

AGENCE NATIONALE DE LA RECHERCHE
ANR

2012

Annual report

Agence Nationale de la Recherche

Editorial

At the French National Research Agency, and particularly with our growing role as main operator for research and higher education in the Investments for the Future programme, we are continuing in our mission to provide project funding to support the finest research teams.

Project funding is predominant in all the other major countries that produce new knowledge, and in France it supplements the recurrent funding awarded to civil public research, accounting for 3.5% of overall spending in this area. Via competitive calls for proposals, the best research teams can form successful partnerships, working with other researchers on complex issues and goals that require cooperation and a multidisciplinary approach, develop public-private partnerships that ensure resourcing and transfer as well as the emergence of new key questions, and also call for transnational partnership projects.

The ANR is extending its work internationally to increase the excellence and competitiveness of French research, in a context of global societal issues and knowledge. In 2012, we concentrated our efforts on consolidating the organisation of the Agency's goals and priorities, with particular emphasis on working within the European Research Area and promoting multilateral strategic partnerships. The agency has also initiated a Mediterranean policy with our European partners.

2012 is the final year in a programme cycle in which the ANR endeavoured to develop programmes based on the fruit of the reflections by academic and industrial communities taking into account the national strategic priorities and the international context. This was the year in which we reached the threshold of 10,000 research projects funded since the Agency was created. Our Agency manages a portfolio of 5,500 active projects with 23,000 research grants currently awarded, in addition to over 400 government-funded projects in the Investments for the Future programme which in 2013 will benefit from over €1 billion in funding.

Finally, the Agency has begun to reorganise its operations to provide better service to the scientific community: simplifying but not altering our processes, particularly for international standards for independent competition-based scientific selection, consolidating dialogue with our counterparts and preparing the methods for implementing future actions. These methods, presented in a unique Action Plan and using a two-step selection procedure, will be tested this year. They aim to be clearer in the description of the range of funding instruments and are intended to benefit today's major cognitive and societal challenges.



Pascale Briand
Director General

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About the ANR

The French National Research Agency was created in 2005 to organise the funding of projects whose end-purpose is to give impetus to the research sector.

Firmly committed to addressing this issue, which is of crucial importance for the competitiveness of France and the international visibility of its research work, the ANR places great importance on fostering creativity and openness, stimulating new ideas and partnerships, targeting research efforts on economic and societal priorities determined at the highest level of State and through consultation with the other research players, encouraging inter-disciplinary actions, intensifying links between the public and private sectors, and developing international and European collaborations.

The main challenges the ANR works on are part of the European Strategic Agenda.

The ANR offers funding instruments adapted to the various challenges and needs of the scientific community: calls for proposals open to all research subjects including instruments specifically aimed at young researchers and at the return of post-doctoral researchers, thematic calls for proposals that meet the main societal issues targeting private-public partnerships and international cooperation and other more specific calls, like the "Challenges" ("Cups"), industrial research chairs or the Carnot Institutes.

The ANR also manages the Investments for the Future programme, with responsibility for project selection, funding and monitoring.

Some 14,500 peer reviews are performed each year by French and foreign scientists outside the Agency, ensuring fair treatment and competitive selection to meet international standards. The ANR teams finance and

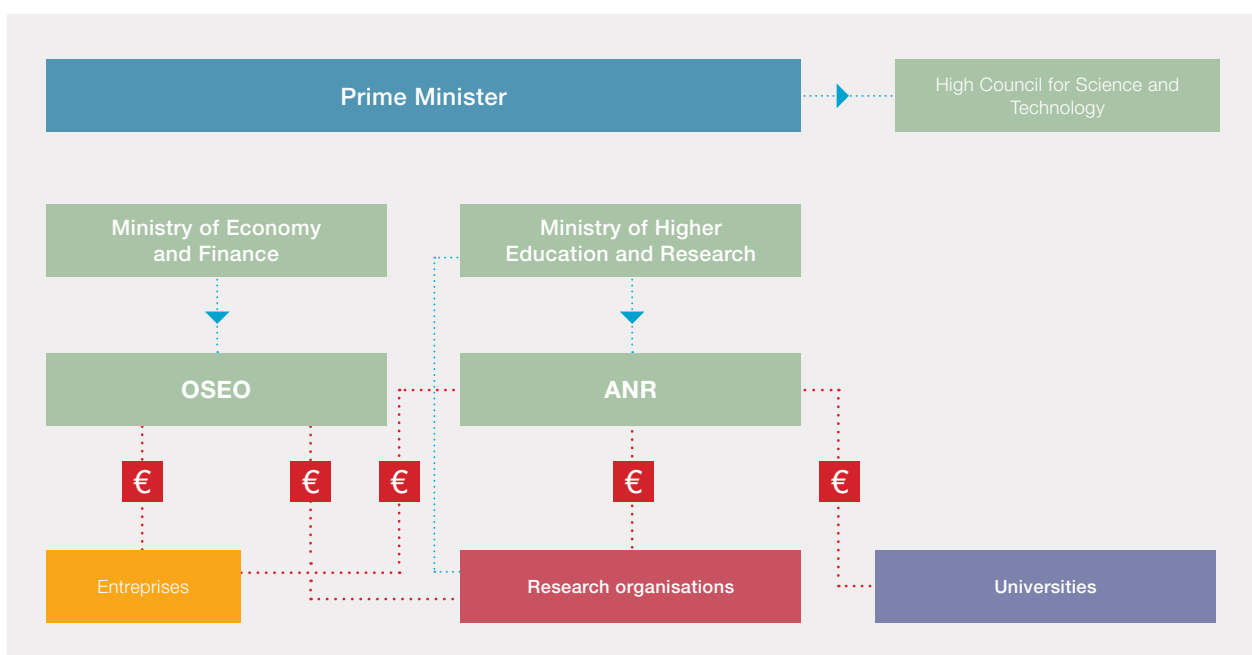
monitor and assist these projects. In 2012, we crossed the threshold of 10,000 research projects financed since the ANR's inception.

The ANR prioritises the quality of service delivered to the scientists, speed of response, procedural simplification and constant adaptation to the new challenges.



ANR funds are available in all scientific fields, for both fundamental and applied research and for public research organisations and universities as well as private companies (through public-private partnerships)

ANR in the French research system



The ANR is a public funding organisation depending on the Ministry of Higher Education and Research and a key player in the French research and innovation system.

ANR in figures

Independence and quality of the peer reviews



Selecting the projects

49	calls for proposals including 18 international calls
6,829	projects submitted
1,301	projects funded, 11% of which are co-funded transnational projects
20%	average success rate

In 2012, the agency exceeded the threshold of 10,000 projects financed since its inception

Funding and supporting

€555.5 M

committed in 2012 to fund research projects

33%

of the budget allocated to public-private partnership projects

8.4%

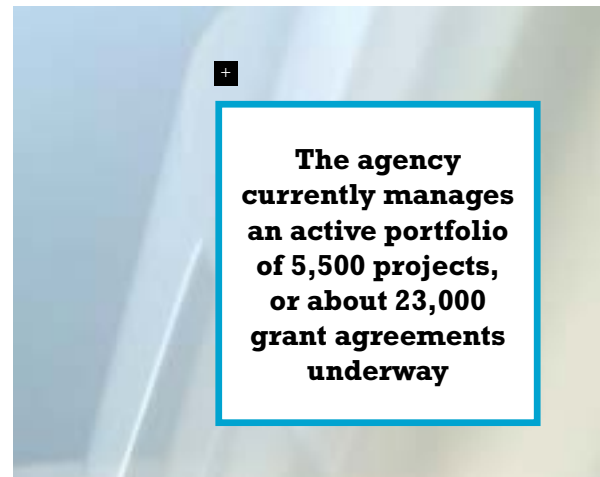
of funding awarded to companies

243

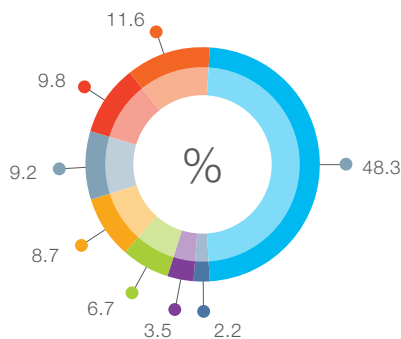
employees

Breakdown of funding allocation by type of beneficiary (%)

Research performing organisations	54.4
Universities	21.5
Other higher education institutions	7.3
Hospitals	0.8
Miscellaneous public	2.1
Foundations	2.4
Associations	1.2
Very small enterprises	1.8
SMEs	3.5
Other enterprises	3.1
Miscellaneous private	1.9

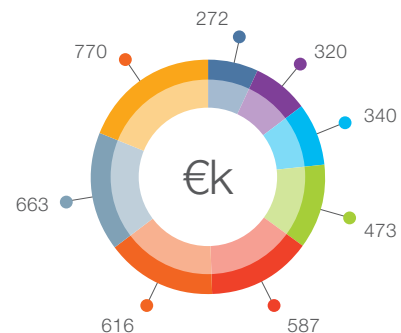


Breakdown of funding allocation by scientific department



Engineering, Processes and Security ●
 Social Sciences and Humanities ●
 Information and Communication Sciences and Technologies ●
 Sustainable Energy ●

Average funding per project by scientific department



Environment and Biological Resources ●
 Partnerships and Competitiveness ●
 Exploratory and Emerging Research (bottom-up programmes) ●
 Biology & Health ●

ANR: Projects for science

Project-based research funding is well established in many countries where it is known to stimulate research organisations and strengthen their synergies.

Since 2005, the French National Research Agency has been funding projects and thus adding real value to the French research system.

The project mode allows us to track the finances of the research work accurately in each field, and we can concentrate and increase research on priorities in scientific fields by calling on the best teams. But in addition to the financial aspects, the impact is manifold.

The competitive and independent selection procedures meet international standards, and allow us to focus funding on the most effective research teams. Meeting scientific challenges and finding answers to social issues is a source of creativity

and fosters collaboration between teams of scientists from a variety of disciplines and public and private institutions (organisations, universities and graduate schools and companies) with shared goals.

It is essential to break down the barriers between disciplines in order to take up the societal challenges identified in national and European strategies. These challenges all correspond to complex problems that require different scientific fields, particularly combinations of Social Sciences and Humanities and Life Sciences or Physics, if we are to produce new knowledge that can quickly be put to use for this purpose.



Funding projects, an asset for France

Direct the research to scientific, technological and societal issues

Target and focus resources on the best projects

Encourage creativity and generate leaps in scientific knowledge

Foster interdisciplinary work and dialogue between disciplines (almost 20% of projects encompass several disciplines)

Keep or acquire leadership on new topics

Facilitate European and international partnerships

Speed up production and transfer of knowledge in public-private partnerships (23% of projects are public-private partnerships, equally shared between large companies and SMEs)

Assist young researchers

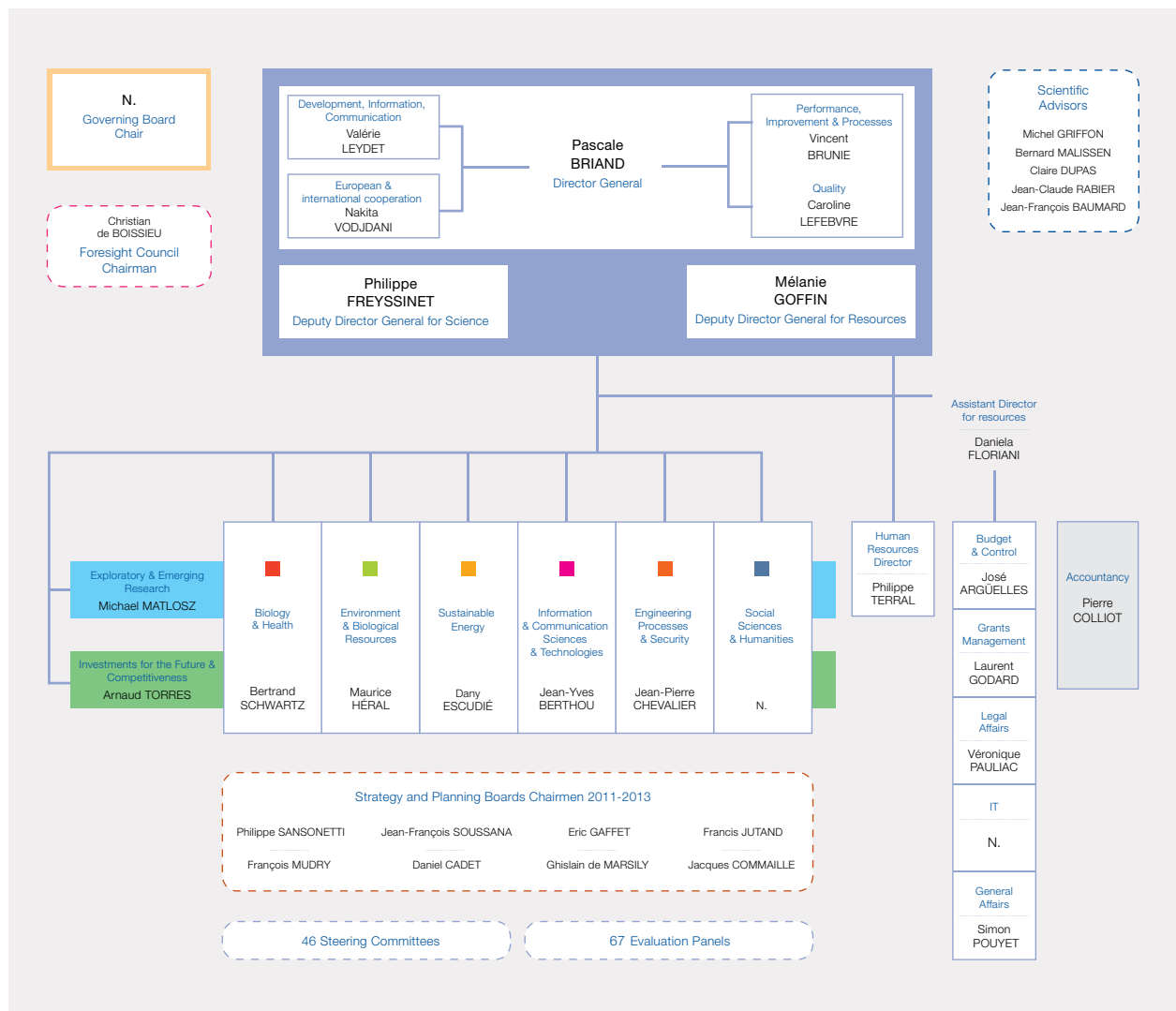
Organisation and staff

The ANR is headed by a Governing Board and a Director General. It is organised around 8 scientific departments, each with a head of department and a number of programme directors and project managers. The typical programme director is an active senior scientist working part time at ANR for a set period before returning to his/her institution or moving to another one.

The International division and the Development, Communication and Information division both depend on the Director General and work closely with the scientific departments. Administrative services are grouped under the Deputy Director General for Resources to handle all general affairs, matters and finance and awards management.

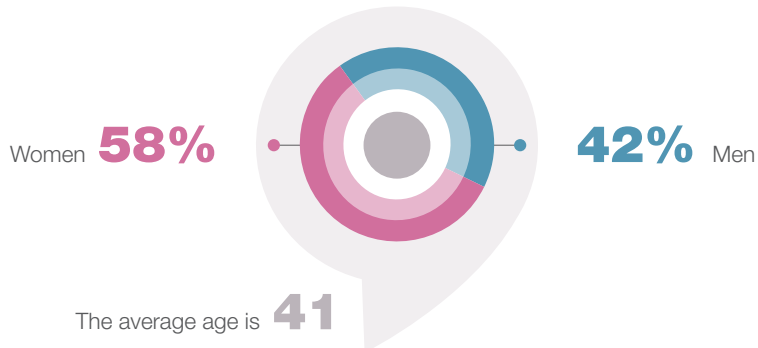
The ANR is staffed by 243 people. Management costs (staff and operations) are maintained at a low level and represent 2.6% of the agency's funding budget in 2012

Organisation chart



Key figures

The agency staff is about half scientists and half administrative personnel.



Governance: ANR's Governing Board

Taking all major decisions, the role of the Governing Board is to define the general frame of agency's operations. It is responsible for questions relating to science and research policy, discussing the financial planning for the coming years and adopting the annual budget.

