aim of supplying perspective based on market constraints.

Finally, the Department is in charge of organizing information and communication campaigns aimed at socio-economic actors in the goal of bringing public and private research structures closer together. Accordingly, in 2008 the PCD organized two seminars, one for Competitiveness Clusters seeking to concentrate their R&D needs in line with the recommendations of the government, the other devoted to the Carnot Institutes to highlight results of collaborative research between Carnot researchers and industrial companies.

The Carnot Program

The Carnot program is intended to foster collaborative research and in particular that which meets the definition of contractual research by:

- bringing public research actors closer to the socio-economic sphere;
- facilitating the passage from research to innovation.

In order to meet these two objectives the Research Ministry awards the "Carnot" label for four years to public research institutions, known as "Carnot Institutes", that are committed to placing partnered research at the center of their strategy.

To facilitate their efforts to forge ties with socio-economic actors, a matching fund of 60 M€, based on the amount of their incomes from research contracts, is made available to the Carnot Institutes.

KEY FACTS
12,000 researchers involved in 5,000 research contracts
1.3 Billion € of annual consolidated budget for 33 Carnot Institutes
205 M€ of incomes from research contracts

Competitiveness Clusters

In 2008 the ANR pursued its policy of support for Competitiveness Clusters alongside other State sources of funding and local and regional government. This support took the form on one hand of Agency funding of research projects recognized by the clusters and which were the subject of proposals submitted under ANR calls for proposals (a major phenomenon for the last three years), and on the other hand of a policy of supplementary matching funds to projects sponsored by the clusters.

Main results of ANR funding mechanisms aimed at Competitiveness Cluster projects

ANR support in 2008 amounted to 177.7 M€ for 234 projects recognized by 60 clusters. The selection rate of projects recognized by a cluster was 23.9% or slightly higher than the average for all ANR-funded projects (23.2%).

Average profile of a cluster-recognized project
4.5 partners
759 K€ of funding

EUROPEAN



INTERNATIONAL COOPERATION

The aims of ANR activities at the European and international levels are to improve the international positioning of French research, to participate in the construction of the European Research Area, and to encourage the opening of national projects to international research teams. Moreover, European and international cooperation tends to promote higher quality and more dynamic research due to the resulting competition. Therefore, the high importance that the ANR places on European and international collaborations is crucial for reinforcing French scientific potential, leveraging French expertise and boosting French participation in international research networks. Accordingly, the ANR aims to deepen existing collaborations, initiated by actors of the French research system, through the implementation of transnational calls for proposals. The ANR focuses its collaboration actions with particular countries in certain strategic fields in the hope of generating European and international "research teams of excellence".

Ultimately, the goal is to build an international network of partner funding agencies, each supporting its own country's research teams in projects judged to be excellent. Agencies in such a network could work together to launch ambitious common programs or to implement transnational calls for proposals leading to projects with multinational academic teams or multinational public-private partnerships.

The ANR international collaboration policy has been progressively implemented since the Agency's creation in 2005 through a series of bilateral meetings with research funding organisations from abroad, most notably Germany's DFG and BMBF, certain Research Councils in the UK, the NSF in the States, and the Academy of Finland. In 2007, some ANR national programs were "opened" to research teams from another country when an agreement had been signed with the funding agency from that country. This proved to be an effective and flexible means for bilateral cooperation, so this mode of cooperation was repeated in 2008 and new agreements were signed with other agencies. Examples include agreements signed with the NSFC in China on ICTs and materials, with the JST in Japan for ICSTs, robotics and nanotechnologies, with Japan's JSPS for social and human sciences, or with FINEP and CNPQ in Brazil for telecommunications, biofuels and nanotechnologies. In all, 18 transnational projects were funded through such cooperation actions, which represents 17% of the Agency's European and International Activity.

Including all collaboration actions, ANR's support to transnational projects doubled between 2007 and 2008, with total funding to such projects reaching 33 M€ or 5% of the total budgets for ANR calls for proposals. In 2008, transnational projects co-funded by the ANR and partner agencies amounted to 8% of total project funding by the Agency.

In 2008, the ANR organized the first International Summit of Research Funding Agencies. This event was an opportunity for more than 150 participants from 10 countries to share their experiences and exchange ideas while strengthening their perspective on international collaboration.

A step forward in European cooperation and the construction of the European Research Area (ERA)

Collaboration and partnership with the European Commission are essential, as is the effort to coordinate national programs with those of the 7th Framework Program (FP7). Accordingly, ANR program managers are participating in the discussions of the National Thematic Groups (NTG) and are thus contributing to the elaboration of DG Research programming. The ANR is also the French representative to the "Ideas" Committee of the European Research Council (ERC), which is a non-thematic research funding agency established at the European level. In this way, the ANR takes part in the discussion on ERC actions.

