

# Wind, water, sun and atom

John D Crothers, Véronique Fröding, Sylvain Bergès and Grégoire Lemiesle of Gide Loyrette Nouel discuss how France is encouraging movement away from its traditional nuclear power model

Talk of energy and power in most parts of the world brings to mind coal and oil; not so in France, where energy is heavily based on nuclear but where other renewables are gaining a small foothold.

## Nuclear dominance

Nuclear energy has always held a strong place in the French energy mix, accounting today for nearly 80% of the total electrical output. According to industry figures, the combined 63,200MW capacity of France's 58 reactors entails savings of 700 million tons of carbon monoxide (CO<sub>2</sub>) each year. Nuclear power has been in the news recently following the much-anticipated conclusions of the report commissioned by President Sarkozy and authored by Électricité de France's (EDF) former President François Roussely.

The Roussely Report aimed to deal with criticism sometimes voiced at the technical success of France's new European pressurised reactor (EPR) technology, French nuclear plant availability and the French radioactive waste management agency's delays. It also addressed issues of industry administration, nuclear safety and commercial concerns (including EDF's role in nuclear exports and private investment in the sector generally).

Nicolas Sarkozy's cabinet gave quick and well-publicised reactions to the Report, adopting key proposals including (i) reaffirming EDF's leadership role, albeit in a more nuanced manner than in the Roussely Report, (ii) the establishment of a strategic partnership between EDF and Areva, (iii) the reassertion of the state's central role in the nuclear sector, particularly with the creation of an Energy Ministry (rather than the current Ministry of Ecology, Energy, Sustainable Development and Maritime Affairs), (iv) the extension of plant lifespan and (v) the desire to build smaller reactors. The state also used the opportunity to announce that it was looking into the acquisition of up to 15% of Areva's share capital by EDF.

## Renewables rush

Although the nuclear sector has taken up so much of the spotlight in France, potential investors today look predominantly to other renewables for investment opportunities. This is bolstered by the European Union's 2009 directive on renewable energy, which requires France to increase its share of energy from renewable (non-nuclear) sources from 10.3% in 2005 to 23% by 2020.

Biomass accounts for two thirds of all renewables in France and hydropower for another third. Wind and solar still play a marginal role but are at the heart of a big new push by the French government to increase the renewable share of the country's total energy consumption. The new Multi-Annual Planning of Investments (PPI) for power generation in France of December 2009 set ambitious targets for 2020: 25,000MW for wind (19,000MW onshore and 6,000MW offshore), 5,400MW for solar energy, 2,300MW for biomass and 3 TWh/year with a peak capacity of 3,000MW for hydropower.

These objectives have been confirmed by the all-party roundtable reform process for a new environmental policy referred to as the *Grenelle de l'environnement*. Measures have taken concrete form in new legislation with the enactment of Grenelle I on August 3 2009 and Grenelle II on July 12 2010.

But can these objectives be achieved through the regulatory framework? The question is particularly acute for the three most visible renewable energy sources – wind, solar, and hydropower.

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The policy to promote wind and solar energy in France is built upon a favourable feed-in tariff system. EDF and local distribution operators bear a statutory obligation to purchase power generated from renewable energy sources at a tariff fixed by the state. This power purchase obligation is limited to a single contract (PPA) of 15 years for onshore wind and 20 years for offshore wind and solar.

At the end of the PPA period, the producer can sell electricity to other operators at market rates as prices cease to be regulated. The execution of the PPA only takes place after the project is commissioned. However the producer must first file a PPA request, since the base tariff is adjusted annually by a factor K, which is determined by the date of filing of the application file. Once the PPA has been signed the tariff is continuously adjusted to inflation via an L factor. The tariffs for wind and solar are subject to the same principles, but the applicable tariff level and system differ.

#### Growth with turbulence

Within the EU, the French wind market is attractive due to a high power potential (the second largest after the UK) and a favourable feed-in tariff for onshore projects at least.

The ministerial order of November 17 2008 (following an identical one in 2006) provides for a base repurchase tariff of 8.20c€/kWh for the 15 years PPA period for installations with an average annual operational capacity under 2,400 hours. Above 2,400 hours, the tariff is degressive from year 11 to year 15. The feed-in tariff has largely helped to boost the onshore wind energy market. With 4,500MW installed capacity in December 2009, France is the fourth-largest onshore wind market in Europe after Germany, Spain and Italy.

The regions with the greatest potential for wind power development are mostly located in the North and Brittany. Considering the current growth rate (950MW per year since 2006) the installed capacity could reach 14,000MW in 2020.

#### New regulatory framework

Although the sector is continuing to grow, the current installed capacity will not be sufficient to meet the 2020 target. If the objectives of the wind sector are to be attained, the annual growth rate will have to be doubled. But it is uncertain whether these objectives can be achieved through the current regulatory framework.

“Grenelle II is increasing the burden of red tape by multiplying the number of permits that are required for the building of wind turbines”

On the one hand, the French government is pushing prefects (heads of regional authorities) pursuant to a ministerial directive to promote wind energy in their regions. The prefects have been ordered to submit an assessment of the situation in their regions along with a breakdown of the number of turbines to be installed in each region per year to reach the 19,000MW onshore target for 2020. However, there are no legal provisions obligating the prefects to install the required number of turbines in their regions.

On the other hand, Grenelle II is increasing the burden of red tape by multiplying the number of permits that are required for the building of wind turbines. In particular Grenelle II amends the wind turbine licensing system and includes it within the scope of “classified installations for the protection of the environment” (ICPE). A building permit is still required and wind turbines will also be subject to the construction and operational rules that are specific to facilities which may present dangers to or inconveniences for the environment.

Grenelle II adds further constraints on the development of wind parks as the power purchase obligation on EDF applies only to wind parks consisting of more than five turbines.

Going forwards, turbines may only be built in areas designated on the wind power regional roadmaps that are being drawn up for each region. These road maps should be in place by June 2012 and, at the latest, established by prefectorial orders by September 2012.

Furthermore, within the current regulatory framework, only wind parks located in specific wind energy development zones (*Zone de développement de l'éolien* or ZDE) can benefit from the EDF power purchase obligation. ZDEs are created by prefectorial orders that specify a minimum and maximum production capacity for all wind turbines located within the ZDE. Grenelle II provides that it will no longer be possible to establish a ZDE outside the confines of the regional roadmap, once it is enacted. Such restrictions on the designation of ZDEs may well hamper the growth of onshore wind farms.

#### Slow offshore wind development

The first and only offshore wind farm (Enertrag's 105MW Côte d'Albâtre project in Upper Normandy) began with a Government tender in 2005. Due to long permitting procedures, construction has been delayed but should start by the end of 2010. In the meantime a number of other innovative projects are at an early stage of development.



#### About the author

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Grenelle II provides for the suppression of ZDE and building permit requirements for offshore wind farms. This should simplify the authorisation process, but several regulations will still impose specific constraints relating to the protection of the marine environment and sea uses. Developers must obtain multiple administrative permits concerning public domain occupation, water law authorisation and so on, and undergo a number of procedural controls such as consulting a maritime commission, conducting an environmental impact assessment, or holding a public inquiry before the building work can get under way.

Moreover, the offshore feed-in tariff is too low (13c€/KWh) to make offshore wind farms bankable. The French Energy Regulatory Commission (CRE) has recommended that future offshore wind energy projects should be exclusively carried out through public calls for tender, with the feed-in tariff being that proposed by the winning bidder in its offer.

To this end, the Ministry announced on May 5 2010 that the government intends to initiate a first call for tender in October 2010 for several offshore wind farm projects with an installed capacity totalling 3000MW. This should be followed by additional calls in 2012 and 2014.

The call for tenders will be organised for a number of offshore projects to be constructed within special maritime zones conducive to offshore wind (*zones propices à l'énergie éolienne en mer*) to be defined by the Ministry following public consultations. These projects are expected to be awarded in the third quarter of 2011, with bids being evaluated on criteria that include the competitiveness of the feed-in tariff and the commissioning date proposed by candidates.