The Board has 11 members and is made up of:

- The chairman of the French High Council for Science & Technology

5 State representatives:

- 2** from the Ministry of Higher education and research
- 1** from the Ministry of Budget
- 2** from the Ministry of Economy, industry and employment

5 highly qualified scientific personalities

Although no set quota exists for the distribution of seats, efforts are made to split the seats equitably between scientific and academic fields. The Chair is chosen from among the 5 scientific personalities.

Creation of a Performance, Improvement and Processes division

In 2013, the French National Research Agency created a "performance, improvement and processes division" to propose and manage the way in which the ANR adapts to its national and international environment



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Selecting and funding the best research projects

A selection process based on peer review and international standards

The ANR has organised funding for research by projects on the basis of an ISO 9001 accredited selection process since 2008. The keywords are transparency, equity and quality.

The selection process involves various people with the following roles:

+ The French and foreign ad hoc peer reviewers, appointed by the evaluation panel, give a written opinion on the proposals. At least two reviewers are designated for each proposal.

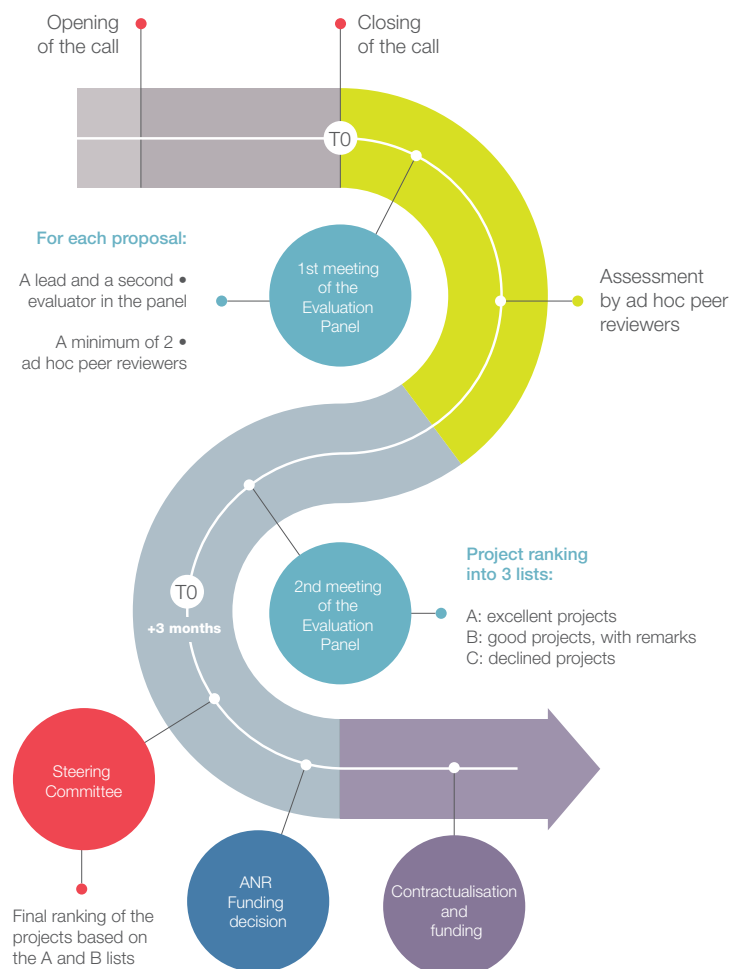
+ The evaluation panel, made up of scientists from the research communities concerned, French or foreign, from the public or private sectors, evaluates the project proposals after reading the peer reviews, and categorises them according to their excellence as "A list", "B list" or "C list".

+ The steering committee, made up of qualified people and representatives of institutions, suggests a list of projects to be funded by the ANR, on the basis of the scientific appraisal of the evaluation panel.



All the persons involved in project selection undertake to comply with the provisions of the code of ethics and in particular the rules pertaining to confidentiality and conflict of interest

The selection process



Funding

In most ANR funding schemes, projects can last 2 to 4 years and the Agency funds either marginal costs or Full Economic Costs (FEC), according to the status of the applicants.

The ANR generally funds marginal costs for public academic institutions, thus covering all expenses necessary for the projects: equipment, travel costs, outsourcing, contracted personnel costs (ANR grants can be used to fund post-doctoral positions as well as PhD students in most scientific fields. The salaries of researchers or participants with tenured positions are paid directly and independently by their own institutions and are not included in ANR budgets.)

For private sector applicants, ANR funds in "Full Economic Cost" mode. Funds are available to both SMEs and larger companies. The ratio of funding is subject to the applicable rules of the European Union regulations on free competition and State aids.

Accompanying the projects during their lifetime and disseminating results

The ANR develops activities to monitor the progress of the funded projects and verify that they actually meet their initial commitment, and to provide appropriate answers to the scientific teams if they encounter difficulties during the project lifetime. All funded projects are therefore carefully monitored during their realisation through diverse procedures such as intermediate and final reporting, individual review seminars and collective symposia.

When individual projects end, the calls for proposals and programmes themselves are evaluated in the light of their initial objectives.

Disseminating project results

The ANR also plays a role in disseminating the project results by publishing project summaries updated by their principal investigators as they progress, and by organising symposia on specific research topics, enabling projects that have reached or are nearing completion to disseminate their results to the community concerned.

The ANR draws up formal assessments of its programmes on the basis of the final reports and the symposia, which enables it to capitalise on all the significant elements of a programme in a single document.



Managing the contingencies encountered by the projects is also an important activity

When we must take decisions on projects that meet with difficulties, we always endeavour to maintain the initial project objectives. The examination of the decisions having an impact on the future of the project or the possibilities of achieving the objectives is mutualised within the ANR. It is also important to point out that all the monitoring and assessment activities are founded on a number of basic principles that aim to limit the effort demanded of the project principal investigators and to ensure high-quality relations between them and the ANR. These principles include **establishing a relationship of trust between the ANR and the principal investigators of the projects it finances, ensuring uniformity of practices between the programmes, and good linking between the scientific and administrative spheres.**

Being constantly attentive to the scientific community

ANR research programmes act as a catalyst and amplifier for research themes that emerge within different components of society (public authorities, scientific communities, industry). The implementation of the programming is a highly iterative process that is based on a broad consultation of the national scientific community into the future research needs, in both fundamental and finalised research. The programmes respond not only to societal, environmental and economic needs, but also to technological and scientific challenges.

ANR programmes are developed essentially from the work of the eight Strategy and Planning Boards made up of 200 scientists and representatives from industry, the public authorities and the five research alliances.



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

The 2013 ANR programming completes a three-year cycle (2011-2013). The Agency has also taken into account the general recommendations of the Ministry of Higher Education and Research, by setting its **Action Plan** as follows:

■ Non-thematic bottom-up instruments (Blanc Programme, Young Researchers, Post-doctoral Return, Industrial Chairs, etc.)

■ Construction of the European Research Area and multilateral cooperation agreements (ERA-NETs and multilateral programmes)

■ Thematic top-down programmes meeting the major challenges to society

A targeted approach: ARP Foresight Workshops

The ANR Foresight Workshops (ARP) are intended to encourage collective and prospective analyses on emerging themes with strong societal and scientific implications. These studies unite researchers and decision makers from the public, private and associative sectors and serve to identify new research questions, in areas as yet relatively unstructured.

Eight ARPs were initiated in 2012:

- Biodiversity and global change
- Nanotechnologies
- French-German Mapping of Projects, Players and capabilities in civil Security
- Mathematics and complexity of the Earth System
- New challenges for the cultural heritage
- Environmental geo-engineering: What research and what partnerships?
- Adapting to environmental changes in the Mediterranean Sea: What research and what partnerships?

IN FOCUS

The ANR quality policy

The quality of service we provide our partners and particularly scientists, our quick reactions and constant adaptation to new issues must be a priority for a service organisation that facilitates, unifies and improves. The ANR continually adapts to meet the needs of the research community. The ANR quality policy is based on three main strategies:

- Adapt the project funding tools to the researchers' needs
- Continually improve the operating methods: simplify procedures and reduce processing times
- Analyse, evaluate and disseminate the project funding results

The redress procedure

Customer focus is helped by a redress committee that can investigate inquiries into project rejections that are deemed irregular.

A service to collect and treat complaints

A service to collect and treat complaints helps to identify any problems and implement corrective actions that go beyond a mere acknowledgement of the complaint.

The users committee

Set up in 2011, its role is to discuss with the main managers at the ANR how the agency's processes are seen and whether they are efficient, and to report on any difficulties encountered. It comprises about ten members appointed for a one-year term, renewable for a maximum of three times. It includes principal investigators, heads of research laboratories or research organisations, administrators and consultants and meets at least twice a year.

+

In 2008, ANR obtained the ISO 9001 certification by AFNOR for its entire selection process. Since 2010, all of ANR's processes have been ISO 9001 certified. This certification reflects the concerted efforts of the Agency's staff to develop rigorous and optimised working methods



A range of funding instruments to meet specific aims



- Encouraging the production of knowledge and the emergence of innovative concepts

Call for proposals open to all themes ("*Blanc*" Programme)

Rationale

- Select and finance research projects that break away from the usual research routes. Encourage boldness in science. Encourage interdisciplinary approaches. Foster the development of emerging topics, disciplinary and cross-disciplinary breakthroughs, new models and methods and advances in theory. Encourage production of knowledge that could potentially lead to innovation
- Improve the position of French projects in European programmes particularly in the European Research Council (ERC), and also in the FP7 and in international programmes

Forms

- Single partner, collaborative or public-private partnership
- Open to all research topics, evaluation by specific disciplinary evaluation panels
- Accent on scientific excellence

Expected results

- Creation of ground-breaking and interdisciplinary knowledge
- Innovation, long term
- Better positioning on the ERC and the FP7

Call for proposals specific to "Young researchers"

Rationale

- Foster the empowerment of young researchers, enable them to develop their own topics independently, start up a tentative team or consolidate a fully-formed one and give them an early opportunity to show their capacity for innovation

Forms

- Specific project format: single partner, strong commitment
- Weighted evaluation criteria

Expected results

- Prepare the new generation of talented young researchers to be future leaders and scientific research directors in our country

Call for proposals specific to "Returning post-doctoral researchers"

Rationale

- Facilitate the return to France of young highly-qualified researchers who have spent their postdoctoral time abroad
- With their acquisition of further experience in research, help them find a future post in a research institute or company

Forms

- Personal grant / research project

Expected results

- Improve the quality of research in France
- Integrate young researchers in research institutes
- Open the corporate world to the most brilliant young researchers who do not intend to pursue a career in academic research

Chairs of excellence

Rationale

- Encourage top level researchers to work in France

Forms

- Personal grant / research project

Expected results

- Develop a new set of topics, form a team in a competitive field, conduct original research to supplement that of teams already in place or initiate innovative topic that would place the French research institutes among the front runners of international competition



Promoting research that meets the major societal challenges (society’s needs, environment and sustainable energies, the economy and competitiveness)

Calls for collaborative proposals

Rationale

- Accelerating research work in chosen topics
- Aggregating skills

Forms

- Calls for proposals on specific topics
- Compulsory collaborative work
- Pluri- and multidisciplinary research preferred depending on the topics
- Open to public-private partnerships

Expected results

- Production of new knowledge in selected topics

Intensifying partnerships between academic research and industry, in line with societal issues

Calls for public-private partnership proposals

Rationale

- Production of new knowledge that can be used by the private sector

Expected results

- Production of new knowledge
- Transfer of this knowledge

Forms

- Thematic calls proposals
- Compulsory cooperation between public laboratories and companies



“Emergence” call for proposals

Rationale

- Facilitate and speed up the development of products, technology or services arising from academic research and apply them to industry at the end of the project

Forms

- Project format
- Weighted evaluation criteria
- Specific composition of the evaluation panel

Expected results

- Valorisation of the academic research findings, creation of start-up businesses

Call for proposals for industrial chairs

Rationale

- Help higher education and research institutions to receive eminent professors and researchers
- Contribute to forming lasting links between academia and industry

Forms

- Weighted evaluation criteria
- Co-funded by ANR and companies

Expected results

- Consolidate the potential of innovative and strategic research in the fields considered as priorities for French industry and for local authorities in support of a concerted deployment in the economy
- Encourage the host institution to initiate a high quality, selective and positive recruitment policy
- Give institutions and companies freer access to new skills and knowledge



Call for proposals "LabCom" (new in 2013)

Rationale

- Enable SMEs and intermediate-size enterprises access to public academic research

Forms

- Simplicity and speed
- Flat-rate grant to the research institution
- Specific selection criteria

Expected results

- Long-lasting shared laboratories
- Make companies more competitive

The ANR launches the "Challenges" ("Cups")

The aim of this instrument is to foster creativity by the very notion of challenge set to teams on a given topic. The first team competition was on robotics, entitled "the carrot challenge" for "automated mapping of an area" and was launched in 2009, in partnership with the DGA (French defence procurement agency). This challenge was successfully completed in 2012.



Call for proposals for "Challenges" ("Cups")

Rationale

- Compare different approaches competing on the same issue

Forms

- Several teams in competition (consortium) on one same topic, with the competition being organised by a third party

Expected results

- Stimulate research on a focalised topic
- Establish benchmarks
- Weighted evaluation criteria
- Applications
- Create lasting partnerships

Developing European and international collaborations

Specific bilateral and multilateral calls for proposals

Opening of national programmes

Lead Agency

Adaptability

+ Flash Calls for Proposals

Rationale

- Give a quick answer to an urgent request (examples: Flash call Haiti, Flash call Japan "Great Tohoku Earthquake")

Forms

- Outside the ANR programmes
- Short projects (18 months maximum) and low budgets (e.g. €100k maximum)
- Simplified selection procedure
- No ad hoc peer reviews

Expected results

- Adaptability





2012 in brief

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International activities

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Disseminating knowledge:
seminars, workshops and “les cahiers de l’ANR”

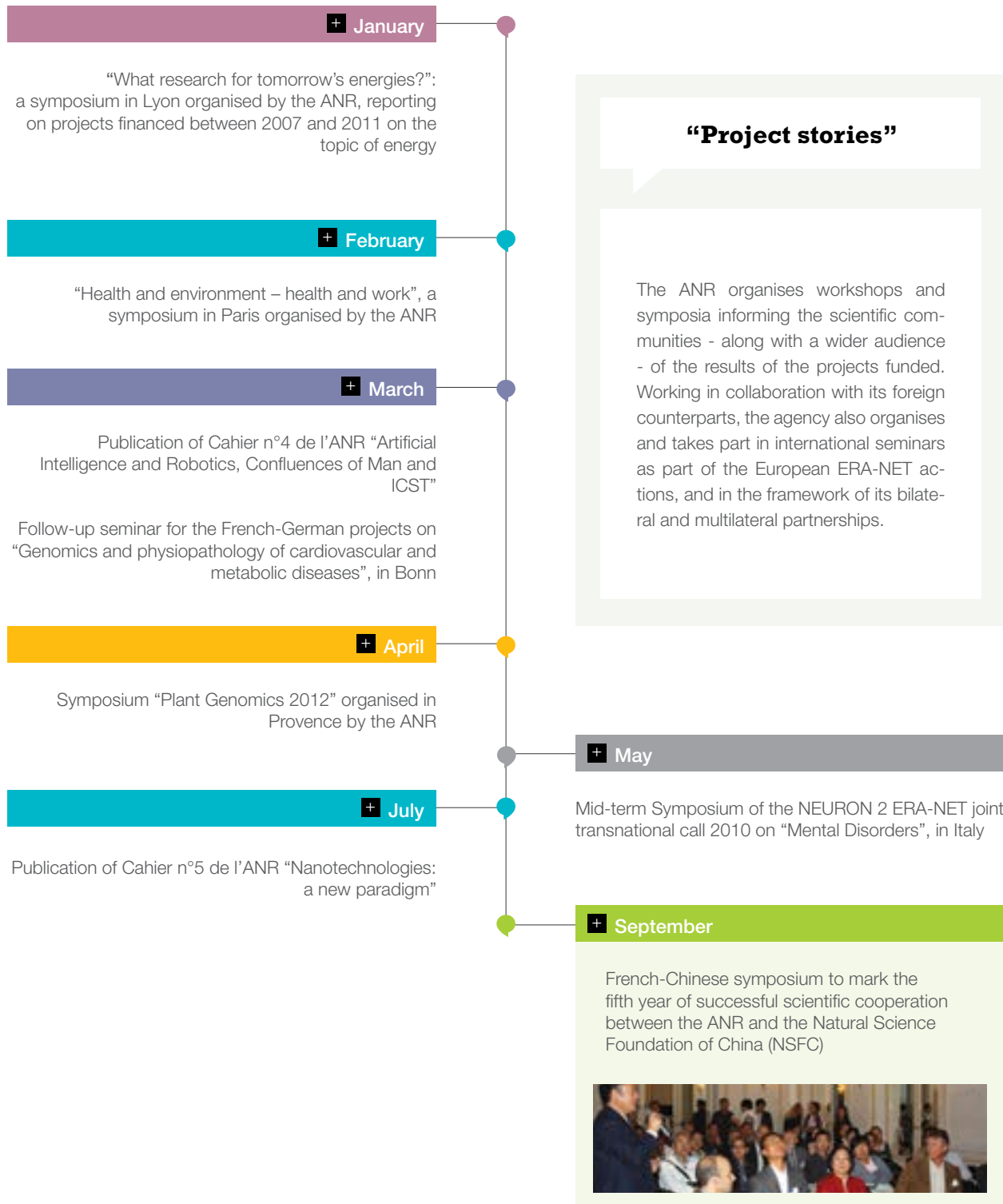
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Life at the ANR

