

France cleantech review 2013

Light at the end of the tunnel



In partnership with:



Summary of the France cleantech review 2013

Light at the end of the tunnel page 3

Interview: Hervé Suty, VP Research and Innovation, Veolia Environnement

“Sustainable cities, driving cleantech” page 6

The most active investors

France’s cleantech champions page 8

The government prepares the energy transition page 13

Venture capital funds resume their investments page 16

Slowdown in infrastructure investment page 18

In partnership with:



This Cleantech Review was prepared on the basis of documentary research and interviews with experts and businesses in the relevant sectors. It is not intended to be exhaustive: the sectors reviewed were selected by GreenUnivers, a reference information website devoted to green business. As such, GreenUnivers accepts no liability on the basis of this document.

© GreenUnivers, January 2013

Light at the end of the tunnel

After a year characterised by caution – if not headwinds – in 2012, encouraging signs can be seen in most of France’s cleantech sectors: new rules are being adopted for solar and onshore wind power; a new call for tenders is pending in offshore wind power; the Linky meter is enjoying a revival of interest, potentially giving a boost to the smart grid sector; ecomobility has notched up commercial successes; and investments by venture capital funds are soaring. On top of that, a nationwide consultation is underway on the energy transition, aimed at defining a new energy mix. Everything is “go” again, and 2013 looks promising.

The most active investors

The State and local authorities continue to play a vital role in clean technologies. Following the period of uncertainty linked to the electoral timetable and the change of majority in 2012, the new government has launched a nationwide consultation on the energy transition aimed at giving rise to a planning law geared towards promoting a new and “greener” energy mix. It is scheduled for adoption before the end of 2013. In the meantime, emergency support measures have been announced for solar and onshore wind power, but their implementation is proving slow. On the funding side, 2012 was marked by the finalisation of 10 calls for expressions of interest managed by ADEME, France’s Environment and Energy Management Agency: 123 projects were selected, of which 79 are already underway. Local authorities are also handing out their own subsidies.

Among **large groups**, most French players tenaciously continued their expansion in clean technologies in 2012, despite the crisis, although often at a slower pace and with fewer acquisitions: Alstom and Areva in offshore wind power, Total in solar power, Air Liquide in hydrogen, EDF and GDF Suez in renewable energy and storage, Bouygues and Schneider Electric in green building, etc. They are all counting on a surge in these markets. And as they do not want to miss the boat, they have avoided drastic options such the 2012 decision by German company Siemens to draw the curtains on solar power.

Investments by venture capital funds in cleantech companies in France jumped by over 100% to more than €380 million in 2012, setting a new record, according to our initial estimates. More than 70 companies have benefited. A caveat, however, is that a number of large transactions (Paprec, Voltaia) pumped up the overall number. Corporate and multi-corporate funds (Electranova, Aster Capital, Ecomobilité Ventures) continue to ramp up. In terms of sectors, investors are looking for diversification, and are taking a fresh look at mature industries with proven business models, such as water treatment and recycling.

The situation is much less favourable in the funding of renewable energy infrastructure, with investments down 35% in France in 2012. The main barrier is regulatory and legislative uncertainty. Investments in solar power are poised to resume in 2013, thanks largely to calls for tenders launched in 2012 and continuing this year. In wind power, a wait-and-see attitude is likely to prevail because of uncertainties on feed-in tariffs.

State of play and outlook in 10 key sectors

1. Emerging sectors

Ecomobility & electric vehicles

Ecomobility was the great hope of 2012, although still a lightweight in terms of revenue. Car sharing is taking off, with more than 50 cities now offering a service, as opposed to 23 in 2009. Symbolising enthusiasm for this new mode of transport, the Parisian Autolib’ scheme cleared one million rentals in January 2013, barely a year after its launch. Carpooling is equally attractive: France now counts some 200 carpool services and more than three million users, according to the French Ministry for the Environment. The market for electric vehicles is also growing, but is still in its infancy. In 2012, 9,300 electric vehicles were sold in France. This accounted for barely 0.5% of new registrations. But a broader ecosystem is emerging (charging infrastructure, batteries, etc.).

Energy storage

Storage will be crucial as a means of smoothing out generation from intermittent renewable sources (solar, wind). But France is not one of the most advanced countries in this newly emerging market. Many experiments were nevertheless undertaken on different technologies in 2012. They include the GRHYD project led by GDF Suez (power to gas), Myrte, led by the CEA and Areva (fuel cells), and Venteea, promoted by ERDF (wind energy storage). But regulation continues to hamper the development of the market, and companies are struggling to find a business model. Alongside the large groups, several start-ups are seizing positions. They include McPhy (hydrogen storage solutions), which raised €10 million in early 2013 to accelerate its growth.

Marine energy

The France Energies Marines experimental technology platform project, certified as an institute of excellence in carbon-free energy, was launched in 2012 to underpin the development of this promising sector. It has a budget of more than €133 million over ten years. Among the various sources of marine energy, marine current power is the most promising market in the short term. It is entering the pilot farm phase, and a call for expressions of interest is scheduled for early 2013. The French fleet could have a capacity of a hundred MW by 2020. Large groups have taken up positions at different points along the value chain. They include DCNS, Alstom, EDF and GDF Suez.

2. The most promising sectors in the medium term

Biogas

The French biogas sector is still small, but is growing thanks to the establishment of a more favourable regulatory environment in 2011. The number of facilities could grow from fewer than 200 in 2011 to more than 1,000 by 2020. Numerous companies are entering this market, which remains highly fragmented. The pioneers (Naskeo, Methaneo, Verdesis, etc.) are being joined by a multitude of players, including groups hailing from the photovoltaic sector. Consolidation of the “downstream” market is highly likely in the medium term, especially in view of funding needs. The upstream segment remains underdeveloped at the moment.

Offshore wind power

The winners of France’s first call for tenders were selected in spring 2012 for farms representing an installed capacity of 1.9 GW (of the 3 GW open for bidding). The consortium led by EDF EN won three of the four areas assigned. An entire industrial sector is growing up around turbine manufacturers Areva and Alstom, with the help of the State and local authorities. A second call for tenders for 1 GW will be launched in the spring. But accumulated delays mean that France will miss its target of having 6 GW of installed capacity by 2020.

Smart grid

Activity was flat in France in 2012 in this sector that spans the rollout of smart meters, equipment enabling grids to integrate renewable energy systems and demand-response systems. With a robust grid, stable power consumption and slower growth in renewable energy in 2012, there was nothing to spur activity in this area, while delays on the Linky communicating meter paralysed the sector. However, the market is expected to resume growth in 2013, with the start of the rollout of Linky and the birth of a capacity market, which will require energy producers to finance demand-response solutions. France and its major manufacturers are well placed on the next step of this urban planet: smart cities.

3. Sectors in crisis

Solar power

2012 was a second bad year for the French photovoltaic market, constrained by regulations introduced in March 2011. Bankruptcies continued (Auversun, Evasol, etc.), with the loss of nearly 15,000 jobs. The government promised emergency measures to help the sector (doubling of the target volume to

1,000 MW in 2013, higher feed-in tariffs for facilities using panels manufactured in Europe, etc.), but they have yet to trigger a tangible improvement. Nevertheless, the fleet is growing: France has 4 GW of installed capacity. It could even reach its 2020 target of 5.4 GW earlier than 2015.

Onshore wind power

Hurt by complex regulations and uncertainty about feed-in tariffs, onshore wind power had a difficult year in 2012, marked by a further drop in connections (757 MW in mainland France over the year). Several companies experienced major difficulties: bankruptcies of tower manufacturers Céole and Siag, taken over by the Gorgé group, refinancing of Vergnet, etc. The government took emergency measures, which are still in the process of being adopted.

4. Sectors in full stride

Energy efficiency

France has fallen behind on its 2020 energy-saving goals in buildings. But energy efficiency is a priority for the new government, which is expected to give it a boost as part of the consultation on the energy transition. Among companies, players were buoyed by the entry into force of the new RT 2012 energy-performance standard, as well as the strength of the market, especially outside Europe.

Waste and recycling

The sector experienced some turbulence in 2012, due to a decline in business activity that reduced the volume of waste and prices of recycled raw material, while local authorities sought to rein in their spending. The legislative framework remains highly favourable, particularly for waste recovery, whose potential remains compelling.

Water

Emerging from a long dormant period, the French water market is under pressure, and facing new challenges: tariff revisions demanded by numerous local authorities and a steady decline in consumption. Saving resources, improving water quality and finding innovative industrial water treatment solutions are some of the development thrusts in this sector where innovative SMEs are taking their place alongside the three giants (Veolia, Suez, Saur).

