

NEW INDUSTRIAL FRANCE

Building France's
industrial future

#NFI

[www.economie.gouv.fr/
nouvelle-france-industrielle](http://www.economie.gouv.fr/nouvelle-france-industrielle)



NEW INDUSTRIAL FRANCE

**Building France's
industrial future**

#NFI

**[www.economie.gouv.fr/
nouvelle-france-industrielle](http://www.economie.gouv.fr/nouvelle-france-industrielle)**

EDITORIAL

France's industry has suffered through a long period of crisis. In June 2012, when facing with an ever-increasing number of layoffs, the French government decided to put an end to the country's drastic loss of competitiveness. To ensure France's place in a globalised world, our industry had to be strengthened. Major decisions were made. One of my first actions, in keeping with my commitments as a candidate, was the creation of the Public Investment Bank, Bpifrance, followed by the introduction of the Competitiveness and Employment Tax Credit and, in January 2014, the Responsibility Pact. Today, manufacturers' margins have improved and the cost of labour in France has fallen, with no wage decreases for employees.

However, the competitiveness battle will not be won on the basis of cost alone. Our goal is to be an innovation leader and to push the technological frontier to create the products and the uses of tomorrow. Our aim is to seize the opportunities created by the industrial revolution that is sweeping through our economies.

This calls for an unprecedented effort in terms of research and investment. The government maintained the research tax credit and introduced the higher depreciation allowance on industrial investments, a one-time tax incentive to support investment. This last measure was in addition to the €2bn in loans made available by Bpifrance to companies investing in Industry of the Future projects.

We also need to rally the country's manufacturers around a genuine industrial policy. A return to the grandiose plans of the 1960s and 70s is out of the question, as is waiting around for initiatives to happen by themselves. What is required is that the government set priorities and make financing available, allowing businesses to define their own strategy.

With this in mind, the New Industrial France initiative was launched in September 2013. Subsequently, in April of 2014, I announced the creation of the Industry of the Future Alliance, a grouping that involved manufacturers, universities, research centres and France's regions.

Support was given to a thousand projects. Critical progress is being made on new processes, such as additive manufacturing. The E-Fan electric aircraft, driverless cars, the Connected Objects Centre (Cité de l'Objet Connecté) in Angers – the Alliance is helping to spread these innovations throughout France's industrial fabric. It has provided modernisation support to 1,500 SMEs. It has also launched international cooperative efforts – particularly with Germany – and it is enhancing the international reputation of France's creative industries via Business France.

Finally, at a time when there is an increasingly pressing need for creative solutions, when entrepreneurs and employees alike must keep moving forward to cope with a rising tide of technological progress, the Alliance has set itself the goal of supporting changes in the working world.

Over the past year, France's industrial production has been on the rise. There is robust investment in industry. Our goal now must be to expand this trend and to build the industry of tomorrow – and sustainable growth along with it.

François Hollande
President of France

EDITORIAL

French industry is at a critical turning-point – the digital revolution and new manufacturing technologies represent a golden opportunity for French companies to modernise, innovate and manufacture in France.

To help this become a reality, starting in 2013 President Hollande launched the New Industrial France initiative in order to assist French companies move upmarket and position themselves in the markets of the future. The government defined nine key priorities, the goal of which was to provide tangible responses to the major economic and social issues. They are meant to provide solutions to challenges in areas such as the medicine of the future, eco-mobility, new resources, sustainable cities, transport of tomorrow, the data economy, smart objects, digital trust and smart food production. In April 2015, we supplemented this initiative with the Alliance for the Industry of the Future, which focuses on the modernisation of France's production tools.

The digital revolution offers a wealth of opportunities. It is critical that we support all of our businesses – particularly small and mid-sized industrial firms – as they make the transition. We have provided nearly €2 billion in public support to one thousand innovative projects. The involvement of the public authorities and private-sector industry has put France at the forefront of technological revolutions in mobility, the energy transition, new resources and the medicine of the future. These help France attract foreign investments, and are a source of pride and momentum for French companies.

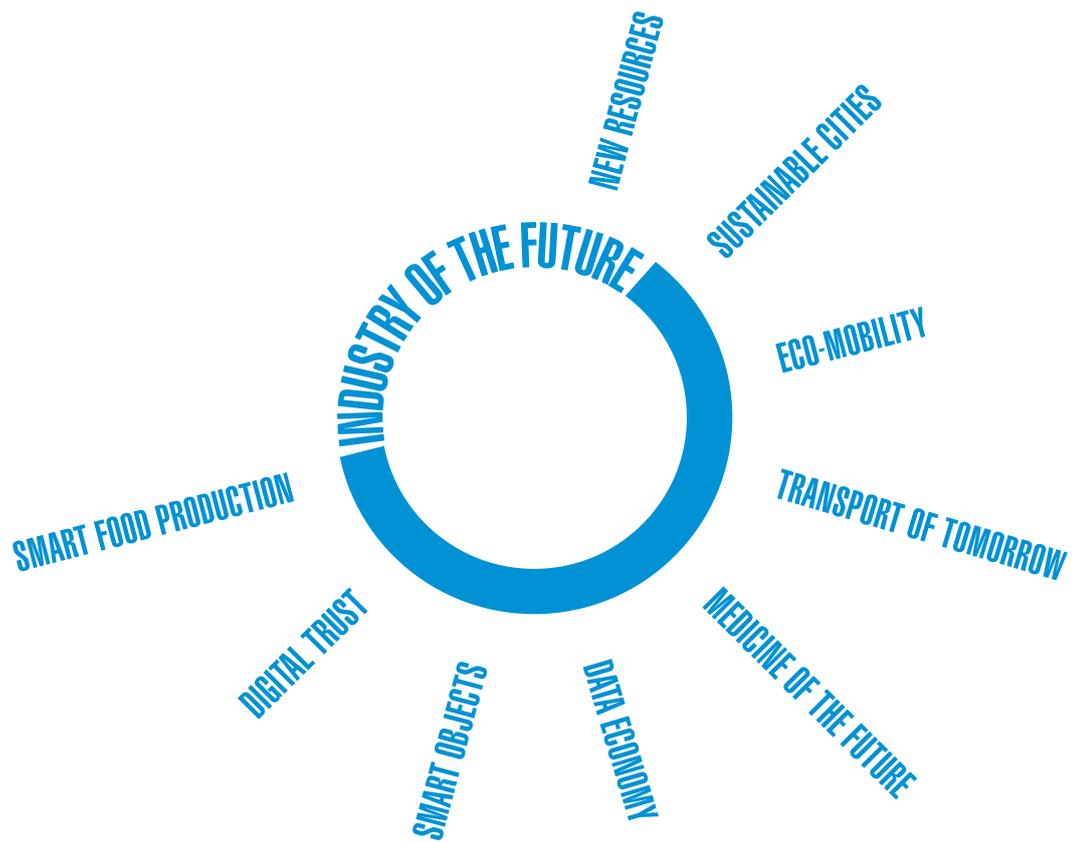
The Industry of the Future initiative is a cross-cutting one that aims to modernise all of French industry. Significant human and financial resources have been deployed: more than 500 trained experts provided support to 3,400 SMEs throughout France in 2016, and the goal is to reach more than 4,000 such companies by the end of 2017. In addition, €2 billion in Bpifrance "Industry of the Future" financing has been made available to companies, €1.2 billion of which has already been taken advantage of. Moreover, new regulatory approaches are being tested, and the initiative has already begun to bear fruit.

However, the Industry of the Future initiative is about more than just modernisation. France enjoys a comparative advantage in digital technology, particularly thanks to its start-up ecosystem. Its industry is working to build the factories of tomorrow, by developing technologies such as additive manufacturing and digital process modelling. The new "Industry of the Future" trade show that took place in December 2016 near Paris provided a showcase for French industrial excellence.

Nevertheless, our goals are meaningless unless we keep the rest of the world in mind. During the Hannover Messe, we laid the groundwork for close cooperation with the German Industrie 4.0 initiative in the areas of standards, technologies and training. We are also fully committed to the plan launched by European Commissioner Günther Oettinger to digitise European industry. Other cooperative efforts are underway with key industrial players such as the US, Italy and the UK.

The New Industrial France initiative is much more than a new industrial programme – it is an entire social project. By offering a new way to carry out industrial policy, it represents an unprecedented occasion for French industry to once again play a leading role.

Christophe Sirugue
Minister of State reporting
to the Minister for the Economy and Finance,
with responsibility for Industry



Visit the New Industrial France programme's new website:
www.economie.gouv.fr/nouvelle-france-industrielle

CONTENTS

11 INDUSTRY OF THE FUTURE, THE CORNERSTONE OF NEW INDUSTRIAL FRANCE

The Industry of the Future programme was launched on 18 April 2015. Its goal is to modernise France's production tools and provide support for manufacturers as the digital changeover transforms their business models, organisations and the way they design and market their products.

33 9 INDUSTRIAL SOLUTIONS FOR 9 KEY MARKETS

The New Industrial France programme is based on 9 industrial solutions that provide real-world responses to key economic and social challenges. These solutions will position French businesses on tomorrow's markets in a world in which digital technology is erasing the boundary between industry and services. Large-scale means have been put in place to support ambitious industrial projects and step up the deployment of the goods and services of tomorrow.

- 34 Data economy**
- 42 Smart objects**
- 52 Digital trust**
- 52 Smart food production**
- 62 New resources**
- 70 Sustainable cities**
- 76 Eco-mobility**
- 84 Medicine of the future**
- 90 Transport of tomorrow**

99 47 KEY TECHNOLOGIES FOR FRANCE

The "Key Technologies 2020" report presents a list of key technologies in which French companies need to be present within 5 to 10 years in order to maintain a competitive advantage and uphold the appeal of France in growth markets. These key technologies provide a medium-term direction for the development of New Industrial France solutions. Real-world applications of these key technologies are set out in this brochure.

106 APPENDIX

THE NEW INDUSTRIAL FRANCE PROGRAMME

Key dates

12 September 2013

Launch of the New Industrial France (NFI) programme by President Hollande.

14 April 2015

Launch of the Industry of the Future initiative by President Hollande.

18 May 2015

Launch of the second phase of the New Industrial France programme by Emmanuel Macron, Minister for the Economy, Industry and Digital Affairs, and presentation of the 9 industrial solutions.

20 July 2015

Creation of the Industry of the Future Alliance.

SUPPORT FOR NEW INDUSTRIAL FRANCE PROJECTS

1,000

INNOVATIVE INDUSTRIAL PROJECTS
SINCE 2013

€1.9 billion

IN PUBLIC SUPPORT (SUBSIDIES
OR REPAYABLE ADVANCES) SINCE 2013
FOR NEW INDUSTRIAL FRANCE PROJECTS,
PARTICULARLY AS PART OF THE INVEST
FOR THE FUTURE PROGRAMME (PIA)

UPGRADING OUR MANUFACTURING FACILITIES TO USHER IN THE INDUSTRY OF THE FUTURE

€5

BILLION IN TAX INCENTIVES OVER
SIX YEARS FOR BUSINESSES THAT INVEST
IN PRODUCTION CAPACITY BETWEEN
15 APRIL 2015 AND 14 APRIL 2017
(HIGHER DEPRECIATION ALLOWANCE)

850

“INDUSTRY OF THE FUTURE”
LOANS GRANTED, FOR A TOTAL OF

€700 million

1,500

SMES HAVE BENEFITED FROM CUSTOMISED
“INDUSTRY OF THE FUTURE” SUPPORT
FOR MODERNISING THEIR BUSINESS MODELS

€2.2 billion

IN “INDUSTRY OF THE FUTURE”
LOANS AS PART OF THE SECOND PHASE
OF THE INVEST FOR THE FUTURE PROGRAMME
(PIA 2) TO FINANCE PROJECTS TO MODERNISE
AND TRANSFORM BUSINESSES,
WITH AN ADDITIONAL TRANCHE OF

€1.1 billion

AVAILABLE IN 2018

BRINGING TOGETHER FRANCE’S INDUSTRIAL FORCES

37

BUSINESS LEADERS ARE HEADING UP NEW
INDUSTRIAL FRANCE SOLUTION PROJECTS

33,000

BUSINESSES AND

1.1 million

EMPLOYEES REPRESENTED
IN THE INDUSTRY
OF THE FUTURE ALLIANCE

500

BUSINESSES INVOLVED
IN NEW INDUSTRIAL FRANCE PROJECTS

INDUSTRY OF THE FUTURE

INDUSTRY OF THE FUTURE

MAKING THE NEW INDUSTRIAL REVOLUTION A SUCCESS – OUR CHALLENGE

The new technologies of the Industry of the Future, such as additive manufacturing and the Industrial Internet, are introducing sweeping changes in our industries. This revolution is an opportunity to make up for France's lack of investment in production over the last decade and to make French industry a global leader.

The quality of our innovation and digital transformation ecosystems will give French companies everything they need to take advantage of this revolution and become world leaders. Every day, around the world, French companies prove the reality of this by exporting French know-how thanks to the talent of its 1.3 million engineers.

To better accompany French industry's modernisation efforts and to ensure that it rebuilds its innovative presence, President Hollande launched the Industry of the Future Alliance in April 2015. The Alliance brings together manufacturers, engineering schools, research and technical institutes and the National Industry Board (CNI) around a shared project to modernise and transform our industrial model through digital technology.

The programme aims to make companies excited and hopeful about the future, to be the driver for an appealing industrial sector that respects employees. To do so, we have to help companies play a part in this industrial revolution in order to produce differently, become more responsive and more competitive, and relocate their business activities.

Whether in the areas of design, after-sales service, production or logistics, the Industry of the future programme touches every stage in the value chain and every stakeholder, regardless of size or sector. Under the banner of the Industry of the Future Alliance with a smaller leadership team, and with support from central government and the regions, these stakeholders are preparing to take the lead in this revolution, with efforts based around five pillars.

THE FIVE PILLARS OF THE INDUSTRY OF THE FUTURE



DEVELOPING
CUTTING-EDGE
TECHNOLOGIES



HELPING
COMPANIES ADAPT
TO THE NEW
PARADIGM



TRAINING
EMPLOYEES



SHOWCASING
THE FRENCH
INDUSTRY
OF THE FUTURE



STRENGTHENING
EUROPEAN AND
INTERNATIONAL
COOPERATION



DEVELOPING CUTTING-EDGE TECHNOLOGIES

Ensuring that the Industry of the Future remains at the forefront of technology and that these technologies are available throughout France's economic fabric.

