European Perspectives on the Challenges of Financing Low Carbon Investment: France

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1. Background

France exerts a high degree of economic, political and military influence within the European Union (EU). Alongside Germany it was a founding member of the European Community in 1957 and has remained a politically dominant force ever since. France and Germany continue to have a strong alliance within the EU – ahead of most big EU summits France and Germany will try to agree a common position – and together they are seen as its dominating force. France has the fifth highest GDP in the world and the second highest in Europe after Germany at $2.6 trillion[1]. GDP per capita is the ninth highest in the EU and eighteenth highest in the world[2]. Despite being made up of 21 administrative regions plus a further six in territories overseas that form part of France proper, France is a highly centralised economy. It is ranked by the World Bank as 26th out of 183 countries in terms of 'ease of doing business' as of 2010[3].

France is an Annex I country under the UNFCCC and has a target for emissions reduction of 0 percent over 1990 values between 2008 and 2012 – reflecting the contribution made by its already highly decarbonised power sector. By 2009, France's emissions reduction had far-exceeded that – at 8.1 percent below 1990 levels (excluding LULUCF)[4]. On July 13, 2005 – under the 'Loi de programme fixant les orientations de la politique énergétique' – France set itself a domestic target of cutting greenhouse gas (GHG) emissions to one-quarter by 2050[5]. In June 2011 a new committee 'Paths 2020–2050' was launched to help France develop 2050 decarbonisation scenarios to guide long term emissions reduction and investment

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[1] World Economic Outlook Database, April 2011, International Monetary Fund
[2] World Economic Outlook Database, April 2011, International Monetary Fund
[3] World Bank Group, accessed May 2011, http://data.worldbank.org/indicator/IC.BUS.EASE.XQ/countries
[4] Annual European Union greenhouse gas inventory 1990–2009 and inventory report 2011, European Environment Agency, 31 May 2011
[5] This target was confirmed in the Grenelle 1 Law see http://www.developpement-durable.gouv.fr/les-objectifs-de-la-france-en.html

strategies and to help clarify the French position on moving to a 2020 30 percent GHG reduction target in Europe[6].

Energy use per capita (gross inland consumption) in France is 18 percent higher than the EU average[7]; final electricity consumption is also 18 percent higher than the EU average[8], at least in part because of the widespread use of electric heating. However, while France's energy intensity is equal to the EU average[9], emissions per capita are much lower. Analysis of figures from 2009 shows that average emissions per capita (excluding LULUCF) were 7.99 tonnes – 87 percent of the EU average of 9.21 tonnes[10]. Overall energy dependency in 2008 was 51.2 percent and this has stayed relatively constant over the last 10 years, at only just below the EU average of 54.8 percent. France is 97.8 percent dependent on imports of natural gas[11].

France has set itself a target for 23 percent of final energy to come from renewables by 2020 but had only achieved 12 percent by 2009. France no longer has a target for renewable electricity but in 2009 renewables contributed 14 percent to total electricity production, while 7.5 percent of primary energy came from renewables. France also has 2020 targets for ocean power (800 MW), wind (25 GW including 6 GW offshore) and solar photovoltaic (PV) (4.9 GW). In 2010, France was the fourth largest global producer of biofuels behind the US, Brazil and Germany. By the end of 2010, France was seventh in the world in terms of installed capacity for both wind (4.6 GW) and solar PV (1 GW) with 1.1 GW and 720 MW respectively being added during 2010[12].

Despite this growth, renewable energy generation continues to be dwarfed by the volume of nuclear generation. France has one of the highest nuclear power capacities anywhere in Europe − in 2008 it provided 84 percent of primary energy, with renewables contributing 15 percent and oil and gas 1 percent each (see Figure 1).

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[6] http://www.developpement-durable.gouv.fr/spip.php?page=article&id_article=23410

[7] 4.28 toe compared to an EU average of 3.62 toe. From Energy, transport and environment indicators, Eurostat, 2010 edition, February 2011

[8] 6,772 kWh per capita compared to an EU average of 5,738 kWh per capita. From Energy, transport and environment indicators, Eurostat, 2010 edition, February 2011

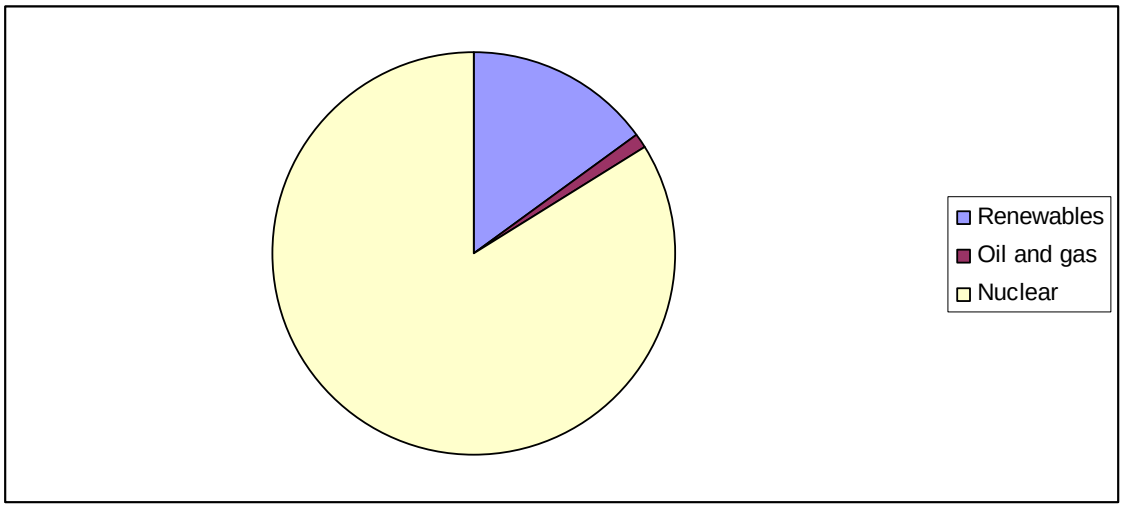
[9] EU average is 167 kgoe/1 000 EUR'00. Energy, transport and environment indicators, Eurostat, 2010 edition, February 2011

[10] Analysis of total emissions from 'Annual European Union greenhouse gas inventory 1990-2009 and inventory report 2011, European Environment Agency, 31 May 2011' and population statistics from 'Demography Report 2010, European Commission'

[11] Energy, transport and environment indicators, Eurostat, 2010 edition, February 2011