How much is the cleantech market worth ?

The value of the cleantech sectors in France is estimated at approximately €62 billion for 2012 (excluding water and waste), or roughly 2.5% of GDP, with annual growth rate of 5-7% over the last ten years. It represents nearly 420,000 jobs. Within this total, renewable energy achieved revenue of approximately €19 billion (unchanged compared with 2011), of which €4.2 billion for solar power (€2.6 billion in maintenance and €1.6 billion from electricity sales) and €3 billion for wind power (€1.9 billion in maintenance and €1.1 billion from electricity sales).

Renewable accounted for a total of approximately 90,000 jobs in 2012, compared with 99,000 in 2011. The decline was attributable to the loss of between 10,000 and 15,000 jobs in the field of photovoltaic facilities.

Energy efficiency represented a market of approximately €41 billion in 2012, compared with €39 billion in 2011, with 220,000 jobs (compared with 209,000 in 2011), half in building renovation (104,000 jobs in 2012, vs. 100,000 in 2011).



www.
**THE CITIES
OF TOMORROW**.com
>>

The first website to showcase the city of 2020.

Rethinking our cities in practical terms to turn them into sustainable urban spaces is a vast project that will involve environmental advances as well as economic and social change. Across the board, projects are proliferating, people are mobilizing and methods are improving. The time has come to step beyond isolated experiments to

pursue the sweeping changes needed in the way we conceive and use urban spaces. This requires rolling out solutions that draw on cutting-edge technology and making sustainable urban planning a major part of public policy on a local level. This website paints a clear picture of tomorrow's urban landscape.

ENERGY
RESOURCES
CLIMATE
QUALITY OF LIFE

CREATIVE SOLUTIONS FOR OUR ENVIRONMENT

 **VEOLIA**
ENVIRONNEMENT

Driving cleantech

The future of the environment will require better management of cities: comprehensive and intelligent solutions that are sustainable and include services to people, energy management, mobility, green buildings and information in a circular economy in which innovation will be key.



Interview with **Hervé Suty**,
VP Research and Innovation at
Veolia Environnement.

“Inventing new solutions for sustainable and integrated cities is possible: the process is already underway”

How do you see the cleantech market in the years to come?

Every month, the world's urban population swells by the size of a city like Madrid. In China, boomtown Shenzhen soared from 100,000 inhabitants to 14 million in just five years. Megacities are characterised by exponential density and, above all, complexity. Cities are now home to more than 50% of the global population (70% in Europe and 80% in France), but more than 70% of energy and resource consumption. They are responsible for over 75% of greenhouse gas emissions. They also consume roughly 60% of drinking water worldwide. Urbanisation triggers profound changes. Cities need to reinvent themselves. This is an immediate concern in respect of quality of life for all and the attractiveness of different regions. The market for sustainable cities is driven by real demand, with prospective growth of nearly 14% per annum to roughly \$1,000 billion by 2016. The cleantech market clearly stands to benefit.

Have governments and local authorities, particularly in France, grasped the importance of new offers in the field of sustainable cities?

The French government has demonstrated true determination in recent years: the Grenelle Environment Forum, Agenda 21, territorial climate-energy plans (PCET), territorial coherence schemes (Scot) have become more prescriptive than before. The launch of the Ecocité approach was a real catalyst, with 13 ecocities chosen, combining 93 innovative projects. Veolia is obviously positioned on these projects. More recently, the creation of the national “EcoQuartier” label was another step in promoting tangible projects as opposed simply to “showcase” developments. French cities are becoming more active and keener to adopt comprehensive approaches. But these integrated approaches remain a challenge, because they require new visions, using systems thinking as opposed to silo thinking, with appropriate governance.

Which do you see as the most advanced countries?

While some are more promising than others for the development of sustainable cities, due to their culture or government incentives, no country has really taken the lead. The biggest differentiating factor for most countries is their

strategic motivation. Singapore, for instance, is very involved in the issue of sustainable cities because of its limited resources. In India, by contrast, new towns are being built to meet the needs of the burgeoning middle class. The Gulf countries are factoring in technological revolutions. We have to grasp these differences. Gigantic projects such as Songdo in South Korea and Masdar in the UAE have often attracted media attention, but must be taken with caution. While things are starting to move more quickly in Europe and North America, China and India could soon be the most prominent countries. The Chinese smart city market looks set to be huge: a government survey shows that 154 Chinese cities already have plans aimed at becoming smart. Similarly, India has plans to build seven new smart cities from scratch, each with populations of at least two million, as part of the Delhi-Mumbai Industrial Corridor. The Indian government has also foreshadowed plans to build two smart cities in each of the country's 28 states.

What technological building blocks do you think will come first in sustainable and smart cities?

Most cities operate today as “ogre cities” characterised by voracious consumption of resources and little reuse of waste. But by optimising and streamlining their various flow systems (water, energy, waste, mobility, information), sustainable cities can achieve leaner and more resource-efficient metabolisms, with less impact on the environment. Our commitment to innovation in environmental technologies, aimed at optimising environmental services, goes back 160 years. Innovation is in our DNA, especially today with the rise of environmental aspirations and demands among our customers. The first building blocks of a sober city are the cutting-edge environmental solutions that we already offer in a number of benchmark contracts.

But these solutions are fragmented, insufficiently integrated, and sometimes still at the pilot stage. The next step will be to accelerate innovation at the interface of our businesses in order to converge flows. This “inclusive” approach will be the value added of sustainable cities. This is what the notion of circular economy means: nothing should be lost; everything must be transformed and enhanced. This step requires detailed knowledge of environmental flows. Information technologies will subsequently blend themselves naturally and gradually into the system, providing further optimisation and getting residents more involved. Open data is a major trend, but one that will take time.

How is Veolia positioned in the smart city market? Is it part of the group's long-term strategy, a new growth channel?

For Veolia Environnement, as a benchmark in environmental services, smart cities are a natural extension of our business and expertise. We are ideally placed to help cities adopt new “integrated” and sustainable approaches. To raise awareness on the issue, we have launched a website dedicated to the city of

tomorrow, at www.thecitiesoftomorrow.com. Our belief is that green growth will require technological shifts. We have accordingly identified seven key strategic innovations for our offers: territorial strategies, smart grid, resource conservation, alternative energy, quality of life and health, social equity and training, resident involvement. In all these areas, cities are a veritable open-air laboratory. To speak of it as a new growth channel is excessive, as it is already our business. But we want to keep our technological lead, so the term should really be “new innovation channel”! The “Novéa Lyon sustainable city” approach we have developed with Greater Lyon, for instance, is supporting projects contributing to the reputation of the city of Lyon, beyond our environmental expertise: support for innovative start-ups, sustainable real estate projects in the heart of the city, modelling of urban systems, actions favouring social inclusion and training, development of clean technologies and new services to residents. In Sweden, we are helping the city of Borås forsake fossil fuels by combining green energy derived from biomass, cogeneration and the reuse of biowaste. Biogas capture produces green energy, supplying 90% of the city’s buses.

Is it difficult to bind together the various actors needed for these offers for cities (computer groups, property developers, energy companies, etc.)?

Our staff are experienced in this type of teamwork. Veolia Environnement’s Research and Innovation is already working with more than 200 public and private partners, in the industrial, academic and institutional spheres. When goals are shared and boundaries well defined, everyone benefits. By playing our historical role as technology integrator, we can accelerate collective innovation. Local communities and industries see us as a gateway to multi-stakeholder projects in open mode. Three years ago, we went even further in terms of open innovation, launching the Veolia Innovation Accelerator programme designed to accelerate the rollout of environmental technologies in conjunction with start-ups. The speed with which innovation can emerge and be rolled out worldwide depends on our ability to move forward collectively, in networks.

FRANCE'S CLEANTECH CHAMPIONS

Most of the large French players tenaciously continued their expansion in clean technologies in 2012, despite the crisis, although often at a slower pace and with fewer acquisitions: Alstom and Areva in offshore wind power, Total in solar power, Air Liquide in hydrogen, EDF and GDF Suez in renewable energy, Bouygues and Schneider Electric in green building, etc. They are all counting on a surge in these markets. And as they do not want to miss the boat, they have avoided drastic options such the 2012 decision by German company Siemens to draw the curtains on solar power.