Disruptive technologies such as additive manufacturing and digital production lines form the core of the transformations sweeping through French industry. Just as the Internet did for the knowledge economy, these technologies represent a vast field of opportunities for industrial manufacturing.

As part of France's National Research Strategy, French public and private research institutions are working to develop these cutting-edge technologies, and to make the Industry of the Future one of the country's core social challenges.

We have defined **7 key action areas** to expand the range of what France can offer in terms of production technologies. We are providing support for industrial projects in each of the following areas:

- Digital technology, virtualisation and the Internet of Things
- The human factor in manufacturing plants, cobotics, augmented reality
- Additive manufacturing (3D printing)
- Monitoring and control
- Composites, new materials and assembly
- Automation and robotics
- Energy efficiency

240
R&D PRIORITY
"INDUSTRY OF THE FUTURE"
PROJETS LAUNCHED SINCE 2013

€100 million
EARMARKED FOR
"INDUSTRY OF THE FUTURE"
CALLS FOR PROJECTS

MILESTONES

1 October 2015

Launch of “Industry of the Future” call for projects, with €100 million in funding.

15 March 2016

First additive manufacturing conference organised by the Industry of the Future Alliance.

Early 2016

4 projects, representing a total funding budget of €48.5 million, selected for in-depth assessment.

“Industry of the Future” call for projects

With a €100 million budget provided by the Invest for the Future programme, this call for projects will be closed on 30 June 2016. The goal is to support cutting-edge R&D and investment projects (pilot production lines, demonstrators) with an eye to stepping up deployment of Industry of the Future technologies. The call will target projects with budgets of at least €1.5 million, with the aim of bringing to market high-value-added goods, processes and services with strong growth potential.

Public support: €100 million.

[http://www.bpifrance.fr/Vivez-Bpifrance/Agenda/
PIAVE-un-appel-a-projets-thematique-pour-l-
industrie-du-futur-20177](http://www.bpifrance.fr/Vivez-Bpifrance/Agenda/PIAVE-un-appel-a-projets-thematique-pour-l-industrie-du-futur-20177)

SUCCESS STORY

ESI GROUP



A member of the Industry of the Future Alliance, the ESI Group is involved in promoting French technology.

ESI works with its peers in the Alliance to structure and disseminate French know-how, particularly by creating a catalogue of suppliers wishing to showcase their products.

ESI Group offers virtual prototyping software and services to industrial manufacturers. Virtual prototyping allows ESI's customers to test their products and processes virtually and in a collaborative manner. The ability to provide low-cost innovations in a shorter time-frame gives ESI's customers a key competitive advantage.

Key technology: Modelling, simulation and digital engineering.

THE INDUSTRY OF THE FUTURE ROADMAP

30 June 2016

Closing of the Industry of the Future call for projects, and selection of projects to be given public funding.

Summer 2016

Presentation of the French additive manufacturing roadmap.

Early fall 2016

Opening of the “Factory Lab” platform south of Paris. Manufacturers and academic laboratories can use the platform to test industrial process technologies. The project is supported by the French Alternative Energies and Atomic Energy Commission (CEA), in partnership with industrial firms such as DCNS, Safran and PSA.

End 2016

Publication of a catalogue of France’s technological offer in terms of production site modernisation, which will be distributed to businesses both in France and abroad.

**Open calls for projects for Industry of the Future technologies can be found at
www.economie.gouv.fr/nouvelle-france-industrielle**



HELPING COMPANIES ADAPT TO THE NEW PARADIGM

Providing customised modernisation and transformation support to SMEs.

Support initiatives were put in place in early May 2015 in every one of France's regions, with the goal of providing support to 2,000 SMEs and mid-tier firms by the end of 2016.

These companies will receive customised assessments by Industry of the Future experts. The support, which is provided by regional councils with expertise from the Industry of the Future Alliance, will help business leaders to better understand what technology is available, to identify the human or organisational roadblocks to accessing these innovations, to integrate new concepts in a "value chain" approach, and to reinvent their economic model.

Loans from Bpifrance and tax incentives (the higher depreciation allowance and accelerated depreciation) will provide the necessary financial support.

**1,500 SMES/
MID-TIER FIRMS**

ALREADY INVOLVED IN INDUSTRY
FOR THE FUTURE SUPPORT PROGRAMMES,
OUT OF A TOTAL GOAL OF

**2,000 SMES/
MID-TIER FIRMS**

BY THE END OF 2016

€719 million

IN INDUSTRY OF THE FUTURE LOANS
ALREADY GRANTED TO FINANCE THIS SHIFT

MILESTONES

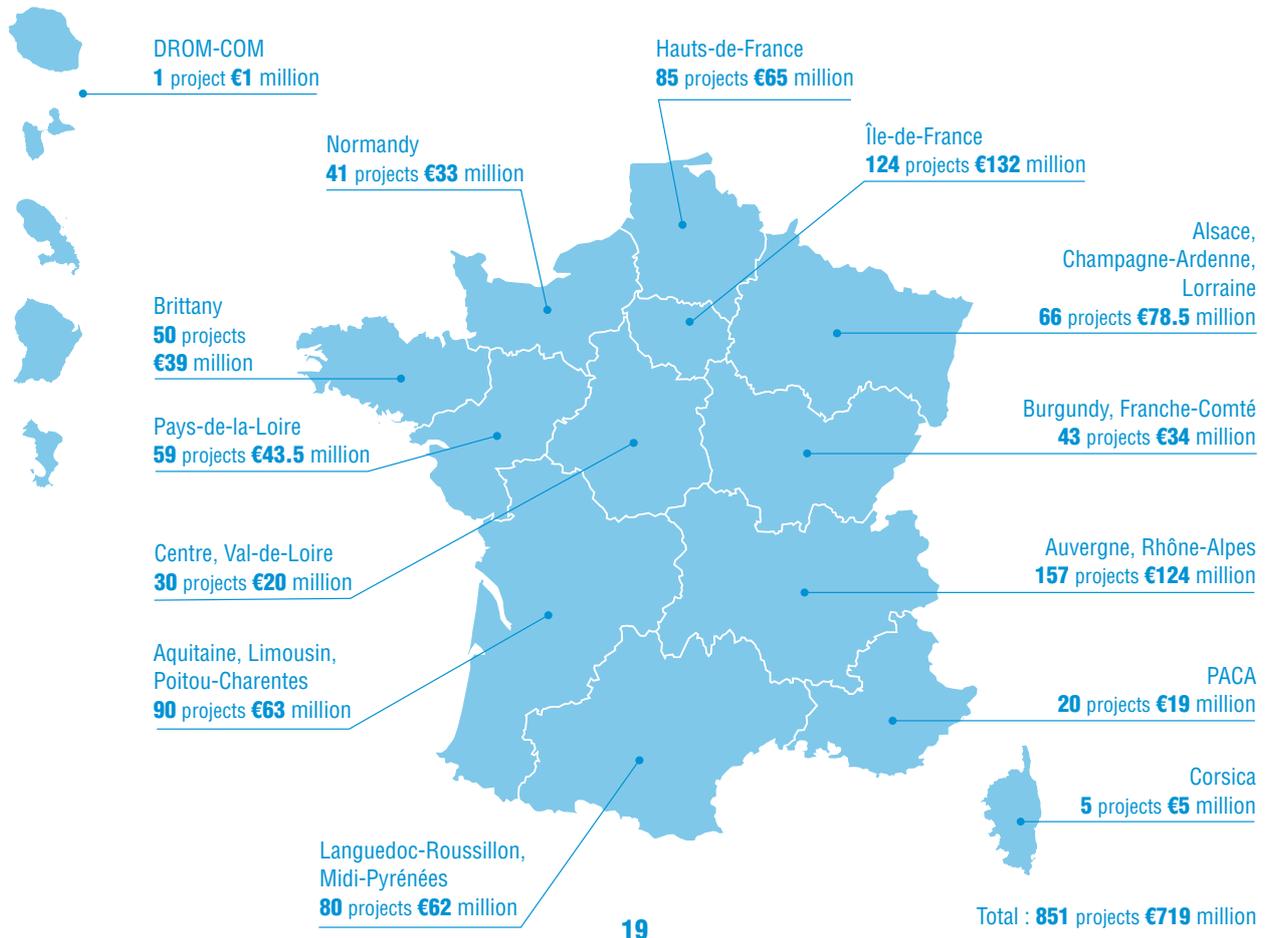
14 April 2016

The higher depreciation allowance was extended for one year and expanded to include certain digital goods. This tax incentive, which covers up to 13% of the value of investments made between 15 April 2015 and 14 April 2017, is intended to support companies seeking to modernise their business models.

Industry of the Future loans

These are soft, unsecured loans granted to SMEs and mid-tier firms with a two-year deferred repayment. They have a significant leverage effect on private-sector financing, and can be used to finance innovative and high-powered investment in production capacities. The loans are granted by Bpifrance. €1.2 billion was earmarked, and 851 “industry of the Future” loans have already been granted, for a total of €719 million. A new tranche of €1 billion will be introduced in the fall of 2016, in the form of a new “Industry of the Future” loan that will consolidate all of the various existing unsecured loans.

REGIONAL BREAKDOWN OF INDUSTRY OF THE FUTURE LOANS



SUCCESS STORY



Ventana

Ventana specialises in the production of complex metal parts for aerospace. Its unique know-how includes the use of additive manufacturing to create sand moulds. This process, combined with digital simulation of the casting process, means that the company can design and perfect products for its clients with a drastically shorter development cycle at half the cost.

Public support: The company has benefited from the “Industry of the Future” support initiative by the Aquitaine-Limousin-Poitou-Charentes Regional Council. The support focused on the digital changeover for the company and its production plants (IT systems, digitisation, robotics). The company has taken part in Caraïbe, a Single Interministerial Fund (FUI) project certified by the Aerospace Valley, Astech and Pégase clusters.

In terms of investments, Bpifrance has provided Ventana with €4.5 million in loans.

Key technology: Additive manufacturing.

150 more real-world examples of Industry of the Future projects can be found on the Industry of the Future Alliance’s website. Businesses who wish to can present their Industry of the Future projects on the site, using a simple online form. For more information go to <http://exemples-aif.industrie-dufutur.org>

THE INDUSTRY OF THE FUTURE ROADMAP

September 2016

Availability of a new €1 billion tranche of “Industry of the Future” loans granted by Bpifrance, thanks to the Invest for the Future programme. These new loans will be simplified and will target Industry of the Future technologies.

End 2016

Designation of business leaders as **Industry of the Future Ambassadors** in France’s regions, to boost local participation in transitioning towards the Industry of the Future.

An Industry of the Future roadshow, organised by the Industry of the Future Alliance will tour France’s regions to hold talks with local stakeholders and help them understand the resources available to them.

Regional Industry of the Future correspondents can be found at
www.economie.gouv.fr/nouvelle-france-industrielle



TRAINING EMPLOYEES

Help industrial employees improve their skillsets to tackle new jobs.

Training upcoming generations to perform new tasks is the cornerstone to the success of the Industry of the Future. Training goes hand-in-hand with the heightened presence of digital technology and robotics in industry, which are vital to creating jobs in France and ensuring that businesses in many sectors remain competitive.

A new vision of training must be based on a collective approach, in particular with the social partners and local stakeholders.

MILESTONES

March 2016

Launch of the “Learning About Industry” project over 18 months, an initiative of the National Industry Board and the Industry of the Future Alliance.

Learning about Industry (“Osons l’Industrie”)

The aim of the Learning about Industry project is to create a web portal to provide students and their families with information about professions, trainings and recruitment possibilities in Industry of the Future-related sectors, in connection with businesses. The project was selected for financing as part of the Invest for the Future Programme.

During a pilot phase, teams will set up an initial portal that focuses on new technologies. This phase will also serve to introduce processes for creating new training offers and to collect existing offers as defined by a certain number of sectors.

SUCCESS STORY

SEEMAKE



New technologies are playing a role in employee training sessions. For this reason, the SeeMake project is developing a 3D platform to provide training and technical assistance to workstation operators. The project incorporates augmented reality based on ground-breaking technology that allows virtual elements to be superimposed over real representations without additional markers. The goal is to develop “on demand” and “on-site” trainings for those employed in the industrial sector. Two demonstrators have been developed in partnership with Renault, one of which deals with repairing batteries for electric vehicles.

Public support: The project has received support from the Single Interministerial Fund as part of a certification process by the Cap Digital cluster.

Key technology: Immersive technologies.

THE INDUSTRY OF THE FUTURE ROADMAP

By the end of 2016

Launch of operational efforts on the first case histories for the Learning about Industry project.



SHOWCASING THE FRENCH INDUSTRY OF THE FUTURE

Showcasing the Industry of the Future both in France and abroad.

MILESTONES

14–20 March 2016

Industry Week 2016. This year's theme: Industry of the Future. Throughout France, 2,550 authorised events will spotlight French industry.

26 April 2016

Launch of the Creative Industry campaign by Emmanuel Macron at the Hanover Fair. The goal of the campaign is to promote French industrial excellence abroad.

1 April 2016

The naval shipyards at Cherbourg are an authorised Industry of the Future flagship site, and the Sew-Usocome plant at Brumath is an authorised French-German flagship site. With these new accreditations, there are now six emblematic Industry of the Future locations.



6
EMBLEMATIC INDUSTRY
OF THE FUTURE PROJECTS
OUT OF A TOTAL OF
15
BY THE END OF 2016

Emblematic Industry of the Future projects

The goal of accrediting emblematic Industry of the Future projects is to provide visibility for innovative French technical solutions and to share best practices among national and international ecosystems, including manufacturers in the same sector (SMEs in particular) as well as those from other sectors, technology integrators and suppliers, funding sources, public authorities and the academic world.

Businesses interested in emblematic project status should contact the Alliance.

SUCCESS STORIES

Air Liquide



An Industry of the Future emblematic project

With its Connect project, Air Liquide is setting up an operations centre in France capable of remotely managing the production, energy efficiency and reliability of manufacturing sites. The project's other goal is to introduce the latest digital technologies (3D scans, augmented reality, touch tablets, etc.) into the daily work of teams at various sites.

The new centre, which is expected to be operational in 2017, will pilot production and energy consumption, while a site's teams will focus on security and equipment availability.

Key technology: cobotics and human enhancement, immersive technologies.