ERA-Net actions undertaken in 2006 and 2007 were continued in 2008. In all, the ANR is now an active member of 12 ERA-Net and in 2008 issued 5 supplementary calls for proposals within this framework. In addition to these multinational calls, each of which unites some 10 to 25 countries, in 2008 the Agency also implemented a series of more specific, bilateral or trilateral cooperative actions, such as the non-thematic call in Social Sciences and Humanities launched in conjunction with the DFG or the call for public/private partnership proposals in the area of plant genomics, funded trilaterally with Germany's BMBF and Spain's MICINN.

Four thematic programs were opened specifically to European cooperation: Chemistry of Processes with Finland's AKA and Germany's DFG; Ground Transportation Vehicles with Germany's BMBF; Fuel Cells with Germany's BMWI, and Nutrition and Food with Germany's DFG.

The ANR also intensified its collaboration with the European Commission:

- Joint programming - The ANR in association with the CNSA (National fund for solidarity and assisted living) joined the pluri-annual program "Ambient Assisted Living" (AAL) whose aim is to develop and implement innovative solutions based on ICTs for the benefit of elderly persons. At least one call will be issued each year from 2008-2013. Transnational projects of public-private-partnership type selected by these calls will be co-funded in equal parts by the European Union and member States.
- Co-funding of projects between member States and the European Commission by means of the "ERA-Net Plus" mechanism. The 9 projects selected under Nanosci-ERA Plus calls are co-funded by the European Commission up to 30%.
- Collaboration with the ERC - In 2008 the ANR funded 17 French projects selected by the ERC under the call for proposals "ERC Starting Grants" but which the European Commission could not fund due to budgetary constraints.

2008	Number of proposals submitted	Number of proposals with French partners	Number of projects selected for funding	Number of projects funded by ANR with French partners	Total ANR funding M€
Dedicated Calls					
ERA-neuron: ERA-Net on neurodegenerative diseases	59	29	12	6	2.3
Pathogenomics: ERA-Net on infectious agents	50	32	13	10	2.5
Biodiversa: ERA-Net Biodiversity	165	-	13	9	4
Ambient Assisted Living - AAL	117	30	22	3	2.1
NanoSci-Era: Era-Net plus Nanosciences	209	119	24	9	1.9
Sub-total ERA-Nets	600	210	84	37	12.9
Trilateral Genomics	39	39	12	12	4.6
Fr-D call (ANR-DFG) non-thematic SHS	71	71	19	19	3.2
Sub-total dedicated calls	110	110	31	31	7.8
Opening of national programs:					
Non-thematic Program (Blanc) - China NSFC	24	24	3	3	
Non-thematic Program (Blanc) - Japan JSPS	12	12	5	5	
Non-thematic Program (Blanc) - Japan JST	5	5	1	1	
Non-thematic Program (Blanc) - Taiwan	40	40	7	7	
					2.8
ALIA: Food and Agro-Food Industries D (DFG)	10	10	4	4	1
PRECODD: Ecotechnologies and Sustainable Development - Ampera	3	3	1	1	0.2
Bionergies - Brazil	2	2	1	1	1
PAN-H: Hydrogen and Fuel Cells - D BMWI	3	3	1	1	0.7
VTT: Ground Transportation Vehicles - D (Deufrako)	4	4	2	2	2
VERSO: Future Networks and Services - Brazil	3	3	1	1	0.8
CP2D: D (DFG) Chemistry and Processes for Sustainable Development	17	17	5	5	1.1
CP2D: Fi (AKA) Chemistry and Processes for Sustainable Development	10	10	3	3	0.8
	133	133	34	34	10.3
MatetPro: Functional Materials and Innovative Processes Eraspot	3	3	1	1	0.4
HABISOL: Intelligent Habitat and Solar Energy - No-D	2	2	2	2	1.3
Open Biology - D (DFG)	1	1	1	1	0.4

PRESENTATION OF THE ANR



SUPPORT UNITS

The ANR relies on support units established within the major public research organizations and universities for the implementation of calls for proposals. The Agency also directly oversees a certain number of research programs (5 programs in 2008, 7 in 2007, 4 in 2006, and 5 in 2005). For programs managed by the support units, the ANR supervises the operation of calls for proposals and directs the follow-up. In addition, the ANR is engaged upstream in the preparation of the annual programming of calls for proposals.

The administrative costs of the ANR and its support units in 2008 remained at a modest level, well below international standards, despite the increase in activities of follow-up and program assessment over previous years. Administrative costs in 2008 represented 2.7% of total research funding provided by the Agency.

Operating expenses of the ANR

Operating expenses and salary costs for the ANR rose to 9 M€ in 2008 from 7.5 M€ in 2007, an increase of 21% due to an increase in the overall budget as well as to the development of new actions by the Agency such as follow-up and assessment activities and the development of an international sphere of activity by the Agency.