1. RENEWABLE ENERGIES & BIOFUELS

AIR LIQUIDE

Air Liquide, the world's leading player in natural gases, is expanding in gases for the photovoltaic industries, where it also the world leader, in biogas and in hydrogen for transport, where it reaffirmed its ambitions in 2012.

Air Liquide has in recent years developed the sale of hydrogen for hydrogen fuel cells for forklifts and other captive fleets, such as buses. But a major change of direction is ahead: the group is now counting on the take-off of hydrogen as a large-scale fuel for mainstream cars. In 2012, Air Liquide accordingly opened its first hydrogen fuelling station for passenger cars in Düsseldorf, Germany, for an investment of nearly €2 million, 60% from its own resources and 40% from government subsidies. It plans to open a further 10 stations in Germany within three years. It also plans to open more units in Germany, Norway, Switzerland, the Netherlands and Japan, where the government is aiming to install 100 such stations. Including its stations for captive fleets, Air Liquide had a total of 60 hydrogen fuelling stations throughout the world as of end-September 2012. The group considers the market potential of hydrogen as a consumer biofuel to be huge: if 1% of the world's cars used hydrogen fuel cells, the market would represent an opportunity of €15 billion for Air Liquide. Air Liquide is also interested in the market for hydrogen as a large-scale energy storage solution for power systems.

In solar power, the group has opened a new research and development laboratory specialising in solar power on its site in Loges-en-Josas (Yvelines). Its sales in this field again increased in 2012, despite the crisis in solar power, representing 10% of the sales of its "electronic" division (i.e., approximately €130 million in 2011). However, the group is anticipating a significant decline in its customer base, from "170 customers today to roughly 50 within three years", according to Olivier Blachier, vice-president of the group's Solar world business line.

Air Liquide is also growing in biomethane, especially in the United States, where its membrane technology is used to transform the waste stored in landfills into biogas. In March 2012, the group expanded in this sector by acquiring the biogas business of Georecover, a subsidiary of American group Jacoby Energy Development, in Georgia.

ALSTOM

Present in onshore wind turbines since 2007, Alstom positioned itself as a new entrant in the offshore wind sector in 2012. It also continued to fund American solar thermal energy player BrightSource Energy, even though its technology is competing against photovoltaics. Growth continued in onshore wind power, where Alstom is still only a moderately sized player: in 2012, the group installed 265 turbines worldwide, with a capacity of more than 557 MW. In total, the company already has 2,500 turbines installed or under construction in more than 150 wind farms, with a capacity of more than 3.7 GW. Its ambitions are much greater in offshore wind power, with several plants announced in 2012. The consortium led by EDF Energies Nouvelles, which includes Alstom, was selected in April 2012 to develop three large wind farms off the French coast, for which Alstom will supply 240 turbines starting in 2015. To this end, Alstom Renewable Power plans to build four plants in Saint-Nazaire (Loire-Atlantique) and Cherbourg (Manche). In March 2012, Alstom inaugurated its Haliade 150 wind turbine, with a capacity of 6 MW, developed for this tender, on its Carnet site in Loire-Atlantique. Internationally, Alstom Renewable Power is also set to build a plant manufacturing wind turbine towers in Canoas (Brazil), with a capacity of 120 towers every year. The plant is expected to be operational in the first half of 2013, making it Alstom's second production unit in the wind power business in Latin America.

Before it reaps the benefits of its new activity in offshore wind power, Alstom experienced a disappointing year in renewable energy in 2012: in the first nine months, order intakes in renewable energy (including hydropower) were down 8% at €1.2 billion, with revenue down 10% at €1.2 billion as well. This represented approximately 14% of total group revenue, with most coming from its legacy hydropower business.

In solar power, the group invested an additional \$40 million in BrightSource Energy, raising its interest to more than 20%, notably to fund the planned giant Ivanpah power plant.

Alstom is the biggest shareholder of BrightSource, which in 2012 shelved plans for an IPO.

AREVA

Operating in offshore wind, solar thermal and biomass, Areva Renouvelables, the nuclear group's renewable energy division, managed to double its revenue to €600 million in 2012. Its order backlog stood at €2 billion as of end-2012.

As part of the call for tenders in offshore wind power in France, the consortium led by Iberdrola and Eole-RES, which includes Areva, was awarded the development of the Saint-Brieuc farm (Côtes-d'Armor). Areva will supply 100 wind turbines of 5 MW each, due to be commissioned between 2017 and 2019. To manufacture them, in addition to its main site in Bremerhaven, Germany, it has decided to build two new plants in Le Havre in France. It is also considering opening a third site in Scotland to supply wind farms in the United Kingdom. In green energy, the group has acquired Thermya (biomass torrefaction) to provide an alternative fuel for its power plants.

Areva has also signed a very large contract in solar power in India: it is to build two power plants of 125 MW each in the state of Rajasthan for Indian group Reliance Power. But it signalled in late 2012 that its renewable energy revenue will stagnate at €600 million in 2013, as opposed to the initial guidance of €750 million. It cited the slow pace of project funding in renewable energy.

EDF ENERGIES NOUVELLES

With 4.4 GW of installed renewable capacity and 2.2 GW under construction, EDF Energies Nouvelles is one of the world's 10 biggest renewable energy companies. A wholly owned subsidiary of EDF since 2011, its vitality helped drive its parent company's growth in 2012, despite representing only 3% of its sales – less than €2 billion out of €65 billion. As of end-September, the group had 3.7 GW of installed wind capacity (2.2 GW under construction), a third of which in the United States, and 500 MW of solar capacity (200 MW under construction). It also has modest presence in biomass and biogas, with a capacity of roughly 100 MW.

In offshore wind power, the consortium led by EDF won the call for tenders for projects in Saint-Nazaire (Loire-Atlantique), Courseulles-sur-Mer (Calvados) and Fécamp (Seine-Maritime), representing a total capacity of more than 1.4 GW.

In onshore wind power, it moved into Morocco and South Africa following calls for tenders, and into Poland via two acquisitions.

In solar power, the group commissioned three photovoltaic plants in France in 2012: Toul-Rosières in Lorraine (115 MW), Massangis in Yonne (56 MW), and Crucey (60 MW).

GDF SUEZ

GDF Suez long ago began developing onshore wind farms in France and internationally. As of 30 June 2012, its installed capacity worldwide was 3.9 GW, of which 3.3 GW in Europe. But growth in this area stalled in 2012: to deleverage, GDF Suez sold its wind farms in Italy and Canada. It sold a majority interest in its Italian subsidiary IP Maestrale to Italian group ERG for approximately €900 million, and 60% of its Canadian wind farms (680 MW) for the equivalent of €1.5 billion.

It has confirmed its ongoing ambition in the onshore wind segment in France, where it has several subsidiaries (La Compagnie du Vent, CN'Air, Eole Generation, Erelia, etc.). The group had an installed capacity of approximately 1.2 GW as of end-October 2012. In November 2012 it commissioned the Landes de Couesmé wind farm in Brittany (33 MW). Internationally, it won a contract for 94 MW in South Africa. In offshore wind power, the group lost out in the call for tenders undertaken by the French government. Partnered with CDC Infrastructure and Vinci, GDF Suez bid for four regions, but failed to win a single one. Its Electrabel subsidiary nevertheless won 35% of a 450 MW wind farm in Belgian waters, which will be its first offshore wind farm. In biofuels, the group set up the Gaya project aimed at developing second-generation biomethane.

It plans to commission a unique pre-industrial research and demonstration platform in Europe in Lyon in 2013.

Outlook: the group aims to have 2000 MW of installed capacity in France by 2016-2017. As of 30 June 2012, it had 693 MW under construction in onshore wind power, of which 118 MW in France, 297 MW in Canada and 115 MW in Brazil. A biomass plant with a capacity of 190 MW is also scheduled to enter its operational phase in Poland in 2013. GDF Suez has set a target of increasing its installed capacity of renewable energy by 50% by 2015 compared with 2009, when it was 13.4 GW.

MERSEN

The former Carbone Lorraine has diversified into both solar power (sale of equipment to manufacturers) and wind power, although these activities represent only a small proportion of its sales. But in 2012, Mersen was faced with a steep decline in its sales in solar power, stemming from the crisis in the sector, forcing it in October 2012 to unveil a restructuring plan containing job cuts. In the first nine months of 2012, sales in solar power were halved to approximately €40 million, compared with €89 million. The group has signalled the pending disposal of "certain non-core and unprofitable product lines". In offshore wind power, the group has been selected by REpower, a leading global manufacturer of wind turbines, to supply signal transfer systems for the Thornton Bank offshore wind farm in Belgium, which will have 48 wind turbines of 6.15 MW.