Also:

- Bosch (Rodez): Using local biomass to reduce greenhouse gas emissions
- SNCF (Oullins): Digital technology in the service of industrial maintenance
- Daher (Saint-Aignan-Grandlieu): High-speed manufacturing of thermoplastic parts
- Constructions Mécaniques de Normandie (Cherbourg): The naval shipyard of the future
- Sew-Usocome (Brumath): Integrating robotics and new concepts of intralogistic flows

THE INDUSTRY OF THE FUTURE ROADMAP

6–9 December 2016

Organisation of the first Industry of the Future trade show at Paris Villepinte, with Germany as the guest of honour.

End 2016

Accreditation of ten new emblematic projects.

Spring 2017

Industry Week 2017.

Read more about Industry of the Future emblematic projects at
www.economie.gouv.fr/nouvelle-france-industrielle



STRENGTHENING EUROPEAN AND INTERNATIONAL COOPERATION

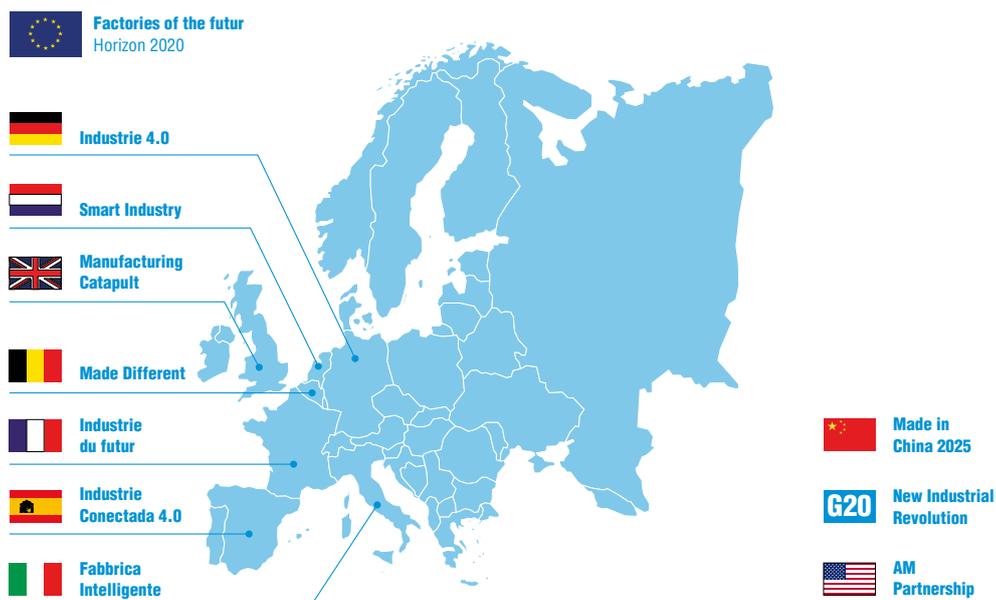
Forging strategic partnerships at European and international levels.

Most industrialised countries have launched government-sponsored programmes to promote new technologies in industry. On 19 April 2016, the European Commission announced a set of measures to digitise European industry.

The goal of the French “Industry for the Future” initiative is to connect with these various projects in order to initiate and support joint technological and training efforts with other countries. Additionally, the aim is to create strategic alliances in the area of standardisation, with an eye to better representing French interests within European and global initiatives.

International initiatives

Much like France’s “Industry of the Future” programme, national and even regional initiatives to encourage the use of digital technology within industry are springing up everywhere around the world. The European Commission and the G20 have also launched similar efforts. France is working closely with these many initiatives.



MILESTONES

27 October 2015

Franco-German forum at the Elysée Palace, hosted by President Hollande and attended by Angela Merkel and Jean-Claude Juncker, to draft an ambitious digital strategy for Europe. The event put the spotlight on the forward thrust of the German and French digital sectors and provided an opportunity to promote an overall strategy for the EU's Digital Single Market. More than 400 representatives of startups, multinational companies and public bodies were in attendance. Cooperative efforts were launched between France's "Industry of the Future" and Germany's "Industry 4.0" programmes. A Franco-German Industry of the Future Academy, a joint effort between the Institut Mines-Télécom (IMT) and the Technische Universität München (TUM), was also launched at the forum.

1 April 2016

Launch of an ambitious approach to standardisation for the Industry of the Future within the Industry of the Future steering committee. A specific structure will be put in place to bolster France's position within international bodies and to promote French and European solutions – specifically concerning digital technology – in the areas of collaborative robotics and additive manufacturing. In this area, the Industry of the Future Alliance and the French standardisation community (AFNOR and sector-specific standardisation bodies) are gearing up to take action.

22 April 2016

Günther Oettinger presents the EU's "Digitising European Industry" plan to European ministers with responsibility for industry at the Friends of Industry Conference in Warsaw.

25 April 2016

Formalisation of a partnership between France's "Industry of the Future" and Germany's "Industry 4.0" platforms. A joint action plan was drawn up, with particular emphasis on a shared strategy in terms of standardisation and technologies.

17 May 2016

France attends the G20's "New Industrial Revolution" working group.

SUCCESS STORY

BALYO



Balyo's unique, in-building navigation technology transforms standard forklift trucks into standalone intelligent robots, capable of working alongside human operators. Under a partnership agreement with Fenwick / Linde, the European leader in material handling, the two companies will jointly market a range of intelligent robots in line with the concepts of Industry of the Future.

Public support: Balyo has received equity financing from the French government (Fonds Ambition Numérique).

Key technology: Standalone intelligent robots.

THE INDUSTRY OF THE FUTURE ROADMAP

27 May 2016

Launch of a French/Chinese dialogue and introduction of a platform for exchange between businesses on the theme of the Industry of the Future. The goal of this initiative is to create joint pilot projects based on French know-how.

End 2016

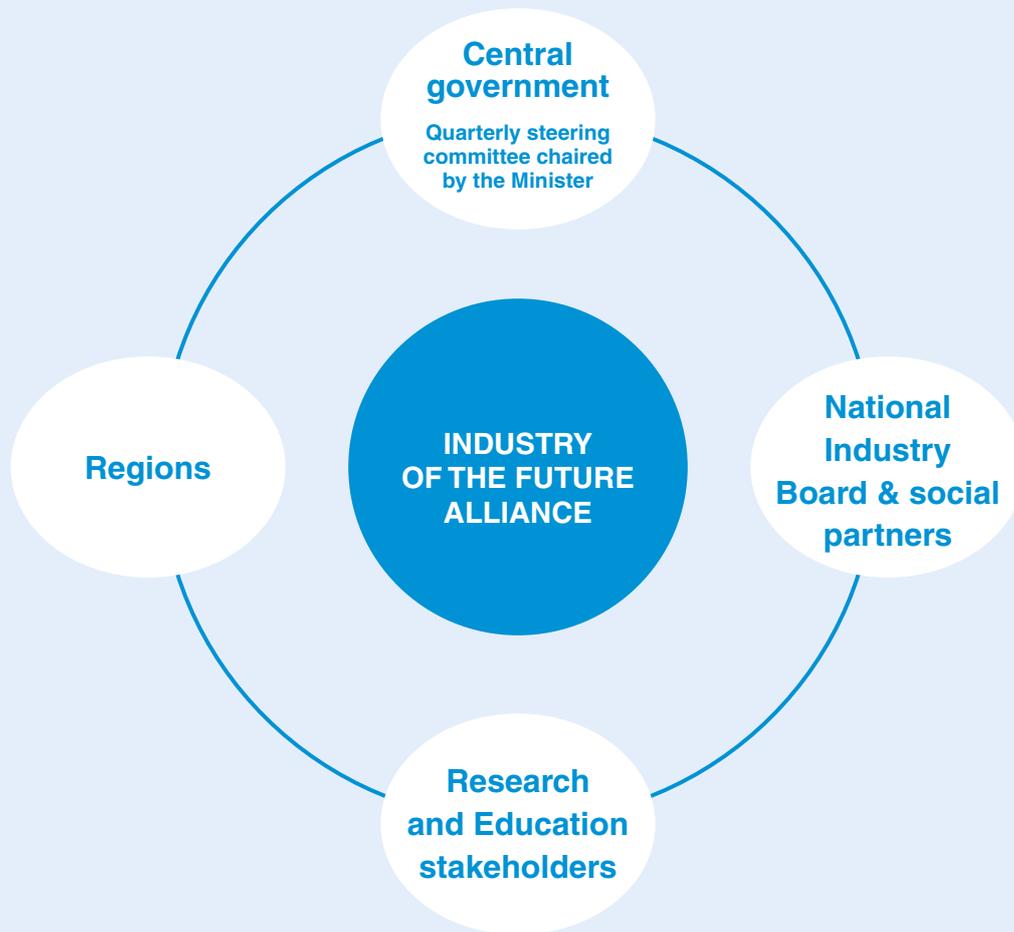
Appointment of **Industry of the Future Ambassadors** to the US, China, the UK and Germany. These ambassadors, all from French companies within the Alliance, will be tasked with promoting and coordinating bilateral Industry of the Future efforts.

End 2016

Formalisation of a French standards strategy based on four technologies (additive manufacturing, digital continuity, robotics and multi-material assembly) in order to speak with a single voice within international bodies.

December 2016

Second Franco-German Digital Conference.



INDUSTRY OF THE FUTURE ALLIANCE

chaired by



PHILIPPE DARMAYAN
Chair, *Groupement des Filières Industrielles*

co-chaired by



FRÉDÉRIC SANCHEZ,
Chairman of the Executive Board,
Fives



BERNARD CHARLÈS,
CEO, Dassault Systèmes

AN EXPANDED INDUSTRY OF THE FUTURE ALLIANCE

The Industry of the Future Alliance is responsible for the operational implementation of France's Industry of the Future project, which was launched in April 2015. The Alliance, which was founded on 20 July 2015, organises and coordinates, at national level, initiatives, projects and efforts aimed at modernising and transforming France's industry, particularly via digital technology. To do this, it relies on dedicated working groups.

The Alliance, which is now fully operational, is tasked with fostering real-world, operational partnerships (employers' associations, clusters, sectors, chambers of commerce and industry, etc.).

Its founding members, from the worlds of industry and digital technology, represent more than **33,000 businesses and 1.1 million employees** (FIM, Syntec Numérique, AFDEL, Symop, Gimélec and UIMM).

To support industrial SMEs on the ground, the Alliance's actions are passed on throughout France's regions by teams consisting of Alliance members, local authorities, the Directorates for Enterprises, Competition Policy, Consumer Affairs, Labour and Employment (DIRECCTE) and clusters.

The Industry of the Future Alliance consists of **22** members.

Active members:

- Federation of Federation of Electrical, Electronics and Telecommunication Industries (FIEEC)
- Federation of Mechanical Engineering Industries (FIM)
- French Electrical Equipment, Automation and Related Services Industries Group (GIMELEC)
- Automotive Industry and Mobilities (PFA)
- French Manufacturing Technologies Association (SYMOP)
- Syntec Numérique (employers' federation)
- TECH IN France (formerly the French Association of Software and Internet Solutions Publishers)
- Chemical Industries Union (UIC)
- Union of Metallurgy Industries (UIMM)
- Alternative Energies and Atomic Energy Commission (CEA)
- French Mechanical Engineering Industries Technical Centre (CETIM)
- Arts et Métiers ParisTech
- Centre for Higher Industrial Studies (CESI)
- Institut Mines Telecom

Associate members:

- French Cluster Association (AFPC)
- CCI France
- Cercle de l'Industrie
- Plastics Processing Federation
- EMC2 cluster
- UIMM PACA
- Union of French Furnishing Industries (UNIFA)
- French Welding Institute (IS)
- French Mechanics Association (AFM)

THE 9 SOLUTIONS

THE DATA ECONOMY

Creating value by processing the vast quantities of data available to us.

The expansion of digital technology and the explosion in tablets, smartphones, computers and connected objects are generating hitherto unknown quantities of data. This data is a source of value for citizens and an underexplored source of growth for companies.

Exploiting this data – particularly through the use of Big Data technologies and cloud computing and supercomputers – will help companies anticipate and adapt products to meet everyone's needs. These include lower operational costs for businesses (predictive maintenance for equipment, fraud reduction, optimised key processes, etc.), creating new innovative services (cutting red tape for citizens through the use of cloud-based tools, better understanding of customers' problems using behavioural analysis, etc.).

France is well-positioned to meet this challenge: trainings for French engineers and scientists (mathematicians, statisticians and IT experts), dynamic startups and SMEs such as the 30 winning businesses in the World Innovation Competition in the Big Data category, and rapidly growing associated markets. The Big Data market in France will be worth an estimated €2.5 billion in 2018.

MILESTONES

25 October 2013 and 12 January 2015

Launch of two successive calls for projects on supercomputing and digital simulation to expand the uses of Big Data.

12 September 2014

Definition, with the French Data Protection Agency (CNIL), of “compliance packs” for insurance companies to facilitate use of Big Data in compliance with the legal framework. Two additional packs have now been published, on smart metering and social housing.

2 December 2014

Launch of “Big Data Challenges” to expand the uses of data and to support up and coming firms working in the sector. Throughout France, five coordinators will offer more than 50 challenges over a three-year period as part of the Open Innovation programmes. These challenges will allow sponsors (companies or public bodies with data and a stake in the Big Data issue) to single out companies who can provide the best innovative solutions for exploiting the data they possess.

February 2015

Test launch of the “Secure Cloud” accreditation by the National Information System Security Agency (ANSSI). This accreditation is a guarantee of a provider’s skill and the quality of a cloud computing service. The goal is to make this a joint French-German accreditation.

8 July 2015

Launch of a best practices guide on the use of cloud computing by local authorities. The guide can be downloaded from the website of the Directorate General for Enterprise.

17 September 2015

Launch of a second call for expressions of interest to launch new digital challenges (Big Data, 3D printing and connected objects), and thus target the development of innovative applications in new areas (e.g. tourism or observation of the Earth from space). Nearly a dozen new coordinators will launch challenges over the next three years.

1 October 2015

Launch of SiMSEO, a nationwide initiative to support VSEs, SMEs and mid-tier companies in their use of digital simulation in industry and in the construction sector.

25 November 2015

Creation of the Big Data Usage Monitoring Unit to analyse the impact of big data in every economic sector, and to identify opportunities.

12 April 2016

Emmanuel Macron inaugurates the Sequana supercomputer, the first Exascale-generation computer. The expected improvements in size and power consumption will allow for an enormous leap in computing power – the Sequana is capable of one exaFLOPS (one billion billion Floating-point operations per second).