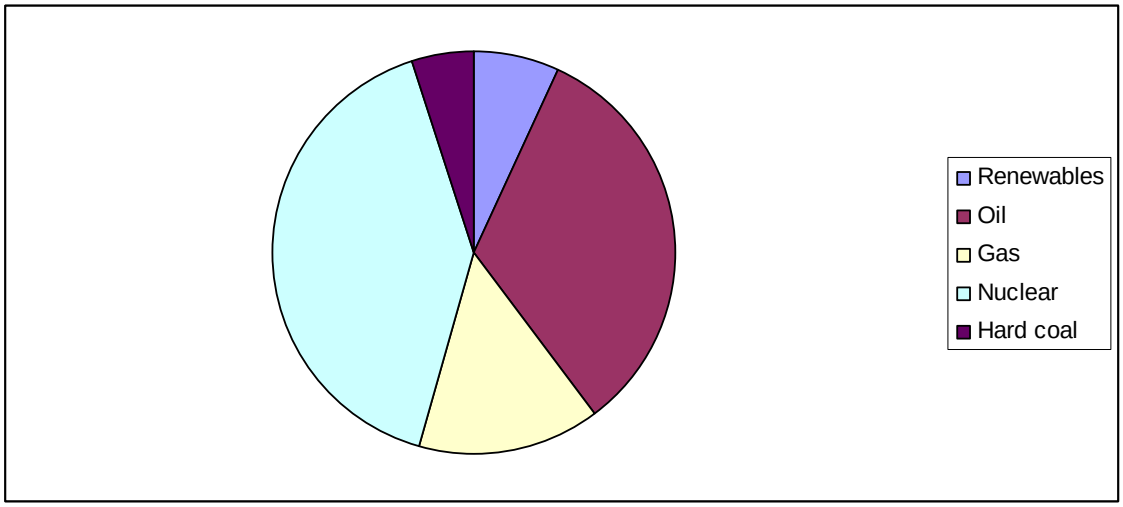
[12] REN21 (2011) Renewables 2011 Global Status Report

Figure 1. Primary energy production in 2008.



Of gross inland consumption, 41 percent came from nuclear, 33 percent oil, 15 percent gas, 7 percent renewables and 5 percent hard coal[13] (see Figure 2).

Figure 2. Gross inland energy consumption in 2008.



Nuclear power generation is dominated by one player – EDF, which had a market share of 87.3 percent in 2008[14]. The State has 84.5 percent stake in EDF[15]. The natural gas market is similarly dominated by one major player – in 2008 Suez merged with Gaz de France and GDF Suez is now the dominant provider, with over 10 million customers. As of March 2009, its

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[13] Energy, transport and environment indicators, Eurostat, 2010 edition, February 2011
[14] Energy, transport and environment indicators, Eurostat, 2010 edition, February 2011
[15] http://shareholders-and-investors.edf.com/edf-share/shareholding-structure-42691.html

market share was 94 percent on the retail side and 85 percent on the business side[16]. Like EDF, GDF Suez is part state owned, although the stake is smaller at 35.6 percent[17]. Gas and electricity prices are regulated: they set by the State after approval from the regulator CRE (Commission de Régulation de l'Energie).

2. Financial overview

France is currently listed as the seventh most attractive country in the world for renewables investment and fourth in Europe[18]. The global financial crisis initially had a relatively light impact on France, with the economy shrinking −2.6 percent in 2009 compared to a European average of −4.1 percent[19]. As part of an economy-wide fiscal stimulus France had directed some of its largest companies, including EDF and GDF Suez, to boost their own investment efforts in 2009[20]. The Government also launched the 'Grand Emprunt' ('Big Borrowing') in late 2009, which allocated €35 billion to strategically significant sectors including education, research and development (R&D), information and communication technology (ICT), transportation and green technologies[21]. Of this €2.5 billion was allocated to low carbon and renewable energy: €1 billion to nuclear, €1 billion to urban transport and €0.5 billion residential energy efficiency[22]. A dedicated 'Commissariat aux Investissement d'Avenir' ('Commissioner for Future Investments') was put in place and various agencies disbursed the funds as grants, interest-free loans and equity stakes in order to catalyse private sector investment. €2.9 million was disbursed through the French Environment Agency ADEME for investment in renewable energy, carbon capture and storage (CCS) and smart grid[23]. A sovereign wealth fund – Le Fonds stratégique d'investissement (FSI) – was set up via the state bank Caisse de Dépôts et Consignations (CDC) to help stabilise French firms and Oséo, another state bank, also played in role in ensuring lending to small and medium-sized enterprises (SMEs) continued. By the end of 2010 France had returned to growth, but levels were still quite low: 1.5 percent of GDP compared to a European average of 1.7 percent[24].

Government support

France's overarching plan on the environment is called 'Grenelle de l'environnement' – which sets out a legal framework for promoting sustainable development in France. Established in 2007, the initiative consisted of six working groups looking at a range of issues

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[16] http://www.newswire.ca/en/releases/archive/May2009/04/c7936.html
[17] http://www.gdfsuez.com/en/finance/share-price/shareholder-structure/shareholder-structure
[18] Ernst & Young (May 2011) Renewable Energy Country Attractiveness Indices
[19] I MF World Economic Outlook Database. Accessed April 2011
[20] Crédit Agricole (Dec 8 2008) France: What effects should we expect from the fiscal stimulus
[21] Of this €35 billion, €22 billion was raised from the capital markets. A further €25 billion was sought from the private sector to create a final fund size of €60 billion
[22] Présidence de la République (14 décembre 2009) Priorités Financées Par L'Emprunt National
[23] ADEME (22/10/2010) Investissements d'Avenir
[24] IMF World Economic Outlook Database. Accessed April 2011

including climate change. From this the Government committed to a number of actions including:

- Improved energy efficiency standards in buildings – both new and existing;
- 20 percent of energy consumption to come from 20 percent renewable energy by 2020; and
- Implementation of a carbon tax[25].

The aims of Grenelle were enshrined in the Grenelle Act of 2008, 'Grenelle 1'. More detailed implementation measures followed in 'Grenelle 2', which was passed in May 2010, and was supposed to include greater detail on how the overarching aims of the Grenelle programme would be achieved[26]. The carbon tax never came into force: there were many criticisms of the way it was implemented, including the fact too many exemptions threatened to place a heavy burden on only a few consumers[27]. A new text could have been proposed by the Government but instead a few months later the project was dropped. Implementation of other measures, such as incentivising increased renewable energy and energy efficiency investment, has been more effective.

In 2001, to drive investment in renewable energy, France introduced feed-in-tariffs (FiTs); they have been revised several times since. In 2009 France adopted a FiT for building-integrated PV that was amongst the highest in the world (€0.42–€0.58/kWh)[28]. Alongside a 50 percent income tax credit for solar PV[29] and tradable renewable energy certificates, this led to a 150 percent growth in building-mounted solar PV in 2010, with $2.7 billion (~€1.9 billion) invested[30].

In January 2011 the Government announced that it would launch a 3 GW tender for offshore wind installations at five sites in the English Channel, delivering around €10 billion in investment. The wind farms are expected to be operational by 2015 and the tender represents the first half of the Government's strategy to install 6 GW of offshore wind by 2020. In July 2011 the tender was formally launched: winners of the first round are expected to be announced in April 2012, when a tender for the remaining capacity will also be launched.