For the end of 2012, Mersen was anticipating a recovery in orders in the solar power market prompted, first, by the deterioration of the financial situation of solar cell manufacturers and, second, by new tariffs imposed by the United States on Chinese solar cells, which could also be imposed in Europe. Due to the crisis in solar power, Mersen was anticipating a decline of approximately 8% in its 2012 sales.

TECHNIP

Technip has signed the first stage in a partnership with Areva to combine solar power with the oil and gas industry. Their partnership will span a period of two years.

The engineering specialist has also signed a cooperation agreement in the field of green chemicals with Compagnie industrielle de la matière végétale (CIMV), whose process Technip aims to industrialise. This technology converts solid biomass into hydrocarbons that can be used as a raw material for the petrochemical industry.

Technip has also been hired by Saudi start-up Idea Polysilicon Company (IPC) to assist in the implementation of a proposed solar silicon plant.

TOTAL

With its 66%-owned US subsidiary SunPower, Total opened a new plant in the Moselle department in 2012. The unit will manufacture approximately 150,000 high-performance photovoltaic panels with a capacity of 44 MW every year.

SunPower, which reported sales of \$2.31 billion in 2011, but a net loss of more than \$600 million, also announced in April 2012 the closure of a 125 MW plant. In early 2013,

Warren Buffett's holding company, MidAmerican Energy, invested \$2.5 billion to acquire two giant solar projects in California totalling 579 MW from SunPower, together with a contract for SunPower to supply panels and maintain the sites. This news reassured the markets as to Total's choice, pushing SunPower's share price up by 40%.

In France, Total took part alongside EDF and Air Liquide in the founding of the Institut photovoltaïque d'Ile-de-France (IPVF), in which the oil company plans to invest €70 million over 10 years to make it one of the top five global research centres specialising in next-generation photovoltaic devices. Belgian cell manufacturer Photovoltech, in which Total holds a 50% stake, announced in 2012 the closure of its production activity. Total also owns a 20% interest in the Shams Power Company joint venture, which was due to start building one of the world's largest solar thermal power plants, in Abu Dhabi (United Arab Emirates). But this technology, which has become less competitive than photovoltaics, is an exception in the group's strategy.

In biofuels, Total continues to support Amyris, a California-based start-up. The French oil company, which holds a 21% interest, has devoted \$82 million over three years to help Amyris bring its Biofene, an element that can make biodiesel and biokerosene, to market.

2. GREEN BUILDING, ENERGY EFFICIENCY, SMART GRID ALSTOM

Alstom Grid, a subsidiary of the world's third-biggest player in power transmission, is pinning high hopes on the smart grid and super grids, sectors it sees growing at a pace of 15% per annum. The smart grid is the focus of 50% of its R&D budget. The group is involved in more than 50 smart grid demonstration projects worldwide. In France, it is taking part in flagship projects such as Nice Grid (with a microgrid project in the PACA region) and IssyGrid (Greater Paris), via Embix, a joint venture formed with Bouygues in 2011.

Internationally, Alstom is targeting markets including super grids in Germany, the connection of German offshore wind farms (where it has already won contracts), round 3 wind farms in the United Kingdom, and smart grid projects in the United States and India.

In 2012, Alstom Grid forged new partnerships and made fresh acquisitions to strengthen its presence along the entire transmission chain, from producer to consumer. In 2012, the group concluded an agreement with Cisco on communications technologies over IP to connect smart objects, in addition to forming an alliance with Japan's Toshiba. It also acquired Canadian company ASAT Solution, specialised in automation solutions for electrical substations (including data protection). This is its third acquisition in this sector in three years. In 2011, Alstom Grid had acquired British company Psymetrix, specialising in software applications for the control and monitoring of power systems, and US player Utility Integration Solutions (UISOL), specialising in demand-response systems.

In France, where its parent company, Alstom, is to provide hundreds of wind turbines for prospective offshore wind farms, Alstom Grid has been preselected for their connection to the grid. Lastly, the group is working closely on the integration of green energy with transmission system operator RTE. In mid-2012 it set up a laboratory with CEA-Ines in Chambéry (Savoie), specialising in the smart grid. It also lobbied forcefully for the establishment of Supergrid, an institute of excellence in carbon-free energy in Villeurbanne (Rhône).

BOUYGUES

On the heels of its alliance with Alstom to form Embix, specialising in energy management and control services for ecodistricts, Bouygues Immobilier partnered with Schneider Electric in May 2012 to create a joint venture, Aveltyx (energy-

performance contracts for office buildings in France). With its experience in the new Fort d'Issy district (Hauts-de-Seine), the group is also positioned in the market for smart cities, with a new offer for comprehensive city management, known as UrbanEra. It has already won several contracts under this banner: management of the new Wacken district in Strasbourg (Alsace), near the Théâtre du Médallion, which will be a positive energy area thanks to solar panels on the roofs of houses. Other projects include Innovéa in Chatenay-Malabry (Hauts-de-Seine), a positive energy island, and above all Hikari, located in the new Lyon Confluence district (Rhône), in partnership with Toshiba and Nedo (the Japanese equivalent of ADEME).

SAINT-GOBAIN

Saint-Gobain, two years ago, had big ambitions in solar power: Pierre-André de Chalendar, then CEO and now Chairman and CEO, set the objective of generating €2 billion in sales in the sector by 2015, compared with €200 million in 2009. The group announced the opening of a plant in South Korea with Hyundai, and announced plans for a site in France. But since the crisis in solar power, Saint-Gobain has been more discreet, except with respect to the promising Saudi market, which could give fresh impetus to solar activity. In 2012, it signed an agreement to help Saudi Arabia, which also has big ambitions in solar power, build and operate a plant manufacturing thin film solar panels. The site will use technology developed by Avancis, a German joint venture founded in 2006 by Shell and Saint-Gobain, which the French partner acquired fully in 2009.

In addition, US company Solar Gard, wholly owned by Saint-Gobain, has opened a new plant in China. It is dedicated to the production of photovoltaic films to cover building and vehicle windows in the Asian market.

SCHNEIDER ELECTRIC

A global leader in energy efficiency, Schneider Electric shored up its position in green building through partnerships and acquisitions in 2012. It established Aveltyx, a joint venture with Bouygues Immobilier, specialising in energy-performance contracts for office buildings in France. Aveltyx is 51% owned by Schneider Electric and 49% by Bouygues Immobilier.

In energy management, Schneider Electric also acquired UK player M&C Energy Group, specialising in energy supply services. Combined with that of Summit Energy, in 2011, this acquisition will strengthen Schneider Electric's position in advanced energy management services. Schneider also directly targeted the consumer market in 2012 by offering the Wiser "energy" box in DIY chains such as Castorama and Leroy Merlin, and in consumer electronics stores. Pilot testing of Wiser is underway in the GreenLys smart districts of Lyon and Grenoble. Consumers can interact with the Wiser box via their smartphone, thereby managing their devices and receiving consumption data.

SUEZ ENVIRONNEMENT

At the end of November 2012, Suez Environnement won a major call for tenders: its subsidiary Ondeo Systems was selected by GrDF for a remote gas-meter reading system. The rollout of 11 million communicating gas meters could begin in 2015 if approved by the government in 2013. They will increase the ranks of the two million smart meters targeted by the group in Europe in 2014.

In building management, Suez strengthened its hand by establishing Ocea Smart Building, born of the July 2012 merger of

three companies dedicated to buildings' environmental performance and management: Ocea, a meter specialist, Lyonnaise des Eaux Pro, a specialist in controlled water management, and Isiom, a data-management expert. By the end of 2012, Ocea had already won three contracts: a system for automated tracking of fluid consumption for 9,500 households in Poitiers and the Vienne department, remote meter reading for 2,400 households in Romainville and, lastly, the rollout in 1,800 buildings of the "ISI for you" information system, in partnership with BNP Paribas Real Estate Property Management.

GDF SUEZ

Through its Ineo subsidiary, GDF Suez is also active in smart cities, offering metropolitan areas veritable "dashboards" to help achieve intelligent and comprehensive management of water, energy, services, security, traffic, waste recovery and recycling, mobility, building, biodiversity, etc. In 2012, Ineo software was sold to Rio de Janeiro (Brazil), Barcelona (Spain) and other cities in Europe. French cities are also said to be interested.