International activities



Disseminating knowledge: seminars, workshops and “les cahiers de l’ANR”

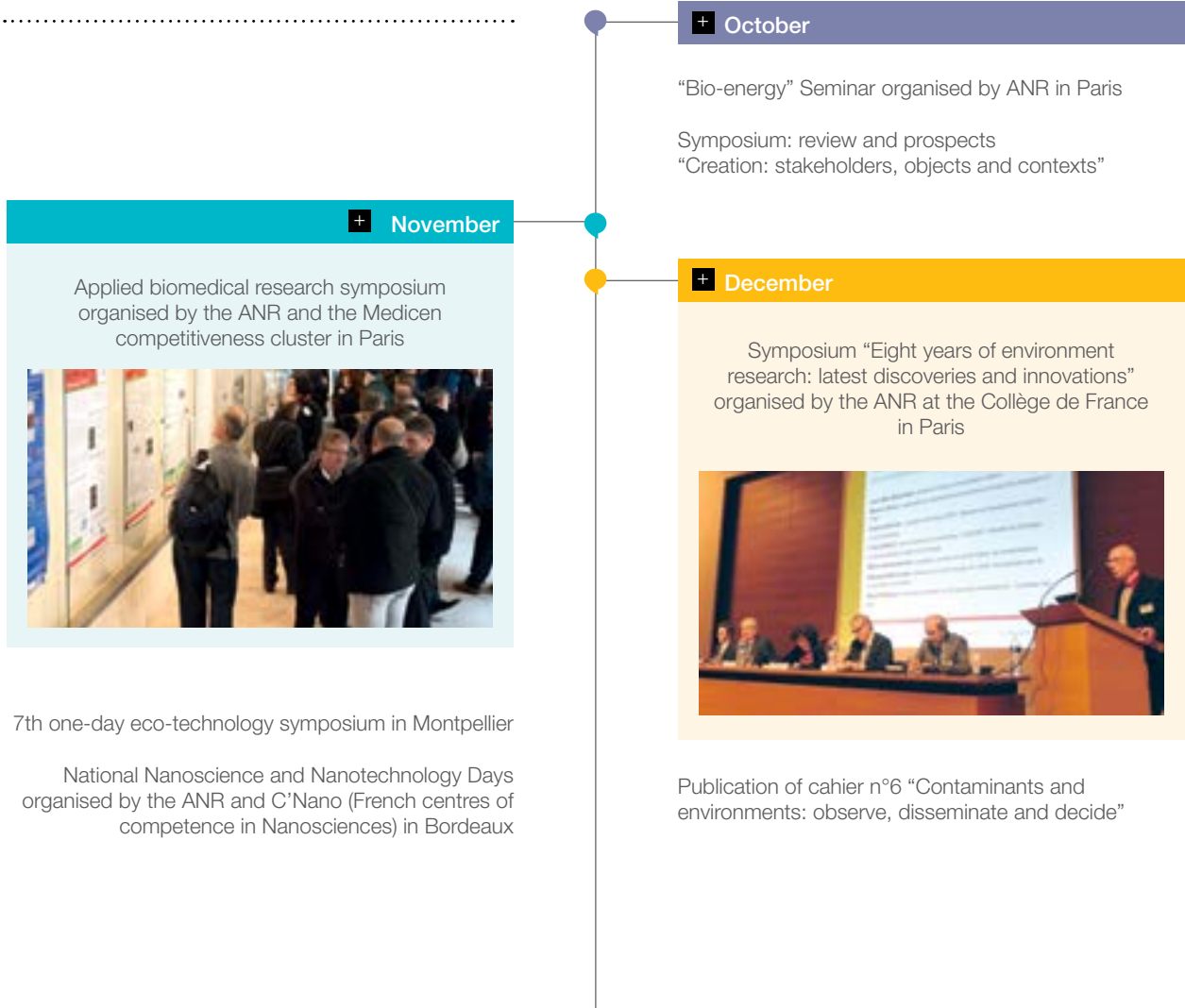


“Project stories”

The ANR organises workshops and symposia informing the scientific communities - along with a wider audience - of the results of the projects funded. Working in collaboration with its foreign counterparts, the agency also organises and takes part in international seminars as part of the European ERA-NET actions, and in the framework of its bilateral and multilateral partnerships.



Symposia: “Sustainable towns and cities” in Marne-la-Vallée and “Sustainable Chemistry” in Lyon



IN FOCUS

Science outreach: “Les Cahiers de l’ANR”

In 2009, the ANR launched a collection called “Les Cahiers de l’ANR” which addresses pertinent thematic questions that span the ANR’s diverse research funded. Through a cross-disciplinary approach, this collection brings the on-going research, innovations and technological advances in a particular field into perspective. What are the technological, societal, economic and prospective issues? What is the ANR doing in this particular field? It is intended not only for researchers, but also for decision makers and a wider public.



Life at the ANR

+ January

The French National Research Agency and Paris Dauphine University launched a further education diploma: the Executive Master of Research Management

+ 1 February

Pascale Briand took up the position of Director General of the ANR

+ March

The ANR opened its major annual consultation of French research alliances to define the future ANR programmes

+ 14-15 May

The Agency attended the first world summit on scientific evaluation in the US, for the creation of the **Global Research Council (GRC)**



+ 24 May

General assembly of the association **Science Europe** in Brussels, with Philippe Freyssinet, Deputy Director General of the ANR



+ 20-21 June

In conjunction with the NSF, the ANR organised an international workshop in Paris on the notion of accountability in science and research funding



+ 11 July

Internal General assembly with all the staff at the ANR



+ 28 August

Pascale Briand was auditioned by the steering committee of the French summit of higher education and research ("Assises de la recherche"), in a major national debate to find innovative and effective proposals to improve the French higher education and research system. A written contribution was also submitted to the Ministry in September

+ 11 December

Pascale Briand spoke at the second national forum of the Strategic Council of information technologies at the Cité des Sciences et de l'Industrie in Paris. The Director general has been appointed to the national committee of the Strategic Council



Investments for the future

Selecting, funding

and monitoring large-scale projects

As part of a government initiative to reinforce long-term French competitiveness, a major programme called “Investissements d’Avenir” or “Investments for the Future” was launched at the end of 2009.

The ANR is the operator for the research and higher education component of this programme, which covers 21.9 billion euros.

Such a programme has a structuring and integrating purpose, and is part of a long-term and dynamic drive to transform higher education, research and innovation.

These large-scale initiatives promoting excellence will strengthen France’s capacities for innovation and be a driving force in the dynamics of growth in the coming years.

The Investments for the Future Programme (PIA)



Produce, innovate and increase competitiveness

Under a law published on 9 March 2010, the programme aims to increase productivity, to innovate and to make companies more competitive and also to boost employment and promote equal opportunities by encouraging investment and innovation in 5 priority sectors that generate growth and employment:

- + Higher education and training
- + Research
- + Industries and SMEs
- + Sustainable development
- + Digital

10 managing institutions

The task of managing the €35bn Investments for the Future Programme was given to 10 government organisations, including the French National Research Agency. The agreements signed between the government and the operators encompass some forty actions. They lay down the rules of governance by example based on profitability standards with a return on investment for the government and a routine assessment of the work done.

Competitive calls for selecting centres of excellence



ANR is the prime manager of the Investments for the Future programme, with responsibility for 21.9 billion euros

The 3 roles of the ANR in the Investments for the Future

The government has chosen to launch competitive calls for proposals organised in two stages (two sets of calls) in order to select the awarded projects for the Investments for the Future programme.

+ Selection

The ANR selects the projects and proposes them to interministerial steering committees which then submit them to the Prime Minister.

+ The contracts

The ANR is in charge of drafting the contracts for the projects selected by the Prime Minister with the project leaders. This stage includes the funding of the Investments for the Future projects.

+ Follow-up

The ANR, together with the Ministry of Higher Education and Research (MESR) and the French government investment commission (CGI), monitors all the Investments for the Future projects.

Investments for the Future, a specific assignment

By virtue of their exceptional nature, the Investments for the Future have some particularities. The project evaluations were always conducted by international panels, with the project selection criteria being defined according to the priorities for Investments for the Future. The amount of funding assigned to the chosen projects is quite substantial, and covers “ten-year projects”, opening up new perspectives and leading to collaborative associations that would otherwise never have existed. Furthermore, they

enable not only the financing of large-scale research projects, but also the implementation of new “objects” such as intermediate-size research equipment, infrastructure for research into biology and health, and the emergence of global research and higher education clusters.

Project selection criteria

Scientific excellence

Potential for innovation and technological disruption

Investment in high-level training

Acquisition of knowledge and know-how and transfer to the socio-economic sphere, value creation strategy

Governance efficiency, quality of the development plan and management over the long term

Positioning with respect to the territorial policies, competitiveness clusters, the National strategy for research and innovation (SNRI), and European policies

📍 In 2012

Competitive calls for proposals were organised in two waves and 14 calls for proposals were launched in 2010. Alongside the contractualisation of the projects selected in 2010, a second wave comprising about ten calls for proposals was launched during 2011, as an extension of the first wave. Continuing in this vein, in 2012 contracts for the vast majority of the projects selected were signed and projects already underway were given backing. With the world news and the Fukushima nuclear accident, the Investments for the Future programme initiated a new call for proposals for research into nuclear safety and radioprotection. This significant year also saw new project monitoring methods, which prepares the way for a support phase for these programmes.

Investments for the Future actions followed by the ANR

+

CENTRES OF EXCELLENCE

Equipment of excellence

They aim at providing French research with scientific facilities of very high quality, which comply with international standards and play a key developmental role at national level. These facilities will contribute to the implementation of competitive projects on the international scale. The selected projects cover all scientific fields, from the creation of an observatory of the written legacy of the Middle Ages and the Renaissance in social sciences and humanities, to the construction of an experimental aquatic ecology platform for environmental sciences, and topics in applied robotics.

Submitted projects

601

Funded projects

93

Success rate (%)

15.5

Total funding (€M)

582

Average funding per project (€M)

6.258



Laboratories of excellence

The aim is to select Laboratories of Excellence, and give those with international visibility the means to compete with their foreign counterparts on an equal footing, to attract researchers and professors of international renown and to build an integrated policy of high level research, training and value creation.

Submitted projects

436

Funded projects

171

Success rate (%)

39.2

Total funding (€M)

1,540.3

Average funding per project (€M)

9.008

Initiatives of excellence

This is one of the flagship operations of the Investments for the Future programme, which, by using international-level research as a lever and an engine, intends to induce the emergence in France of a limited number (5 to 10) of world-class multidisciplinary clusters of excellence in higher education and research.

Submitted projects

28

Funded projects

10

Success rate (%)

35.7

Total funding (€M)

1,265.2

Average funding per project (€k)

126,520

Initiatives of excellence in innovative training

This action aims at enhancing the prestige of innovation in training by supporting ambitious initiatives that meet up to the international and emblematic standards of the university offering of the future. The challenge is to promote true “demonstrators” that foreshadow university training of the future through new systems, new training procedures, new content and new methods.

Submitted projects	95
Funded projects	37
Success rate (%)	38.9
Total funding (€M)	186.2
Average funding per project (€M)	5.032



+

HEALTH-BIOTECHNOLOGIES

Bioinformatics

At the intersection of Biology, Mathematics and IT, this action should increase our knowledge of biological mechanisms using mathematical models, algorithms and software programmes.

Submitted projects	45
Funded projects	12
Success rate (%)	26.7
Total funding (€M)	17.1
Average funding per project (€M)	1.425

Biotechnologies and Bioresources

The aim is to bring to light a bio-economy based on knowledge of the living world and on new methods for recovering renewable biological resources.

Submitted projects	29
Funded projects	13
Success rate (%)	44.8
Total funding (€M)	91.5
Average funding per project (€M)	7.038

Cohorts

The aim is to provide long-term funding for cohorts with underlying health issues, both general population and patients.

Submitted projects	44
Funded projects	10
Success rate (%)	22.7
Total funding (€M)	74.5
Average funding per project (€M)	7.45

Preindustrial biotechnology demonstrators

This action aims to install large equipment to test the feasibility of economically and ecologically viable production of various biotechnology products at industrial scale. This concerns all biotechnologies.

Submitted projects	12
Funded projects	4
Success rate (%)	33
Total funding (€M)	78
Average funding per project (€M)	19.5

National infrastructures in health and biotechnologies

This will cover all aspects, from medicine to biodiversity to fundamental biology, and aims to form national networks and equip them for the future. All French and European researchers will have access to this state of the art heavy equipment.

Submitted projects	65
Funded projects	23
Success rate (%)	35.4
Total funding (€M)	498.2
Average funding per project (€M)	21.661

Nanobiotechnologies

This call concerns the health sector, aiming to bring to light a new field (nanomedicine), and the environment with work on nano-ecotoxicology.

Submitted projects	37
Funded projects	8
Success rate (%)	21.6
Total funding (€M)	18.8
Average funding per project (€M)	2.350



Research Hospitals

The aim of this initiative is to finance centres of excellence in research, care, training and technology transfer in the field of health. Six Research Hospitals (IHU) have been selected, thereby bringing together a critical mass of researchers, professors, and hospital personnel focusing on priority health topics within an integrated structure comprising a university, a research hospital centre or a public service health care institution, and public research centres.

Submitted projects	19
Funded projects	12
Success rate (%)	63.2
Total funding (€M)	387.8
Average funding per project (€k)	33,735

Research Hospital Oncology Centres

This call for proposals aims at giving France a university hospital centre of excellence specialised in research, training and innovative treatments in oncology.

Submitted projects	3
Funded projects	2
Success rate (%)	66.7
Total funding (€M)	20
Average funding per project (€M)	10

+

TECHNOLOGY TRANSFER AND VALORISATION

Societies for accelerating technology transfer

The purpose of the SATTs will be to group together all the technology transfer teams of universities and put an end to the splitting up of structures in order to significantly improve the efficiency of technology transfer and the economic value created. They should lead to greater professionalisation in the creation of value from research and strengthen skills.

Submitted projects	15
Funded projects	11
Success rate (%)	73.3
Total funding (€M)	900
Average funding per project (€M)	81.818

Thematic technology transfer consortiums

The aim is to offer technology transfer services with high added value to technology transfer structures of universities on given themes.

Submitted projects	6
Funded projects	6
Success rate (%)	100
Total funding (€M)	50
Average funding per project (€M)	8.333

Technological research institutes

The aim of this action is to create a limited number of technological innovation campuses of a global dimension grouping training institutes, public and private research laboratories, prototyping and industrial demonstration resources, industrial players, essentially on the same site, thereby reinforcing the ecosystems made up by the competitiveness clusters.