KEY FIGURES

87

PROJECTS SUPPORTED
SINCE 2013

€251 million

IN PUBLIC FINANCING GRANTED
SINCE 2013

THE SEQUANA SUPERCOMPUTER
CONSUMES

10 times less

ENERGY THAN CURRENT SUPERCOMPUTERS
AND IS CAPABLE OF 1 BILLION BILLION
OPERATIONS PER SECOND

FRANCE IS ONE OF THE

top four

COUNTRIES IN THE WORLD IN TERMS
OF SUPERCOMPUTER TECHNOLOGY

SUCCESS STORIES

Pôle Emploi Store Dev



The “Store Dev” of Pôle Emploi (the national employment agency) makes the agency’s data available to third-party developers who wish to create new applications. Using Store Dev, developers can connect their applications to Pôle Emploi’s database to create and develop employment- and training-related digital services, guidebooks for agencies, labour market statistics, anonymised offers, and so on. Once the service has been developed, the developer can request to be listed in the agency’s “Job Store”. As part of the “Big Data Challenges” call for expressions of interest, Pôle Emploi has been working with the Paris-based cluster Cap Digital since early 2016 to support SMEs who wish to offer new apps in the Store.

Public support: Cap Digital has received €20,000 in support to organise the challenge, and the winners will share up to €70,000.

Key technology: Big Data Intelligence.

TeraLab R&D platform



The TeraLab project is supported by the Institut Mines Telecom and GENES (Group of National Economics and Statistics Schools), government-funded institutions dedicated to higher education and research into innovation in engineering and digital technology in the service of industry. The goal of TeraLab is to build a platform for Big Data experiments and to work in cooperation with a number of projects that received financing as part of the New Industrial France initiative. The platform, which will be hosted in Paris and Dubai, will provide “platform as a service” access, particularly for collaborative R&D projects. The idea is to set up a cutting-edge infrastructure and tools for processing and visualising generic data. The project also has a data security aspect.

Public support: This project received €5.5 million in funding (Invest for the Future Programme: “Cloud Computing / Big Data” call for projects).

Key technology: Big Data Intelligence.



SaaS Academy

The SAAS Academy was developed at the initiative of private stakeholders and with support provided by OVH and SystemX (a technology research Institute for developing public-private research projects and supporting innovation in France). Its goal is to provide support for software publishers as they transition towards SaaS (Software as a Service) and cloud computing models.

The Academy offers trainings throughout France, which consist of coaching sessions for company executives around three key themes:

- Changing economic and sales models
- New technologies
- Financing transformation

SystemX provides steering and awareness training. Private funding covers first-year training sessions.

Key technology: New hardware-application integrations.



Bull's supercomputer Sequana

Bull, a subsidiary of the Atos Group, is Europe's only supercomputer designer. Bull offers high-value-added products and software to Atos customers as they make the digital changeover in order to cope with the challenges of Big Data and cyber-threats. Bull has provided many outstanding solutions, including the low-energy supercomputers Sequana and Bullx. Sequana is the first Exascale-generation computer, and is capable of one exaFLOPS (one billion billion Floating-point Operations Per Second). It also consumes one tenth of the energy of current supercomputers. A Sequana supercomputer is currently being installed at the French Alternative Energies and Atomic Energy Commission (CEA). To meet demand for this new product, Atos has set up a dedicated production and assembly line at its plant in Angers.

On 12 April 2016, the Bull Sequana was unveiled by Atos CEO Thierry Breton, before a group of representatives from the worlds of industry and research, and in the presence of Emmanuel Macron, Minister for the Economy, Industry and Digital Affairs. www.bull.com/fr/sequana

Key technology: Supercomputers.

ROADMAP

Summer 2016

A UK-France taskforce publishes its report on the data economy, in a bid to develop innovation, infrastructures and skills in both countries.

Q2 2016

Launch of the second phase of the “Exascale” research programme, led jointly by Atos and the CEA, with the goal of meeting the major challenges of digital simulation and Big Data.

Q4 2016

Launch of the website of the Big Data Usage Monitoring Unit (observatoirebigdata.fr) and the corresponding smartphone application by the Directorate General for Enterprise and TECH IN France. The Unit’s findings will be published at the end of the year.

Early 2017

Establishment of an action plan with respect to High-Performance Data Analysis (HPDA), which brings together technologies for analysing large volumes of data (Big Data) and those of High-Performance Computing (HPC) in an effort to push the boundaries of simulation technologies.

2017

Establishment of skill centres to accompany businesses in the real-world use of these new key technologies, including a “Datalab Centre” on the use of data.

PROJECT MANAGERS



THIERRY BRETON,
CEO, Atos



OCTAVE KLABA,
Founder and Technical Director,
OVH



GÉRARD ROUCAIROL,
President, Teratec

FOR MORE INFORMATION

Find out more about operational contacts and financing resources at
www.economie.gouv.fr/nouvelle-france-industrielle

SMART OBJECTS

Make France a leader in smart objects and improve French citizens' daily life by developing new uses.

Whether we are talking about connected objects, contactless tools and services, robots and smart garments, as well as associated technologies such as virtual reality, augmented reality and artificial intelligence – smart objects are transforming everyday life. Connected objects have the potential to improve everyday life, facilitate decision-making and improve our understanding of our environment.

France needs to fully own these technologies, which will be the source of growth and jobs in high-growth markets. The goal is to push out these technologies into every corner of our economy, particularly to VSEs and SMEs, to help them successfully make the digital transition.

Today, France is an acknowledged world leader in connected objects, and demonstrates this each year at the Consumer Electronics Show in Las Vegas.

MILESTONES

March 2014

Launch of an €80 million public/private “Robolution” fund for supporting French startups in the field of robotics.

May 2015

Launch of a Digital Innovation Competition to create innovative projects involving digital technology in order to offer a new ground-breaking product or service on specific themes (healthcare, sports, tourism, personal services, social outreach, etc.). There is a rolling call for projects (three selections per year).

2 June 2015

The first Means of Payment Conference organised under the aegis of the ministers for finance and industry.

12 June 2015

Inauguration of the first Connected Objects Centre in Angers.

19 June 2015

Inauguration of Connectwave, an experimental platform for connected objects with professional applications at Rousset, by the National RFID Centre (CNR RFID).

1 July 2015

Organisation of the second edition of the Robotics Conference in Lyon. The third edition will take place on 24 May 2016 on the fringes of the Innorobo trade show.

22 October 2015

Launch of two initiatives by the National RFID Centre aimed at deploying connected objects in the luxury goods and energy sectors.

19–25 October 2015

First week of French Tech connected objects in the food retailing sector.

16–22 May 2016

Second week of French Tech connected objects in the food retailing sector.

KEY FIGURES

More than 60

CONNECTED OBJECTS PROJECTS
SUPPORTED SINCE 2012

10,000 M²

DEVOTED TO INTELLIGENT
AND CONNECTED DEVICES AT THE ANGERS
CONNECTED OBJECT CENTRE

€100 million

IN PUBLIC FINANCING,
FOR A TOTAL AMOUNT OF

€270 million

(INCLUDING PUBLIC/PRIVATE
CO-FINANCING)

A fourfold

INCREASE IN THE NUMBER OF CONNECTED
OBJECTS BY 2020

80 billion

CONNECTED OBJECTS BY 2020

190

FRENCH STARTUPS AT CES IN LAS VEGAS
(THE SECOND LARGEST NATIONAL
DELEGATION, AND THE TOP EUROPEAN ONE),

20

OF WHICH WERE AWARDED
THE CES INNOVATION AWARD

380,000

SHOPS ALREADY EQUIPPED
WITH FRENCH CONTACTLESS
PAYMENT TECHNOLOGY

SUCCESS STORIES

ePawn Arena et LSee



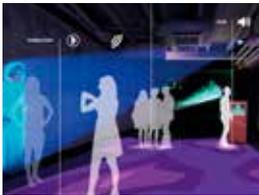
The ePawn Arena connected game platform, by the firm EPawn, provides a unique experience to fans of board games, video games and intelligent automated toys. ePawn Arena is the first board game featuring a flexible, revolutionary surface that connects smartphone and tablet applications to physical game pieces.

Nutrifit, by the firm LSee, is a unique biosensor capable of predicting the most appropriate foods and sports for a person's metabolism, and offering customised recommendations.

Public support: These projects, like a half-dozen others in the area of smart objects, received support via the Digital Innovation Competition.

Key technology: Internet of Things.

Doublet-Surface



Doublet, which specialises in large-format printing on textiles, panels and flexible coverings, has developed a new technology called Surface, which can make printed signage intelligent. The technology includes pressure sensors hidden beneath a printed surface. Pressure on the sensors can trigger videos, sounds and lights. At the same time, Surface can harvest and analyse data about behaviour. Doublet worked closely with outside designers to create the initial application for its first demonstrator, a connected printed carpet.

Public support: 10 projects in the area of intelligent textiles, including this one, have received support from the Invest for the Future Programme (some €20 million in total), as well as from the Connectitude initiative funded by the Directorate General for Enterprise, in connection with the R3iLab.



Ez-Wheel

Ez-Wheel designs and markets a line of autonomous electric wheels that contain both a motor and battery. The EZ-Wheel technology means that equipment for transporting loads and people can be quickly and easily motorised. A number of uses can be imagined in the areas of industry, medicine, construction and logistics.

Public support: Ez-Wheel is supported by the €80 million public-private Robolution Fund within the framework of the “Smart Objects” solution. The Fund has also provided support for Navya (self-driving shuttles), Alci (intelligent vision), Balyo (standalone forklift trucks), Enerbee (energy modules for the Internet of Things), Fotokite (drone cameras), Neurala (AI for robots) and PIQ (sports sensors).

Key technology: Standalone intelligent robots.



The Connected Object Centre

The Connected Object Centre was inaugurated on 12 June 2015, in Angers, in the presence of President Hollande, Minister for the Economy, Industry and Digital Affairs Emmanuel Macron, and Minister of State with responsibility for Digital Affairs Axelle Lemaire. A flagship project of the Smart Objects solution of the New Industrial France initiative, the Connected Object Centre is supported by a consortium of manufacturers headed by the Eolane Group. Its goal is to allow French startups and SMEs to step up industrialisation and get to market more quickly by carrying out – in France – the design, prototyping and production of their objects.

Public support: The Connected Object Centre has received public funding from the French government through the Invest for the Future Programme (€1.5 million), as well as from the Pays de la Loire region and the city of Angers.

Key technology: Internet of Things.

ROADMAP

June 2016

Presentation of the Internet of Things roadmap shared by the three digital solutions in the New Industrial France programme. The roadmap is based on proposals received during the public consultation carried out in April 2016.

End 2016

Launch of a second robotics competition around the theme of exterior robotics (aerial and terrestrial drones).

2017

Development of skills centres for the purpose of expanding technologies (particularly the use of smart objects) within traditional companies.

PROJECT MANAGERS



BRUNO BONNELL,
Partner, Robolution Capital



ERIC CARREEL,
CEO, Withings



YVES DUBIEF,
Chair, Textile Industries
Union (UIT)



VINCENT MARCATTÉ,
President, Images et Réseaux
and Innovation Director,
Orange Labs



OLIVIER PIOUS,
CEO, Gemalto



DANIEL NABET,
President, National RFID Centre
(CNRFID)

FOR MORE INFORMATION

Find out more about operational contacts and financing resources at
www.economie.gouv.fr/nouvelle-france-industrielle

DIGITAL TRUST

Maintaining France's technological independence in strategic sectors, strengthening security and trust in digital technology and ensuring the growth and presence in France of businesses in these sectors.

Growth in digital usages is impossible without the development of communication networks (whether terrestrial or satellite-based), control of electronic components and onboard systems, and the creation of a safe environment that builds trust.

The goal of the "Digital Trust" solution is to encourage the expansion of key technologies and digital building blocks at every level, both in terms of micro- and nano-electronics, onboard systems or at systemic level (security, terrestrial and satellite-based infrastructures) and ensuring that they are widely distributed within France's businesses and infrastructures.

MILESTONES

2014

Selection of flagship projects in digital security (detection, security of industrial systems, security of mobile communications) with an eye to bolstering domestic industrial capacity in this area and facilitating the protection of vital national infrastructures.

November 2014 and April 2015

Signature of agreements to provide support for the development of electric propulsion satellites and associated high-powered electric motors within the framework of the Invest for the Future Programme (€48 million).

21 January 2015

Launch of the “France Cybersecurity” accreditation programme to promote the export of French digital security technologies.

September 2015

Launch of the “Industrial Android” S3P project, which will create an integrated, modular and secure onboard software system for aeronautics, programmable logic controllers and connected objects.

September 2015

Opening of a national testing and demonstration platform for cybersecurity.

28 January 2016

Launch of two projects concerning LTE Professional Mobile Radio, with support from the Invest for the Future Programme (€23 million), with the goal of developing a secure, high-speed mobile service for government use (armed forces, law enforcement and civilian security in intervention).

26 February 2016

Franco-German workshop in Nuremberg on onboard systems to encourage the emergence of shared efforts and standards.

SUPPORT FOR

60

PROJECTS IN THE AREA
OF DIGITAL TRUST AND

€350 million

IN PUBLIC FINANCING

3,000 SMEs

SUPPORTED IN 2015 AS PART
OF THE CAP’TRONIC PROGRAMME
FOR HELPING BUSINESSES
IN EVERY SECTOR INTEGRATE DIGITAL
TECHNOLOGY INTO THEIR PRODUCTS

70

PRODUCTS WITH
“FRANCE CYBERSECURITY”
ACCREDITATION

CNES’S ELECTRIC PROPULSION
SATELLITES:

30%

LESS EXPENSIVE

40 TB per second:

A WORLD RECORD FOR LONG-DISTANCE
TRANSMISSION SET FOR THE LYON/
MARSEILLE/LYON ROUTE (762 KM),
OR THE EQUIVALENT OF 8.5 MILLION VIDEOS
TRANSMITTED SIMULTANEOUSLY

SUCCESS STORIES

Development of the S3P project



The goal of the “Smart, Safe and Secure Platform” project is to provide a testing and development platform (“Industrial Android”) for the Internet of Things, industrial applications (aeronautics, energy, rail transport, factories of the future) and applications for the general public (healthcare, security of goods and people). The project brings together technological partners and groups of users to develop an environment to test open-source hard- and software that will make it possible to deploy different revenue models that are unconnected with hardware constraints. The environment will be able to maintain a high level of quality and will be fitted with efficient and certified modelling and system/application development tools.