3. WATER MANAGEMENT & RECYCLING

SUEZ ENVIRONNEMENT

35.7% owned by GDF Suez, Suez Environnement generated sales of €11.1 billion in the first nine months of 2012. It operates in France through its Lyonnaise des Eaux subsidiary. In waste, CEO Jean-Louis Chaussade noted when presenting the group's third-quarter results that the "Waste Europe business is still being affected by a difficult economic environment, with volumes trending down by roughly 3%". The group nevertheless maintained its 2012 guidance.

VEOLIA ENVIRONNEMENT

In the first three months of 2012, Veolia Environnement recorded sales growth of 3% at €21.6 billion. Also operating in the waste sector, the group derived 43% of its sales from water in 2011. In waste, it reported a decline of 3.4% in sales in the first nine months of 2012. In water management, the group has set up a joint venture known as m2ocity with Orange, via its Orange Business Services division. Veolia's stake is 80%. m2ocity offers remote meter-reading services and solutions aimed at optimising water use. It has already won a contract in Greater Paris for the installation of 550,000 communicating water meters. **Outlook:** the group has undertaken a wide-reaching disposal programme set to total €5 billion in 2012-2013.

4. CO2 CAPTURE & STORAGE

AIR LIQUIDE

Air Liquide reportedly plans to construct a CO2 capture and recovery plant on its Port-Jérôme hydrogen production site, near Le Havre (Seine-Maritime), at an estimated investment of €29 million. The French industrial gas specialist has not officially confirmed the information. The unit is expected to be operational by 2014 and to have a capacity of 100,000 tonnes per annum.

ALSTOM

Alstom is one of two suppliers selected to build and test CO2 capture facilities near Bergen, in Norway. The largest test site for CO2 capture – based in part on Alstom's chilled ammonia technology – was inaugurated at the Technology Centre Mongstad (TCM) in May.

TOTAL

Total continues to test CO2 capture and injection at its site in Lacq (Pyrénées-Atlantiques), in partnership with IFP Energies Nouvelles and Air Liquide.

5. TRANSPORT & ECOMOBILITY

BOLLORE

Launched in December 2011, the Autolib' shared electric-car service could be profitable sooner than expected, by 2014-2015 according to Cédric Bolloré. The Bolloré group owns 100% of Pininfarina Bolloré Electric Vehicles, which produces the BlueCar electric vehicle used by Autolib'.

Outlook: in an interview with *Les Echos*, CEO Vincent Bolloré announced plans to organise an IPO for the electric car business in autumn 2013. He has similar plans for the industrial unit producing LMP (lithium metal polymer) batteries for electric vehicles, also in autumn 2013.

PSA PEUGEOT CITROEN

In May 2011, PSA Peugeot Citroën started marketing iOn (Peugeot), a cousin of the Citroën C-Zero, which was launched in late 2010. PSA Peugeot Citroën is bound to General Electric by a European cooperation agreement, focused in particular on electric mobility. To boost sales, the group has established a programme to promote the C-Zero.

Outlook: in 2012, the group announced a wide-ranging restructuring plan including job cuts. When reporting its third-quarter 2012 results, the group said that it sees the European car market down 9%.

RENAULT

Nearly 8,000 Twizy, Renault's new electric vehicle, have been sold in Europe since its launch in February, making it the best-selling electric car on the continent. Its success was somewhat tarnished in November 2012 by the recall of 6,247 Twizy cars due to brake problems. For 2013, Renault is pinning high hopes on its fourth electric vehicle, Zoe, which is available to order, with deliveries slated to start in early 2013. In 2011, Renault had already brought Fluence Z.E. and Kangoo Z.E. to market. In its 2016 strategic plan, unveiled in 2011, the group set a target of 1.5 million "zero emission" vehicles sold worldwide by 2016.

SCHNEIDER ELECTRIC

The group has launched the Plug & Move platform, dedicated to users of electric vehicles. Born of a partnership between AXA Assistance, EDF, Europcar, Nokia and Schneider Electric, Plug & Move is a tool aimed at promoting electric mobility. Schneider Electric has also joined forces with Sodetrel, a wholly owned subsidiary of EDF, to propose turnkey electric-vehicle charging stations for the retail sector.

VEOLIA

Veolia Habitat Services, a subsidiary of the environmental services giant specialising in energy equipment, is moving into the market for electric-vehicle charging infrastructure. It has signed agreements with Renault, Nissan, Peugeot and Citroen to sell charging stations to individuals and small businesses (merchants, self-employed, mechanics, etc.). It aims to become a market leader in France based on a network of 140 branches that, for the moment, market and maintain boilers.

UBIFRANCE

FACILITATING BUSINESS RELATIONS BETWEEN FRENCH-BASED COMPANIES AND THEIR COUNTERPARTS OUTSIDE FRANCE

UBIFRANCE, the French agency for international business development, comes under the aegis of France's Ministry for Economy and Finance and that of the Ministry for Foreign Trade. UBIFRANCE lies at the heart of France's public-sector export-support framework.

With 80 offices in 60 countries, UBIFRANCE offers a comprehensive range of products and services aimed at accompanying French-based companies in their development on export markets :

- knowledge-based products and services, from business information to consultancy and monitoring services, in order to help companies elaborate a strategy for international expansion
- promotional operations in order to foster partnerships with companies outside France

UBIFRANCE promotes technologies, products, services and know-how from France, and puts French-based professionals in contact with their international counterparts

Outside France

- UBIFRANCE organises seminars where French technology is showcased,
- UBIFRANCE organises pavilions for French-based companies at international trade shows,
- UBIFRANCE organises multi-sectorial B2B forums where French products are showcased,
- UBIFRANCE identifies international partners for French-based companies and sets up B2B meetings accordingly.

Within France

- UBIFRANCE runs information programmes on the technologies and expertise of French-based companies. These collective or individual events are aimed at international decision makers.

UBIFRANCE runs www.ubifrance.com, the official B2B web portal dedicated to French-based exporters and their international partners

- 6 000 French-based exporters are accessible on line through this unique platform in order to facilitate international contacts and increase business opportunities.

UBIFRANCE accompanies French-based innovative companies and high-technology clusters in their international expansion

- Technology partnering aimed at innovative businesses : UBIFRANCE accompanies innovative businesses to facilitate the joint development of processes, products and services, in tandem with companies and R&D facilities based outside France.
- Innovative clusters' partnering initiative : UBIFRANCE promotes collaborative projects on behalf of France's high-tech clusters in order to foster technological co-operation within the innovation ecosystem worldwide.

UBIFRANCE enables French-based companies to communicate about their technologies, products and services in the international trade press, thanks to an unrivalled network of press offices both inside and outside France

- Sectorial experts within France work closely with a network of press offices around the world, which are present in all the major economic capitals - Bangkok, Beijing, Cairo, Delhi, Dubai, Düsseldorf, Hong Kong, London, Madrid, Mexico City, Milan, Moscow, Sao Paolo, Seoul, Shanghai, Tokyo and Warsaw.

UBIFRANCE is an executive agency of the French government

UBIFRANCE

Head office

77, boulevard Saint Jacques - F-75014 Paris

Tel: + 33 (0) 1 40 73 30 00

www.ubifrance.com

ISO 9001:2008

BUREAU VERITAS
Certification



UBIFRANCE

The government prepares the energy transition

“2013 will be the year of the energy transition,” says Delphine Batho, Minister for the Environment, Sustainable Development and Energy, as if to dismiss 2012 as a year forfeited to the electoral calendar. 2013 should therefore see the resumption of major projects, embodied chiefly by the nationwide consultation on the energy transition, which is intended to result in a planning law aimed at achieving a greener energy mix. But the cumulative delay in most sectors looks daunting, and the objectives of the Grenelle Environment Forum are receding inexorably.

1. Nationwide consultation before a law

The nationwide consultation on the energy transition, one of François Hollande’s campaign promises, officially got underway on 29 November 2012. A National Council comprising seven colleges of sixteen people will have the task, until next spring, of drafting the outlines of an action plan to reduce energy consumption and promote the role of renewable energies in the French energy mix. One of François Hollande’s notable campaign pledges was to reduce the share of nuclear power in the French electricity mix from the current 75% to 50% by 2025.

Delphine Batho, Minister for the Environment, Sustainable Development and Energy, has identified four main areas that will provide foundations on which to draw up guidelines:

- change in the energy mix, including electrical power, in the years to 2025,
- a policy in favour of energy sobriety and efficiency,
- the development of renewable energy,
- funding.