Submitted projects	15
Funded projects	8
Success rate (%)	53.3
Total funding (€M)	924.3
Average funding per project (€M)	115.537

Institutes of excellence in decarbonised energies

The aim is to set up, in the energy and climate sectors, a limited number of technological innovation campuses capable of acquiring a global dimension. They are to group together training institutions, public and private applied research laboratories, prototyping and industrial demonstration means, and industrial and service players, essentially on the same site, thereby reinforcing the ecosystems made up by the competitiveness clusters. This call for proposals concerns the energy pathways that hold promise for the future.

Submitted projects	27
Funded projects	13
Success rate (%)	48.1
Total funding (€M)	448.2
Average funding per project (€M)	34.477

Carnot Institutes



An action targeting SMEs supports the Carnot Institutes (see page 74) which engage in a programme to develop their partnerships with small, medium and intermediate sized companies.

An international action backs the Carnot Institutes which commit to a programme to develop their partnerships with stakeholders beyond their national borders (French or foreign companies or research and technology organisations-RTOs).

Submitted projects	13
Funded projects	4
Success rate (%)	30.8
Total funding (€M)	148
Average funding per project (€M)	37

Research on nuclear safety and radioprotection

The Fukushima nuclear power plant accident highlighted the need to take certain research on nuclear safety and radioprotection to a higher level. The aim is to support public-private partnership projects and the infrastructures and platforms in this field by calling for proposals to attract research in nuclear safety and radioprotection.

Submitted projects	42
Total funding (€M)	50

Research Highlights



+ © IVTV Team - Cell image

FOCUS on an Equipment of Excellence

The Engineering and Ageing of Living Tissue Centre Photoprotection to reduce the use of pesticides

On 11 December 2012, the IVTV (Engineering and Ageing of Living Tissue) centre was officially inaugurated. This project to develop high powered technological tools combining biological, biomechanical and imaging approaches to tissues in the ageing process

will provide tools for regenerative medicine and transplantation, produce clinical databases for a better diagnosis, provide tools to evaluate new drugs or therapies and help us understand the influence of cell activity on tissue alteration.

FOCUS on a Research Hospital

The IHU in Strasbourg: Institute of Minimally Invasive Image-guided Hybrid Surgery

By combining the skills and excellence of surgeons, gastroenterologists and radiologists, the Research Hospital in Strasbourg aims to bring to light a new ultramodern speciality: "Minimally-Invasive Image-Guided Hybrid Surgery" and to become a unique

hospital for treatment, research and training. Under the Investments for the Future programme and with a strong supporting partnership, the hospital will be able to install two operational platforms in Experimental Imaging and Robotic-assisted Surgery.



+ © Project leader
Two operational platforms in Experimental Imaging and Robotic-assisted Surgery.




+ © Jules Verne's Communication
Research robot

FOCUS on a Technological research institute

IRT Jules Verne

Created on 5 March 2012, the institute groups members of industry and a number of SMEs and its founders from higher education and research organisations. It aims to become a world-renowned centre of expertise in implementing composites, for applications in trans-

port (air, sea, road and rail) and energy. The first major investment was launched with the construction of a research robot in the ROBOFIN project whose aim is to automate the finishing process of large size (up to 100 metres) composite parts.



Encouraging the production of knowledge and the emergence of innovative concepts

Fostering knowledge production and scientific progress in all disciplines is one of the ANR's scientific priorities.

It favours a creative environment for researchers by giving them total freedom to defining research themes through bottom-up non-thematic calls for proposals, thereby paving the way for advances in S&T and innovative developments.

Blue-sky research:
supporting curiosity-driven
research

The non-thematic instruments cater for the scientific community as a whole and accompany the researchers in different stages of their career (young researchers, post-doctoral positions, experienced researchers, etc.)

The only rationale that prevails is the acknowledgement of excellence and the support given to innovative or interdisciplinary approaches in order to open new paths in research and thus push back the frontiers of knowledge. The projects financed thus foreshadow striking scientific discoveries.

In 2012, ANR's bottom-up programmes are:

- + the Blanc programme, and its international component
- + the Young researchers programme
- + the Post-doctoral return programme
- + the Chairs of Excellence programme

Fostering excellence and risk taking in science

ANR' support to bottom-up initiatives acknowledges excellence and enhances the French potential for innovative research. Since its creation in 2005, ANR has given researchers a real opportunity to submit single or multi-partner projects evaluated on the sole criteria of originality and excellence. The bottom-up "Blanc" programme is open to all types of research projects, from the most fundamental to applied or partnership research; it stimulates cooperation between teams from different laboratories, particularly at international level, and possibly with partners from the socioeconomic sphere.

There is also a **strong international component**, aiming at giving rise to European and international teams of excellence. The ANR has concluded specific cooperation agreements with targeted countries on specific and broad domains, thus giving French researchers the opportunity to initiate or further their scientific collaborations with foreign teams.





Encouraging autonomy and innovative initiatives of young researchers

ANR supports the projects of researchers or lecturers/researchers at the start of their career, to encourage them to take responsibility, to enable them to develop their own topics independently, to set up or consolidate an existing research team, and give them the possibility of rapidly demonstrating their ability to innovate. This is also a stepping stone for the French researchers applying to the ERC (European Research Council) Starting Grants programme.



Supporting the return and integration of post-doctoral researchers

ANR facilitates the return to France and integration of top-level French or foreign young scientists who have spent their postdoctoral time abroad after obtaining their doctorate degree in France. It provides the successful candidate with the resources to conduct a project in a host laboratory in France for a maximum period of three years.



Promoting the attractiveness of France

ANR provides substantial means for top foreign researchers willing to set up a team and rapidly undertake ambitious research projects in France. Such an initiative is vital to reinforce the country's innovation potential as well as the structuring of new research themes. ANR proposes different **chairs of excellence** according to the project duration and the researcher's career, whatever his/her nationality or discipline.

Focus on the Blanc programme in 2012, the Agency's main non-thematic instrument

The Blanc programme covers all fields of research: Mathematics, Physics, Chemistry, Engineering sciences, Information and Communication Sciences and Technologies, Science of the Universe, and geo-environment, Agronomy and Ecology, Biology and Health, Social Sciences and Humanities. Its aim is to develop emerging themes, breakthroughs within and across disciplines, new models and methods and theoretical developments, and to encourage the production of knowledge that will lead to innovation.

Disciplinary areas	Funded projects
Societies, space, organisations and markets	15
Human development and cognition, language and communication	13
Cultures, arts, civilisations	13
Mathematics and interactions	21
Computer science and applications	9
Hardware and software for systems and communications	12
Physics of condensate and dilute matter	23
Subatomic physics and related theories, astrophysics, astronomy and planetology	17
Earth system, environment, risks	18
Molecular, organic, coordination chemistry, catalysis and biological chemistry	32
Solid-state chemistry, colloids, physical chemistry	23
Engineering sciences, materials, processes, energy	33
Nanosciences	18
Physiopathology, physiology, public health	39
Cell biology, developmental biology	25
Microbiology, immunology, infectiology	25
Neurosciences	27
Physics and life chemistry, biotechnological innovations	25
Genomics, genetics, bioinformatics, systems biology	18
Biodiversity, evolution, ecology, and agronomy	24
Biochemistry, molecular and structural biology	25



Research Highlights

UNLOC Project

*funded by the Blanc
programme - 2008*

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+ © jaylopez

Mathematics in information technology: design of a worldwide SAT Solver

Computer science is based on mathematical foundations. Computer programmes therefore need to satisfy a certain logic, which is, in most cases, very difficult to check. That is why computer scientists build SAT solvers, which are programmes that test the logical validity of other programmes. The UNLOC project has developed very sophisticated, high-powered algorithmic tools which can shorten the formal proofs of a programme's validity. The application section of the project then led to the design of a SAT solver, Glucose, using these techniques. Glucose at once proved very ef

fective and won first prize in the international SAT competition, an annual competition of the best solvers designed by computer scientists all over the world. Glucose's embedded technology is now present in most solvers tackling industrial problems.

Photoprotection to reduce the use of pesticides

To meet the need to increase yields in farming and still avoid contaminating the environment, chemical treatments on crops must be carefully planned. Pesticides (herbicides, fungicides and insecticides) must remain on the plants after spraying as early dissipation makes it necessary to repeat the applications. A significant cause of dissipation is exposure to the sun's rays. The initial aim of the project was to show that plant extracts could limit photodegradation of pesticides and therefore help to reduce doses used. Degradation under the effect of light of 10 pure or formulated pesticides applied dry to films imitating leaf surface was shown.

This sometimes-rapid dissipation is significantly slower if color plant extracts are added. Lower doses were obtained in laboratory thanks to photoprotection. During the study, it was also demonstrated that some extracts stimulate the plants' natural defences, which is another way of reducing the use of pesticides.

Research Highlights

ECOPHYTO Project

*funded by the Blanc
programme - 2008*

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+ © chrisdesign

Research Highlights

MAGBiSY
Project

*funded by the Young
Researchers
programme - 2008*

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Exploration of the quantum properties of graphene

The MAGBiSY project aims to explore the fundamental quantum properties of graphene, a material discovered ten years ago, made up of a monolayer of carbon atoms laid out in a two-dimensional honeycomb pattern and extracted from graphite. It is currently a very serious candidate for the future of electronics, as its uses include the design of very fast nanoelectronic systems, flexible screens and state of the art optoelectronic sensors. The use of very intense magnetic fields is an

excellent method of analysing the electronic properties of graphene and gives access to a very specific quantum Hall effect regime that describe the fundamental quantum properties of the charge carriers. The findings of this original study have established the influence of the pattern on the interwoven layers of graphene. This study opens the way to a field of research hitherto unexplored: a study of the electronic properties of multi-sheets of graphene.

Research reveals the existence of 30% of new genes (non-coding) with regulating properties

Routine analysis of genomes has shown that they are made up of numerous non-coding sequences that can reach 98% in humans. This huge reservoir or "dark matter of the genome" still needs to be described. The development of very high-speed sequencing techniques has revealed that these regions are far from inert and generate a number of non-coding RNAs, some of which play a key role in carcinogenesis. The current issue is to draw up an exhaustive panorama of the RNA families and define their functions in the biology of genomes and the epigenome. The ANR REGULncRNA project aimed to lay the foundations of these analyses

on the model yeast organism *S. cerevisiae*. The work published in 2011 in the journal *Nature* revealed the existence of almost 30% new (non-coding) genes, with the regulatory properties of the epigenome. The sensitivity of the approach, never reached for this organism, strengthens the idea that the hidden "dark matter" of genomes plays a crucial role in gene expression. It prepares the ground for future studies on crown eukaryotes, particularly during differentiation or a cancer.

Research Highlights

REGULncRNA
Project

*funded by the Blanc
programme - 2008*

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Promoting research that meets the major societal challenges

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Fostering research
to address the needs of society

Well-being, health, security and social cohesion

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issues and sustainable energies

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economic development
and competitive industry

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Promoting multi- and
interdisciplinary research
for the major society and global issues



+ Fostering research to address the needs of society

Well-being, health, security and social cohesion

Science and technology have a major impact on societies, transforming means of communication, transport and food and even helping to improve living conditions and increase life expectancy.

The knowledge acquired through scientific research and technology development can have amazing repercussions on human societies, giving rise to new ethical and moral questions, but also provide answers to key philosophical questions like how we can all live together and the meaning of life in society.

The ANR backs research projects aiming to meet essential societal needs such as health care or burning social issues and producing work on the major changes of our time.

Gaining insight into our societies:

examining the various forms of changes in society

“Changing societies” programme

The studies of societies and cultures in transformation fits into a context in which new forms of exchange, interdependence and differentiation of cultures blend with a globalisation of lifestyles and ways of thinking. The ANR invites all Social Sciences and Humanities disciplines to examine changes in society on a political, social, economic, cultural and historic level. It considers issues relating to cultures and cultural phenomena, globalisation and its effects, and the resulting questions of governance, and issues of equal opportunities, social cohesion and living in society.



Promoting sustainable food systems for consumers



“Sustainable food systems” programme

Food systems cover all the activities of production, exchange, processing, distribution and consumption. They are undergoing unprecedented change that concerns all the stakeholders: the agribusiness industry, consumers and public authorities. Consumers seek to satisfy their needs (safety and satiety) and desires (well-being, health, fun) within economic constraints. They want to buy safe, healthy products with good nutritional value, affordable for all, eco-friendly and corresponding to values they uphold. At a time when the public au-

thorities are promoting sustainability throughout the food chain, enabling people to obtain safe products and foster sustainable economic growth of companies, the ANR offers researchers a systemic and multidisciplinary approach to questions relating to food and foodstuffs.

Developing innovative technologies for health and independence of sick and elderly people

“Technologies for health” and “Ambient Assisted Living” (AAL) programmes

The ANR promotes scientific and technical advances in medicine and surgery to make it safer, more precise, less invasive and more effective, and also for people who are dependent because of illness, disability or age, by affording them greater autonomy while ensuring a high level of safety and assistance. Developing technologies for health and independence meets not only a need for quality healthcare and assistance, but also the need to reduce costs, social cohesion and living in society.

Working together to fight neurodegenerative diseases and Alzheimer’s disease

Joint Programming initiative on Neurodegenerative Diseases (JPND)

Neurodegenerative diseases are incapacitating and often chronic. With the ageing population in western societies, they are a major public health issue, because of the disability of the patient, the cost of healthcare and the impact on the families. The available treatments can improve the disease’s manifestations but do not tackle the cause. With the European and Canadian partners, the ANR plays an active role in this joint programming initiative on neurodegenerative diseases (JPND) which aims to shed light on the causes of these diseases to develop tools for early diagnosis and better prevention, as well as new, more targeted treatments.



Bringing to light concrete solutions to matters of global security

“Concepts, systems, and tools for global security” programme

Key elements of modern societies like energy, mobility, information and communication technology and health care all depend on safety. The ANR endeavours to produce innovative solutions relating to global security, defined as the ability to ensure a sufficient level of prevention and protection against risks and threats of all kinds in conditions that will favour development without interrupting life's everyday activities. It concerns protecting citizens and also vital infrastructure and protecting networks and

their interconnection, when faced with risks from terrorism, organised crime or natural disasters. The aim is to produce multidisciplinary scientific excellence on a major issue for our societies.



Research Highlights

MIPROTRAN Project

funded by the ERA-NET NEURON programme - 2008

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A European consortium breaks ground in understanding Alzheimer's disease

The aggregation of a certain number of proteins in the brain is devastating for neurons. It can cause neurodegenerative diseases like Alzheimer's, Parkinson's and Huntington's. A European consortium (CNRS, France, Lund University, Sweden and Tübingen University, Germany) has identified the most toxic protein aggregate species for neurons. It showed that this species spread from one cell to the next after being transported from one end of the neuron to the other. This species grows in receiving cells just like an infectious agent. They have shown that it is possible to interfere with the propagation process of protein aggregates involved in neu-

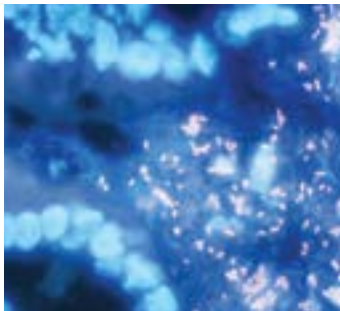
rodegeneration, by changing the surface properties of these aggregates as they pass between the two neurons. By pooling their skills including the study of purified proteins and studying animal models and patients' brains, the European partners were able to identify a new mechanism shedding light on how Alzheimer's disease progresses. These results pave the way for a reasoned conception of new tools that could potentially be used to treat these diseases that represent the second cause of death in human beings by 2040.

Research Highlights

**MICRO-Obes
Project**

*funded by the Large-scale
bacterial genomics
programme - 2007*

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+ © Violaine Rochet, INRA
In situ hybridization of an intestinal
tissue biopsy

Human metagenomics in healthcare:

a study of the role of the human intestinal
microbiota on obesity

In 2007, when metagenomic studies were in their early stages, the MICRO-Obes project was something of a pioneer in studies of human intestinal microbiota. In relation to the International Human Microbiome Consortium, MICRO-Obes succeeded in identifying the metagenomic profiles of obesity and helped place France among the leading countries in the field. The scientific goals of MICRO-Obes were ambitious and the technological challenge was high: to study a little-known partner for our health, intestinal microbiota, with a high-resolution metagenomic approach. A clinical study of groups of patients included in

nutritional studies was undertaken. Metagenomic profiles linked to various stages of obesity were identified, which made it possible to predict responses more or less favourable to dieting. The industrial, political and socio-economic impacts are potentially huge in the pharmaceutical and agribusiness industries and also in setting up public policy on nutrition. On an international level, the project has initiated discussions between France and China aiming to compare the impact of different diets on intestinal microbiota by studying European and Asian populations.