In 2008 the Agency continued to reinforce its human resources capacity, in terms of both scientific and administrative skills. Agency personnel rose from 69.3 full-time equivalents (FTE) in 2007 to 81.3 FTE in 2008 divided roughly equally between scientific and administrative personnel. The cost of personnel on leave from other posts and assigned to the ANR and of contractual personnel amounted to a total of 5.3 M€ or 58% of the total operating budget of the Agency.

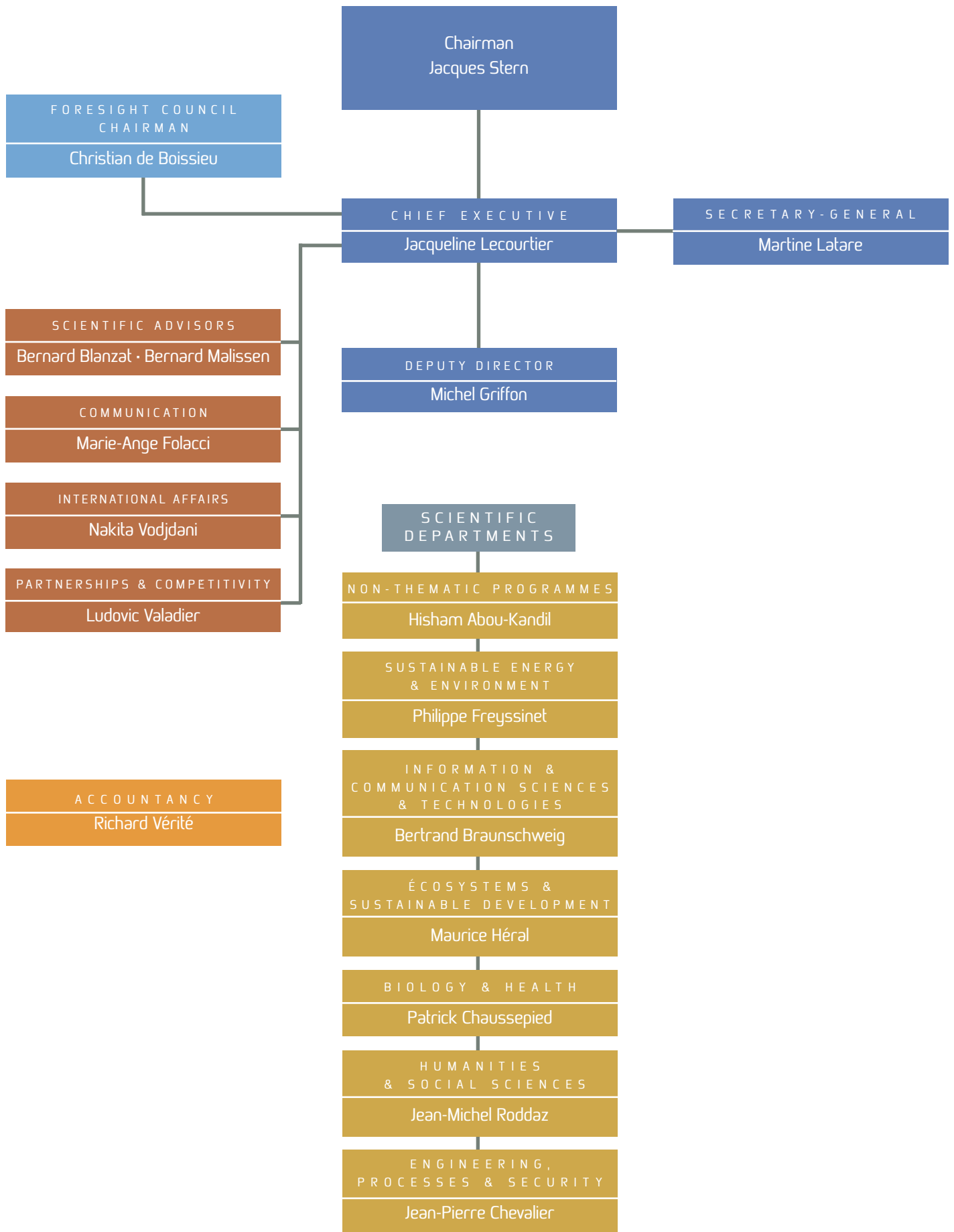
The second largest budget item was rent paid for the headquarters building at 212 rue de Bercy (1.4 M€). Travel expenses and expenses incurred for organizing research colloquiums and seminars also represented a significant part of the ANR's operating budget (0.7 M€).

Operating expenses of the support units

In 2008 the ANR worked in conjunction with 15 support units within 12 universities or public research organizations that had signed a mandate agreement with the ANR.

The support units administrate 15,000 files of beneficiaries of ANR funding under calls for proposals issued from 2005 to 2008. (Over 2200 files are directly managed by the ANR).

Administration fees reimbursed to the support units by the ANR amounted to 13.9 M€.



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