The main challenge will be to draw on conclusions reached at meetings of experts, public hearings, discussions at regional level and citizen contributions collected on a dedicated website starting on 31 January 2013. “We must take care not to drown in 10,000 considerations,” warns Alain Grandjean, Chairman of the Expert Committee, who says that thermal renovation of buildings and transport will be key issues in the debate. The National Council formed to organise the consultation is to issue recommendations for a **planning law** in July 2013. “The law will be adopted before the end of the year,” promises Delphine Batho.

2. Major projects in 2013

• Energy efficiency, a government priority

Energy efficiency remains a priority for the government, especially in the building sector, which accounts for 44% of final energy consumption in France.¹ The RT 2012 energy performance standard, which came into force for commercial buildings in 2011 and in residential buildings on 1 January 2013, is a real opportunity for industry players, as it caps energy consumption at a level three times lower than the previous RT 2005 standard. Without waiting for the outcome of the consultation on the energy transition, the government announced on 10 January 2013 a series of (still vague) measures, due mainly in the first half:

(1) French action plan on energy efficiency – June 2011.

- **Support for smart grid equipment and apparatus in the building sector** in the energy renovation plan amending the 2013 budget.

- **The launch of a training and employment plan** aimed at including the smart grid in training in the electricity, and information and communication technology (ICT) sectors.

- **The designation of a “pilot” region** for these technologies.

• Smart grid: Linky resuscitated?

France made little progress on the smart grid in 2012, but the process is set to gather pace in 2013 with the resumption of the installation of Linky meters, after a pause of more than a year. Delphine Batho convened dedicated working groups in November 2012. They are to issue their findings in early 2013.

• The photovoltaic industry: battered in 2012, comforted in 2013?

The photovoltaic industry suffered greatly in 2012, between falling prices imposed by Asian competition and the quarterly reduction in feed-in tariffs applied since March 2011. The havoc prompted the authorities to introduce emergency measures. “Transitional measures before the transition,” acknowledged the Minister for Energy. A more sustainable outlook will only emerge following the consultation on the energy transition.

The main emergency measures include:

- **The doubling of target volumes**, previously set at 500 MW per annum at the Grenelle Environment Forum. They will increase to 1,000 MW in 2013.

- **The launch of two new calls for tenders**, one for facilities with a capacity greater than 250 kW and the other for power plants. The CRE, France’s energy regulator, was sent draft specifications for the first tender, which will bear on 400 MW, in January.

- **The establishment of a “Made in Europe” bonus** of up to 10% of the feed-in tariff for facilities equipped with modules wholly or partially manufactured in Europe.

• Wind power: objectives receding despite emergency measures

2012 was another tough year for onshore wind power, affected by complex regulations and ongoing challenges to feed-in tariffs. 2013 got off to a better start, with a parliamentary vote in favour

of measures easing restrictions on the construction of wind farms. This should help stimulate the sector, although the measures did not live up to industry expectations: abolition of the threshold of five towers to build a farm, establishment of exceptions to France's Coastal Law to allow the construction of wind farms in France's overseas departments, etc.

However, the crucial issue of feed-in tariffs is unlikely to be resolved before autumn 2013: the Court of Justice of the European Union is currently examining the legality of France's 2008 order on feed-in tariffs, which has been attacked on a technicality because it was not notified as State aid to the European Commission. The French government has nevertheless announced the start of talks on the issue with Brussels to avert the possibility of a call for aid to companies to be repaid.

In the offshore segment, the government announced on 8 January 2013 the launch of a second call for tenders for the installation of two wind farms off Noirmoutier (Vendée) and Tréport (Seine-Maritime), representing a total capacity of 1 GW. The first round, which began in January 2011 and whose winners were announced in April 2012, represents 1.9 GW of capacity to be built. Eagerly awaited by the industry, the second round ended up dampening their enthusiasm: with 1 GW, as opposed to the initial target of 3 GW, it effectively buries the 6 GW target for offshore wind capacity by 2020. At best, France will have 2.9 GW of capacity by 2023.

• Ecomobility: early successes for State aid

Support for clean mobility was one of the first measures taken by the Ayrault government. In July 2012, the Minister for Productive Recovery, Arnaud Montebourg, announced an increase in the bonus on purchases of electric or hybrid vehicles. Meanwhile, the increase in penalties imposed on buyers of polluting vehicles came into force on 1 January 2013. As part of the Investments in the Future programme, the French government has also released a budget of €50 million for the rollout of charging infrastructure, while ADEME has set aside a budget of €700 million for the vehicle of the future. This determination is starting to pay off: sales of electric vehicles more than doubled to nearly 10,000 units in 2012.

3. Funding: increased government support for SMEs

In 2012, the government continued to provide financial support for clean technology companies, notably through ADEME and Oséo. Aid is poised to increase in 2013, with the creation of the new Public Investment Bank and the allocation of funds not attributed under the Investments in the Future programme, which should greatly benefit cleantech companies.

• Increased funding from ADEME

In 2012, ADEME increased its investments in the cleantech sector sharply. Since 2010, it has been responsible for a budget of €2.6 billion as part of the Investments in the Future programme. 2012 was marked by the completion of 10 calls for expressions of interest launched in 2011 and 2012: 123 projects were selected, 79 of which are already funded.

Two calls for expressions of interest are currently underway for the rollout of charging infrastructure for electric and hybrid

vehicles. The first is for cities with fewer than 200,000 inhabitants. It has a budget of €50 million and will run until 16 December 2013. The second, launched in early 2013, is for major cities. It has no specific budget and will run until December 2014. Other calls for expressions of interest are due in 2013, including one devoted to "marine energy" and another to the "sorting and recycling of waste".

ADEME's four major projects under the Investments in the Future programme are:

- Technology demonstrators and platforms in renewable and low-carbon energy and green chemicals (budget of €1,275 million),
- Smart grid (budget of €215 million),
- Circular economy (budget of €210 million),
- Vehicle of the future (budget of €950 million).

In addition, ADEME launched a venture capital fund known as Ecotechnologies in July 2012. With funds of €150 million, it is dedicated exclusively to funding SMEs in the cleantech sector. Four sectors corresponding to the four Investments in the Future programmes managed by ADEME will be favoured. Managed by CDC Entreprises (a subsidiary of Caisse des Dépôts), Ecotechnologies has already invested in start-ups Actility and McPhy.

• Public Investment Bank: €35 billion for SMEs

With France's new Public Investment Bank (*Banque publique d'investissement* – BPI), formally established on 1 January 2013, innovative SMEs will benefit from unprecedented financial support from the government. With firepower of €35 billion, the BPI combines the financial resources of State-owned bank Oséo, the Strategic Investment Fund (*Fonds stratégique d'investissement* – FSI) and CDC Entreprises (a subsidiary of Caisse des Dépôts). It offers funding as well as equity investments in SMEs: a welcome boost in a context of tight conditions on bank lending and timorous business angels.

• Investments in the Future: €300 million more for the energy transition

On 21 January 2013, France's Prime Minister announced the reorientation of the €2.2 billion of the Investments in the Future programme that had not at that stage been earmarked towards the priorities set by the government in the national growth, competitiveness and employment pact. €300 million will be allocated to new calls for proposals in the energy transition and €600 million to support SMEs in emerging sectors, notably in the form of venture capital. A sizeable proportion of these two new channels of funding is likely to go to the cleantech sector.

• Oséo: support for innovative projects

In 2012, Oséo kept up its support for SMEs through various channels, from direct funding to bank financing solutions. It manages a budget of €2.44 billion as part of the Investments in the Future programme, earmarked to finance companies in industry. At the heart of this budget, approximately €500 million will go specifically to "subsidised green loans" to finance investments that meet the objective of protecting the environment and reducing energy consumption. In 2012, Oséo helped fund such iconic projects in the cleantech sector as:

- **Thanaplast**, a research project on plastic recycling led by young green chemicals company Carbios. Oséo provided €9.6 million out of a total estimated budget of €22 million.

- **Inkjet OPV**, a project to build a pilot production line for the manufacture of third-generation solar panels, led by DisaSolar, an SME from the Limousin region. It represents a total investment of €16 million, of which 45% funded by Oséo (€7.3 million) as part of its Strategic Industrial Innovation programme (ISI).

• Clusters and the Single Inter-Ministerial Fund maintained

The second phase (2009-2012) of the competitiveness cluster project² was completed at the end of 2012. But the project was extended for at least another three years in December 2012, as was the Single Inter-Ministerial Fund (*Fonds unique interministériel* – FUI), which funds part of the clusters' R&D. The amount allocated has not yet been disclosed. The FUI had funding of €600 million over the 2009-2012 period. Funded projects are selected through calls for proposals twice a year, and cleantech companies are generally well represented.