Research Highlights

**RESCUE-IT
Project**

*funded by the CSOSG
programme open to
French-German
collaboration - 2009*

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**A French-German initiative aims
at securing the whole cross-border
supply chain of foods and sensitive
products**

The aim of this French-German collaboration is to address a major societal concern linked to the safety of persons and goods, by securing the whole cross-border supply chain of food and sensitive products. German involvement was therefore essential for this project during which partners from both countries have worked closely. Using an innovative secured logistics platform, German partners have focused on modeling the IT part of the supply chain, while

French partners have focused on supervising goods via the Internet of Things. In this project, goods are tracked using RFID tags. Environmental sensors encrypt and store information, and goods are monitored depending on their classification. Hence, RESCUE-IT has been successful in meeting many challenges: optimizing and securing RFID tags identification, encryption on platforms with limited resources and secured alert notification toward the supply chain management system.



+ Funding research on environmental issues and sustainable energies

Biodiversity, sustainable agriculture, clean energies

Intensive use of natural resources due to the development of human societies leads to the dual planetary challenge of maintaining resources to cope with food and energy requirements, etc. and maintaining environmental, ecosystem and biodiversity services, necessary for the development and safety of human, animal and plant populations. The energy transition interacts closely with the issues of preserving the environment, from a development perspective, which comes from a virtuous circle in which all changes in societies follow the guidelines of reducing emissions of pollutants and greenhouse gases. The ANR promotes innovative research that finds solutions to these major issues for human societies.

Exploring and preserving a rich, complex biodiversity

BIOADAPT programme:
 “Adapting: from genes to populations. Genetics and biology of adapting to stress and disruptions” and the European ERA-NET BIODIVERSA programme

Under fierce pressure from human enterprises such as urbanisation, agriculture, deforestation and fishing, and with the context of significant world demographic growth, our ecosystems, of which man is a part, are changing and their stability is being threatened. To survive these constraints, the various species are having to move or adapt. If not, they

are doomed to disappear, and with them goes part of the world heritage. To gain more insight into these phenomena, scientists study the biodiversity of ecosystems: this involves describing species and discovering new ones, and also understanding the interactions between them. To anticipate changes in the ecosystems, the ANR funds projects on description, evolution and dynamics of biodiversity, and also on the ecological, economic and social impacts of the changes underway, the development of sustainable usage practices, and the preservation of species and their habitats.



+ © Krappweis



+ © OeilDeNuit

Moving towards sustainable, “ecologically intensive” agriculture

Agrobiosphere programme:
 “Viability and adaptation of productive ecosystems, territories and resources to global changes”, BIOADAPT, “Sustainable food systems” and JPI FACCE programmes

The bigger the populations become, the more space is needed for agriculture and breeding, to the detriment of natural habitats. In this race for space, there is much more pressing need to increase production per surface unit. Intensive farming and breeding methods can meet this need, but are severely limited because of climate change, the increasing scarcity of irrigation waters, the rising price of

oil, and the awareness of the human populations of chemical hazards (fertilisers and pesticides). After examining all the possible alternatives for finding the agriculture of the future, research is now moving towards a new concept: “agro-ecology”. This means amplifying the functions of the ecosystems and making them interact to reduce the use of industrial input and eliminate most of the sources of pollution and related hazards. The ANR funds research to develop sophisticated eco-friendly engineering technologies to allow the biosphere to evolve into an ecologically and environmentally viable agrobiosphere that will remain sufficiently productive to meet populations’ needs for food, energy and materials.

Increasing energy efficiency in industry, building and transport and reducing CO2 emissions

Efficient de-carbonised energy systems” programme and “Sustainable electricity production and management” programme

To meet European targets of reducing primary energy consumption and greenhouse gas emissions, the ANR encourages research in the field of energy efficiency of components and systems in industry and construc-

tion. It funds work on developing technologies for capturing and storing CO2, including recovering it as a further means of drastically reducing the emissions of stationary industrial sources. It also aims at the massive development of renewable energies and the integration of innovative systems to optimise electricity management, especially in the building and transport industries.



Promoting the use of biomass as energy

“Biomaterials and energies” programme

Biomass is one of the biggest potentials of all the renewable energies for reducing CO2 emissions into the air. Using biomass for energy requires the economic viability of the industries chosen, which will have to be ensured

by the combined recovery of materials and energies, in particular, by developing applications in plant chemistry (molecules and platforms), in the concept of bio-refineries. Biomass transformation by thermochemistry or biological means would possibly provide biogas and synthetic combustible gases, usable as substitutes for natural gas, in cogeneration facilities,

as well as the development of biofuels that could be used in the transport industry. To meet this ambitious goal, the ANR encourages research aiming at reducing costs and improving productivity and economy in industry, especially by recovering their by-products more efficiently.



+ © dcandea

Research Highlights

RESACOR
Project

*funded by the
Contaminants, Ecosystems
and Health
Programme - 2008*

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The virtues of Miscanthus in biological depollution of contaminated farmland have been proven

This project aimed to establish whether the long-term cultivation of Miscanthus, a high yielding energy plant, could be an alternative to annual crops to decontaminate farmland contaminated by micro-pollutants. Two sites were studied and compared. The results show that Miscanthus induces a change in availability of metals linked to a change in speciation and incorporation of carbon in the soil. Miscanthus has an impact on the

bacteria and invertebrates and its growth depends not on pollution but on water availability. The effects observed vary with the metal examined and the type of soil. Overall, this project provides original data on agro-ecology and the renovation of contaminated soils, which can be a reference in drawing up biological depollution strategies for polluted sites.

Research Highlights

OPTIQUE CO2
Project

*funded by the
CO2 Capture and Storage
programme - 2008*

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+ © ANR project: OPTIQUE CO2

An ANR project develops a system of infrared optic fibres to measure CO2

Geological sequestration of CO₂ is an indispensable means of meeting targets to reduce carbon dioxide emissions by 2050 and avoid major climate change. If it is to contribute effectively to reducing greenhouse gases, it has to be demonstrated that the overall leakage rates in storage zones remain within determined limits. An accurate measurement with an acceptable confidence rate is essential, both to quantify the CO₂ injected and for early detection of a potentially dangerous leak and measure the CO₂ flows from the storage site that reach the surface. The main difficulty in obtaining a precise measurement of the CO₂ injected into a geological formation and any leaks from drill

ing lies in detecting a weak signal at depth and therefore evaluating the detection limit in relation to the background levels, which requires devices that give the best possible signal-to-noise ratio. These measurements are most often taken by infrared devices. This research aimed at developing a specific sensor installed directly in the milieu under observation to detect and quantify the CO₂ leaks non-stop. The project developed a prototype for an optoelectronic sensor, tested, graded and calibrated in the laboratory, opening the way for a technology transfer to CO₂ storage sites. The method was successfully tested in three test campaigns on natural sites.

Research Highlights

EMERGE Project

*funded
by the Bio-energies
programme - 2008*

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+ © Mathieu Dassot, Lerfob

Towards an accountable and sustainable management of wood energy

There is still a lot of uncertainty about the evaluation of the source of forest biomass technically and economically exploitable and usable for energy purposes, despite existing local inventories. This project aimed to estimate the extra volume of wood energy found mainly in the crown (the branches). The idea was to obtain predictions of biomass for energy, compatible with the estimations of volumes of industrial wood and timber. These models are combined with estimations of mineral mass and heating value, to get a better idea of exports of mineral elements and recoverable energy. One of the major results of the project was a huge data

repository, a basis for generic modelling work. This data is developed in volume, biomass and mineral mass models, and the key stage was to work on coherence between the variables. Two inventory technologies were addressed: terrestrial laser to examine the external measurements of the trees in the forest and the tomographic scanner to assess the distribution of internal density of the trees. At national resource scale, this work will consolidate and shed new light on debates about the harvesting of slash and on the carbon footprint. This work will also lead to better steering of strategic harvesting choices.



+ Encouraging R&D that boosts economic development and competitive industry

Scientific and technological progress is key for modernisation and economic growth or for increased productivity. ANR funds research in key economic sectors with high potential for innovation (ecotechnologies and biotechnologies) and fosters the development of key enabling technologies feeding all sectors of the economy (information and communication technologies, nanotechnologies), with a true lever effect on industrial productivity, employment and company competitiveness and contributing to sustainable development in industry.

Promoting ICT to develop the digital economy

Programmes: “Digital contents and interactions”, “Infrastructures for the digital society”, “Digital engineering and security”, and “Digital models”

The information and communication technology (ICT) industry has become a major part of the economy of the main industrialised countries. Beyond the sector itself, ICT is totally enabling and helps to develop all the other economic sectors. In a time of transition marked by huge changes in ICT and the emergence of the digital society, the ANR supports the development of ICT in its numerous

aspects: developing communication, big data and high-power computing infrastructures encompassing cloud computing; supporting methods and software tools for digital service and systems engineering, embedded systems and information systems security; production and exchange of content and knowledge, related services and robotics; and also developing a “digital double” by modelling and simulating the physical world, objects, services and interactions and human behaviours.

+ © Grafixar



Developing technologies for the post-carbon industry

Programmes: “Materials and processes for high-performance products” and “Sustainable chemistry – Industries – Innovation”

Industry has by and large integrated into its innovation and investment strategies the existence of certain constraints (increasing energy costs, CO₂ waste management, REACH regulations, etc.), but this requires considerable investment in R&D to find sustainable solutions. The ANR promotes research on subjects related to sustainable development and advanced manufacturing. It groups together scientists from a variety of horizons working to develop materials

and processes that will lead to higher performance products. Performance here covers energy saving, reductions in raw materials, limit state design and innovative processes leading to more competitive industries. It also promotes research aiming to maintain and develop competitiveness in chemical industries in Europe, for which it invites researchers to think differently and integrate eco-design principles into their synthesising methods, and their approach to improve or define new processes, research into renewable resources. The aim is to get the chemistry and process specialists to take on board the concepts of sustainable chemistry.

Promoting sustainable means of transport

“Sustainable transport and mobility” programme

The transport industry is undergoing fundamental change. It is the biggest employer in France, and is subject to fierce international competition and restricted by very stiff regulations governing CO2 emissions. The French transport industry will remain competitive if it maintains an intensive innovation strategy. The ANR promotes research in the fundamental building blocks required for technological progress in land, air and sea transport systems. The aim is to increase energy efficiency, quality, reliability, fluidity and vehicle and transport system safety. ANR backs work ranging from motorisation systems to transport management systems and optimising logistics. We also explore questions of global optimisation, mobility support and communications between users.



Highlighting the impact of nanotechnology

“Nanotechnologies and nanosystems” programme

Nanotechnology is one of the key enabling technologies that we need to control and have available if we are to maintain and create employment in Europe. They have produced expectations in the development of many industry sectors, and technology integration allowed for the emergence of new application areas.

After more than ten years of research in this field, leading to the emergence of new knowledge and technologies, it is important, while maintaining the basic research work, to put forward the benefits of nanotechnology in applications. In this context, the ANR promotes not only long term research on nanotechnologies opening up new avenues, but also on the use of nanotechnologies for integrated components and microsystems and in network, on multi-physical and mul-

ti-scale simulation in supporting the development of new materials and processes, and applications of nanotechnology in health, energy and the environment.

Research Highlights

SAIPON Project

*funded by the ARPEGE
programme - 2008*

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Industrial research offers a solution to improve the yield of embedded audio systems like mobile phones

Embedded systems for the general public (cell phones, DVD players, GPS) integrate a number of features like high quality audio and video applications, wireless communication services or user-friendly interfaces (touchscreens and touchpads). With the increasing complexity of these nomadic devices, designers are faced with a double challenge: higher integration and increased autonomy. In an industrial research programme, the SAIPON project aims to develop a new system in-package audio technology for nomadic devices to meet increasing

constraints of integration, energy saving, quality and noise level. To overcome the current limitations, partly due to the assembly of elements designed separately, an overall approach to heterogeneous design has been implemented (acoustic, mechanical and electronic). One of the key aspects of the project was integrating a high-performance electroacoustic transducer on a silicon chip.

Research Highlights

CO₂ GREEN Project

*funded by the CP2D
programme in partnership
with the Academy
of Finland - 2008*

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French and Finnish teams work together on CO₂ conversion into staple products for the chemical industry

This fundamental research project focused on the catalytic reduction of CO₂ as a possible way to convert CO₂ into reagents for the chemical industry (e.g. carbon monoxide for the hydroformylation reaction). The energy required for this process can be provided by solar energy (photocatalysis), electrical energy (electrocatalysis) or both (photoelectrocatalysis). To develop such new processes, safer and new low cost molecular catalysts must be developed. The cooperation between the French (complex synthesis, catalytic proprieties) and Finnish (ligand synthesis, molecular modeling) research

teams led to three main results: (i) the development of a combination of two catalysts allowing the hydroformylation of olefins from CO₂ instead of carbon monoxide; (ii) the development of an efficient osmium photocatalyst for the photoreduction of CO₂ with a similar activity and a better stability than the commonly used derivatives of rhenium (rare metal); (iii) the development of a manganese based catalyst (the third most abundant transition metal in the Earth's crust) which allowed the selective and efficient electroreduction of CO₂ with a moderate voltage (hence reasonable energy consumption).



+ Promoting multi- and interdisciplinary research for the major society and global issues

Cross-disciplinary work is vital to develop innovative approaches that will provide effective answers to the major societal and global issues. Some problems, by their nature, their cause or their impact, involve a number of sectors and can only be analysed by completely interdisciplinary methods. The ANR encourages dialogue and helps to break down barriers between disciplines. It encourages research that aim to provide answers and solutions to the major societal issues, by bringing together scientific communities from various horizons to work on research projects.

Inventing tomorrow's sustainable towns and cities

“Sustainable cities and buildings” programme

The global urban population is constantly increasing, and the 21st century is apparently going to be the century of cities and towns, places that drive growth and create wealth, but that also generate social instability and inequality and concentrate environmental pollution. The ANR suggests that researchers look into questions of urban “sustainability”. This means examining the city, a complex and multi-dimensional system, as a scientific research topic in its own right. The research proposed crosses a number of disciplines (habitat, mobility, urban development, governance, risk, infrastructure, biodiversity, etc.), involve a number of practitioners (local authorities, companies) and the scientific community from a wide variety of scientific fields, to produce knowledge, tools, techniques and services that will help towns and cities to better integrate the requirements of sustainable development.



Understanding the social determinants of health

“Social determinants of health” programme

Studies have shown that hierarchical social structures are a reflection of the distribution of most indicators of population health. The ANR is therefore mobilising research communities in social sciences and humanities,

biologists and doctors to find new hypotheses, that can be confirmed or refuted, on the social determinants of health and the mechanisms by which they affect individuals' likelihood of contracting diseases throughout their lives. The aim is to produce specific studies on certain diseases whose development is apparently closely linked to events in individuals' social, fa-

mily or educational background. Possibilities for preventive action could also be indicated. The ANR promotes “integrative” approaches encouraging the fields of public health and social sciences and humanities to join forces with biology, and clinical work based on modelling tools (mathematics and physics).

Strengthening societies' ability to cope with global change

"Facing societal, climate & environmental changes" programme, Belmont Forum calls for proposals

It is essential to take into account environmental changes, climate, biodiversity and air, water and soil quality when studying changes in human activities. These issues go way beyond a local scale and require an understanding of the interactions with regional and global scales. They pose the com-

plex question of how societies adapt to change. As it goes way beyond the capabilities of one single scientific community or nation, it requires a fully interdisciplinary and international approach. The ANR offers an interdisciplinary programme dedicated to integrated approaches in Earth System Science towards sustainable development, interconnecting research on environmental changes and research on the development of human societies, with particular care given to regional and global scales.