As offshore developments pose extra challenges due to their size and the difficulty of construction at sea, there is no certainty that the 6,000MW target will be met by 2020 – despite the environment plan promoting faster growth in offshore wind power in order to gain a leading position in the future marine energy industry.

### Sunny days ahead?

With an overall installed photovoltaic (PV) capacity of 285MW in 2009, France still lags behind other European countries such as Germany, Spain

and Italy. Market growth is fastest in the French overseas departments where it is bolstered by a higher feed-in tariff, longer hours of sunshine and special tax regimes for investment in these areas. But mainland France is catching up as several measures decided by the Government in late 2009 and 2010 regarding administrative procedures and the feed-in tariff are making France one of the more attractive PV markets in Europe.

Reasons for this improvement lie in changes to the French promotional scheme for photovoltaic installations as implemented on July 10 2006 and amended by ministerial orders of January 14 and March 16 2010. As a result the Building Integrated Photovoltaic (BIPV) feed-in tariff is the highest in Europe.

The French government has also decided to organise public tenders to build at least one PV farm in each of France's 22 administrative regions, totalling an installed capacity of 300MW. The tender procedure should be closed in December 2010.

### The 2010 feed-in tariff

The 2010 feed-in tariff regulation differentiates between building-integrated PV (BIPV) systems and all other PV installations (including ground-mounted), with an additional distinction between mainland France and overseas departments including Corsica. The rates will remain unchanged until 2012, before being lowered gradually over a 20 year period. More specifically:

- The base tariff is 31.4c€/kWh for mainland France and 40c€/kWh for Corsica and overseas. For installations with a capacity greater than 250kWp the tariff will vary in mainland France from 31.4c€/kWh in the sunny south to 37.7c€/kWh in the cloudy north.

- For the more favourable BIPV tariffs, the installation must be in a building (a fully built-up structure with a roof), replace other construction materials and have an essential structural function (so must be integrated in the building, not just mounted on it):

Where PV capacity  $\leq$  250kWp and the system is integrated in totally closed buildings, in accordance with the construction plan, the tariff is 58c€/kWh (residential, educational, healthcare buildings) or 50c€/kWh (commercial, industrial,

agricultural buildings) and applies to existing buildings except for the residential segment.

Where the system has a less strictly essential structural function (in practice – roof coating parallel to roof plan and only contributing to waterproofing), even where the building is not totally closed, the tariff is 42c€/kWh.

The approach of the new French tariff system is thus very different from other countries as it pays more to, say, hospitals with roof-mounted systems than factories, and strikes a financially critical distinction between simplified BIPV installations and more aesthetically refined BIPV installations.

The system also compensates owners of ground-mounted solar installations in proportion to the amount of sunlight their region receives, which enables a better geographical distribution of solar power across the country. However, EDF's power purchase obligation applies only to production sites with a production capacity of less than 12MW – the capacity of all production units belonging to the same company group within a 500m radius being aggregated for this purpose. Solar farms whose installed capacity exceeds 12MW can sell freely on the power market, although this is currently not profitable.

In addition, the town planning law requirements for PV projects have been substantially modified by the Government Decree of November 19 2009 which provides that PV farms with an installed output of 250 kWp require a building permit, must conduct an environmental impact study and hold a public enquiry.

While such requirements may well slow down the authorisation process, they do help to discourage purely speculative project developers. The main barrier that still hinders the development of solar projects lies with grid connection capacities. In 2009, some 285MW were installed but only 185MW were connected to the grid due to long and slow administrative procedures. The regional electricity grid connection schemes planned in Grenelle II aim to address this problem.

### Re-shuffling the cards

Hydroelectric energy generates around 10% of the French electricity production. Today, around 80% of French hydroelectric power plants are operated



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by the historical concessionaire EDF. The concessions for nearly 400 hydroelectric power plants with a maximum gross flow power (MGFP) of 4.5MW or more will expire between 2009 and 2020 (88% of these are currently operated by EDF and 12% are operated by GDF-Suez, through the SHEM – Société Hydroélectrique du Midi – and the CNR – Compagnie Nationale du Rhône). This accounts for 20% of the installed hydroelectric power capacity in France. New concessions for nine existing hydroelectric power plants are expected to be awarded under an open bid procedure between 2010 and 2015. The maximum gross flow power of these power plants varies from 37MW to 2014MW.

Since 2006, the French government has set up a new legal framework regarding tender procedures for the renewal of concessions of hydroelectric power plants. Access to the hydroelectric concessions should now be carried out in a competitive and transparent manner. Furthermore, the French government declared in July 2008 that hydroelectric power plants must be renovated in order to reduce their environmental impact and to enhance their production capacity and economic efficiency.

As a result, substantial construction works should be undertaken in the context of the renewal of these concessions. Nevertheless, the bulk of construction investments remain largely amortised so that the average price of hydroelectric power should be, for a long-term period, below the market price. Furthermore, Article 91 of Law No.2010-788 of July 14 2010 establishes a royalty, charged to the concession holder, proportional to sales electricity income resulting from the operation of hydroelectric concession. The royalty rate cannot exceed a threshold determined by the licensing authority under the tender procedure.

The current French market thus represents a significant opportunity for investment by construction and utility companies throughout Europe, who are making the most of recent reforms to open up access to hydroelectric concessions.

### Concession regime

The production of electricity using hydraulic power is governed by the Law of October 16 1919. The Law provides that the motive power of water is the property of the state. Therefore, hydroelectric power plant projects cannot be developed without an authorisation or a concession contract. The procedures for examining applications for authorisation are defined by Decree No.94-894 of October 13 1994 relating to the concession and declaration of public utility for works using hydroelectric power, amended in 2008. The Law No.92-3 of January 3 1992 on water defines the terms and conditions for the implementation of construction works on water-related projects. A concession contract is entered into for hydroelectric power plant with a MGFP of 4.5MW or more. An authorisation is granted for a maximum gross flow power under 4.5MW.

“The process for the renewal of concessions has been amended in order to provide for a more transparent tender process”

### EDF in competition

Under French law, certain public entities are exempted from the obligation to compete in public service contracts such as concessions. This was the case for EDF, whose public entity status specifically granted it the right to perform power-related public service activities. Nevertheless, its transformation into a publicly listed company by shares in 2004 has placed it outside the scope of this exemption regime. Thus, EDF now needs to compete like other companies in order to obtain new concession contracts.

### Levelling the playing field

According to former Article 13 of the Law of October 16 1919 and to Article 12 of aforementioned Decree of October 13 1994, a preference was granted to outgoing concession holders when concessions for hydroelectric power plants were being renewed and awarded. This system effectively ensured that existing concessionaires would retain their concessions for an indefinite period, given that the concessionaire itself could choose to invoke this preference to secure the renewed concession. Following an infringement proceedings instituted by the EC against France, the preferential right was abolished.

In addition, the process for the renewal of concessions has been amended in order to provide for a more transparent tender process and to open the sector to effective competition. Pursuant to the new legal framework, the process is now subject to a formal open-tender procedure with a strictly monitored pre-qualification phase, designed to ensure that all competing applicants are on an equal footing, including the outgoing beneficiary of the concession. The call for tenders must contain precise information regarding the concession and the technical characteristics of the hydropower plant as well as the technical capacities required of applicants. The new framework also requires that certain criteria be adopted, among others, to better evaluate applicants' bids for a concession:

- (i) the works to be undertaken to enhance plant efficiency with regard to production capacity and the reduction of CO2 emissions;
- (ii) the works to be undertaken to reduce the environmental impact of the plant, particularly with regard to water quality; and
- (iii) the remuneration offered to the State and the local communities on the basis of the electricity generated by the installation.

The next decade should see the continued evolution of the French all-renewable energy model as historical players reorganise in the nuclear industry and new entrants look to opportunities in wind, water and solar. The state will continue to play an active role in regulating the playing field however to ensure France meets its national goals and European obligations.



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