In 2012, the winners of the 13th and 14th calls for proposals were announced, and a 15th call was launched.

- **The 13th call for proposals** saw the selection in March 2012 of 63 projects that received €58.4 million in government aid. Seventeen projects are led by a "green" cluster and a further eight involve a "green" cluster.

- **The 14th call for proposals** saw the selection in August 2012 of 77 projects that received €61.46 million, of which 24 led by a "green" cluster and three involving a "green" cluster.

(2) A cluster is a combination recognised by the French government involving businesses, higher education institutions, public research bodies and innovative projects in the private sector. The competitiveness cluster policy was adopted at a meeting of the interministerial committee for regional development and competitiveness (Comité interministériel d'aménagement et de compétitivité des territoires – CIACT) on 13 December 2002. The clusters benefit from government subsidies and a special tax regime to boost their innovation potential.

• The ramp-up of the institutes of excellence in carbon-free energy

As part of the Investments in the Future programme, the French government selected new institutes of excellence in carbon-free energy (*Instituts d'excellence en énergies décarbonées* – IEED), thematic technological innovation platforms combining the expertise of private industry and public research. The first two winners were announced in mid-2011: Indeed and Pivert. In March 2012, seven new institutes were selected: France Energies Marines, Greenstars, Ifmas, IPVF, Supergrid, Geodenergies and Vedecom. They work in several areas: solar power, smart grid, green chemicals, marine energy, algae energy, geothermal energy and clean transport. In total, the nine IEEDs stand to receive more than €331 million in government aid.

• Local authorities increasingly involved

Local authorities are organising regular calls for proposals in the green economy and clean technologies, using their own funds to support the cleantech sector. Two years ago, for instance, the Alsace region introduced a bonus of €5,000 (maximum and/or 20% of the price) for the purchase of an electric vehicle. As a result, Alsace accounted for nearly 10% of electric vehicles sold in France in 2012.

Another example was in the Centre region, which has set aside €300 million for projects to produce renewable energy and carry out the energy renovation of buildings within its borders. The regional authority has signed a financial agreement with the European Investment Bank (EIB), which is providing €150 million, Banque Populaire Val de France and Caisse d'Épargne. The funds will be distributed to project leaders in the form of loans at favourable rates.

In 2013, the regions will be involved in the work of the BPI: an outlet will be installed in each of them and regional officials will have a say in the selection of projects.

Venture capital funds resume their investments

Venture capital investment in cleantech in France more than doubled in 2012, setting a record of more than €380 million. A caveat, however, is that this amount was reached thanks to a few very large transactions. Broken down by sector, funds are no longer so keen on renewable energy. They now prefer to diversify their investments, from water treatment to ecomobility.

French investors regained their appetite for clean technologies in 2012. They funded more than 70 companies to the tune of more than €380 million, according to initial estimates by GreenUnivers.¹ This represented an increase of 108% compared with the €182 million in funding in 2011, a year marked by a steep decline. It pulverised the previous record of €262.6 million dating back to 2010. These excellent figures nevertheless need to be put into perspective, as they were attributable chiefly to a handful of very large transactions: Paprec, a recycling group that reconstructed its capital with the acquisition of a significant stake by the Strategic Investment Fund (*Fonds stratégique d'investissement* – FSI), alone accounted for more than €100 million. And Voltalia, a producer of green energy, raised over €61 million thanks to Creadev, the Mulliez family fund. Aside from these few deals, the ramp-up of corporate funds also contributed to the good performance in 2012.

Prudent choices

Funds generally favoured investments in mature companies, which are less risky than start-ups (see box). The establishment of the €400 million National Seed Money Fund (*Fonds national d'amorçage* – FNA) to support the sectors boasting the most promising technologies, under the Investments in the Future programme, will have a limited impact. But it is an impact that should nevertheless start being felt: Demeter Partners established a seed fund with capital of €43 million supported by the FNA in 2012. Emertec Gestion and CEA Investissement also plan to take advantage of the new State-owned fund.

Change in venture-capital investments in clean technologies in France		
	Investments (in € millions)	Number of fund raisings
2009	169	57
2010	262,6	82
2011	182,4	64
2012 (estimation)	>380	>71

Prudence is also a by-word among sectors. Renewable energy, the most popular area of investment in 2008-2010, has lost its appeal. Regulatory instability, lack of visibility and bankruptcies in solar and wind power (Evasol, Auversun, Céole, etc.) have

(1) GreenUnivers provides data for the quarterly fundraising barometer of the Cleantech Club of the French Association of Capital Investors (Association française des investisseurs en capital – AFIC). The final numbers for 2012 will be published in late February. For more information, go to: www.greenunivers.com/category/barometre/

frightened off funds, prompting them to focus on more traditional activities with proven business models such as recycling, waste management, and air, soil and water treatment. Alliance Environnement (water treatment, €6.2 million raised from iXO Private Equity), Delta Recyclage (€8.3 million raised from Demeter Partners, Soridec, Amundi Private Equity and CM-CIC Investissement) and F2A (air treatment, €4.6 million raised from Siparex and Crédit Agricole Régions Investissement) benefited from this focus in 2012.

But funds remain on the lookout for hidden treasures in new sectors with high potential. Green chemicals are attracting interest, witness fundraising by Carbios (€3.3 million from Truffle Capital), as is storage, with €10 million raised by McPhy, €5 million of which from the Ecotechnologies fund managed by CDC Entreprises with ADEME. Ecomobility is another hit, going by the €7.5 million collected by the French carpool star BlaBlaCar (formerly Comuto) and the successive fundraising by several start-ups specialising in peer-to-peer carsharing (Deways, Drivy, Zilok, etc.).

Corporate funds increasingly active

Funds specialising in clean technologies remained very active, not only the biggest, Demeter Partners, but also Emertec Management. The former acquired stakes in companies specialising in recycling (Content, Delta Recyclage), waste recovery and biomass (Inova), but also measurement (Dr. Födisch). The latter invested more capital in McPhy (storage), S'Tile (solar power), Claranor (air treatment) and HPC-SA (DFE software).

Corporate – and multicorporate – funds continue to grow in importance, and explain part of the investment boom of 2012. In May 2012, EDF launched the Electranova fund dedicated to start-ups in the energy sector. Managed by Idinvest Partners and boasting initial capital of €40 million, it has already made two investments: Seatower, a Norwegian company developing gravity-base technology for offshore wind power, and Activity, a French start-up specialised in the smart grid.

Transactions in France and internationally

Aster Capital, the French pioneer among corporate funds active in cleantech, created by Schneider Electric and Rhodia, later joined by Alstom, welcomed a fourth investor in 2012, the European Investment Fund (EIF), which contributed €20 million. Aster has signed several deals, both internationally (US company EcoFactor and German player SolarFuel) and in France (Lucibel, a LED specialist). Ecomobilité Ventures, a sector fund established in November 2011 with three shareholders – SNCF,

Orange and Total – and capital of €25 million, acquired its first three stakes in start-ups in 2012: two French, ez-Wheel (electric wheel) and OuiCar (formerly Zilok Auto, peer-to-peer carsharing), and one Norwegian, Move About (carsharing), for a total of €5 million. Lastly, Blue Orange, the fund owned by Suez Environnement, invested in water (Redox Maritime Technologies) and waste management (SigrenEa).

The government also became an equity investor in 2012: ADEME created the Ecotechnologies fund, managed by CDC Entreprises. With capital of €150 million, it has so far focused on the smart grid (Actility) and storage (McPhy).

By contrast, the withdrawal of mainstream funds was confirmed in 2012. Spooked by the sudden downturn in the solar market, they are now prone to a more wait-and-see attitude vis-à-vis cleantech.

Seed money still hard to find

While fundraising surged in France in 2012, it was mainly thanks to growth capital, with many start-ups struggling to find investors. Only 36% of the companies in the GreenUnivers Observatory of French cleantech start-ups⁽²⁾ raised funds in 2012, whereas 75% had plans to do so. Thirty-seven percent of managers also said that it was harder to raise funds in 2012 than in 2011 (44% equally difficult and 2% easier). Business angels provided money in more than half of deals, putting them ahead of investment funds. But

start-ups are not despairing: 53% intend to raise funds in 2013. Sources: ADEME, Cosei, SER, CGDD

(2) The Observatory has identified 405 French cleantech companies created since 2007. Ninety of them responded to an email survey in October and November 2012. See the complete results of the Observatory of cleantech start-ups on GreenUnivers.com (www.greenunivers.com/observatoire/).