+ © boogy man

Reflecting on the future of the Mediterranean

"Cross-disciplinary research on the future of the Mediterranean" programme

The Mediterranean region has seen rapid changes in its history which show capital issues. The demography of the South shores is much higher than that on the northern shores. The national differences are even stronger in economic activity, employment and agricultural and food resources. The coastal zones are under pressure from societies, which creates pollution and fierce competition for space and water resources. A series of problems linking demography, ecology, the economy and culture have been identified and the studies agree that there is a risk of complex crisis. The political awakening in the south and the economic difficulties in the north are

most likely signals of change. In this context, the ANR funds research that is necessarily interdisciplinary aimed at promoting intellectual investment in the Mediterranean without delay.



Developing the concept of innovative societies

“Innovative societies” programme

Innovations concern all fields of scientific life, working life and daily life. To gain better understanding of the methods of dissemination, acceptance or refusal of innovations and contribute to the study of how the new idea is taken on board by individuals, groups and societies, the ANR suggests renewing innovation approaches with a better synergy between the social sciences and humanities and the other sciences.

The researchers are invited to consolidate partnerships between companies, SSH teams and laboratories in various research themes (ICST, nanotechnologies, materials, energy, transport, habitat, environment, agricultural and food production, industrial processes, health, etc.), to examine individual and social behaviours and economic models in technical or social innovations.



Research Highlights

PEPS Project

funded by the Vulnerability, Milieus, Climate and Societies programme - 2008

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+ © ctr

French-Peruvian studies show the impact of climate change on off-shore fishing in Peru

The aim is to study the effects of global change on fishing catches (sardines and anchovies) in the region of the Peru-Chile upwelling, known to be the most productive in the global ocean, to assess the vulnerability of the ocean ecosystem and to produce fishing recommendations for the people concerned in the region of the study. A cascade of digital models at various space and time scales under different climate retrospective and prospective scenarios was implemented, to more fully represent the physical (ocean and atmosphere) biogeochemical and biological mechanisms and links between them as part of a multidisciplinary French and Peruvian approach and a public-

private partnership. The results, which are a first for this typical upwelling system, show that the coastal upwelling and the fishing stock could decrease in the future off the coast of Peru, and that this, coupled with the heating of equatorial waters carried near the coasts, causes an increase in coastal eddying. This leads to waters less rich in nutritional salts rising, causing a serious decrease in the quantity of plankton available for pelagic species to develop. This study gives marine resource managers the opportunity to appreciate the impact of climate variation and change in a social field of obvious importance for the populations in the region concerned.

Research Highlights

**Eval-PDU
Project**

*funded
by the Sustainable Cities
programme - 2008*

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Multidisciplinary research to assess the socio-economic consequences of urban mobility

Mobility is one of the core issues to make cities "sustainable". Transport policies set in place in cities increasingly integrate socio-economic and environmental dimensions. The Urban Displacement Plans (PDU) in France are an essential instrument in urban mobility policies. A cross-disciplinary consortium, in partnership with practitioners and local authorities, has conducted studies to describe the impacts on a number of factors, based on physical models (traffic, consumption, greenhouse gases, air pollutants and noise) and statistical models of the socio-economic consequences (hedonic prices of real estate transactions, satisfaction survey by the residents, etc.). The method was tested on the PDU in Nantes in the west of France, for two reference years

and ten scenarios covering either sensitivity analyses, or alternative PDU or major local actions. The project demonstrated that accessibility by public transport and noise both have net effects on the property market and on the comfort of the residents.

Research Highlights

**ENZHYD
Project**

*funded by the National
plan of action on
hydrogen and fuel cells
programme - 2008*

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A bio-inspired approach leads to the development of a fuel cell without noble metals

This fundamental research project has led to the design of a functional fuel cell using bio-inspired complexes, and without noble metals. Combining interdisciplinary skills (biology, synthetic chemistry, surface chemistry and electro-chemistry), it has developed techniques for grafting innovative compounds. In addition to the field of hydrogen, the project shows that a bio-inspired

process can lead to great scientific breakthroughs. This project is part of a process to reduce costs of fuel cells and find responsible management of the Earth's resources by focusing solely on abundant metals (nickel, iron and cobalt). This process is the key to sustainable technology development.



Developing European and international collaborations

ANR's international policy participates in the internationalisation of research, of its questions and of the major scientific challenges.

Our transnational endeavours aim to increase the excellence, competitiveness, attractiveness, impact and influence of French research throughout the world.

The goal is to join forces and provide concerted answers to global, environmental and social problems, which cannot be dealt with by one single country. They make it easier to pool resources and share the costs of research on the major challenges of knowledge.



The ANR proposes bilateral and multilateral funding instruments that help teams to speed up and strengthen the relationships between French researchers and the best teams from other countries. We play an active part in European and international research policy, make French research more visible on projects by being part of a variety of European and worldwide research bodies, and we develop organised, long-lasting partnerships with our foreign counterparts.

This helps us to support transnational teams of excellence, bring to light research areas “without borders” and foster the construction of integrated projects on strategic subjects, of a common interest, or projects that tackle the major world challenges.



GOALS	AREAS OF FOCUS	MEANS AND INSTRUMENTS
Building the European Research Area	Be a major and active stakeholder in the joint programming initiatives for major societal issues	Participate in JPIs and ERANETs and launch multilateral calls for proposals within those frameworks Calls for French-German proposals
	Take more advantage of the European Research Area instruments	
	Strengthen the French-German alliance in research	
	Develop a Euro-Mediterranean Research Area	
Speeding up and developing partnerships between French researchers and the best foreign teams	Consolidate the partnerships with the major powers in R&D on key topics chosen together	Have international projects compete with national projects: mutual opening of national programmes Bilateral and multilateral calls for proposals
	Form partnerships with the major countries emerging on the world scientific scene on topics of common interest	
	Enhance public-private research internationally	
Bringing to the fore cross-border teams of excellence and research areas without borders	Conduct and share fundamental research with international teams	
Finding a concerted response to major global issues	Promote wide-reaching multilateral initiatives on global issues	Large-scale multilateral calls for proposals such as G8, IGFA/Belmont forum, JPIs
Strengthening the visibility and attractiveness of French research throughout the world	Encourage the ANR and French research to play a bigger part in projects on the global scientific scene	Join and participate in Science Europe, the Global Research Council, the G8-HORCs Co-chair the Belmont Forum
	Make France more attractive to researchers	Specifically targeted instruments like Young Researchers, Return of post-doctoral researchers, Industrial chairs, Chairs of excellence

Co-funding instruments for transnational projects

In all the transnational instruments offered by the ANR, each country funds its own national teams.

■ Specific calls for proposals:

joint calls for proposals in which the text of the call is drafted together, as are the submission, evaluation and selection procedures for the research projects. They are used in certain bilateral and multilateral partnerships as well as in more specific ones:

- ERA-NETs, networks of national funding agencies and research bodies which can launch multi-partner calls for proposals;
- Article 185 indicating that the EU can participate in research and development programmes undertaken by several member States and their transnational calls;
- Joint Programming Initiatives (JPI), cooperation methods between member States aiming to take up societal challenges by jointly implementing research programmes.

■ Opening of national programmes:

bilateral cooperation in which projects are submitted and evaluated in parallel with each agency. The countries then agree on which projects to co-fund.

■ Lead Agency:

a particular method of opening a programme based on mutual transparency and trust, in which a shared project is prepared and submitted to one single agency, which takes charge of peer reviews and evaluating and selecting the projects on behalf of the two countries.

📍 The transnational projects in 2012

940

transnational projects were submitted to the ANR

14%

of all the projects submitted to the ANR are transnational ones

11%

of the projects funded by the ANR are transnational projects

145

transnational projects were co-funded with 34 countries

15%

success rate for the transnational projects

€40.3 M

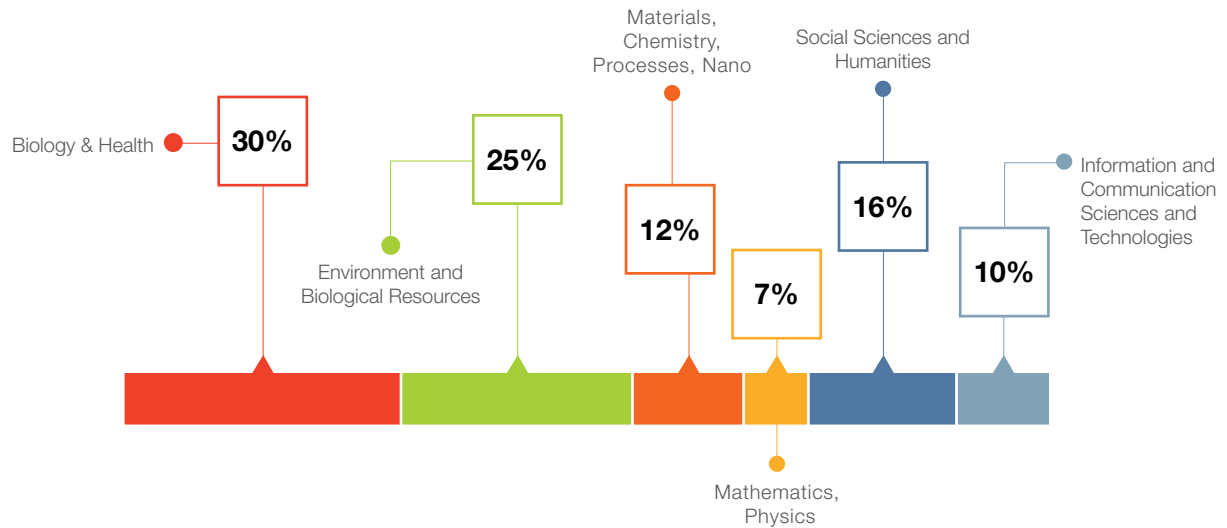
ANR research project budget awarded to transnational projects

7%

of the ANR research project budget was awarded to transnational projects

The ANR's transnational collaborations cover a variety of research fields

Transnational projects co-funded in 2012 by topic



ANR's main collaborations since 2006

	BH	SE	EBR	MCPN	MP	SSH	ICST	CS	TOTAL
Germany	143	19	69	47	-	124	17	11	430
Spain	80	3	61	3	-	-	11	-	158
United Kingdom	44	1	14	7	-	22	15	-	103
Italy	63	-	8	8	-	-	2	-	81
Austria	37	1	6	5	13	-	6	-	68
China	-	-	4	26	4	-	19	-	53
Portugal	26	-	20	2	1	-	-	-	49
Netherlands	26	-	3	5	-	12	-	-	46
Canada	13	1	7	8	-	8	5	-	42
Taiwan	13	-	9	9	-	4	5	-	40
Japan	-	-	9	1	-	10	12	-	32

Materials, Chemistry, Processes, Nano: **MCPN** ●
 Social Sciences and Humanities: **SSH** ●
 Information and Communication Sciences and Technologies: **ICST** ●
 Sustainable Energy: **SE** ●

● **EBR**: Environment and Biological Resources
 ● **MP**: Mathematics, Physics
 ● **BH**: Biology & Health
 ● **CS**: Civil Security

Building the European Research Area: a priority

The ANR takes part in a number of multilateral calls for proposals in the European instruments

Active participation in multilateral European programmes

It is a member of some twenty ERA-NETs, including CHIST-ERA, which it coordinates in information and communication sciences and technologies. In 2012, we took on the coordination of a second ERA-NET on nanomedicine (EuroNanoMed II). We also play an active role in the joint European programming process, and are involved in new JPIs on social issues relating to the environment and health. We took part in the fifth call for proposals of the European association on Ambient Assisted Living (AAL, article 185).

Strong institutional cooperation

As an institution, the ANR cooperates with the European Commission in implementing the 7th R&D framework programme and in discussions on the future framework programme, Horizon 2020. It is a member of Science Europe, an association based in Brussels grouping 51 funding agencies and research bodies from 26 European countries whose aim is to promote the collective interests of its members, support collaborations among them and thus strengthen the European Research Area.

The ANR in the Joint Programming initiatives (JPI) in 2012

JPI ND
on neurodegenerative diseases

JPI FACCE
on agriculture, food safety and climate change

JPI HDHL
promoting a healthy diet for a healthy life

JPI AMR
on anti-microbial resistance

JPI-Climate
for coordinated development of climate knowledge

JPI-Oceans
concerning healthy, productive seas and oceans

Germany, a special partner of the ANR

The ANR is a major stakeholder in the French-German research alliance and promotes projects with German partners in a variety of fields

Fundamental research partnerships with the DFG

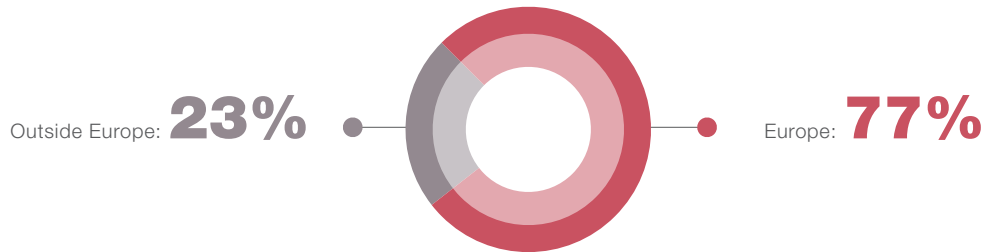
In addition to French and German collaborations implemented through a number of European and international actions, the ANR forms bilateral partnerships with its German counterparts. In 2012 it renewed its partnership in social sciences and humanities with the DFG, the fundamental research funding agency in Germany. We have also furthered our cooperation by launching a bilateral co-funding programme open to all disciplinary fields.

Collaborations with the German research ministry

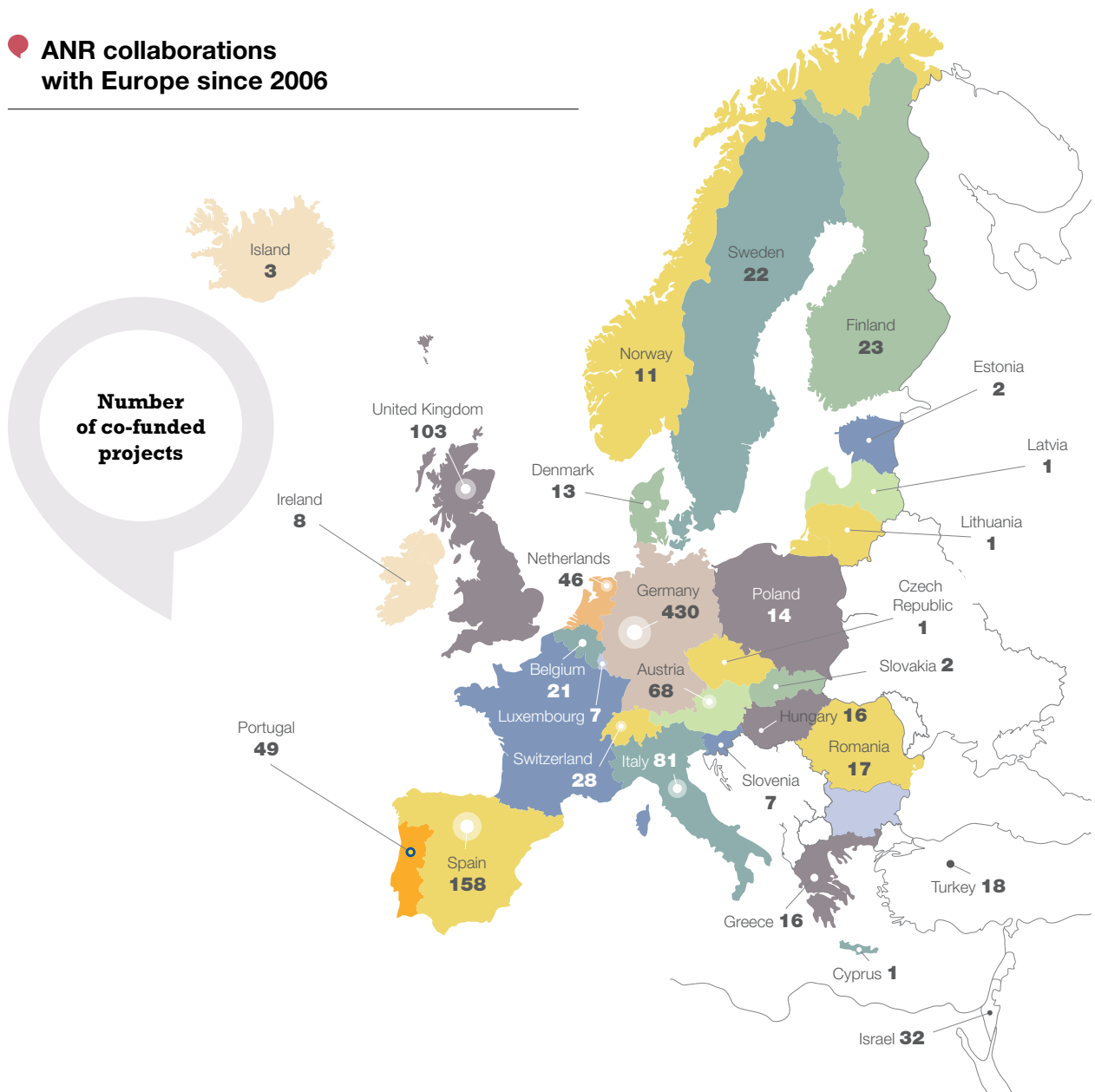
The ANR also cooperates with the German research ministry, BMBF, on strategic topics. A cooperation agreement was signed in 2012, opening the way to a new French-German cooperation in strategic materials. Germany is far and away the ANR's main partner. Forty-eight bilateral or multilateral projects that include German partners were co-funded in 2012, i.e. a third of the transnational projects funded by the agency.