Also in January 2011 the Government adopted a new ministerial order creating a new FiT system for biomass plant. These positive moves followed more negative announcements in December 2010 of a 3-month moratorium for new non-residential solar PV projects >3 kW and a review and re-establishment of support frameworks for such investments.

[25] http://www.legrenelle-environnement.fr/ and Worldwatch institute (22 July 2011) An analysis of France's Climate Bill: Green Deal or Green Disillusion

[26] This does not appear to have been followed up as a coherent package – although elements have clearly have been funded through FiTs, soft loans for energy efficiency and funds held by CDC and Oséo and so on

[27] http://www.france24.com/en/20091230-constitutional-court-rules-sarkozys-carbon-tax-unfair

[28] REN21 (2010) Renewables 2010 Global Status Report

[29] REN 21 (2010) Renewables 2010 Global Status Report

[30] The Pew Charitable Trusts (2011) Who's Winning the Clean Energy Race 2010

Since then, the French Government has joined other European countries in adjusting its solar PV incentive mechanisms. In March 2011 – following a suspension of the application process lasting 3 months – a new range of lower FiTs was introduced. The system is complex, with 12 rates that depend on a number of factors including: type of sponsor (e.g. residential or public sector client); size of installation; type of installation (e.g. on the ground or on a building); type of fixing system (in particular for roof installations – full or simplified integration); and volume of applications for connections received in the preceding quarter[31]. This saw solar PV FiTs drop to €0.46/kWh for domestic installations <9 kW and €0.406/kWh for those >9 kW and <36 kW[32]. The quarterly adjustment is particularly difficult to predict as exact reductions investors can expect are not quantified. For example, the target for installed capacity is 100 MW/year both for residential and non-residential sectors. If capacity is on target and evenly distributed (i.e. 25 MW per quarter), tariffs will be reduced by 2.6 percent per quarter, but if capacity is higher the reduction will be more (up to 9.5 percent per quarter), or if lower then the reduction will be less (down to 0 percent). On 22 July 2011, the first adjustment since the March 2011 decree was published came into force and saw FiTs fall a further 7.5 percent for domestic installations (i.e. <9 kWh).

Similarly, new lower FiTs were introduced in March for electricity from biomass[33]. On the other hand, FiTs for biogas were increased by 20 percent with the aim of achieving a four-fold increase by 2020. Biogas will also be injected into the natural gas grid[34].

As well as the FiTs, France has a biofuels obligations and additional fiscal incentives including capital subsidies, grants, rebates, and sales and investment tax incentives[35]. As a result of all of the incentives there was a 26 percent overall increase in clean energy investment in France compared to 2009 levels (valued at $4 billion or ~€2.8 billion in total)[36].

For energy efficiency, Grenelle 2 has set out a target for an almost 40 percent reduction in the average energy consumption of buildings (and a 50 percent GHG reduction) by 2020. From 2013 France also plans to renovate 400,000 buildings per year, with the renovation of public buildings starting before the end of 2012 – cutting emissions from this sector. Other measures such as requiring landlords to audit their property and inform tenants about the energy performance of their buildings are also in place[37]. The 2009 Finance Law provided various measures to support energy efficiency investments including: an increase of €20,000 in the size of zero-interest loan available for first-time buyers if the building standard is above required regulations; a zero-interest eco-loan up to €30,000 for major energy efficient renovation (e.g. insulation, heating/hot water, renewables), which aims to secure

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[31] The latest range of tariffs is available from the Ministry website See Ministry of Ecology, Sustainable Development, Transport & Housing website for latest range of tariffs see http://www.developpement-durable.gouv.fr/Les-tarifs-d-achat-de-l,12195.html

[32] http://www.developpement-durable.gouv.fr/Les-tarifs-d-achat-de-l,12195.html

[33] http://www.iea.org/textbase/pm/?mode=re&id=4485&action=detail

[34] http://www.bloomberg.com/news/2011-05-23/france-raises-biogas-power-tariffs-by-20-in-bid-to-increase-production.html

[35] Ren21 (2011) Renewables 2011 Global Status Report

[36] The Pew Charitable Trusts (2011) Who's Winning the Clean Energy Race 2010?

[37] Worldwatch Institute Analysis of France's Climate Bill: green Deal or Great Disillusion. See http://www.worldwatch.org/node/6511

repayments from energy savings; and tax credits for the interest paid on loans to acquire or construct a new home if it meets certain thermal efficiency standards[38].

EU funding

France is a net contributor to the EU Budget. In line with all EU countries it receives a share of Cohesion Policy funding and was allocated €14.4 billion for the period 2007−2013. This was split between €3.2 billion focused on increasing competitiveness and employment on the mainland; €10.3 billion spent on the French territories of Martinique, Guadeloupe, La Réunion and French Guyana to bring living standards more in line with those on mainland France; and €0.8 billion for European Cooperation Programmes. This translated to 36 regional programmes and 20 European Cooperation Programmes. There was a strong focus on innovation and job creation with €4.2 billion going to promoting R&D and innovation and €1.4 billion to supporting SMEs. In addition €1.1 billion was allocated to developing accessible and sustainable transport; €1 billion to strengthening the workforce; and €0.6 billion to promoting ICT[39].

Public banks

France has two main public banks: CDC and Oséo. CDC was created in 1816 to restore confidence following the financial crisis after the Napoleonic wars. It focuses on financing a range of assets from major infrastructure to social housing. It is France's long term investor and has a mandate to serve the 'general interest and economic development of the country'. Oséo focuses on the other end of the spectrum − emerging opportunities. It was created in 2005 from ANVAR (the French innovation agency) and BDPME (France's SME development bank). Its mandate is to 'provide assistance and financial support to French SMEs'. Oséo aims to facilitate access of SMEs to private sector financing through co-financing with public capital.

Caisse de Dépôts et Consignations (CDC) Group

Overview of structure − CDC Group consists of a holding company that is 100 percent publicly owned and a series of commercial subsidiaries. It is the largest financial institution in France and one of Europe's largest public banks. In 2010 Global Finance Magazine branded it the second safest bank in the world[40]. CDC is deeply woven into the fabric of the French economy − it has stake in over 50 percent of all listed French companies[41] − and the Government is heavily reliant on it both as an agent for managing national financial assets and for stimulating investment in infrastructure and housing. A third of CDC's annual

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[38] IEA energy efficiency database: http://www.iea.org/textbase/pm/?mode=pm&id=4298&action=detail
[39] European Cohesion Policy in France
[40] http://www.gfmag.com/tools/best-banks/10533-worlds-50-safest-banks-2010.html#axzz1Ru1oy8Nr
[41] Discussion with CDC

investment is public interest investment. It has a public mandate to administer deposits entrusted to it including national savings accounts[42], retirement pensions, as well as funds related to acting as a public service banker to the justice and social security sectors[43]. Some of these savings are compulsory for citizens. CDC does not make a profit on these investments and can only cover its management costs but it must achieve a fair return. It is also oversees financing social housing and managing retirement bodies.

CDC was established by the first Finance Law in France on 28 April 1816. This legislative document is still in force today and has only been modified three times by the legislator during that time. Because CDC is now viewed as a 'special agency' – éstablissement spécial (EP) – endowed with a public interest remit, its role can only be modified by a new law. The most recent modification happened in 2008 – through the Law for the Modernisation of the Economy. This enshrined in legislation CDC's identity as a long term investor and reinforced the role of the Supervisory Board and Parliament[44]. In addition it established in statute the key sectors of activity – including sustainable development[45].

As an EP, CDC cannot be liquidated. Its solvency is protected by law and it has an implicit guarantee due to its strong institutional links with the French State and its unique legal status. Ratings agencies therefore assess CDC as being a quasi-government issuer and have assigned it an AAA rating. Although CDC undertakes many activities that are characteristic of banks, it does not officially regard itself as one and is not therefore subject to capital adequacy ratios. A key priority for 2011 is developing an appropriate capital adequacy strategy for CDC Group.

CDC's current priorities – as identified in the Elan 2020 plan[46] – are housing, SMEs, universities and sustainable development. Its preferred sectors for long-term investments are utilities, infrastructure projects (motorways, viaducts and satellites), real estate and environmental industries (sewerage and water treatment) that the French Government is keen to develop. It may take a minimum controlling interest in some investments.

CDC Group consists of a public institution with commercial subsidiaries. The public institution carries out public service, general interest roles and operational activities. It also performs core functional activities (such as risk management) for the Group. Subsidiaries take on more specialised operational roles grouped under the main categories of:

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[42] Including the Livret – a regulated savings scheme favoured by French customers because it is guaranteed by the Government, offers a reasonable rate of interest and is exempt from income tax

[43] For example funds deposited with lawyers during real estate transactions

[44] Another change is that the CEO, who used to be appointed for life, is now appointed for a 5 year term. The CEO operates independently of ministerial control

[45] This modification described Caisse des Dépôts et Consignations as "a special institution in charge of administering deposits (including compulsory ones), providing services related to the funds it has been entrusted to manage and carrying out the other missions legally attributed to it. It is in charge of protecting popular savings, financing social housing and managing retirement bodies. It also contributes to local and national economic development, particularly in the areas of employment, town policy, fight against banking and financial exclusion, creation of businesses and sustainable development."

[46] The Elan 2020 strategic plan was presented in 2007 and formalised the rules under which CDC operates. It was approved following the adoption of the Law for the Modernisation of the Economy (2008)

- Investment and private equity subsidiaries − which includes the FSI the sovereign wealth fund, CDC Entreprises, Qualium Investissement (equity financing via leveraged buyouts), Avenir Entreprises, and CDC Infrastructure.
- Environment subsidiaries − which includes CDC Climat as well as subsidiaries focused on forestry and biodiversity.
- Real estate subsidiaries − which include SNI group (a social real estate group, CDC has a 100 percent stake) and Icade (a major French real estate company CDC has a 60 percent share).
- Services subsidiaries − includes Veolia Transdev (which focuses on transport, CDC has a 50 percent share); Egis (infrastructure engineering – CDC has a 100 percent share); and leisure and accommodation companies such as Compagnie des Alpes (CDC has a 42 percent share) and Belhambra (CDC has a 40 percent share).
- CNP Assurances − a leading French life insurer (CDC has a 40 percent share).
- La Poste (banking and postal services – CDC has a 26 percent share; the French state has a 74 percent share).
- Oséo – provides SME finance (CDC has a 43.7 percent share).

A few of these are described in more detail below.

Le Fonds stratégique d'investissement (FSI) – France's sovereign wealth fund was created in 2008 to help stabilise French firms. It is managed by CDC via CDC Entreprises and consolidated into its accounts. It is 49 percent owned by the State and 51 percent by CDC. FSI was endowed with €20 billion contributed by CDC (from its equity) and by State contributions (€20 billion contributed as a combination of cash and securities as part of the 'Investissements d'Avenir'). FSI provides equity capital to businesses and industrial companies regarded as priority investment areas. FSI acts as a minority investor either alone or with a joint investor. Total assets at the end of 2010 were €21.8 billion[47].

CDC Entreprises (CDCE) – An asset manager, providing equity finance to French SMEs. Initially CDC has set aside €1 billion over 3 years to develop SMEs. CDCE carries out its private equity investments either indirectly via dedicated investment funds or directly via private equity funds and companies – but mainly invests via FSI. It is involved in all stages from seed to buyouts. It makes minority investments with public/private bodies and regional/national vehicles investing in SMEs and traditional industry. It aims to increase liquidity and profitability to incentivise other private investors. It also provides business angels and mezzanine funds for small companies. It also has a portfolio of direct investments in companies and works in partnership with Oséo.

Following the creation of the FSI, FSI replaced CDC as the main financier to CDCE – allocating an average of €360m per year. CDCE now focuses on direct/indirect investment on behalf of

[47] CDC Business Review 2010

FSI. Two categories of FSI funds are available: (i) France Investissement for public-private partnerships; and (ii) the fund for consolidation and business development, which is focused on providing capital to SMEs suffering liquidity shortages due to the financial crisis. CDCE still receives €50 million a year from CDC for its own interest activities in sectors not covered by FSI. CDCE managed 169 funds at the end of 2008 which invested €900 million in 788 SMEs. It also manages funds open to third parties, such as the State, European Investment Bank (EIB) and European Investment Fund.

CDC Infrastructure – Invests directly in infrastructure (target 70 percent brownfield/30 percent greenfield) mainly in France financed through public-private partnerships or concessions through special purpose vehicle structures. It has a focus on long-term profit and does not take overly risky investments. It acquires minority shareholdings in sectors such as energy, transport and telecoms investing with banks, businesses or other CDC subsidiaries. It manages a €600 million asset portfolio with holdings including the Sanef highway company, Eurotunnel, Gas de Strasbourg plus projects under construction e.g. Reims tramway, railway between Lyon and St-Exupéry, A88 motorway and TGV lines.

Avenir Entreprises – A subsidiary of CDC and the Oséo Group with two dedicated funds. It makes equity investments in French SMEs in industry, distribution, services, tourism and recreation.

CDC Climat – CDC was created in February 2010 to facilitate new carbon markets and invest in innovative carbon assets. It is aiming, through its investments, to reduce France's GHG emissions by at least 60 MtCO2e before 2015 throughout the world, mainly in the Mediterranean region, sub-Saharan Africa, France and Europe. CDC Climat and Proparco, a subsidiary of the French Development Agency (AFD), have formed a strategic partnership to invest jointly in carbon emission reduction projects in Sub-Saharan Africa and the Mediterranean region.

CDC Climat manages carbon registries, invests in carbon funds and – as a shareholder – supports market operators such as Sagacarbon and BlueNext. It also acts as a centre of research expertise focused on emissions reductions, quotas, carbon markets and adaptation. CDC has divested all its climate change-related assets and products to CDC Climat including:

> **Sagacarbon**: a specialised in carbon broker.

> **BlueNext**: a carbon and environmental assets stock exchange (CDC Climat has a 40 percent stake alongside NYSE Blue, which holds 60 percent).

> **MetNext**: a company that helps develop climatic indexes and that assists other companies wishing to incorporate meteorological parameters into their activities and risk management frameworks. (CDC Climat has a 48 percent stake alongside Meteo-France, which holds 52 percent.)

> Stakes in carbon funds including:

- European Carbon Fund – the first privately owned carbon fund in Europe, launched in 2005 sponsored by CDC Climat and Fortis Bank (now BNP Paribas Fortis). The fund

finances GHG reduction projects through the CDM mechanism and uses the credits to provide emissions reduction flexibility for European industry. CDC contributed €25 million.

- Post-2012 Carbon Credit Fund – founded by the EIB. It aims to support GHG mitigation projects by guaranteeing the purchase of post-2012 CDM/JI emission reduction credits up to 2020, with the intention of on-selling when the post-Kyoto regime is established. It was launched in 2008 and has €125 million under management; CDC provided €25 million.
- Carbon Capital Fund Morocco – set up by Caisse des Dépôt et de Gestion du Maroc, CDC Climat is a 25 percent stakeholder. The fund's investment target is €26.5 million[48].
- The Forest Carbon Partnership Facility – a carbon fund managed by the World Bank. CDC contributed €3.8m in May 2011.

CDC Climat also intends to finance a variety of emissions reduction projects and to make project finance-based direct investments. Finally, CDC Climat Research provides information and expertise on climate change economics to the general public, companies, experts and public decision-makers.

SNI group – SNI Group consists of 24 companies and is the leading French lessor managing 300,000 homes. Its portfolio includes real estate services, social housing, rent free/rent-assisted, residential blocks, barracks, public heritage and partnerships with 230 'semi-public economy companies'. It also meets State and local authority housing needs.

CDC group operates through its subsidiaries in more than 90 countries. It is strengthening bilateral relationships with other institutions – for example, it is a member of the Long-Term Investors Club[49] and works with Caisse de Dépôt et de Gestion du Maroc to invest in the Mediterranean region.

CDC has also invested in the following funds:

> Marguerite fund – a pan-European public-private infrastructure fund. CDC was one of the founders, contributing €100 million.

> Inframed – a long-term investment fund which will provide primarily equity investment in primarily greenfield projects to build urban, energy and transport infrastructure in the Southern and Eastern Mediterranean region abiding by social and environmental responsibility criteria. CDC was one of the founders, contributing €150 million.

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[48] http://www.caissedesDépôts.fr/en/the-group/organisation.html and Investor Presentation, Caisse des Dépôt, June 2011

[49] The club consists of major global institutions (e.g. sovereign wealth funds, pension funds), as well as financial experts (e.g. economists and policy makers) to promote long term investment as the basis for growth and economic stability

CDC receives no money from the State and in fact has contributed on average €2 billion a year to the French Budget. As of October 2010, this arrangement was formalised via an agreement whereby 50 percent of the Group's recurring and non-recurring consolidated net profit will paid to the State. CDC finances most of its long term investments through its legal deposits. It has also built up its investments over the years and is now self-financing. CDC has a very stable deposit base that is part driven by regulated consumer saving. CDC benefited from a 'flight to quality' during the 2008 crisis but deliberately limited the inflow of funds. It does issue some debt, although levels are quite low at ~€2 billion–€3 billion per year with maturity mainly from 2–15 years[50]. Some €23 billion is outstanding as a mixture or short and long-term issuances.

CDC Group's consolidated activities cover the activities of Caisse des Dépôt Division (Public Institution). The consolidated balance sheet covering these activities stood at €269.5 billion in 2010 – a 5 percent increase on the previous year. Net profits rose by 31 percent to €3.2 billion indicating a much higher return on assets[51]. Total equity was €38.9 billion, giving a leverage (equity:assets) of 1:7[52] – a relatively conservative ratio compared to other public banks such as KfW Bankengruppe for which the same ratio is 1:28[53]. Consolidated activities break down into local development (€1.3 billion portfolio of diversified investments under 'Elan 2020' plan including infrastructure, universities, renewable energy and SMEs); legal deposits and banking services (legal monopoly over €35 billion of deposits and social security (ACOSS) cash management); and financial investments; affiliates and strategic shareholdings (€5 billion real estate portfolio); ~€12 billion of long term investments in a diversified equity portfolio; and a major investor in a highly rated bond portfolio (~€60 billion, 75 percent rated AA and above).

CDC's consolidated assets, valued at €269.5 billion, are not as large as KfW Bankengruppe's (€441.8 billion)[54] or the European Investment Bank (€419.8 billion)[55]. However, inclusion of the savings funds as part of the formally consolidated balance sheet would make CDC bigger than both. CDC's Savings Fund Division (which manages savings and social housing financing) includes €200 billion of deposits; €100 billion of long term loans; and a further €100 billion of financial assets on behalf of the French State[56]. Additionally, CDC administers various retirement schemes, which are also excluded from consolidated assets.

Operation and role in the financial crisis – CDC reports to the French Parliament rather than Government. The Supervisory Board is overseen by Parliament, which exercises control over CDC's activities and guarantees its autonomy. The Chairman and Chief Executive Officer (CEO) roles are combined and held by an MP – the Head of Financial Affairs in the French Parliament (who is usually but not always the former Head of the Finance Ministry). The role is fully autonomous: Parliament may offer advice to the Chairman and CEO, but he is not

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[50] Investor Presentation, Caisse des Dépôts, June 2011
[51] CDC Financial Report 2010
[52] CDC Financial Report 2010
[53] KfW Annual Report 2010
[54] KfW Annual Report, 2010
[55] EIB Annual Report 2010
[56] Investor Presentation, CDC, June 2011

obliged to implement this advice. An annual report to Parliament is drawn up and approved[57]. Similarly the Supervisory Board is fully independent of Government and has 13 members. Members are drawn from a range of state bodies as well as professionals from the fields of economics, banking and commerce. The majority are nominated by Parliament.

CDC makes its investment decisions independently in accordance with strict guidelines and criteria. It keeps assets on its balance sheet for around 7 years. It offers equity rather than debt, on commercial terms and always with commercial co-financing. However, during the financial crisis CDC was called upon by the Government to provide €40 billion to key sectors through direct investment, loans and redeployment of savings during the financial crisis. As part of the stimulus package 'Investissements d'Avenir' it freed up €16.5 billion of centralised regulated savings deposits from CDC back to the banking sector to help finance SMEs; loans to Oséo Financement (43 percent controlled by CDC), long-term loans to local and regional authorities and short-term loans to Société de Financement de l'Economie Française (SFEF), which provides liquidity to French banks, plus the recapitalisation of Dexia. The aforementioned Strategic Investment Fund − FSI − was also established at this time (51 percent/49 percent CDC/State ownership) to take minority stakes in leading French companies to ensure they remained under French ownership and to stimulate innovation.

CDC and climate change − Most of CDC's climate change-related activities are handled by CDC Climat, as noted above. However, other parts of CDC are also involved in climate change-related investments and as such CDC is in the process of embedding sustainability across all its activities. CDC Infrastructure, for example, will finance specific renewable energy investments that are struggling to raise finance such as biomass or gasification projects. Projects need to prove that without CDC assistance they would not go ahead − investments are always co-financed via public-private partnerships.

Oséo

Overview of structure − Oséo is a 100 percent publicly owned company, with CDC owning 43.7 percent and the French Government owning the rest. Oséo's structure was streamlined in December 2010 when former subsidiaries Oséo Garantie, Oséo Innovation and Oséo Bretagne were merged into Oséo Financement. Oséo Financement then also changed its name to SA Oséo[58]. Unlike CDC, Oséo reports not to Parliament but to the Ministry for Economy, Finance and Industry and to the Ministry for Higher Education and Research and its establishment is not enshrined in law. Oséo has a public mandate to provide assistance and financial support to French SMEs. It operates throughout France − in accordance with regional economic development priorities − through a network with 37 regional branches and partners with:

[57] This is set out in the 1816 law: The Chairman and Chief Executive Officer has wide reaching management powers and great autonomy with regard to the body of executives who cannot relieve him of his duties in an authoritarian manner. He takes an oath "to defend the establishment's autonomy and to guarantee the inviolability of the funds entrusted to it". The law also stipulates that he is personally and financially responsible for the management of funds conferred upon Caisse des Dépôts.

[58] CDC Financial Report 2010

- Banks, financial institutions and equity investors;
- Research laboratories, universities, engineering schools, major companies;
- Chambers of commerce and industry, tradesmen's guilds;
- Business start-up assistance and support networks;
- Government agencies and private organisations working to promote the use of information technology by SMEs;
- European Structural Funds and Community research programmes[59].

In 2010 Oséo supported over 80,000 French companies, making investments worth €29.6 billion including: €1.9 billion for innovation subsidies and grants; €11.5 billion as loan guarantees; €9 billion for direct co-financing alongside banks; and €7.2 billion for short-term financing of receivables.

Oséo is financed from a number of sources including the State Budget and its own bond issuances, which carry a State guarantee and so are rated AAA. From time to time State Budget allocations are topped up with additional general reserve funding and ad hoc provisions provided by the Government to enable it to undertake specific higher risk projects with social mandates. For example in December 2010 the French Government applied a capital increase of €438.1 million to Oséo to enable it to undertake activities related to the financial crisis.

Operation and role in the financial crisis – Oséo is seen as both a partner and a competitor to the private sector. It provides support when private money alone cannot finance investment – however projects must not be too risky and must be profitable. Oséo's activities are based around:

- Supporting innovation – through a mixture of technical support, loans (which must in most cases be co-financed with the private sector) and grants of up to €50,000.
- Guaranteeing funding granted by banks and equity capital investors – Oséo will guarantee 40 percent to 70 percent of loans and up to 70 percent of equity investments to facilitate access to private sector capital.
- Providing a range of other services including bridging loans, practical advice and technical assistance with contracts and networking.

The Board of Oséo EPIC includes State representatives from the National Committee of French Foreign Trade Advisors, Treasury Department, the Ministry of Economy, Finance and Industry, Ministry of Higher Education and Research and Budget. The Board of Oséo SA

[59] http://www.oseo.fr/oseo/oseo_in_english

includes representatives from the same State departments as well as other shareholder representatives, experts appointed by the Minister, employee representatives, a Board of Censors appointed by the General Assembly and the President of the French Association of Capital Investors[60]. The Ministry of Industry drives the strategic focus of Oséo and selects the industrial clusters to be supported. During the financial crisis Oséo played a key role: €2.44 billion was allocated via the stimulus package 'Investissements d'Avenir' to support SMEs and address liquidity issues. There were six strands to the financing, including loans to SMEs to strengthen their long-term financing prospects (€1 billion) – Oséo on-lent to SMEs via commercial banks; calls for new R&D projects (€500 million); and additional funding for 'le prêt vert' (€500 million)[61].

Oséo and climate change – The key climate change related products offered by Oséo is 'le prêt vert' ('green loans'). This is a low interest loan offered to SMEs and intermediate-sized enterprises up to 5,000 employees for improving energy efficiency. Subsidised loans lasting up to 7 years are provided at up to 40 percent of the value of the project and are capped at €3m. Private sector co-financing must accompany such loans and be at least equal is value and last for a minimum of 5 years. This portion of the loan can also be guaranteed by Oséo for up to 60 percent of the loan value[62].

European Investment Bank (EIB)

With €4.9 billion of loans granted in France in 2010, the EIB continues to act as a catalyst in the French economy, particularly in the key sectors of climate action, innovation and R&D. In 2010, France was the fifth-largest EU recipient of EIB finance – as the EIB continued to support the country's emergence from the financial crisis. Following record levels of lending in 2009 – €6.3 billion – 2010 saw EIB activity in France revert to pre-crisis levels as businesses were again able to obtain funding on the capital markets and from the banking sector[63]. In 2011 the EIB extended a €200m credit line to two banking partners for co-financing a large scale solar PV programme in the Languedoc-Roussillon Region[64].

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[60] Oseo website accessed July 2011: http://translate.google.co.uk/translate?js=n&prev=_t&hl=en&ie=UTF-8&layout=2&eotf=1&sl=fr&tl=en&u=http percent3A percent2F percent2Fwww.oseo.fr percent2F

[61] Oséo website http://www.Oséo.fr/notre_mission/qui_sommes_nous/nos_metiers/financement_garantie&ei=YeQeTsGeDYqnhAfa5cycAw&sa=X&oi=translate&ct=result&resnum=2&ved=0CD4Q7gEwAQ&prev=/search percent3Fq percent3DOseo percent2BFinancement percent26hl percent3Den percent26biw percent3D1280 percent26bih percent3D572 percent26prmd percent3Divns

[62] Oséo website http://www.oseo.fr/votre_projet/croissance/aides_et_financements/financements_bancaires/pret_vert_bonifie

[63] The EIB in France in 2010. http://www.eib.org/projects/publications/the-eib-group-in-france-in-2010.htm

[64] EIB website http://www.eib.org/projects/loans/regions/european-union/fr.htm

Commercial banks

There are a large numbers of multinational commercial banks based in France. Of all the banks only French-Belgian banking group Dexia was bailed out during the financial crisis – with CDC and the French Government contributing €2 billion and €1 billion, respectively. However there are ongoing concerns about their exposure to the sovereign debt of stressed Eurozone countries – particularly Greece[65].

Many commercial French banks have been involved in financing renewables. BNP Paribas is the biggest lender, financing 85 projects valued at €7.8 billion to date, followed by Crédit Agricole Corporate and Investment Bank (36 projects valued at €4.3 billion); Dexia Credit Local (37 projects valued at €4.3 billion); Société Générale (52 projects valued at €4.2 billion); and Natixis (43 projects valued at €2.6 billion)[66].

More specifically, in 2009 the UK arm of BNP Paribas was one of three UK-based banks selected to co-invest £700 million of capital sourced from the EIB in UK onshore wind farms[67]. Crédit Agricole has been involved in the renewables energy sector for more than 10 years – and today renewables represent 24 percent of capital deployed into energy assets. In 2006 the Crédit Agricole Private Equity Fund Capenergie was launched. Focused solely on renewable energy and energy efficiency the €109m fund has invested in 14 projects based in France and 2 in Italy[68]. Société Générale financed 110 MW of wind capacity at Ménaucourt-Plainchamp and Leffincourt in France in 2009. In 2010 Société Générale financed a range of renewable energies globally (including wind, solar, thermal or photovoltaic, geothermal, hydro-electrics, biomass energy), cogeneration and biofuels[69].

3. Financial challenges

France is notable in Europe in that nearly 100 percent of its power is generated by low carbon sources already – nuclear (84 percent) and renewable energy (15 percent). This level of decarbonised power generation is something other Member States still only dream of. There is however uncertainty over whether France will be able to meet its renewable energy target of 23 percent renewable energy by 2020. While there seems to be a sense that there is no lack of private finance to potentially meet the renewables target, there are concerns about the level of political commitment to the sector and the stability of future revenue streams.

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[65] Crédit Agricole owns Emporiki Bank and Société Générale owns Geniki. The Economist (19 October 2010) France/Europe Economy: feeling exposed?
[66] Bloomberg New Energy Finance
[67] EIB website http://www.eib.org/projects/press/2009/2009-217-up-to-pound1-4-billion-in-new-loans-for-onshore-wind-farms.htm
[68] Crédit Agricole website http://www.credit-agricole.com/en/Sustainable-development/Acting-through-our-business/Financing-renewable-energy
[69] Société Générale wesbite http://csr.societegenerale.com/home-page/placing-csr-at-the-heart-of-our-business/corporate-investment-banking/green-finance

The role of nuclear – The main focus for the future appears, for now, to be nuclear. However with much of the nuclear fleet now around 30 years or more in age, attention is turning to the question of when this fleet will be replaced and how it will be financed. EDF will almost certainly be the main backer: compared to most other large European utilities is in a strong financial position[70] and two new nuclear plant are already under construction/planned. EDF needs to replace its fleet of aging second-generation pressurised water reactor (PWR) nuclear plant. While there is no final estimate of the costs involved, the bill is likely to run into hundreds of billions of Euro. Most of the plants date back to the 1970s and 1980s, with the oldest built in 1977. Several life extensions have been given – the latest to 40 years[71] – but this situation cannot continue indefinitely. In addition, there is no clarity on how much it might cost to decommission these plants. EDF has set aside €7.5 billion for decommissioning, but the cost of decommissioning Brennilis – a small 70MW plant that stopped operation in 1985 – has already run to €0.5 billion[72].

France is now building its first third generation European Pressurised Water Reactor (EPR) at Flamanville. This was due to be operational in 2012, but has been delayed to 2016, with costs nearly doubling to €6 billion because of the need for stringent new safety tests in the wake of the Fukushima disaster[73]. In January 2009 President Sarkozy further confirmed a second plant would be built at Penly, which was due to be operational in 2017. Based on the performance of the Flamanville plant in particular, a decision was expected in 2015 on whether EPRs should be rolled out to replace and expand the rest of the existing PWR capacity. This now looks set to take longer. Previously France's nuclear programme was financed from a combination of EDF's balance sheet (50 percent), state contributions (8 percent) and commercial loans (42 percent). It is currently unclear how the forward nuclear investment programme will be financed[74].

Uncertainty comes from another quarter, however. In France electricity tariffs are regulated. This has benefitted EDF – the low rates have prevented new players moving into the market at scale – and consumers alike (French power prices are the sixth lowest in Europe[75]). Replacement of the nuclear fleet as well as a greater number of renewables on the system

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[70] A 2009 report by Citigroup (The Trillion Dollar Decade) noted that the credit ratings of all of Europe's top utilities have steadily fallen for a decade. In 2001 nine of the top European utilities were rated AA+ to A. By 2010 only EDF was in that range. One of the major causes of this credit deterioration is a major expansion in investment. In 2005, capex among the top 10 utilities was on average 60 percent of operating income; in 2009 it was 78 percent. But this downward trajectory is now reaching its limit – and is seeing many European utilities focusing on the disposal of assets in order to protect their ratings and so keep the cost of future borrowing down. Despite EDF's strong balance sheet, it too sold off its UK networks business in October 2010

[71] In July 2009 the Nuclear Safety Authority (ASN) approved EDF's safety case for 40-year operation of the 900 MWe units, based on generic assessment of the 34 reactors. In July 2010 EDF said that it would be assessing the prospect of 60-year lifetimes for all its existing reactors

[72] http://www.ambassadedebretagne.com/bretagne/actu/98-brennilis-un-demantelement-sans-fin.html

[73] FT (20 July 2011) EDF postpones nuclear project by 2 years. http://www.ft.com/cms/s/0/eded8aec-b2f4-11e0-86b8-00144feabdc0.html#axzz1V60KEEh2

[74] World Nuclear Association – Nuclear Power in France. In addition President Sarkozy announced in June 2011 €1bn would be made available for investment in next generation nuclear power

[75] Electricity – domestic consumption http://www.energy.eu/#Domestic

must be funded and will require major increases in power prices for consumers, who will ultimately bear the costs.

In parallel to this efforts to liberalise the European power market continue – with increased calls for the monopolistic French power market to be opened up. In November 2010 the French Government published plans to reform the power market the 'Nouvelle Organisation du Marché de l'Electricité'[76] – the proposals would give alternative suppliers access to around one-third of nuclear production and set a timetable to end regulated tariffs by 2015[77]. Arguments continue about the level at which the tariff should be set and, with the State to some extent conflicted because of its 85 percent ownership in EDF, the matter is likely to be referred to the DG Competition to resolve.

Although nuclear power continues to dominate the market, the amount of renewables deployed in France also continues to climb so that it has the seventh largest solar PV capacity in the world, more than tripling capacity in 2010 to 720GW. It is also seventh largest wind capacity at 5.7GW[78]. But further renewables faces three clear challenges in France – in common with many other Member States. First, concern about the stability of revenues. Second, and related to the first point, is the issue of risk of consumer backlashes against further price increases to cover investment costs. Third, the difficulty of getting planning permissions for new capacity.

Stability of revenues – The frequent adjustment of FiTs in France has created a degree of scepticism over whether renewable energy revenues can be guaranteed to remain stable in future. In addition, while the downward FiT adjustments for PV announced in March 2011 were technically not retroactive, they did affect projects that were in the process of obtaining grid connections and approvals to receive the FiT. This is because once these projects were finally allocated connections and granted a FiT, they had very tight timelines to complete construction and become operational (due to the 3-month moratorium imposed between December 2010 and March 2011). Since missing this deadline means dropping out of the system and having to reapply for a grid connection and a FiT, at the newer lower rate, such projects may still experience de facto retroactive adjustments.

Consumer backlashes – A very strong cultural theme in France in the desire to support French industry and business. Although the solar PV technology deployed on French rooftops is assembled and installed in France, it is not manufactured there – the technology is bought in from overseas, then assembled and installed. At the same time France introduced some of the highest feed-in-tariffs in Europe. While this has been effective means of attracting investment to date, the time has come for consumers to foot the bill. In 2011 the French tax on electricity 'Contribution au Service Public de l'Electricite' will be almost tripled to pay for 7-fold increases in subsidies for solar PV consumer tariffs on the large number of solar PV panels installed in over the past few years[79]. Along with regulated

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[76] http://www.platts.com/RSSFeedDetailedNews/RSSFeed/ElectricPower/8035587
[77] http://www.risk.net/energy-risk/feature/1614211/new-regulation-french-power-market
[78] Ren21 (2011) Renewables 2011 Global Status Report
[79] http://www.morningstar.co.uk/uk/markets/newsfeeditem.aspx?id=138501957933899

tariff increases this will translate to a 4.1 percent increase in electricity bills in July 2012[80]. Political desire to limit price increases to consumers may curb the amount of future FiT support available to renewables and therefore the amount deployed onto the system.

Planning permission and public acceptance – Large-scale renewables, particularly wind, face many administrative hurdles as well as public acceptance issues. Regional landowners are an especially powerful lobby in France and have been the strongest opponents of wind power. These regional landowners are very well-connected and formalised their opposition to wind farms through founding the European Platform Against Wind. This group was influencial in the Grenelle discussions: for example, it was hoped that Grenelle 2 would streamline the consents process – instead is now even more difficult to obtain consent. Wind farms must be at least 500 m away from any area 'designated for housing' – which includes not only sites inhabited today, but also those that might be developed in the future. Wind turbines taller than 50 m are now subject to the same administrative procedures as industrial facilities. Project sponsors are required to make financial provision from the start of the construction for land restoration in the event that the wind turbines are later removed. Finally, small-scale community producers have been locked out of the market by the introduction of a minimum building permit application limit of at least five wind turbines.

4. Conclusion

France leads Europe in terms of demonstrating a near-zero carbon power system is possible. The high levels of deployment of nuclear power resulted from a strategic decision by the French Government in 1974, just after the first oil shock, to rapidly expand the country's nuclear power capacity. This made sense for France, which has few fossil-fuel energy resources, and very substantial heavy engineering expertise. Nuclear energy, with the fuel cost being a relatively small part of the overall cost, made good sense with respect to minimising imports and achieving greater energy security. Today France has 58 operational reactors: nuclear reactors and fuel products and services are a major French export and the nuclear industry is one of France's biggest employers.

However, in the wake of the Fukushima disaster, and the decision by Germany to phase out nuclear, public opinion seems to be turning against nuclear power in France. A poll run in June 2010 found 77 percent of respondents were in favour of a phase out in France[81]. Against this backdrop there is a relatively small but strong renewable energy lobby in France that believes that renewable energy is an important element of France updating its image as a modern economy as well as fulfilling legally binding European targets. However, renewable energy represents a direct substitute to nuclear energy and refocusing political support

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[80] The tax represents a 1.2 percent increase in bills from 1 July 2011 and will be combined with two-stage an increase in regulated tariff of 1.7 percent in 2011 and a further 1.2 percent in 2012 to cover additional costs related to the power network http://www.dowjones.de/site/2011/04/french-government-seeks-to-curb-household-energy-bills.html

[81] Le Figaro (6/6/2011) Les Français de plus en plus hostiles au nucléaire http://www.lefigaro.fr/conjoncture/2011/06/05/04016-20110605ARTFIG00084-les-francais-de-plus-en-plus-hostiles-au-nucleaire.php

away from nuclear and toward renewables will be a very hard task. Recent measures put in place to curtail the scale of renewable energy deployment in France – from the constraints placed on the solar PV deployment[82] through to the outright hostility toward wind farms, which now need to obtain the same set of planning permissions as an oil refinery – was described by one financer as a clear lack of Government commitment to the industry.

Another view voiced that nuclear was accepted in France because everyone knew someone who worked for the industry – and that a similar approach needs to be taken for renewable energy. Yet while this aspiration is laudable it is hard to reconcile the fact that countries such as Germany, Spain, China and the USA have a strong head start in terms of intellectual property and manufacturing expertise. To be successful France will need to focus on driving innovation in technologies that are not yet fully commercial or in completely separate low carbon sectors such as electric cars. This is feasible: France already has the institutional infrastructure in place in the form of Oséo to scale up an industrial interest in securing competitive advantage from the global low carbon transition. France has also already proven itself – it is the joint largest global biodiesel producer in the EU alongside Germany and is the 3rd largest biofuels producer in the world behind the USA and Brazil. But given the very recent undermining of the solar PV and wind markets, it is also unlikely the French Government has the appetite – at least for now – to support the industry at such a scale. With elections happening in 2012, however, there is a chance this could change. It will be interesting to see how these issues are picked up by the Presidential candidates and in particular what will be the emerging Socialist Party position, given the candidate has not yet been selected.

Some of these issues may well feed into the next generation of French discussions on environment policy.

[82] The ongoing downward adjustment of FiTs has seen the industry 'killed' in the words of one investor. The solar sector had employed 25,000 people in 3 years; adjustments to the PV system saw 15,000 of those workers lose their jobs See http://www.lepost.fr/article/2011/07/19/2552288_touche-pas-a-mon-panneau-solaire-est-indigne-par-les-mensonges-de-la-ministre-de-l-ecologie-sur-la-pretendue-relance-photovoltaique.html