Public support: This project received €18.5 million in public support (Digital Society Fund).

Key technology: Safe and secure onboard and distributed systems.

Creation of France Cybersecurity accreditation



The goal of the France Cybersecurity accreditation, which was introduced as part of the “Digital Trust” solution, is to be able to index and promote French cybersecurity solutions for export.

Since the accreditation was officially launched in January 2015, it has been awarded to more than 70 products (firewalls, encryption and identity management tools, application security, etc.). A catalogue of accredited products has been created with an eye to upholding the goals of the accreditation process and promoting accredited products abroad.

Key technology: Safe and secure onboard and distributed systems.

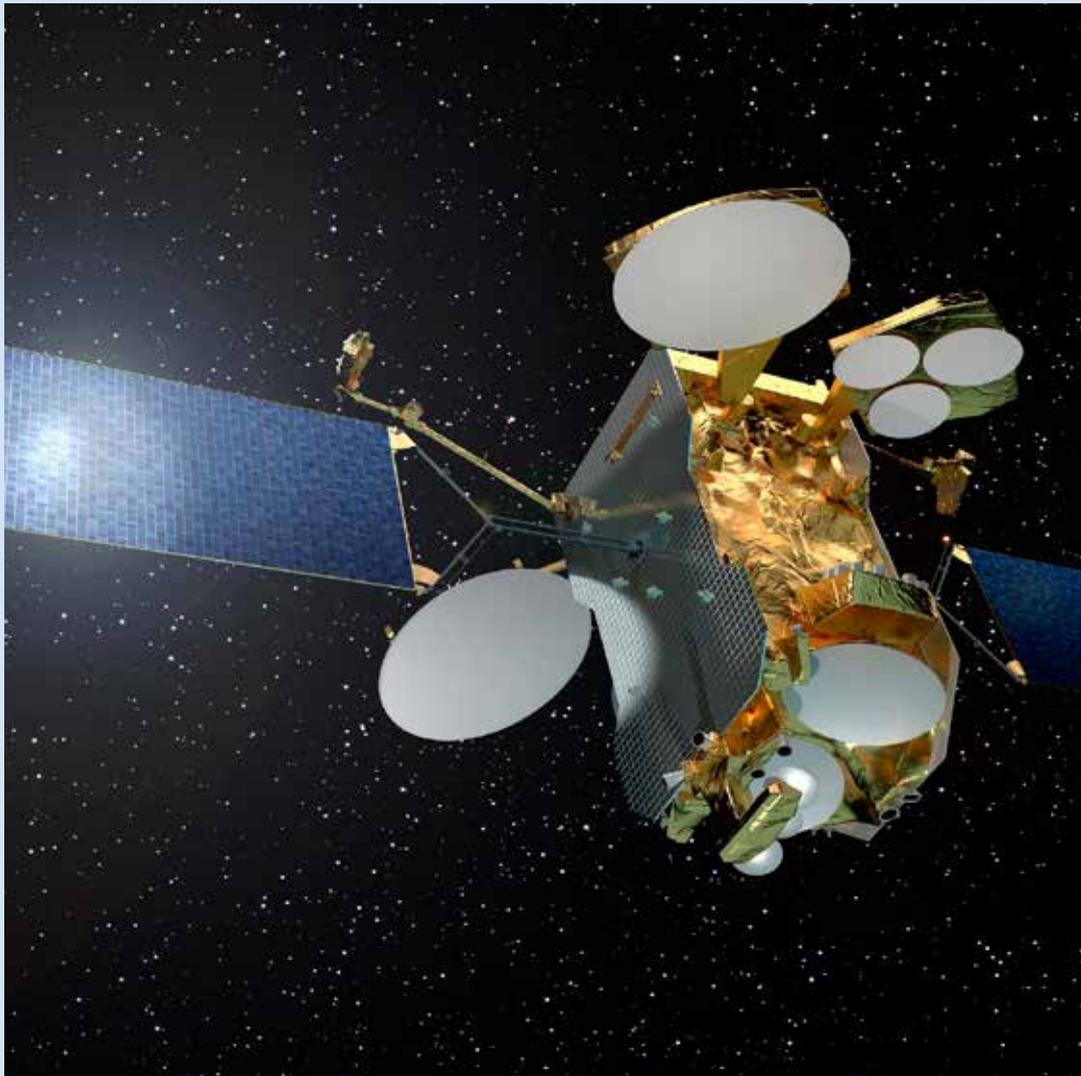
Launch of the secure radiocommunications of the future demonstrator



Early in 2016, as part of the development of demonstrators supported by the Joint Security Industries Committee (CoFIS), a secure radiocommunications of the future demonstrator was launched. It consisted of two sub-projects, one promoted by Thales, and other by Airbus DS.

Public support: This project will receive €23 million in support from the Invest for the Future Programme.

Key technology: Secure communications.



Electric propulsion satellites

Airbus Defence and Space and Thales Alenia Space have booked 8 firm orders for electric propulsion satellites in 18 months, several of them very high-capacity.

Public support: Out of a total project cost of €80 million, €48 million was provided by the “Space” tranche of the Invest for the Future Programme.

Key technology: Propulsion technologies.

ROADMAP

May 2016

Launch of “Sendate”, a European project with very strong Franco-German participation, sponsored by Nokia in the area of telecom networks of the future. The goal is to provide secure, customisable solutions for inter- and intra-datacentre communications.

End 2016

Initial certification of cybersecurity training courses using a reference manual drafted by the National Information System Security Agency (ANSSI) and issued in summer 2016.

2017

Launch of electric propulsion satellites designed and manufactured by Airbus Defence and Space for Eutelsat.

2017

Presentation of the first Industrial Android demonstrator produced by the S3P project.

2019

Launch of the BB4A electric propulsion satellite, designed and manufactured by Thales Alenia Space for Eutelsat.

PROJECT MANAGERS



MARC ROUANNE,
Innovation Director, Nokia



JEAN-YVES LE GALL,
President, CNES (the French
government's space policy agency)



ÉRIC BANTÉGNIE,
CEO, Esterel Technologies
(ANSYS Group)



MARIE-NOËLLE SEMERIA,
Director, CEA LETI



GUILLAUME POUPARD,
Director-General, ANSSI

FOR MORE INFORMATION

Find out more about operational contacts and financing resources at
www.economie.gouv.fr/nouvelle-france-industrielle

A person wearing a blue hairnet and a white lab coat is working in a food production facility. The person is looking down at a tray of food items. The background is slightly blurred, showing other workers and equipment. The overall scene is clean and professional.

SMART FOOD PRODUCTION

Sustainable, competitive and healthy food
in line with consumers' expectations.

How are we going to sustainably feed 9 billion human beings in 2040? How can we make the most of France's agricultural might and its culinary tradition to turn this global challenge into an opportunity to build our exports? The agri-food industry – France's leading industrial sector – is a long-standing powerhouse of the French economy. Global competition, which has been heightened by certain countries' advances and trade liberalisation, means that the sector has to undergo significant changes to become more competitive.

The "Smart Food Production" solution uses these twin leverage points to place France's agri-food industries in a leading position to develop existing and emerging markets: lower costs and higher social and environmental quality, with work on cold storage technology and modernising slaughterhouses, coordinated mobilisation of innovative capacities with respect to fermented products (wine, milk products, charcuterie, etc.) and new sources of protein.

MILESTONES

June 2014

Launch of the Algolife platform for producing and processing seaweed (€23 million). Other platforms also saw the light of day in 2015, including Proleval (oilseed and protein crops for livestock feed – €18 million) and Défi blé dur (a factory of the future for producing pasta – €9 million).

December 2014

Launch of the €120 million “Agricultural and Agri-Food Projects” support mechanism (P3A), managed by FranceAgriMer.

January 2015

Call for projects concerning the slaughterhouse of the future (€50 million, initial projects launched in June 2015). Examples: slaughterhouse modernisation projects (Elivia, LDC, Cooperl).

May and Autumn 2015

Call for projects concerning innovation and competitiveness for the agricultural and agri-food industries (€45 million, initial projects launched in October 2015).

Launch of a call for projects concerning industrialisation of production in the functional food sector as part of the “Promising Industrial Projects” (PIAVE) programme, for a total of €20 million. Examples (initial projects launched in September 2015): yeast proteins (Lesaffre) and chestnut wood extract (King Tree).

April 2016

Presentation of the new roadmap to the Minister of Agriculture, Agrifood and Forestry and the Minister for the Economy, Industry and Digital Affairs.

SUPPORT GIVEN TO

60

PROJECTS IN THE AREA OF SMART FOOD PRODUCTION, MORE THAN HALF OF WHICH DEALT WITH NEW FOOD FORMS

€87 million

IN PUBLIC FINANCING

MODERNISATION PROJECTS SUPPORTED AT

7

SLAUGHTERHOUSES

€4 billion

THE HEALTH FOOD MARKET IN FRANCE

+40%

INCREASE IN WORLD DEMAND FOR PROTEINS BY 2030

FRANCE PRODUCES

7 million

TONS OF PLANT PROTEINS PER YEAR

SUCCESS STORIES

G en vie



The Téréos Group is working on a project involving wheat proteins entitled G EN VIE (Taste and Nutritional Balance for a New Plant-Based Meat). To achieve satisfactory nutritional and digestive qualities, wheat proteins are difficult to extract and functionalise. The products resulting from the project will be marketed to flexitarians (consumers who reduce their meat consumption without necessarily being vegetarians). At the end of the project, operational plant lines will be installed that can produce up to 1,000 kg of meat substitute per hour.

Public support: Public support for this project comes to €570,000 (World Innovation Competition – Phase II / Bpifrance / Invest for the Future Programme).

Puigrenier



Puigrenier is a privately-held SME with 300 employees that specialises in slaughtering, cutting and processing beef. The aim of the project is to support investments connected with the construction of an innovative group of maturation chambers that use salt-curing technologies; these chambers produce high-quality meat with low energy costs.

Public support: This project received €700,000 in government support (Invest for the Future Programme).

Novolyse



Novolyse is a new company that is developing a preventive approach to food safety for production processes involving dry food ingredients. The goal of the project is to perfect non-pathogenic surrogates that mimic the behaviour of pathogens and thereby allowing operators to test the levels of cleanliness of their processes. Novolyse intends to become a world leader in the assessment, validation and optimisation, from a sanitary point of view, of manufacturing processes for dry ingredients.

Public support: Public support for this project came to €650,000 (Invest for the Future Programme).



YOOJI

Yooji offers a customised solution in which parents can compose their baby's food themselves from small frozen disks of meat, vegetables and fish – as close as possible to “homemade”. The MIRAI project (Industrial Means and Research for Innovative Infant Food) includes the construction of a new energy-efficient plant for perfecting vegetable- and meat-based products that provide appealing, balanced meals for infants 18 months old and up. When the project is completed, Yooji is slated to become one of the leaders in frozen infant food.

Public support: This project received €1.3 million in public support (Invest for the Future Programme).

ROADMAP

September 2016

Presentation of industrial projects offering solutions in the following areas:

- **Future proteins:** the expanding world population and changes in dietary habits in developing countries will result in a huge upsurge in world demand for proteins (+40% by 2030). However, animal protein production alone will not be sufficient. France has everything it needs to become a major exporter of new animal and plant proteins. The goal is to coordinate efforts by the key stakeholders to step up the perfection of products that meet the needs of consumers.
- **New enzymes:** one of the strengths of the French agri-food industry, particularly for export, is fermented products (cheese, wine, charcuterie, baked goods, etc.), and the leading producers of yeasts are French. The goal is to combine traditional knowledge with research to step up cross fertilisations, develop new products and examine the connections between food and health via microbiota.
- **Digital technology:** the agri-food sector, 97% of which are SMEs, needs to begin a value-creating digital changeover to improve its competitiveness (supply chain, automation) and to meet the needs of consumers (traceability, ease of contact with producers). The key goal is to identify – among a wide range of digital applications in the food sector – priority areas (R&D, modernisation, etc.) and to draft an initial deployment plan.

16–20 October 2016

With the support of Business France, spotlighting France's strengths in the strategic areas of the "Smart Food Production" solution for an international audience, within the context of the International Food Exhibition (SIAL), held in Paris.

2017

Launch of technological platforms for proteins and enzymes.

PROJECT MANAGER



JEAN-PHILIPPE GIRARD,
President, National Association
of Food Industries / CEO, Eurogerm

FOR MORE INFORMATION

Find out more about operational contacts and financing resources at
www.economie.gouv.fr/nouvelle-france-industrielle

NEW RESOURCES

Develop more efficient processes by encouraging the emergence of new materials, the use of renewable resources, waste processing and, generally speaking, the circular economy.

In the longer term, the increase in global consumption of resources is not sustainable. We need to find new – more efficient and more ecological – ways of producing.

For example, plastics are present in nearly every one of our activities, and are becoming increasingly used in industry, particularly to lighten vehicles. Between 1964 and 2014, plastic production increased by a factor of 20, and is expected to double between now and 2035, and triple by 2050. By mid-century, plastic's share in oil consumption is expected to increase from 6% to 20%, and from 1% to 20% of the carbon budget – which is unsustainable.

To reconcile expanding use with environmental constraints, we need a significant increase in new solutions for new, more efficient modes of production, new materials based on renewable resources, new energy sources and a circular economy:

- Developing the use of “green chemistry”, i.e. chemistry that is more sparing of energy and raw materials, produces less waste and creates high-performance products that are respectful of both people and the environment
- Develop new uses for our renewable resources instead of fossil fuels. These could be natural resources, through the production of bio-sourced products, chemical products or advanced biofuels, the use of recycled raw materials (particularly new materials, plastic and electronic waste, construction industry waste and carbon fibres) or energy recovery (particularly Solid Recovered Fuel – SRF).

MILESTONES

November 2014

Call for expressions of interest in “Eco-Efficient Industry and Agriculture” projects.

August 2015

Promulgation of the Energy Transition and Green Growth Act, which includes objectives to encourage recycling of bio-sourced plastics.

September 2015

Launch of a call for proposals in the “Circular Economy – Waste Recycling and Reuse” category of the Invest for the Future Programme.

December 2015

Presentation of 12 waste recycling and reuse projects, to be deployed in 10 of France’s *départements*, financed by the “Waste Fund”:

- 2 projects for reprocessing circuit boards
- 1 project for a plastic and construction industry waste recycling plant
- 6 projects for solid recovered fuel sorting and preparation centres
- 2 projects for using solid recovered fuel
- 1 project for recovering methane from biowaste.

December 2015

Presentation of legislation encouraging the use of solid recovered fuels (SRF), in a bid to define a regulatory framework and technical guidelines for SRF preparation plants and energy-production installations using SRF.

December 2015

Presentation of the timetable for increasing the use of biofuels to meet the objective of 15% renewable energies in transport by 2030, and presentation of objectives for including advanced biofuels in fuels for 2018 at 2023.

February 2016

Launch of a call for projects in the “Solid Recovered Fuel Energy (SRF)” category.

27 April 2016

Emanuel Macron signs the first four green deals during a conference on the circular economy. The goal of these reciprocal agreements between the government and businesses is to remove roadblocks to the circular economy in a pragmatic fashion.

April 2016

Launch of the SME Initiative “Waste Recycling and Reuse”.

KEY FIGURES

MORE THAN
€100 million
IN PUBLIC SUPPORT BY THE END OF 2015

150
INDUSTRIAL PROJECTS IDENTIFIED
IN THE AREAS OF GREEN CHEMISTRY,
SORTING AND RECYCLING, WITH A
€3 billion
INVESTMENT POTENTIAL

ENERSENS'S SUPER-INSULATING
MATERIALS ARE

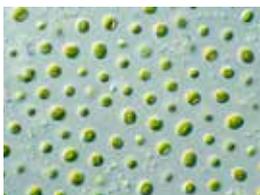
3

TIMES MORE EFFICIENT
THAN GLASS-WOOL INSULATION

15%
OF BIO-SOURCED RAW MATERIALS
BY 2017 AND DOUBLE THE VOLUME
OF PLANT-BASED RAW MATERIALS
USED IN FRANCE'S CHEMICAL INDUSTRY
BY 2020

SUCCESS STORIES

TRANS'ALG



Trans'alg is a consortium that was assembled by Fermentalg, a startup that uses microalgae to produce molecules of interest. The goal of the consortium is to produce raw materials that can be substituted for petroleum products in the chemical and fuel markets. These raw materials will primarily be produced by processing substrate such as distillery and sugarcane residues, or brown liquor from the paper industry. It will contribute to progress in the field of plant chemistry and biofuels. A pre-industrial demonstrator will be set up in the Bordeaux region.

Public support: This project received €14 million in support from the Invest for the Future Programme via Bpifrance, for a total budget of €31 million.

Key technology: Synthetic fuels.

SOLOVER



Solover is an SME specialising in recycling and processing glass. It has built an innovative plant in central France capable of sorting flat glass from the automobile and construction industries and creating a raw material for the highly-demanding flat industrial glass sector. It brings high added-value to the circular economy. The company is calling for €11 million in investments.

Public support: This project received €2.5 million in support under the Invest for the Future Programme. The plant is expected to be operational in the second half of 2016.

Key technology: Environmentally friendly new construction systems.

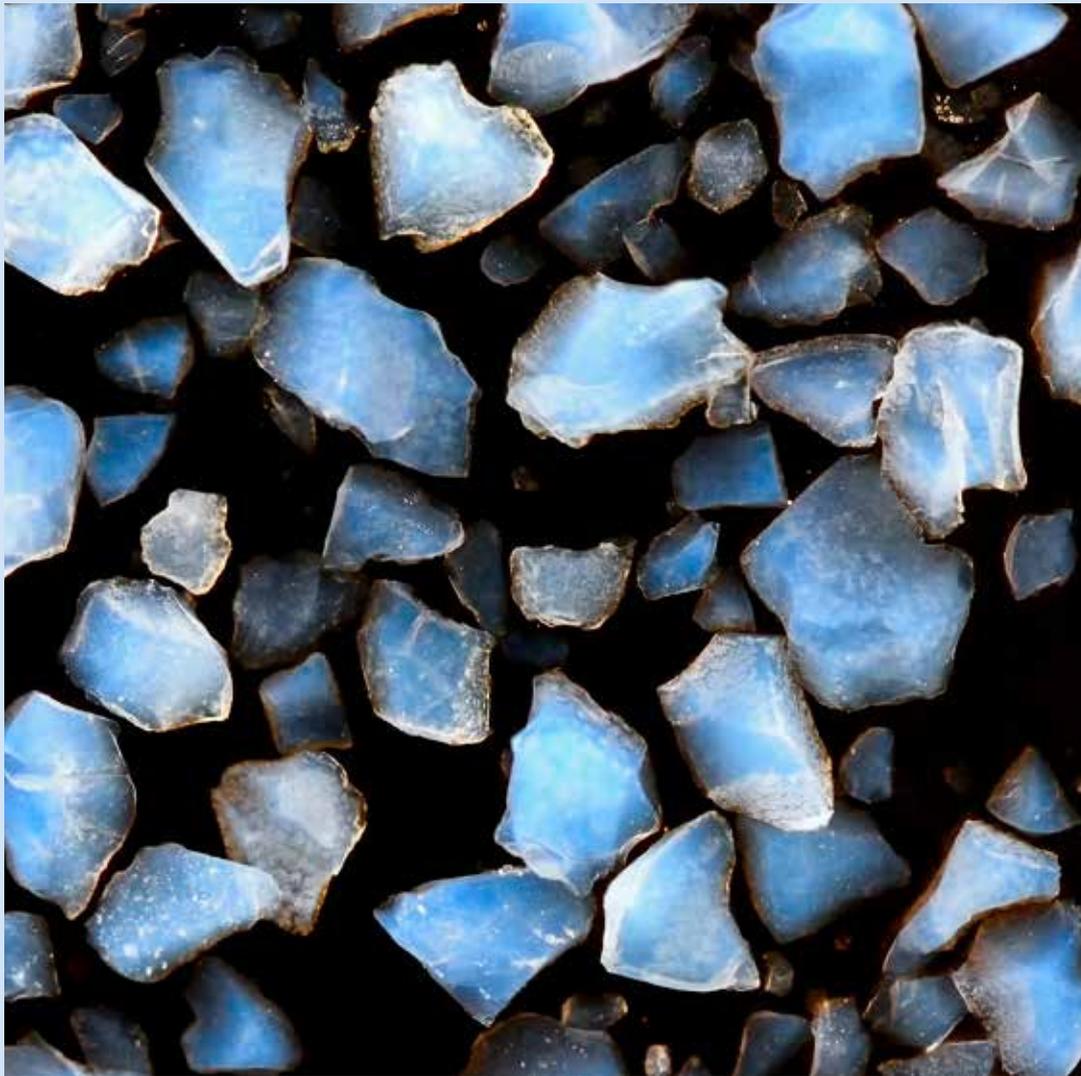


BIOMA+

The Bioma+ project is coordinated by Global Bioenergies. The goal is to develop a process to convert renewable resources into synthetic rubber and isobutene. Pilot plants will be built at Pomacle-Bazancourt in northeast France. Using locally-produced and renewable raw materials, this technology will create non-relocatable industrial jobs. This is an illustration of how sustainable development and green chemistry can be combined.

Public support: This project received €5 million in support under the Invest for the Future Programme, for a total budget of €10 million.

Key technology: Green chemistry-related processes.



ENERSENS

Enersens is a subsidiary of ETI PCAS that was set up in Bourgoin-Jallieu in south-eastern France. A specialist in super-insulating materials, the company has perfected a next-generation super-insulating material based on aerogels – long-lasting materials that are three times more compact than materials currently used to achieve the same insulation. Aerogels will play a part in the energy transition. Enersens's goal is to become a world leader in its field. An industrial demonstrator will be inaugurated in the second half of 2016.

Public support: The Invest for the Future Programme provided €3 million in equity financing via Ademe, which allowed the company to step up its growth; €25 million in investments is needed.

Key technology: Advanced and active materials.

ROADMAP

Mid-2016

Selection of projects under the theme of recycled plastic materials.

July 2016

Review of the multi-year energy plan and the section on biofuels.

September 2016

Public procurement panel on bio-sourced products comprised of buyers and producers.

September 2016

Selection of projects following a call for proposals in the “Solid Recovered Fuel Energy (SRF)” category.

Autumn 2016

Inauguration of Enersens’s and Solover’s industrial units.

October 2016

Selection of projects under the SME Initiative “Waste Recycling and Reuse”.

February 2017

Close of call for proposals in the “Circular Economy – Waste Recycling and Reuse” category of the Invest for the Future Programme.

PROJECT MANAGERS



PASCAL BARTHÉLÉMY,
Deputy Director-General,
IFP Énergies Nouvelles (IFPEN)



ANTOINE FRÉROT,
CEO, Veolia

FOR MORE INFORMATION

Find out more about operational contacts and financing resources at
www.economie.gouv.fr/nouvelle-france-industrielle



SUSTAINABLE CITIES

Developing the smart cities of tomorrow is a way to meet the key environmental, digital and demographic challenges that we face.

By 2020, two-thirds of the world's population will live in urban areas, and one-third of them will live in cities that are currently rapidly expanding in emerging countries. Sustainability is vital. Cities must be able to adapt and innovate to confront environmental, climate and healthcare challenges.

By integrating new technologies, the “Sustainable Cities” solution aims at developing a more intelligent management of water and energy networks and infrastructures, building and renovating structures to make them into high-quality, sustainable buildings with enhanced environmental and energy performances, and improving the environmental quality of public spaces and developing associated services.

MILESTONES

15 April 2015

Launch of the Confluens project, which brings together six industrial firms that will allow equipment that ensures comfort, safety and energy efficiency for smart homes to communicate with each other.

14 May 2015

Launch of a call for expressions of interest, focusing on the theme of treatment plants in sustainable cities, intelligent network management and desalination resources and processes that use new means of energy production. The initial project selected is entitled Demos and is sponsored by the SME Mascara.

9 July 2015

Four campuses (Lille, Grenoble, Saclay, Nice) developing public-private smart grid test platforms receive accreditation by the Think Smartgrids Association.

8 December 2015

Selection of the Neophil 2 project for pre-industrial production of a new generation of hollow fibre membranes whose permanent hydrophilic character is guaranteed by the inclusion of a new material.

11 February 2016

Signature by Ségolène Royal, Sylvia Pinel, Emmanuel Macron and 6 industry representatives of a Commitment Charter by the network of traders /wholesalers in building supplies and equipment. The goal is to spotlight technological solutions to enhance buildings' energy performance and to support skill-building among professionals.

15 March 2016

Announcement by Ségolène Royal and Emmanuel Macron of the winning territories following a call for projects for deploying large-scale smart grid solutions. The three winners are Smile (Brittany/Pays de la Loire), Flexgrid (PACA) and You&Grid (Hauts-de-France).

March 2016

The Invest for the Future Programme agrees to provide support for the project sponsored by Adivbois to build large-scale wooden buildings.

April 2016

Official launch of the Smile project (Brittany/Pays de la Loire) in Lorient, one of the winners of a call for projects for deploying large-scale smart grid solutions.

43

PROJECTS SUPPORTED IN THE SUSTAINABLE CITIES CATEGORY

15,000

JOBES EXPECTED IN THE THREE PILOT REGIONS FOR SMART GRIDS

€145 million

IN PUBLIC FINANCING

A POTENTIAL

€1.5 trillion

MARKET FOR "SUSTAINABLE CITIES" SOLUTIONS BY 2020

A €375 million

BUDGET OVER NINE YEARS FOR 4 ENERGY TRANSITION INSTITUTES

SUCCESS STORIES

Exem and HiKoB



Exem, a company that has developed a compact unit for detecting underground power lines, has won first prize in the “Technician 3.0” category of ERDF’s 2015 Innovation Competition (25 winners out of a total of nearly 300 participants). HiKoB was one of four winners of an innovation competition sponsored by RTE. The winning project concerns a system for remote monitoring of electric transforming stations and of aerial linear RTE transmission infrastructures. Both winners will receive support from electrical grid companies to develop and test their technologies.

Key technology: Electric grids.

DEMOS



Demos is developing an intermittent-operation desalination plant powered by solar energy. Two demonstrators are planned, one in Abu Dhabi and the other in Bora-Bora.

Public support: This project received €1.3 million support from the Invest for the Future Programme. Industrial partners: Mascara (lead company) and Suez.

Key technology: Smart water management.

CONFLUENS



The Confluens project is addressing home automation interoperability issues by creating a metalanguage that can be integrated into new and existing home automation equipment. It was designed in 2015, deployed in 2016 and will be exported within Europe in 2017. Confluens is a joint venture that was an initiative of Iignes, the FIEEC and the companies CDVI, Delta Dore, Hager, Legrand, Schneider-Electric and Somfy.

Public support: Support from the Invest for the Future Programme totalling €1.8 million, of a total project budget of €4.1 million.

Key technology: Smart objects.



Smart electric grids

Smart electric grids combine energy and digital technologies. Good coordination of stakeholders and technologies will be a determining factor in the success of France's smart grids sector. For this reason, as part of a call for projects launched by the government, three projects (including two "showcase" territories) were selected, including Smile (Brittany/Pays de la Loire, 1,000 direct jobs and 8,500 indirect jobs over the long term) and Flexgrid (PACA, 6500 jobs over the long term). These projects will allow grid operators access to the largest assembly of tried and tested smart grid technologies, which are nearing industrial maturity.

Public support: These projects are expected to benefit from €80 million in investments from transmission and distribution system operators (RTE and ERDF) and, together with You&Grid (Hauts-de-France), from €50 million from the Invest for the Future Programme. The French smart electric grids sector (transmission and distribution) is expected to generate 10,000 direct jobs by 2020.

Key technology: Smart electric grids.

ROADMAP

May 2016

Launch of a Call for Expressions of Interest (CEI) under the Urban Planning, Construction and Architecture Programme (PUCA) to identify French territories for constructing wooden buildings.

May 2016

Launch of the “Experience P2E” Association to develop and test an energy performance certificate for buildings.

May 2016

Publication of the guide “Digital Building Mockups: Six Questions to Help You Understand and Take Action” published by Cercle Promodul.

June 2016

Presentation of a guide to the upcoming Environmental Regulations for Buildings (RE 2018).

June 2016

Official launch of the Flexgrid project (PACA region), one of the winners of a call for projects for deploying large-scale smart grid solutions.

June 2016

Launch of a new call for projects having to do with the water sector.

July 2016

Rollout of the first smart, interoperable home automation products from the Confluents project.

July 2016

Submission of the second “Socio-economic Assessment of Smart Grids” report (RTE, ERDF, ADEME and Adeef).

October 2016

Launch of the Batiscaf project which will allow the widespread use of 3D immersive techniques in construction sector trainings.

PROJECT MANAGERS



CHRISTOPHE CHEVILLION,
CEO, Environnement SA



THIERRY MALLET,
Executive Vice President
in charge of Innovation,
Business Performance
and Marketing for SUEZ
environnement



FRANCK MATHIS,
CEO, Mathis SA



PHILIPPE MONLOUBOU,
Chairman, ERDF Board
of Directors



JACQUES PESTRE,
Deputy CEO, Saint-Gobain
Distribution Bâtiment France
(Point P)



MARCEL TORRENTS,
Chairman of the Board
of Directors, Delta Dore



DOMINIQUE WEBER,
CEO, Weber industries

FOR MORE INFORMATION

Find out more about operational contacts and financing resources at
www.economie.gouv.fr/nouvelle-france-industrielle

ECO-MOBILITY

Changing how we travel, to make our trips more ecological, less burdensome and more choice-driven.

Citizens want to be able to travel quickly, safely, at low cost and with as little impact as possible on the environment: sales of electric vehicles are up sharply (+47% in 2015), average CO2 emissions for new cars are falling (111 g/km in 2015 against 127 g/km in 2011). New players from the world of digital technology are positioning themselves to ensure that their products and services are used in “connected” vehicles that are capable of interacting with other vehicles and with infrastructures, and are developing driverless cars. New services based on communication technology, particular carpooling, are expanding.

Individual mobility, particularly in urban settings, is undergoing a profound shift, one that is slated to continue and to expand. Although French stakeholders are already quite active (Valeo is marketing its driving assistance systems to a group of international carmakers; 61% of all light electric vehicles sold in 2015 were made by Renault; PSA is experimenting with driverless vehicles), the changes underway will require vehicles that are more economical – particularly thanks to alternative energies – more connected and more autonomous, combined with appropriate deployment of infrastructures.

MILESTONES

October 2014

The Paris Auto Show: presentation by PSA and Renault of two demonstrator vehicles capable of travelling 100 km on two litres of petrol. These will allow the carmakers to test technological building-blocks (weight optimisation, aerodynamics, electrification, etc.).

20 March 2015

Closure of CGI's first "SME Initiative" call for projects, managed by ADEME, to finance innovative projects by SMEs concerning eco-mobility. Two other similar calls have been launched since then.

22 June 2015

Granting of initial permissions to experiment with driverless vehicles on the open road. PSA, Renault and Valeo received authorisation to use France's motorway network: 40,000 km logged on motorways in Europe. ITE Vedecom has clocked up 1,000 km in urban and semi-urban areas, particularly around Versailles.

5–9 October 2015

State-of-the-art driverless vehicles on display at the 2015 World Congress on Intelligent Transport Systems in Bordeaux.

31 December 2015

Closure of the call for projects in the "Charging Infrastructure Deployment" heading of the Invest for the Future Programme, managed by ADEME, with the goal of financing 20,533 publicly-accessible charging points in France.

January 2016

Acknowledgment of the national scope of Sodetrel's network of 200 electric vehicle charging stations along motorways that cover the entire territory of France. The networks of Bolloré (16,000 stations) and the Compagnie nationale du Rhône (30 stations) are also acknowledged to be of national scope.

4 May 2016

Launch of the "Hydrogen Territories" call for projects, following the recommendations of the report by the interministerial "Hydrogen Energy Sector" taskforce.

KEY FIGURES

77

PROJECTS TO DEPLOY CHARGING STATION
INFRASTRUCTURES TO COVER

73%

OF THE TERRITORY OF METROPOLITAN
FRANCE, FOR A TOTAL OF

€61 million

IN PUBLIC FINANCING

€110 million

IN PUBLIC FINANCING
FOR THE HYDROGEN SECTOR

€150 MILLION

IN PUBLIC FUNDING
FOR THE "2 L PER 100 KM" VEHICLE

40

TEST SITES FOR DRIVERLESS VEHICLES
IN FRANCE,

40,000 km

ALREADY DRIVEN

PLUS DE

30 M€

DE SOUTIEN PUBLIC AU DÉVELOPPEMENT
DU VÉHICULE AUTONOME

MORE THAN

€30 MILLION

IN PUBLIC SUPPORT FOR THE DEVELOPMENT
OF DRIVERLESS VEHICLES

2

INDUSTRIAL SITES IN FRANCE BY 2017
FOR THE BATTERY AND HYDROGEN SECTORS

A €500 billion

GLOBAL MARKET FOR DRIVERLESS
VEHICLES BY 2035

SUCCESS STORIES

SCORE@F/Scoop@F



The aim of these two projects is to lay the groundwork for the deployment of cooperative roadway systems in Europe based on local, wireless communication systems for Vehicle-to-Infrastructure (V2I) and Vehicle-to-Vehicle (V2V) communications.

Public support: SCORE@F was provided with €6 million in funding under the Single Interministerial Fund (FUI). Scoop@F is a European project that has received €10 million in EU funding.

Renault Maxity Electrique



The Maxity Electric is an electric lorry equipped with a hydrogen-powered range extender, which doubles autonomy to 200 km in comparison with standard lorries. It was developed by Renault Trucks in partnership with Symbio FCell, and is currently being tested under real roadway conditions by the French postal service.

Key technology: Hydrogen technologies.



FORCE

The goal of this project is to lighten vehicle weight using low-cost carbon fibres. Phase 2 of the project was launched in cooperation with the Institut de Recherche Technologique Jules Verne (IRT Jules Verne) and the Aquitaine Technological Centre for Advanced Materials and Composites (CANOE) with a total budget of €18 million.

Public support: Force received support via financing for the IRT Jules Verne under the Invest for the Future Programme.

Key technology: Advanced and active materials.



NAVYA

Since October 2015, Navya has been developing and marketing an electric, intelligent and autonomous shuttle: the Navya Arma. It is intended to be used at large sites that do not have traffic regulations, such as industrial sites, airports, amusement parks, hospitals, hotel complexes, or on the public road network with specific authorisations (urban areas).

Public support: For the development of its offer, Navya received €800,000 in loans from Bpifrance.

Key technology: Autonomous robotics.

ROADMAP

June 2016

Sodetrel opens its first 200 rapid-charging stations.

September 2016

Projected opening of the first charging stations by Bolloré.

October 2016

French connected vehicle technology on display at the Paris Auto Show.

End 2016

Announcement on 30 October of the winners of the “Hydrogen Territories” call for projects, and deployment of these projects.

Early 2017

The first Composite 700-bar hydrogen tanks for the Mobilité H2 reach the market.

Mid-2018

Large-scale testing of driverless vehicles on open roads.

PROJECT MANAGERS



FRANCIS VUIBERT,
French Prefect,
government adviser



FLORENCE LAMBERT,
CEO, CEA Liten



GASPAR GASCON-ABELLAN,
Executive Vice President,
Engineering, Renault



GILLES LE BORGNE,
Executive Vice President,
Research and Development, PSA



CARLOS GHOSN,
CEO, Renault

FOR MORE INFORMATION

Find out more about operational contacts and financing resources at
www.economie.gouv.fr/nouvelle-france-industrielle

MEDICINE OF THE FUTURE

Using new technologies to provide better, more customised care at a lower cost.

Medical progress is proceeding at an unprecedented pace thanks to technological innovations, particularly in the areas of biotechnology and precision medicine, and to the rise of digital technology. Global competition in the healthcare industries is experiencing an upheaval, and the healthcare system needs to be overhauled in order to tap the full medical and economic potential of new technologies.

Specialised treatments, which are becoming more expensive, an ageing population, a rise in the prevalence of chronic illnesses, and increasingly customised care – all these factors are placing a strain on healthcare systems.

France has a great deal going for it in the international arena – a widely renowned healthcare system, the richest data sets in the world, top-level academic and clinical research and a strong industrial presence, particularly in pharmaceuticals. The goal is, within 5 to 10 years, to transform the healthcare industries and the healthcare system to maintain, and even improve, France's position in this sector.

SUCCESS STORIES

Starting in February 2014

Mobilisation of France's seven healthcare clusters via large-scale projects for which €400 million in public financing has been made available. These include Imodi (oncology, February 2014), Sight Again (artificial retinas, November 2014), 3d Surg (hepatic surgery, January 2015), Hecam (medical imaging, November 2014), Mivana (aortic valves, July 2015) and Carat (radionuclides, June 2015).

These collaborative projects have strengthened the ecosystems of major healthcare and other companies (General Electric, STMicroelectronics and Areva), as well as of major research institutes (INSERM, CEA, Institut Pasteur, Institut de la vision) and a great many innovative SMEs.

September 2014

Launch of 5 "Digital Healthcare Territories" projects (Aquitaine, Burgundy, Île-de-France, Réunion and Rhône-Alpes).

December 2015

Approval of the Healthcare Modernisation Bill, which introduces a single healthcare identification number for each patient (part of the Digital Healthcare Plan) and creates a national healthcare data system to allow centralised access to medical and administrative data required for research and assessment of healthcare products.

Financing support for startups in the healthcare sector, with the participation of Bpifrance in Sofinnova Capital VIII Fund (a total of €298 million) and the creation of the FABS Fund (Biotech Healthcare Acceleration Fund), with €340 million from the Invest for the Future Programme.

400

"HEALTHCARE" PROJECTS SUPPORTED
IN 2015 VIA SUBSIDIES, REPAYABLE
ADVANCES AND EQUITY INVESTMENT

20%

ANNUAL GROWTH
FOR MEDICAL BIOTECHNOLOGIES
BETWEEN NOW AND 2020

€300 million

IN PUBLIC FINANCING
MOBILISED IN 2015 FOR PROJECTS LED
BY INDUSTRIAL FIRMS

4–5%

ANNUAL GROWTH
IN THE MEDICAL DEVICES
AND HEALTHCARE TECHNOLOGIES
MARKET

SUCCESS STORIES

MR Biopharma



Europe's largest centre devoted to the development and pharmaceutical production of gene and cell therapies is being built outside of Paris. By 2019, it will have a surface area of 13,000 m², and will meet the needs of the AFM Téléthon laboratories as well as those of a great many academic and industrial stakeholders in the biotechnology field, for both clinical trials and post-marketing authorisation distribution.

Public support: This project received €84 million in support from the "Industrial Projects Companies" (SPI) investment fund managed by Bpifrance under the Invest for the Future Programme.

Key technology: Cellular and tissue engineering.

Innate Pharma S.A.

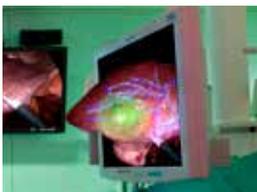


A biopharmaceutical firm specialised in immuno-oncology, Innate Pharma S.A. is a pioneer in the development of antibodies that act on a specific class of immune system cells: the so-called "natural killers" (NK). Its ground-breaking approach has given rise to major alliances with leading biopharmaceutical companies such as AstraZeneca (co-development and marketing agreement signed in 2015), Bristol-Myers Squibb (licensing agreement signed in 2011) and Novo Nordisk A/S and Sanofi (cooperation and licensing agreement signed in early 2016).

Public support: Bpifrance is a long-time shareholder in this company.

Key technology: New immunotherapies.

3D-Surg



The goal of this project is to position France as a world leader in 3D technologies as applied to surgery. It brings together eight partners (startups, SMEs, a major firm and research institutes), who are developing 3-D patient modelling systems, secure transfers for patient data, glasses-free 3D, contactless interfaces and applications and headgear for augmented reality.

Public support: This project received €7.8 million in support from the Invest for the Future Programme, of the total budget of €18 million.

Key technology: Immersive technologies.



CELL4CURE

Led by Cell4Cure (C4C), a specialised subsidiary created in 2010 by the French biopharmaceutical firm LFB, an industrial production platform located in the greater Paris region, is one of the key means to achieving the goal of an industrial cellular therapy sector for France.

Public support: C4C is a project with total investments of €80 million, €30 million of which is in the form of public support.

Key technology: Cellular and tissue engineering.

ROADMAP

June 2016

Report by André Syrota and Olivier Charmeil is submitted to ministers. The report offers proposals and next steps for the solution by defining the key strategic directions and milestones for the upcoming years.

PROJECT MANAGERS



ANDRÉ SYROTA,
CEA



OLIVIER CHARMEIL
President and CEO,
Sanofi-Pasteur

FOR MORE INFORMATION

Find out more about operational contacts and financing resources at
www.economie.gouv.fr/nouvelle-france-industrielle

TRANSPORT OF TOMORROW

**More environmentally-friendly
and competitive transport for both individuals
and goods.**

Emerging countries are fuelling global demand for transport solutions by sea, rail and air; the size of the high-speed rail systems in these countries is expected to double by 2025, whereas air passenger traffic to and from these countries will represent 70% of the world air traffic by 2035. At the same time, the transport sector is a vital part of public sustainable development policies. In 2010, it accounted for 14% of global greenhouse gas emissions, and as such is the subject of increasingly strict regulations. We need to meet this increasing worldwide demand for mobility of goods and people and propose solutions that are both environmentally-friendly and competitive.

Historically, transport has been an area of excellence for French industry: the top French and European firms are among the world leaders in the sector. To maintain our position in the face of increased competition from industrial firms in emerging countries, we must rethink modes of transport and offer innovative solutions that combine environmental efficiency and economic competitiveness in order to take advantage of rising demand on the world market.

MILESTONES

23 July 2014

Creation of Voltair, a subsidiary of Airbus, tasked with developing and marketing the E-Fan electric aircraft, and with launching the project's risk reduction phase.

30 April 2015

Announcement of the construction of the E-Fan assembly plant in southwest France.

19 May 2015

Launch of the "Ships of the Future" call for projects, with €40 million in financing. Among the projects receiving financing is Passion, a smart maritime gateway.

2 July 2015

Signature in Toulouse of a capital agreement between Flying Whales and the Chinese aeronautics group AVIC for the development, industrialisation and marketing to build a 60-ton large capacity airship.

4 July 2015

SNCF Mobilités launches a public tender for an innovation partnership concerning development of a new high-speed train system.

10 July 2015

A prototype of the E-Fan electric aircraft crosses the English Channel.

11 December 2015

Creation of the Alstom-ADEME SpeedInnov joint venture for financing development of tomorrow's high-speed trains.

26 April 2016

Launch of the risk reduction phase of the Stratobus autonomous high-altitude airship project sponsored by Thales Alenia Space.

2 May 2016

Signature of an investment protocol between the Moroccan industrial firm Marita and French investors in Flying Whales' 60-ton large capacity airship project and finalisation of the first funding round.

SUPPORT PROVIDED FOR

24

PROJECTS IN THE "TRANSPORT OF TOMORROW" CATEGORY

€242 million

IN GOVERNMENT FINANCING FOR ALSTOM'S FUTURE HIGH-SPEED TRAIN PROJECT

35% less

ENERGY CONSUMPTION AND A

+15%

INCREASE IN CAPACITY

A 10-year

HORIZON FOR THE SAINT-NAZAIRE SHIPYARDS ORDER BOOK

A 90%

REDUCTION IN EMISSIONS OF SULPHUR OXIDES AND A

70%

REDUCTION IN FINE PARTICULATES THANKS TO THE DEEPBLUELAB SCRUBBERS INSTALLED ON BRITTANY FERRIES VESSELS

SUCCESS STORIES



The Stratobus

Thales Alenia Space is a key aerospace player in Europe in the areas of telecommunications, navigation, terrestrial observation, exploration and the creation of orbital infrastructures. With government support, Thales has teamed up with industrial partners to develop the Stratobus, an autonomous high-altitude airship. Stationed at an altitude of 20 km, the airship is an ideal complement to a satellite-based solution, and will provide access to permanent and regional surveillance missions for borders, critical terrestrial and maritime sites (video protection of offshore drilling platforms), military security (combating terrorism) as well as environmental control (forest fires, shore erosion, pollution, etc.) and telecommunications (Internet access for the 3 billion individuals on earth who do not yet have it). The industrialisation phase will begin at 2018, with a plant located next to the airstrips at the Istres airbase in southern France.

Public support: €16.6 million in support from the Invest for the Future Programme.

Key technologies: Photovoltaic solar energy, hydrogen technologies, advanced and active materials.



E-Fan

Airbus is a world leader in the areas of aeronautics, aerospace and defence. With government support, Airbus has teamed up with industrial partners, research institutes and training schools to develop a two-seater electric aircraft, the E-Fan. The goal of this new-generation aircraft is to provide fresh impetus to general aviation and to pilot training. The industrialisation phase will begin in 2017, with an assembly plant in southwest France.

Public support: This project received €4.6 million in support from the Invest for the Future Programme.

Key technologies: New-generation electro-chemical batteries, propulsion technologies.

CNIM scrubbers



CNIM designs and manufactures high-technology-content equipment and turnkey industrial solutions. It installed its DeepBlueLab scrubbers in the smokestacks of three Brittany Ferries ships that cross the Channel and sail along the Atlantic coast. This allowed Brittany Ferries to comply with recent environmental regulations while continuing to use a standard fuel solution, thereby keeping its competitive edge.

Public support: Brittany Ferries received €13 million in investment support for these projects from the Invest for the Future Programme, one-third in the form of subsidies, and two-thirds as repayable advances.

Key technologies: Advanced and active materials.



TGV OF THE FUTURE

Alstom is a leading global firm that designs and offers systems, equipment and services for the railway sector. It is a leading firm in the high-speed train market. In December 2015, Alstom signed a joint-venture agreement with ADEME to create SpeedInnov, with government co-investment from the Invest for the Future Programme. The aim of SpeedInnov is to develop the TGV of the future, with ambitious goals in terms of energy consumption, capacity and overall cost of ownership. Alstom submitted a bid following a public tender by SNCF Mobilités for an innovation partnership, launched in July 2015. The purpose of the partnership is to develop a concept for a high-speed train, of which SNCF Mobilités will take ownership in 2017.

Public support: Government financing from the Invest for the Future Programme through investment in the SpeedInnov joint venture

Key technologies: Digital modelling, simulation and engineering, propulsion technologies, safe and secure onboard and distributed systems

ROADMAP

As of mid-2016

Launch of the development phase of the Airbus Group's E-Fan project.

As of mid-2016

Launch of the engineering phase of Flying Whale's 60-ton large capacity airship project, with its two international investors.

Autumn 2016

Amtrak is expected to announce the winner of the bid to build 28 high-speed trains between Washington and Boston. Alstom has bid on the project.

September 2016

During scheduled maintenance for the Thalassa, a ship owned by Ifremer, installation of a prototype Integrated Harvesting Energy System (IHES) developed by Geps Techno. This system optimises energy performance using a stabiliser with internal energy storage.

October 2016

Close of the "Ships of the Future" call for projects. Ambitious projects concerning exhaust line innovations and maritime use of hydrogen batteries are expected to be submitted.

2017

Start of production of E-Fan aircraft in the assembly plant in southwest France, with the goal of eventually producing 80 planes per year.

2017

Launch of A-NSE's project to build the A-N 20000, a multi-capacity airship.

Starting in 2017

If the innovation partnership achieves its objectives, SNCF Mobilités could place an order for a high-speed train.

2018

In-flight validation of the Stratobus's most innovative technologies with the aid of a smaller-scale demonstrator.

2018

In-flight test of the E-Fan under real operational conditions (100 hours of flight) and launch of the commercial prospecting phase.

2018

Launch of construction work on industrial infrastructures for the airship sector at Istres.

PROJECT MANAGERS



PHILIPPE BERTEROTTIERE,
CEO, Gaztransport &
Technigaz (GTT)



PATRICK BOISSIER,
President, GICAN



JEAN PERROT,
Director of Institutional
Relations for Research &
Technology, Airbus Group



HENRI POUPART-LAFARGE,
CEO, Alstom Transport



ANDRÉ SOULAGE,
Director of airship programs
at the SAFE cluster

FOR MORE INFORMATION

Find out more about operational contacts and financing resources at
www.economie.gouv.fr/nouvelle-france-industrielle

47 KEY TECHNOLOGIES

**Key Technologies 2020, a study for businesses
in New Industrial France sectors.**

The Key Technologies 2020 study was designed as a tool for manufacturers and service-sector companies using French technologies. It offers a strategic, medium-term vision of global markets, particularly thanks to separate chapters devoted to various areas of application, and an operational viewpoint of technologies that need to be industrialised in order to win market share.

#TC2020

Download the study at www.entreprises.gouv.fr/TC2020



KEY TECHNOLOGIES 2020: PAVING THE WAY FOR THE INDUSTRY OF THE FUTURE

Every five years, just as in other major industrialised countries, the Ministry for the Economy, Industry and Digital Affairs carries out a prospective technological study entitled “Key Technologies” in a bid to identify strategic technologies to help French businesses remain competitive in the medium term. This study, which has already been issued four times, has become an important source document for companies, stakeholders in French innovation ecosystems and institutional players, particularly those tasked with public policy.

The fifth edition of “Key Technologies” was drafted between autumn 2014 and early 2016, and involves the work of a large number of experts. It was led by the General Directorate for Enterprise, and was carried out by the Erdyn and Alcimed consulting firms. Atelier Iceberg provided technical expertise in the area of mapping and systemic representation. A Strategic Committee, led by Philippe Varin, and bringing together high-level individuals from both public and private bodies, met four times. The Committee provided strategic orientations for the study, validated the methodology, selected key technologies and oversaw the quality of the results.

To facilitate identifying priorities in terms of R&D strategy, the Strategic Committee wanted to limit the number of technologies selected in the report. Key Technologies 2020 thus contains 47 key technologies in nine areas – food, environment, habitat, security, healthcare and well-being, mobility, energy, digital technology, and leisure and culture.

Contents of Key Technologies 2020

The report provides:

- A strategic vision of world markets in the medium term in nine areas of application
- A description of the 47 technologies to master in order to win these markets (one description per technology)
- An operational overview of the technologies that need to be industrialised to win market share, via the descriptions of the 47 technologies.

At each level, Key Technologies 2000 represents an operational guide for the New Industrial France solutions and provides recommendations – particularly directed at SMEs – for deploying the report’s technologies. The report is a technological forecasting tool to win market share, which identifies:

- Markets and usages in 2020 such as could be identified in 2016 using prospective analyses
- Industrial challenges that businesses will face
- Key success factors
- The strengths and weaknesses of France’s industrial fabric and academic resources to help companies take advantage of the opportunities listed.

The study highlights the key stakeholders in our innovation ecosystems and offers recommendations – particularly directed at SMEs – for deploying the report’s technologies.

Of the 47 key technologies listed, more than half are cross-cutting, and seven of them have to do with at least seven of the nine areas of application, such as Big Data Intelligence, connected objects and advanced and active materials. Looking 5 to 10 years into the future, these technologies could be extremely important for French competitiveness.

Each description of a key technology lists the main stakeholders, regardless of their status: businesses, academic stakeholders, technology research institutes, energy transition institutes, University Hospital centres, clusters, Carnot institutes, technical industrial centres and technology transfer and acceleration firms. Their contact details are given in a directory, under regional headings.

A mapping of the key technologies was drawn up to highlight links and interdependencies between them. The most cross-cutting technologies are at the centre of the map.

Audience for Key Technologies 2020

Key Technologies 2020 is primarily intended for company executives who wish to diversify their activities or launch new offers, as well as public-sector decision-makers seeking expert opinions to help them make strategic investment and partnership choices. The report can also be of use to training organisations to help find skills and scientific, technical and industrial stakeholders in a bid to make their communities aware of the links between a technology and its applications, thereby stimulating the emergence of innovative ideas.

- The report's digital version provides a fluid navigational mode that links a market with one or more key technologies. Users can also identify all of the applications for a specific technology. Moreover, for each request, a list of key stakeholders – whether in academia or the private sector – is supplied.

Main findings of Key Technologies 2020

- **Mastery of key technologies is vital for the Industry of the Future** (31 key technologies associated) **and for each of the nine New Industrial France solutions.** Five key technologies, which form a common technological core with a high digital technology content, concern practically every one of the nine solutions: sensors, Big Data Intelligence, modelling, digital simulation and engineering, the Internet of Things, and new hardware-application integrations.
- **French stakeholders – manufacturers, high-value-added service companies and academic players – have real potential in these key technological areas.** All sectors combined, French stakeholders are either leaders or co-leaders for one third of the key technologies, and are among the top firms for more than half. In environmental technologies, particularly those concerning food, French stakeholders are leaders or co-leaders for 40% of the key technologies identified. As regards French academic stakeholders, they are positioned as co-leaders for more than half of the key technologies identified and, in the areas of food and healthcare, are leaders or co-leaders for 70% of them (see charts of strategic positioning in the nine areas of application).

- **The most highly-represented technologies in Key Technologies 2020 are digital technologies, followed by healthcare and well-being technologies, mobility and energy.**

Digital technologies continued to enjoy strong forward momentum in the areas of artificial intelligence leading to robotics and cobotics, and in the infrastructures needed for fifth-generation mobile telephony and the many associated services, which themselves are very innovative. Key Technologies 2020 confirms the significance of nanoelectronics, robotics, augmented reality technologies, onboard applications, 3D technologies (including 3D printing) and cloud computing in association with supercomputers, leading to Big Data.

The study also assigns significant importance to **life science technologies**, such as cellular and tissue engineering, immune system technologies and live imaging. Moreover, given France's ageing population, the challenge of home care is leading to the development of products associated with high-value-added services (detection of anomalous situations, customised monitoring and treatment, etc.), particularly via connected objects.

The importance of **mobility, energy and environmental and habitat technologies** is set against a backdrop of global awareness of the challenges of planetary warming and the need for energy independence. The Key Technologies 2020 study lists technologies having as much to do with the means for producing and supplying traditional (oil, nuclear power) and renewable energies (such as sea-based windfarms or next-generation photovoltaics) as it does on improving usages and economising resources (energy savings in construction, high-performance usages of digital technology to reduce consumption, smart grids).

The 47 Technologies:

1. Advanced and active materials
2. Sensors
3. Big Data Intelligence
4. Digital modelling, simulation and engineering
5. Internet of Things
6. Fifth-generation infrastructures
7. Safe and secure onboard and distributed systems
8. Processes related to green chemistry
9. Additive manufacturing
10. Robotics and human enhancement
11. Artificial intelligence
12. Autonomous robotics
13. Secure communications
14. Immersive technologies
15. Processes related to oil chemistry
16. Recycling of critical metals and rare earths
17. Microfluidics
18. Meta-omics
19. Behavioural analysis
20. New hardware-application integrations
21. 2Supercomputers
22. Smart grids
23. Next-generation electrochemical batteries
24. Synthetic fuels

25. Hydrogen technologies
26. Genetic engineering
27. Innovative solutions for protecting and stimulating plants
28. Probiotic strains for bio-preservation and nutrition
29. Cellular and tissue engineering
30. New immunotherapy processes
31. Implanted devices
32. Healthcare imaging technologies
33. Exploitation of electronic health records
34. Strong authentication
35. Smart water management
36. Rapid diagnostic technologies (water, air and soil)
37. Polluted soil treatment
38. Systems for renovating existing housing stock
39. High environmental quality construction systems for new buildings
40. Integrated energy systems at building level
41. Low-temperature heat recovery technologies
42. Photovoltaic solar energy
43. Wind energy
44. Nuclear energy technologies
45. Propulsion technologies
46. Nanoelectronics
47. Technologies for designing content and experiences

APPENDIX

REVIEW OF THE NINE SOLUTIONS

Between 15 February and 9 May 2016, Emmanuel Macron, Minister for the Economy, Industry and Digital Affairs, launched a strategic review of the New Industrial France solutions, with all of the project managers.

15 February 2016: strategic review of the Data Economy, Smart Objects and Digital Trust solutions by Emmanuel Macron at OVH headquarters in Roubaix.

1 April 2016: meeting of the Industry of the Future steering committee, chaired by Emmanuel Macron.

21 April 2016: strategic review of the Smart Food Production solution by Emmanuel Macron and Stéphane Le Foll, Minister of Agriculture, Agrifood and Forestry.

28 April 2016: strategic review of the New Resources solution by Emmanuel Macron.

28 April 2016: strategic review of the Sustainable Cities solution by Emmanuel Macron.

4 May 2016: strategic review of the Eco-Mobility solution by Emmanuel Macron at the headquarters of Thalès in Bordeaux.

9 May 2016: strategic review of the Tomorrow's Transport solution by Emmanuel Macron.

10 May 2016: progress report on the Medicine of the Future solution, with project managers, by Emmanuel Macron.

www.economie.gouv.fr
**[www.economie.gouv.fr/
nouvelle-france-industrielle](http://www.economie.gouv.fr/nouvelle-france-industrielle)**
www.gouvernement.fr

Media contact:
Tel.: +33 1 53 18 45 13