The ANR naturally looks to Europe

Transnational projects co-funded in 2012



ANR collaborations with Europe since 2006



Targeted collaborations with the major R&D stakeholders worldwide

The ANR forms solid, lasting partnerships with major players in world research

Targeted bilateral collaborations

We offer opportunities for bilateral collaborations with researchers from North America and Canada (NSERC), the US (NSF), and Mexico (CONACYT) – in targeted fields of research. In a productive French-Japanese cooperation, the ANR and the Japanese funding agency, JST, have organised their first follow-up symposium in Kobe for research projects on Information and Communication Sciences and Technologies and their uses.

Large-scale multilateral collaborations

At multilateral level, the ANR took part in the third call for proposals launched by the G8 research pilot initiative (G8-HORCs), which finances interdisciplinary research concerning major global issues. This call was launched in collaboration with the Belmont Forum, that the ANR has co-chaired since 2012. The Belmont Forum is the main group of funding agencies for world research that wish to coordinate their work on environ-

mental change. The joint G8-Belmont Forum call is the first in a multi-annual programming of calls for proposals. The 2013 initiative focused on freshwater security and coastal vulnerability. In the Bonn group, of which the ANR is a founding member, we took part in the third call for proposals in the ORA initiative, an open research area in social sciences to promote shared projects with German, UK, French and Dutch teams.



The first ANR-NSFC French-Chinese symposium was organised in Paris in 2012

Strategic, lasting partnerships with emerging scientific powers

The ANR forms partnerships with countries that have an intensive strategy for increasing their contribution to world research

Asia

Mainland China is the ANR's main non-European partner. The ANR and its Chinese counterpart, the NSFC, launched their fifth consecutive call for proposals in 2012. To celebrate the success of this partnership, they held their first French-Chinese symposium in Paris, highlighting the findings of projects co-funded since 2008. They also renewed their cooperation on the topics of infectious diseases and

green Information and Communication Sciences and Technologies. The bilateral French and Taiwanese funding programme, in collaboration with the NSC (National Science Council of Taiwan), was also renewed in 2012. The ANR has also launched a first call for proposals with Hong Kong, and signed a first cooperation agreement with India on infectious diseases and engineering sciences.

Brazil

The ANR has extended its partnership with Brazil, in particular with the government foundations of Sao Paulo (FAPESP) and Pernambuco (FACEPE), adding a new path for collaboration in microbiology, immunology and infectiology.

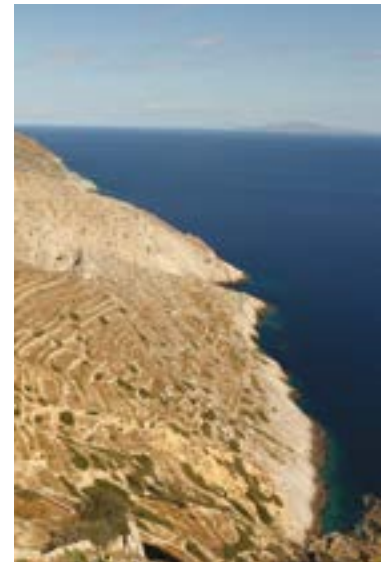
A research strategy for the Mediterranean

The ANR international foresight workshops on the future of the Mediterranean led to the co-construction of common research priorities with southern countries. Following the French policy of commitment in the region, we are considering the requests for scientific partnerships in Mediterranean countries.

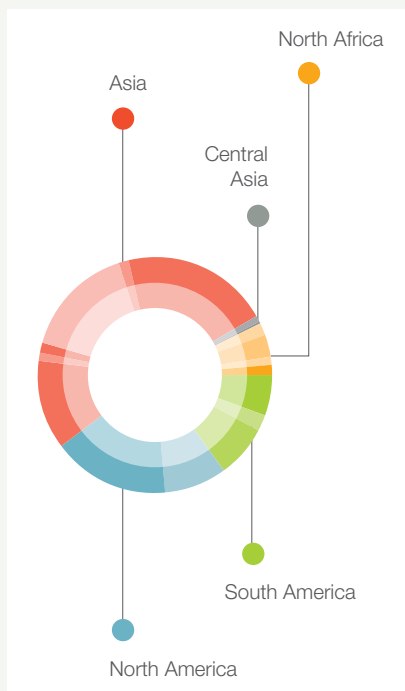
The ANR takes an active part in national and European discussions on multidisciplinary research topics in the Mediterranean area. Together with our Mediterranean and European partners, we are committing to building a Euro-Mediterranean research area, and in 2012 took part in the first call

for proposals of ERA-NET ARIMNET on urgent questions of agricultural research in the Mediterranean area. The funded projects bring together researchers from the North and South and are funded by their respective countries.

The ANR has also been an active player of the construction of a multi-disciplinary programme in the Mediterranean (ERANETMED) and has participated in discussions on preparing an article 185 linking southern countries in research for the Mediterranean.



Transnational projects co-funded by the ANR outside Europe (2006-2012)



Outside Europe, over half the ANR collaborations are with Asian countries

53	China	19	Mexico
4	Hong Kong	6	Chile
40	Taiwan	14	Brazil
4	Singapore	4	Algeria
3	South Korea	3	Egypt
32	Japan	8	Morocco
42	Canada	4	Tunisia
22	USA	1	Russia
		2	India

Key dates in 2012

7 March

Signature of a first cooperation agreement with **India** (DST)

21 March

The first call for proposals with **Hong-Kong** (RGC) closes

14-15 May

Participation in the **Global Research Council**, a group of heads of funding agencies and research bodies dedicated to addressing matters of major scientific policy worldwide

1 April

Co-chair of the **Belmont Forum**, the main group of funding agencies for world research on environmental change

1 June

Joining the governing board of the **Joint Programming Initiative** aiming to implement a European Research Area in food, nutrition and health (JPI HDHL)

29 August

Joining the governing board of the European **Joint Programming Initiative** on the question of anti-microbial resistance (JPI AMR)

19-20 September

First follow-up symposium for the **French-Chinese projects** in Paris

1 November

Coordination of the **ERA-NET EuroNanoMed 2**, consortium funded by the European Commission bringing together 20 partners from 17 countries and regions in Europe on the topic of nanomedicine

ANR bilateral partnerships in 2012

COUNTRY	PARTNER ORGANISATION	THEMES
GERMANY	DFG - Deutsche Forschungsgemeinschaft	Social sciences and humanities
AUSTRIA	FWF - Fonds zur Förderung der wissenschaftlichen Forschung	Mathematics; Physics
NORWAY	RCN - Research Council of Norway	Materials; Nanotechnologies
PORTUGAL	FCT - Fundação para a Ciência e a Tecnologia	Biology health; Ecosystems and environment
ROMANIA	ANCS - Autoritatea Nationala pentru Cercetare Stiintifica	Chemistry; Mathematics; Physics
BRAZIL	FAPESP - Fundação de Amparo à Pesquisa do Estado de São Paulo FACEPE - Fundação de Amparo à Ciência e Tecnologia de Pernambuco	Global environmental change, Earth science; Microbiology, immunology, infectiology
MEXICO	CONACYT - Consejo Nacional de Ciencia y Tecnología	Biology, health, biotechnologies; Environment and natural hazards; Information and communication sciences and technologies; Energy
CANADA	NSERC - Natural Sciences and Engineering Research Council	Information and communication sciences and technologies; Natural resources and energy; Natural sciences and environmental technologies; Engineering and manufacturing
USA	NSF - National Science Foundation	Chemistry; Materials
	CIRM - California Institute for Regenerative Medicine	Fundamental research on stem cells
CHINA	NSFC - National Natural Science Foundation of China	Information and communication technologies; Green and sustainable chemistry
HONG KONG	RGC - Research Grants Council	Chemistry; Sustainable energy and environment; Social sciences and humanities; Information and communication technologies
TAIWAN	NSC - National Science Council	Social sciences and humanities; Environment; Energy; Information and communication technologies; Nanosciences and nanotechnologies; Biology health, biotechnologies, technologies for health; Agriculture, genomics

Research Highlights

Focus on the French-German collaboration on social sciences and humanities

The ANR-DFG French-German Social Sciences and Humanities programme is now firmly established as a reference in collaborative research between the two countries. It has made a significant contribution to building the European Research Area in

Social Sciences and Humanities, together with and in complement to the installation of the multilateral ORA programme in social sciences, which it preceded by 3 years. Its recurring nature and the large number of communities concerned have given it excellent

visibility, and its track record is completely satisfactory thanks to its scientific results and enhancement efforts of the researchers who benefit.

Research Highlights

EARLY PETRA Project

funded by the ANR-DFG programme in SSH - 2008

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stephan.g.schmid@culture.hu-berlin.de



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Study of the origins and the first traces of human occupation in an Arab kingdom

This French-German cooperation is a study of the first traces of human occupation on the site of Petra, in Jordan. Two teams with long experience of the site work together and combine their skills in landscape geomorphology, ceramic assembly, architectural ruins and the study of written and epigraphic sources. The project financed by the ANR and DFG produced significant results and opens useful perspectives for the site and the cultures that made it. The archaeological survey confirmed the written sources for the first time, which now dates the site occupation way back in the 4th century BC (between the fourth and the second), and not between the 2nd and 1st century BC, as had been supposed until now. The oldest parts of the site have been clearly placed in the timeline by the material culture and archaeometry. The ceramic assembly of the oldest phase

has also been described for the first time. The funerary traditions have been traced to their Arab relations, which confirms new perspectives in the study of the origins of Nabataean populations. Finally, the clan, tribal and family structure of the Nabataean settlement in and around Petra has been established (funerary archaeology and epigraphy). This joint funded field research effort was a great opportunity for both countries to build synergies by sharing resources on common archaeological work.

Research Highlights

Arttransform Project

funded by the ANR-DFG
programme in SSH - 2008

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This study investigates artistic training conditions in the 19th century, as seen through the experiences of German painters who came to study in Paris between 1793 and 1843. The study of the training ex-

Study of the artistic training conditions in the 19th century, through the experiences of German painters in Paris

periences of these artists helps to underline the importance of shared experience and to question the basic categories, and particularly the national categories, on which scientific discourse and the great stories in art history are all too often based. The project worked on unpublished archives in France and Germany, as well as in Switzerland and the United States, to identify 160 German painters who studied in Paris in the private studios of great masters (David, Gros, Cogniet, Delaroche) or other lesser-known ones. From their correspondence, journals and drawings, the researchers had to find the reasons for their choice and trace their actual experiences. The material and practical conditions of their time in Paris, and their consequences (educational reforms, transfer of techniques, naturalisation, talk of the critique, rejection and negation of French art, etc.) were also studied through their correspondence with French administrative bodies, ministerial reports or institutional

documents. A database designed during the project lists the artists, where they lived, the company they kept, the works they produced and the lessons they attended. In addition to offering statistical and quantitative analyses, this database represents a sort of “Facebook” of social media in the art world of that time. More than just art history and cultural transfer, the project provides a valuable contribution to 19th century social and material history and offers a wealth of resources for social and historic geography. The data has been put into perspective in the “Dictionnaire biographique des peintres allemands formés à Paris entre 1793 et 1843” (Biographical Dictionary of German Painters Taught in Paris between 1793 and 1843), which highlights the transnational nature of the practices and customs of art. A collective work on the history of private studios rounds off the enterprise.

Research Highlights

NanoPhotoNit Project funded by the ANR-NSC “Blanc” programme - 2008

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Optoelectronic devices are currently moving into smaller and smaller objects to increase the integration density and reduce energy consumption. The nanowire components, and particularly the group-III-nitride nanowires (GaN, AlN, InN, their ternary alloys and their heterostructures) show great promise for developing a new branch of optoelectronics (ultrasensitive detectors and nanoscale photon sources). This project developed the first

A collaboration between France and Taiwan leads to nanoscale UV photodetectors

UV nanodetectors in nanowires. The studies were extended to include the manufacture of GaN nanowire detector matrices which respond much better in near UV than detectors using thin layers of nitride. This work could result in the production of ultrasensitive nano-pixel matrices for near field imaging applications (Medical, Telecom, etc.). The Nanophotonit project also established a successful collaboration between the Institut d’Electronique Fondamentale in France and the partners in Taiwan (NSYS and Academia Sinica).

Research Highlights

FRAGENOMIC Project

*funded by the Plant KBBE
programme - 2008*

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+ © Béatrice Denoyes
Variability in shape, colour, of fruits produced by the segregating population issued from the cross between Capitola and CF1116 (Lerceteau-Köhler et al. 2012)

French, German and Spanish teams collaborate towards improving the nutritional quality of strawberry fruit

Strawberry fruits are a rich source of phytochemicals of which phenolic compounds predominate. Studies have shown that these phytochemicals have potent antioxidant, anticancer, anti-atherosclerotic and anti-neurodegenerative properties. The main aim of the project is to know more about genetic control of healthy nutritional benefits for optimizing breeding programmes and for producing fruits rich in healthy compounds for consumers. The six partners in this trilateral consortium brought the complementary expertise and diverse plant materials that were ideal to boost breeding programmes already launched by both the academic and private partners. Plant populations from Spain and France with different genetic backgrounds were separated by a French and a Spanish company (PLANASA and CIREF). They were genotyped and genetic linkage maps were constructed. Two research groups from the Universidad de Córdoba and Universidad de Málaga working together in functional genomics in relation to the strawberry fruit growth and ripening process developed tools and conducted transcriptomic profiling analyses. The IRTA (Centre de Recerca en Agrigenomica, Barcelona) contributed to the genotyping and produced a linkage map that proved a necessary resource for analysing the genetic makeup of quantitative characters of the strawberries and of the nutritional qualities. The team from the Technical University München analysed data at the metabolome level and provided expertise in functional analyses of

some candidate genes. The French INRA groups provided expertise in linkage mapping and genetic analyses of the complex octoploid genomes of the cultivated strawberry. CIREF (France) and PLANASA (Spain) are two European companies with a long history of breeding strawberry for fruit quality and disease resistance. The possibility of having additional molecular tools to be used in their breeding programmes constitutes a new powerful tool that will benefit these companies. Marker assisted selection will allow these breeders to analyse the individual selections coming directly from the crossing programme quickly, more efficiently and at an early stage in the breeding process. With this applied objective, the project allowed interaction between scientists and breeders and will help reduce the gap between these two communities.



Intensifying partnerships between academia and industry

One of the ANR's tasks is to promote and finance innovation and technology transfer by forming long-term partnerships between the public and private sectors. To meet this challenge, ANR has put in place - in addition to its targeted and bottom-up collaborative calls for proposals - specific instruments and activities.

In 2012, of the 3000 scientists who met in various ANR committees, some 20% came from the private sector.

Similarly, the numerous symposia and seminars contribute to strengthening discussions and open up French research.

Project funding in public-private partnerships

This is one of the most important methods for making an impact. These projects account for over a third of the grants awarded by the ANR. They are co-constructed and led by partners from public research and companies and include stakeholders from all sectors, which shows that this tool meets the requirements of both spheres.

The ANR carries out financial analyses to validate the capacity of the beneficiaries to finance their participation in the projects. These analyses confirm the capacity of the ANR to accompany the companies in their R&D projects whatever the level of their revenues.

+ © sans5



Emergence of technologies or services with high value creation potential

The main objective of this programme is to promote the enhancing of the results of public research by financing “proof of academic concept” in laboratories, in order to achieve the effective creation of value from the work at the end of its financing. Emergence thus supports developments (products, technologies, services, systems, processes, etc.) and complementary studies that aim at consolidating proof of concept and the protection of intellectual and industrial property. These consolidations are

vital to facilitate the creation of value from the discoveries and inventions resulting from research, by enabling them to lead to innovations that are brought to market through transfer to an industrial partner, or by the creation of an enterprise at a stage that is attractive for investors. This programme, which was initially limited to the domains of biotechnologies and health technologies, has been open since 2010 to all scientific disciplines.

+

In 2012, the ANR funded 262 public-private partnership projects on all the scientific topics covered

Industrial chairs

The programme aims at accompanying research projects jointly led by public research institutions and enterprises. It encourages the integration of eminent French (expatriated or not) or foreign professors into higher education and research institutions, or research organisations, and reinforcing the best initiatives developed in French higher education and research. The programme implies esta-

blishing a strong and lasting partnership between the research institution and enterprises in a high priority and strategic area for the parties concerned. The aim is to provide more effective support to industrial research in all areas. The industrial chairs' objective is firstly to perform fundamental and applied research, and secondly to ensure training through high-level research.

This programme works for the co-construction of research projects, with the financial costs being shared between the public (via the ANR) and private stakeholders.

Carnot Institutes

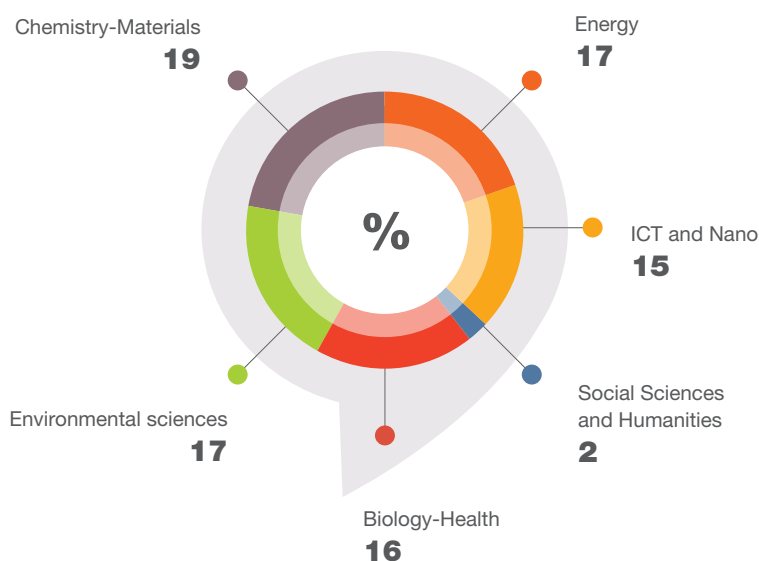
Since 2006, the Ministry of Higher Education and Research has awarded the Carnot label to public institutes (the Carnot Institutes) that undertake to place partnership research at the centre of their research strategy. The Carnot Institutes encourage closer relations between public research entities and the industrial world, with the notable aim of achieving smoother and faster transitions from research to innovation and the transfer of technologies.

The ANR has managed the programme on behalf of the Ministry of Research since it was launched in 2006. Three calls for candidacies were open in 2006, 2007 and 2011. The ANR also monitors the labelled Carnot institutes. To accompany and support the bringing together of institutes and actors of the private sector, the ANR pays the Carnot institutes an annual additional sum calculated according to the partnership revenues.

For 2012, a total budget of €60 M was awarded to the Carnot programme and allocated to all the 34 institutes that received the label in 2011.



Distribution of themes in the 34 Carnot Institutes



Key Carnot figures for 2011

34

Multidisciplinary institutes

27,000

Research staff numbers

2,300

Annual budget (€M)

356

Annual contractual revenues (€M)

The Inter Carnot-Fraunhofer Programme (PICF): An instrument for French-German collaboration

Since it was launched in 2008, the PICF programme has aimed to strengthen ties between the Carnot Institutes and the German Fraunhofer Institutes. The aim of the three calls for proposals launched in 2009, 2010 and 2011 was to develop partnership projects that would establish lasting alliances between French and German institutes. PICF is a programme co-funded by the BMBF and the ANR, which awarded over €8.7 M to back the French partners of the 26 projects selected.

Key figures for Competitiveness Clusters 2012

Cluster projects funded

250

Partners

1,076

Funding (€M)

160.5

of which

28.4

to companies (57% to SMEs)

Complements (bonuses for clusters) (€M)

3

Labels delivered

1,588

Projects labelled (by at least one cluster)

1,218

Success rate of the cluster projects

20.5%

"Average" cluster project (€k)

643

4.3 partners

Competitiveness clusters

A competitiveness cluster brings together companies, research laboratories and higher education institutes in a given geographical location. These entities have committed themselves to a partnership approach that is intended to create synergies around innovative joint projects.

The ANR and the clusters help each other: if selected by the evaluation panels, the ANR finances scientific projects the clusters have already labelled, while the clusters and their ecosystems increase the impact of the ANR projects selected particularly relating to valorisation, technology transfer and entrepreneurship.

The ANR and the competitiveness clusters have three shared objectives: to reinforce the links between the public and private research players, to create value from the research, and to build scientific communities that gain national and international recognition. Since 2005 the ANR has implemented an incentive policy for competitiveness clusters through the recognition of the cluster label in the project selection process and the bonuses in aids to labelled projects.

Preparing a new programme to build public partnerships with SMEs and intermediate-sized enterprises:

LabCom

The programme for support in creating common laboratories between public research organisations and small, medium and intermediate-sized companies (LabCom) aims to develop the potential for partners in industry and for knowledge transfer already in place in academic research, especially for those whose core positioning is a non-partner based research activity. One important issue is to help these

stakeholders establish bilateral partnerships with businesses, and particularly with small, medium and intermediate-sized companies. For this programme open to submission on a continuous-flow basis starting early in 2013, the ANR has set up a system that ensures rapid decision-making and funding arrangements.



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Research Highlights

VEGAZ Project

*funded by the Bioenergies
programme - 2008*

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An industrial project on biomass gasification for environmental issues and competitiveness

The development of renewable energy is a major topic all over the world, in response to various environmental, geopolitical and economic issues. Biomass gasification is a promising way to make renewable energy. This project groups together major public and private stakeholders and is part of an industrial project on biomass gasification and the resulting energy recovery. It aims to analyse the place of the biomethane/heat pathway (bioSNG, a green substitute natural gas) from a technical, economic and environmental point of view compared to other industries, identify the most promising technologies and what R&D is still needed to draw a road map to its application in industry.

The digital studies confirm excellent value of converting biomass to BioSNG (minimum of 45% energy yield), with the possibility of recovering the surplus heat (5 to 7% further gain in yield). A study of the lifecycle of Biomethane 2G confirms the very low environmental impact of this industry. Economically, the production cost of biomethane 2G should be significantly lower than that of biodiesel.

Research Highlights

SIMILAR-CITIES
Project

*funded by the Digital
content and interactions
programme - 2008*

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Source images*

**Enhancing the visual appearance
of virtual cities**

Virtual urban environments are of particular interest for applications in education, transportation, urban planning and tourism. Unfortunately, virtual exploration of cities is currently impaired by the impossibility to capture and store the many images representing surfaces at such a large scale. Apart from some particularly remarkable places and buildings, most of the buildings in a virtual city look very much alike. The technologies developed in this

project aim to greatly enhance the visual quality of virtual cities used in many different applications. This project examines methods that could quickly adapt or synthesise an image of one building to another, thereby constructing new similar, plausible environments by example. The technique consists in analysing an example image and then, by formulating an optimisation problem, constructing new images adapted to a different-sized medium or following constraints determined by the user (a door, the position of a window, etc.). One of the main spin-offs of the project is an industrial application currently underway with the company Algorhythmic, through a technology transfer contract.

+ The SIMILAR-CITIES project uses procedural textures, which are much smaller, to enhance the visual appearance of virtual cities, thereby making them quicker to create.

(*Images from Ecole Centrale Paris Facades Database)

Research Highlights

MABCA
Project

*funded by the
Land transport
programme - 2008*

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+ © Renault Trucks

**A public-private consortium develops
innovative design tools to reduce noise
pollution in vehicles**

On the theme of quality of vehicles and reducing their noise pollution, this project's original approach has provided us with new knowledge on noise generated by powertrains (gear boxes in light vehicles and timing gear system in heavy vehicles) and developed innovative design tools to reduce noise pollution. It reveals the good balance between the analysis of scientific problems (nonlinear acoustic modelling) and their application in industry by the partner Renault Trucks, a French

utility and industrial vehicle manufacturer. Vibratec, the company coordinating the project, ensures efficient knowledge transfer between the academic world and the industrial world.



Appendices

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Transnational calls
for proposals in 2012

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Calls for proposals
in 2012

Transnational calls for proposals in 2012

CALLS FOR PROPOSALS	Proposals submitted to ANR	Projects funded	Projects co-funded by ANR	ANR funding (€M)
MULTILATERAL JOINT CALLS FOR PROPOSALS IN THE CONTEXT OF EUROPEAN INITIATIVES				
AAL 185 - Ambient Assisted Living	42	29	7	3.6
ERA-NET E-RARE 2 - Rare diseases	56	11	7	2
JPND - JPI on Neurodegenerative diseases	10	4	4	1.1
ERA-NET NEURON - Neurosciences	110	11	8	2.5
ERA-NET BIODIVERSA 2 - Biodiversity	32	9	6	1.7
ERA-NET SEAS-ERA - Marine research	12	5	5	1.4
ERA-NET ECO-INNOVERA - Ecoinnovation	10	6	3	0.8
ERA-NET ARIMNET - Agricultural research in the Mediterranean	50	10	9	1.6
ERA-NET ICT-AGRI - ICT in agriculture	28	-	3	0.7
ERA-NET CHIST-ERA - Long-term challenges in ICT	40	10	9	2.8
MULTILATERAL JOINT CALLS FOR PROPOSALS				
ORA "Open Research Area" in social sciences (Germany, DFG / France, ANR / Netherlands, NWO / United Kingdom, ESRC)	51	9	5	1
BILATERAL JOINT CALLS FOR PROPOSALS				
French-German ANR-DFG call in social sciences and humanities	63	-	16	3.5
French-Californian call on stem cells (CIRM)	14	-	1	0.4
OPENING OF NATIONAL PROGRAMMES				
International section of the Blanc programme				
Austria (FWF)	40	-	8	1.9
Brazil (FAPESP-FACEPE)	17	-	4	1.3
Canada (NSERC)	24	-	2	0.7
China (NSFC)	55	-	8	1.7
Hong Kong (NRF)	23	-	4	1
Mexico (CONACYT)	33	-	4	1.1
Portugal (FCT)	91	-	14	4.1
Romania (ANCS)	60	-	8	2.2
Taiwan (NSC)	39	-	6	1.5
USA (NSF)	31	-	2	0.7
Other programmes				
Programme "Technologies for health and autonomy" with Taiwan (NSC)	1	-	1	0.7
Programme "Facing societal, climate and environmental changes" with Brazil (FAPESP-FACEPE)	3	-	1	0.3
Programme "Materials and processes for high performance products" with Norway (RCN)	0	-	0	0
Programme "Nanotechnologies and Nanosystems" with Norway (RCN)	5	-	0	0

Calls for proposals in 2012

CALLS FOR PROPOSALS	Proposals submitted*	Projects funded	Success rate	Total ANR funding (€M)**	Average funding per project (€k)
1/ EXPLORATORY AND EMERGING RESEARCH (BOTTOM-UP PROGRAMMES)					
Blanc	2595	455	18%	183	403
Blanc International	413	60	16%	16.2	270
Young researchers	1033	196	19%	41.2	210
Post-doctoral return	182	38	21%	14.5	382
Chairs of excellence	67	12	18%	6.2	517
French-German call for proposals in social sciences and humanities	63	16	25%	3.5	219
Multilateral call "Open Research Area for the social sciences in Europe" - ORA	51	5	10%	1	200
2/ BIOLOGY AND HEALTH					
ERA-NET NEURON II: Neurosciences	110	8	7%	2.5	313
ERA-NET E-RARE 2: Rare diseases	56	7	13%	2	286
Joint Programming Initiative on Neurodegenerative diseases (JPND)	10	4	40%	1.1	250
Ambient Assisted Living transnational programme - AAL 185	42	7	17%	3.6	515
Bilateral call with California on stem cells - CIRM	14	1	7%	0.4	400
Biomedical innovation in public-private research partnership	92	16	17%	14	875
Technologies for health and autonomy	87	20	23%	15.5	775
Social determinants of health	19	6	32%	3.2	533
Mental health and addictions	78	16	21%	8	493
Alzheimer's disease	49	7	14%	3.6	517
3/ ENVIRONMENT AND BIOLOGICAL RESOURCES					
Viability and adaptation of productive ecosystems, territories and resources to global changes - AGROBIOSPHERE	40	9	23%	6.6	736
Adapting: from genes to populations. Genetics and biology of adapting to stress and disruptions - BIOADAPT	93	22	24%	10.6	482
Facing Societal, Climate and Environmental Changes	34	9	27%	5.3	590
Cross-disciplinary research on the future of the Mediterranean	19	6	32%	3.4	570
Sustainable food systems	31	6	19%	4.8	798
ERA-NET ECO-INNOVERA - Ecoinnovation	10	3	30%	0.8	262
ERA-NET SEAS-ERA - Marine research	12	5	41%	1.4	281
ERA-NET ARIMNET - Agricultural research in the Mediterranean	50	9	18%	1.6	180
ERA-NET ICT-AGRI - ICT in agriculture	28	3	9%	0.7	200
ERA-NET BIODIVERSA 2 - Biodiversity	32	6	19%	1.7	290

CALLS FOR PROPOSALS	Proposals submitted*	Projects funded	Success rate	Total ANR funding (€M)**	Average funding per project (€k)
4/ SUSTAINABLE ENERGY					
Sustainable electricity production and management	69	16	23%	12.4	775
Biomaterials and energies	38	9	24%	7.1	785
Efficient de-carbonised energy systems	44	10	23%	8	803
Sustainable transport and mobility	40	10	25%	10.1	1010
Sustainable buildings and cities	58	12	21%	9.3	752
5/ INFORMATION AND COMMUNICATION SCIENCES AND TECHNOLOGIES					
Digital engineering and security	52	14	27%	11.8	835
Digital contents and interactions	135	31	23%	20.4	658
Digital models	92	22	24%	15.4	695
ERA-NET CHIST-ERA - Long-term challenges in ICT	40	9	23%	2.8	313
6/ SOCIAL SCIENCES AND HUMANITIES					
CORPUS, data and tools for research in social sciences	118	18	15%	4.9	272
Changing societies: "Emergence and evolution of cultures and cultural phenomena"	43	8	19%	2.3	287
Changing societies: "Inequality – Inequalities"	42	7	17%	1.6	229
Changing societies: "Globalisation and governance"	32	5	16%	1.4	288
Innovative societies - Innovation, economy, living	29	6	2%	1.7	283
7/ ENGINEERING, PROCESSES AND SECURITY					
Materials and processes for high performance products	96	20	21%	18	895
Sustainable chemistry - Industries - Innovation	47	12	26%	9	753
Specific support for research works and innovation defense - ASTRID	175	41	23%	11.5	281
Nanotechnologies and nanosystems	83	19	23%	16.5	878
Concepts, systems and tools for global security - CSOSG	44	12	27%	9	753
8/ PARTNERSHIPS AND COMPETITIVENESS					
Emergence of technologies and services with high value creation potential	251	56	22%	14.2	248
Industrial chairs	11	5	55%	5.4	1073

* For transnational programmes, only projects including French participants are taken into account

** For transnational programmes, only ANR funding is taken into account

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