Slowdown in Infrastructure investment

Analysis by PwC

Finding funding for renewable energy is one of the major challenges of the energy transition. The objectives are decidedly ambitious: France aims to derive 23% of its final energy consumption from renewable energy by 2020. But it will not be possible to achieve this target without a significant financial effort, both public and private. 2012 marked an end of an uninterrupted period of growth in renewable energy investment, with a decline of 35%. Investment is set to resume in solar power in 2013, but the waiting game is likely to prevail in the onshore wind segment.

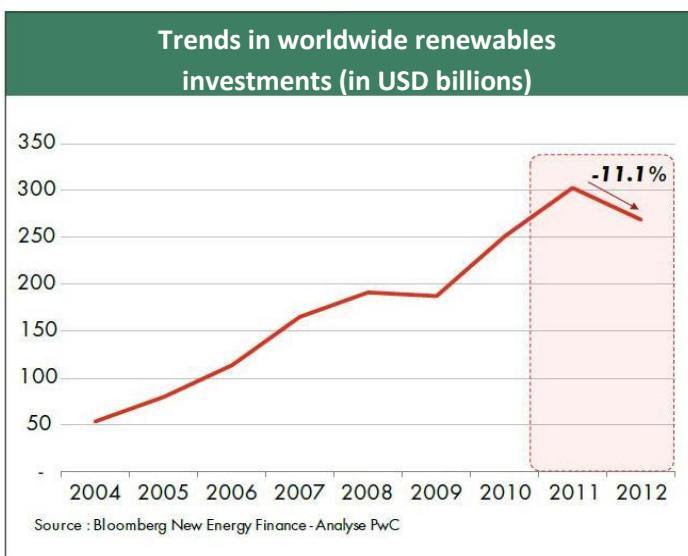
The issue of funding is obviously essential for energy infrastructure projects of all types, but it is especially critical in the field of renewable energy. Capex represents a very large part of the project cost, since by definition the resource is free (except biomass), and this implies a high funding requirement to meet the substantial start-up investment.

Sustainable growth in the global renewable energy market

Aggregate renewable energy capacity worldwide is set to grow by 6.7% per annum in the years to 2035.

While Europe is seen remaining the largest market, with a total installed capacity of 449 GW by 2035, China will be second, with an installed capacity of 359 GW, compared with “just” 251 GW in the United States. Emerging markets to a large extent represent the future of renewable energy, and this is already reflected in investment. During the third quarter of 2012, two of the five biggest new projects were in Morocco (\$1.2 billion for a solar power plant and \$563 million for a wind farm), one in Brazil (\$497 million in a wind farm) and one in China (wind power, for an undisclosed amount).

But a sharp decline in investment since mid-2011



Despite highly favourable long-term prospects, investments in green energy fell by 11.1% worldwide between 2011 and 2012, after having notched up average annual growth of 22.2% between 2004 and 2011. This pulled them down from \$302.3 billion in 2011 to \$268.7 billion in 2012. Venture capital and private equity investments were down compared with 2011, but represented less than 5% of the total in 2012.

The decline was much more pronounced in wind power than in the broader renewable energy sector, with investments down 13.8% at \$78.3 billion in 2012. Solar power was less affected, with a decline of 9% over the period to \$142.5 billion in 2012, keeping it at the forefront of renewable energy.

The decline can be ascribed to several factors:

- An uncertain economic environment limiting public resources to support renewables.
- Competition from shale gas, particularly in the United States.
- Regulatory uncertainty (feed-in tariffs, stability mechanisms, etc.).
- The decline in the unit cost in wind and solar power (45% on the price of solar modules year-on-year), meaning the same installed capacity can be achieved with less investment.

The downward trend was even more pronounced in Europe, with transactions down 71% compared with the first nine months of 2011.

35% drop in investment in France







The situation is similar in France, with a sharp decline in investment in renewable energy (-35% in 2012 compared with 2011), marked by a big drop in investments by private equity funds, which were involved in 23% of renewable energy transactions in 2011, but only 13% in the first three quarters of 2012. Also noteworthy was that while foreign investors were behind 27% of renewable energy transactions in 2011, their share rose to 42% in the first three quarters of 2012.

Stumbling blocks to investment

Political and regulatory uncertainties

Legislative, regulatory and legal uncertainties were the main impediment to investment in renewables in 2012. The decision of France's Council of State to refer the question of feed-in tariffs for onshore wind power to the Court of Justice of the European Union (see the section on wind power) fuelled uncertainty that was compounded by the subsequent Council of

State decision to align photovoltaic tariffs on buildings to the lowest level, with retroactive effect.

EnR	GWh 2011	MW connected 2012 (est.)	Trend in 2012 financing
 <p>Onshore wind</p>	12 235 2,6%	466	
 <p>Solar (PV)</p>	2 015 0,4%	999	
 <p>Biomass</p>	4889 1,0%	n.a.	

Legislative, regulatory and legal uncertainties were the main impediment to investment in 2012

Stop & go legislative developments over recent years (moratorium in solar power, regulation on the building of wind turbines, etc.), affecting the various segments of the renewable energy sector, left investors concerned about the sustainability and stability of the French regulatory framework, notably in respect of the crucial issue of feed-in tariffs.

Their concerns were exacerbated by the fact that the regulatory framework, which remains fairly vague and is constantly changing, is used by opponents of renewable energy projects to challenge the installation of wind farms and solar plants, thereby increasing the risk of non-realisation or threatening long delays and cost overruns.

Project size

Another obstacle to the financing of renewable energy in France is the relatively small size of projects (excluding offshore wind power), which limits financing options: at less than €100 million, corporate and investment banks are less present in such projects, leaving funding up to specialised mid-cap teams in a handful of banks. However, the crisis in the French banking sector has seen many of these teams scaled down. And there is no salvation outside France, as few foreign banks are active in the financing of renewable energy projects: "It is not clear that foreign players have the ability to enter and corner the very diluted French market," says a bank specialising in the financing of renewables. Indeed, aside from the border regions of Spain and Belgium, foreign banks have only fairly marginal presence in the market. In addition, the weakened capacity of French banks to refinance on maturities of more than three years reduces their willingness to grant long-term loans. This complicates matters, since

renewable energy projects are generally financed by loans with maturities of 15 to 20 years. Combined with the Basel III reforms, this has resulted in a lower volume of loans with long maturities and reduced appetite for risk. Banks have also become more demanding in respect of the capital contribution, which must always represent at least 15% of the total. And the Debt Service Coverage Ratio (DSCR) required in onshore wind power now stands at roughly 120 for funding over 18 years. In photovoltaics, the DSCR is closer to 110-115, with funding of 15-18 years.

Investment is set to resume in solar power, but a waiting game is likely to prevail in onshore wind power

Technological risk

Banks have become very attentive to technological risk and are only willing to lend when technologies are mature and experience sufficient: "Innovation is not synonymous with project financing," says a banker. Biogas (methanation) projects accordingly have trouble finding bank financing, as bankers believe that the technology is still maturing and that a business model has not yet emerged (see the section on biogas). Expertise and experience are the other key points that banks look for when reviewing loan applications: having operators that can point to a proven track record and use subcontractors who have demonstrated their mastery of technologies and processes has gone from being an asset to a virtual prerequisite.

2013 outlook

By contrast, those that are able to raise loans enjoy a cost of debt that has never been so low, thanks to current trends in interest rates, which are independent of the conditions prevailing in renewable energy.

Bank lending conditions are unlikely to change significantly in 2013, as their capacity to provide loans will continue to be constrained by the economic environment, although interest rates are not seen increasing significantly this year.

Investment in solar power is set to resume thanks to calls for tenders launched in 2012 and continuing in 2013.

By contrast, a wait-and-see attitude is likely to prevail in the onshore wind segment, since a decision by the Court of Justice of the European Union on the legality of the regulatory framework establishing the feed-in tariff is not expected before the end of 2013 at best. If the mechanism is invalidated, it will take at least six months before the EU can approve new feed-in tariffs. It is a Damocles' sword over the onshore wind sector, and one of which investors and financiers are well aware.

"The halcyon days of renewable energy were three or four years ago; the landscape has darkened a little today. We have moved out of the midday sun into a bit of shade," says one expert in renewable energy financing.

It is now up to the government to demonstrate its ability to create a simple and sustainable regulatory framework to ensure the long-term development of renewable energy in France. As such, investors will be watching the consultation on the energy transition closely.

In partnership with:

