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The Energy Transition in France: A Shift Towards a New Energy Model?

Like many other industrialised economies, France has identified the energy transition as one of the major challenges ahead – one that is also full of promise. Environmental, economic and social reasons have led to a policy challenge that will demand a strong political line and a coherent and multi-sector approach.

France has undergone a structural evolution in its energy policy over the last two years. This process has led to the definition of a long-term strategy, including objectives on greenhouse gas emissions, energy efficiency and the transition of the power mix. With a new “framing law on the energy transition” to be adopted by early 2015 in view of the international climate conference to be hosted by France later that year, it is interesting to take a look behind the scenes at the French process in comparison to transition strategies in neighbouring countries, as well as in the light of the current debate on a post-2020 EU climate and energy framework.

A bit of history: the energy-nuclear nexus in France and its reverberation in the present

French energy policy is closely tied to the importance of nuclear power. The political relevancy of nuclear energy goes back to the scientific pride of France in the early days of nuclear technology: with Henri Becquerel, Pierre and Marie Curie, and Irène and Frédéric Joliot-Curie, France had already produced five Nobel Prize winners in the field of nuclear science before the Second World War. This continued with the crucial significance of French nuclear weapons for the country's return to the international diplomatic scene after the war.

Only in the early 1970s did nuclear energy become a real issue for national energy policy. Lacking any important domestic energy reserves, energy conservation programmes and a very strong commitment to nuclear power became the cornerstones of the French response to the first oil shock in 1973. That same year, Prime Minister Messmer laid the first stone of what would become the most important nuclear fleet in Europe and one of the first in the world. In only 12 years, France built 55 of its current 58 reactors, totalling a generation capacity of 63 gigawatts (GW). It is also interesting to note that starting with the oil crisis, France begun a very ambitious policy in favour of energy efficiency, including the creation of a dedicated organisation (French Agency for the Conservation of Energy, nowadays ADEME). This interesting approach, however, was sidelined after the oil glut countershock of 1986 and was only resumed later in the 2000s.

Forty years later, what could be characterised as France's first energy transition still provides the backbone of its centralised energy system. Based on its amortised nuclear fleet and public control over prices (guaranteeing equal access to the same regulated prices all over the country), France still provides some of the cheapest electricity to households in Europe, 30 per cent cheaper than the EU average and half the price Germans pay. Simultaneously, with its almost decarbonised power sector (75 per cent nuclear, 15 per cent renewables and ten per cent fossil fuels) and the decreasing weight of heavy industry, France already had one of the lowest levels of GDP carbon intensity and per capita greenhouse gas (GHG) emissions among OECD countries in 2010.¹

Looking at the future through a rear-view mirror

For a long time, the general French position has been to maintain the current status quo while observing others in a wait-and-see approach. However, the time has come for an important question: how long can the country rely on its past to face current and future challenges?

Indeed, the country faces many challenges today that require a comprehensive strategic change.

Climate: Even with its almost carbon-free electricity sector, France still has a long way to go to reach its national objective of a 75 per cent reduction of GHG emissions by 2050, which will require significant efforts in all sectors of the economy. Between 1990 and 2012, GHG emissions were reduced by only 12 per cent. The transport and building sectors represent the highest priority (respectively 28 per cent and 18 per cent of overall GHG emissions). However, industry plays a major role as well (18 per cent), and the crucial importance of the agricultural sector, representing 21 per cent (due primarily to significant methane emissions²), is often forgotten.

An investment gap in the power sector: With an average age of almost 30 years, the current nuclear fleet faces an uncertain future. A complete overhaul will be necessary to implement new safety standards (expected for 2016) and

1 http://stats.oecd.org/Index.aspx?DataSetCode=AIR_GHG.

2 This fact is reinforced by the recent reevaluation of the global warming potential of methane by the IPCC, which passed from 25 (compared to CO₂) to 34 over a 100 year period, taking into account its descendants (chemical decomposition) over time. This means that the importance of methane (including descendants) for global climate change is actually twice as important as previously assumed: 32 per cent of total radiative forcing, as opposed to 16 per cent in prior reports. See IPCC: Fifth Assessment Report, 2013.

post-Fukushima requirements. Much more than costs, there is uncertainty over the technical feasibility of such a refurbishment. The national nuclear safety authority has also pointed to the risks of “generic defaults” that might appear over the next decades, bringing with it the risk of a simultaneous shutdown of large shares of the fleet (up to 20 reactors for the first generation) given their identical architecture. This high uncertainty is one of the main justifications for the diversification target (including reducing the share of nuclear power) proposed by the current government. Additionally, considering that most reactors were built in a very short time span, significant investments will be needed in 2020-2030 to renew the aging fleet, and long-term planning is needed to smooth the investment curve over time, regardless of technology choices.

Deploying the transition economy and increasing energy security: Despite the important share of nuclear power (which only represents 17 per cent of the country’s final energy consumption), France depends on fossil fuels for 70 per cent of its final energy needs, with an increasing exposure to price fluctuations. Accounting for 45 per cent of final consumption, oil remains the biggest energy source, whereas gas represents 20 per cent. This has direct implications for the French trade balance, which has worsened significantly since the early 2000s, in large part because of increasing energy prices. In 2012, the cost of energy imports (€66 billion) exceeded the overall trade deficit (€62 billion). On average, France is spending over €1000 per capita per year on energy imports. Reversing this trend by substituting investments into energy efficiency and domestic energy sources instead of capital outflows for oil and gas will be one of the main challenges for the French transition and requires a rethinking of long-term financing mechanisms.

Restructuring the energy market: France has reluctantly committed itself to the European liberalisation of its energy market. To date, competition is almost non-existent in the power sector: 91 per cent of consumers (including industry) are still bound to regulated tariffs provided by Électricité de France (EdF). To lower barriers for new entrants, EdF is legally obliged to sell 25 per cent of its historic nuclear production to competitors to allow at least a semblance of competition. This concentration and lack of diversification might also have consequences for the emergence of new markets (e.g. energy services, energy performance contracting) and innovative products. Additionally, the French model is challenged by the current evolution of the European electricity market, with gross market prices currently even lower than the cost of existing nuclear plants.

Energy pricing: Despite frequent alerts by the regulator on the increasing costs of electricity generation, it is politically difficult for the government to raise prices, even if only to

cover costs (quite apart from the long-run marginal cost of new supply). This not only creates a risk for the viability of business models in the power sector but also impedes wider deployment of policy measures and energy efficiency: at similar standards of living, a French household consumes 30 per cent more electricity (excluding heat and hot water) than a German household. More broadly, the inability of French politics to communicate on price increases also makes it impossible to consider an ambitious ecological tax reform. Despite two recent attempts to create a national carbon tax and the creation of a high-level expert committee on environmental tax reform, the current draft law does not contain any concrete fiscal reform proposition.

Raising energy poverty: To date, it is estimated that almost 4 million French households are experiencing energy poverty (i.e. they are spending more than ten per cent of their budgets on energy). Policy measures have so far concentrated on price relief through social tariffs, encouraging further consumption rather than deploying structural solutions to reduce vulnerability through energy efficiency measures. In the event of rising prices, the sustainability of a solely price-focused approach remains uncertain, however.

The evolution of the French policy debate on the energy transition

Until the 2000s, the French debate on its energy policy was held exclusively among high-level officials and technical experts, without a broader approach involving stakeholders and long-term visions on the energy transition.

A first sign of change arose in 2007, when the government under President Nicolas Sarkozy held the Grenelle Summit, an environmental conference with stakeholders to define new policy measures to improve sustainability and environmental conditions. This conference led in particular to a strengthening of energy efficiency policies (especially in the building sector, with the objective of reducing the energy consumption of the building stock by 38 per cent). Another potential milestone was the creation of a national carbon tax, which was, however, abandoned later in 2009. Interestingly, the topic of nuclear energy was excluded from the beginning, impeding a comprehensive debate on long-term orientations. The Grenelle process also represented the start of a greater French commitment towards defining the EU energy and climate package, adopted under the French presidency in 2008. Relying on this first initiative, presidential candidate François Hollande committed himself to the organisation of a nationwide policy debate on the energy transition. This debate was the first of its kind in France, aiming to establish a comprehensive and pluralist analysis of long-term challenges for the energy transition in France, as well as the identification of objectives and policy measures needed to initiate this transition.

The national debate on the energy transition in France: objectives and architecture

The national debate on the energy transition was effectively launched in November 2012 and lasted until July 2013. Unlike other countries where the energy policy debate emerged as a bottom-up process, the French debate was highly institutionalised from the beginning, involving the creation of a high-level steering committee (including the minister of environment and experts in the fields of energy and climate), a secretary general, an expert committee, a citizen committee, and a plenary assembly gathering 120 actors from seven stakeholder groups (national and European MPs, local representatives, unions, an employers' association, environmental NGOs, a consumers' association, and representatives of the state).

The objective of this stakeholder debate was not to define the policy orientations per se, but to prepare the subsequent legislative process through a common understanding of the challenges and – if possible – the identification of consensual objectives and measures. Additionally, through the process of a continuous national debate over eight months and the organisation of multiple local debates, it also pursued the aim of raising awareness on energy and climate policy challenges among the wider French public. This was a significant challenge in a country where energy policy had remained the responsibility of the central state and administration, and where energy had so far not been considered as a real issue for electoral matters.

The debate on long-term orientations was framed through existing laws (in particular the 2005 law on energy, which included the 75 per cent reduction of GHG emissions between 1990 and 2050, as well as national objectives for 2020 under the 2008 EU climate and energy package). The presidential engagement of François Hollande to reduce the share of nuclear power in the electricity mix from 75 per cent to 50 per cent by 2025 represented a further landmark for discussions and, not surprisingly, one of the main points of conflict within the debate.

The debate itself was structured around four main pillars and corresponding working groups, reflecting the four main issues to be addressed:

1. How can the energy efficiency and sufficiency of the French system be increased? What does this imply for the evolution of lifestyles, production and consumption models, and transports?
2. What are the possible trajectories to achieve the objectives by 2030 and 2050?
3. Which choices should be made to develop renewable energies and new energy technologies? And what does this mean in terms of industrial strategy and local governance?
4. What are the costs, benefits and financing models for the energy transition?

This structure is interesting insofar as it clearly translates the political will to place energy demand at the core of the transition, rather than focusing on supply issues only. These four initial questions were later supplemented by additional topics and working groups, mainly on governance, competitiveness and employment transitions/training.

The outcomes of the debate

Without creating a general consensus on a single policy vision, the national debate generated a number of achievements. First, the extensive work on energy scenarios, including the assessment of all existing scenarios along a predefined matrix, allowed a much more transparent debate on policy visions and helped identify common aspects that could guide a long-term strategy.

Second, the deliberative nature of the debate, without a pre-imposed government proposition that stakeholders had to “accept”, helped establish a functioning permanent body of stakeholders to follow the parliamentary process and implement the strategy.

Third, the issue of energy savings clearly came out as the one single driver that will be crucial for the French transition, regardless of energy technology choices. In this regard, the fact that the government adopted the debate's recommendation of establishing a long-term target to reduce final energy demand by 50 per cent between 2012 and 2050 clearly shows that the debate succeeded at least partly in changing the French policy approach, which had long focused solely on the supply side.

Finally, the national debate led to the general understanding that the energy transition cannot be reduced to energy policy alone. In particular the discussion on local governance and energy savings showed that a much broader perspective on the triggers of social innovation is needed to drive the transition, including a reflection on economic and consumption models, as well as cultural values.

Establishing a broader approach of public participation

Another achievement of the debate was related to the inclusion of the wider public. Whereas prior policy debates

had been limited to a small circle of policy makers and experts, several initiatives were undertaken to improve public participation. First of all, the use of a citizen committee, which gathered 20 citizens without any prior expertise in the field of energy who regularly expressed their views in front of the stakeholder assembly, helped to add a more general vision of the energy transition to a debate that is otherwise inclined to “slip” into a very technocratic dimension. Secondly, the organisation of over 850 regional and local debates during the same timeframe provided complementary views on local issues and greatly improved the awareness-raising process. Finally, the French government employed the Danish Board of Technology to organise a “Citizen Day”, utilising their World Wide Views method: on the same day, assemblies of 100 citizens were gathered in ten French regions to participate in a deliberative debate and survey to provide their opinions on the issues and solutions for the transition. Despite relatively minimal media coverage, this initiative was a success, insofar as the vision of the participants (as reflected in the qualitative survey) was a highly responsible and positive one, with a strong desire for an ambitious transition.

Although no clear causal link can be established between these participative initiatives and the outcomes of the debate and law, they nevertheless provide an interesting experience and example for other countries and regions seeking to enhance public understanding of and participation in debate on the issues at hand.

The ambitious blueprint for the energy transition

Based on the current draft law, the French energy transition is highly ambitious, at least on paper. The main objectives include:

- an overall reduction of GHG emissions by 75 per cent between 1990 and 2050 and by 40 per cent by 2030, with the introduction of a national low-carbon strategy and carbon budgets (following the UK example);
- halving the final energy consumption between 2012 and 2050 and reducing the consumption of fossil fuels by 30 per cent by 2030;
- reducing the share of nuclear energy from 75 to 50 per cent of electricity generation by 2025;
- developing the share of renewable energies to 23 per cent of gross domestic consumption by 2020 and 32 per cent by 2030;
- supporting the deployment of electric vehicles through subsidies and the construction of 7 million charging stations;
- developing the principle of a circular economy and increasing the share of waste recycling;
- supporting the establishment of 200 “positive-energy territories” and “zero-waste cities”.

Behind these very challenging objectives, some policy objectives still leave a lot of room for interpretation regarding specific implementation mechanisms. This is particularly the case for three issues: the evolution of the power sector, energy efficiency and financing the transition.

The evolution in the power sector

The political will to reduce the share of nuclear power to 50 per cent clearly opens a new chapter for French energy policy in the electricity sector. However, several questions have to be raised regarding the credibility of this vision.

First of all, the objective itself does not open the perspective of a new market for industrial actors: investments will only be triggered if the credibility of this measure is confirmed. To date, the law envisages two mechanisms to secure this objective: a legally mandatory five-year plan for the evolution of the electricity sector and a veto right for the government representative on the board of EdF (84 per cent of which is owned by the French state) whenever the business strategy would not align with national planning (regarding the reduction of nuclear power). The implementation of these measures remains to be seen.

In parallel, the pace of nuclear reduction will depend on the establishment of viable alternatives. Considering renewable energy sources (RES), this means that the current situation has to be improved considerably. Under current conditions, France will not achieve its 2020 objective under the energy and climate package (23 per cent overall RES share, 27 per cent in the power sector), and achieving its goal of 40 per cent renewable electricity by 2025 or 2030 remains a great challenge. France has some of the best physical potential for RES (per capita) in Europe (for wind, solar, biomass and marine energy). But a clear political signal should be given, including the simplification of overly time-consuming and costly administrative procedures (a wind power project takes up to eight years to complete in France, compared to two or three years in Germany) and the establishment of preferential financing models, which are the one single factor that might be able to reduce generation costs by up to 30 per cent for capital-intensive technologies such as photovoltaic and wind power.

Additionally, the transformation of the power sector might be considerably facilitated if the government succeeds in implementing a strategy for electricity savings. Because of over-

capacities and low prices, French households have been inclined to consume *more* rather than *less* electricity. As mentioned previously, the average French household consumes almost 30 per cent more electricity (excluding electric heating and hot water) than its German counterpart, illustrating the big potential that could be tapped.

Energy efficiency

The French government has emphasised its will to place energy efficiency at the core of the national strategy. Considering the sector's large potential, this targets primarily the building sector, responsible for 40 per cent of final energy consumption. France has several specific targets in this regard, including a (rather unrealistic) objective to reduce the primary consumption of buildings by 38 per cent by 2020 and to accelerate the thermal retrofitting rate to 500,000 dwellings per year. Furthermore, a new thermal regulation was implemented in 2012 which places France at the forefront of EU member states regarding energy performance standards for new buildings. Additional measures include a stronger focus on energy poverty through a specific objective and reinforced subsidies (up to 50 per cent of investment costs for modest households).

So far, the policy measures implemented to improve the efficiency of the existing building stock remain however far behind the expectations. Financial support is granted through tax credits, but unlike other countries, incentives are not linked to the achievement of specific performance standards, thus generating a fair amount of windfall profits. Several propositions are being implemented to create new financing mechanisms in order to facilitate preferential loans for retrofitting projects, but they often lack the critical size and scope to generate structural effects (see the following section).

The programme on energy poverty has witnessed an increase in volume, though this is mostly due to the easing of eligibility criteria (one of every two households is eligible). However, discussions are ongoing to develop a more comprehensive approach to combine technical and financial assistance for very modest households. Furthermore, the current framing law also proposes a reorganisation of the social tariffs in the form of an “energy cheque” for modest households, covering not only energy costs but also investment costs for energy-saving measures.

On the positive side, French regions have started several initiatives to create third-party financing institutions that work rather well and could provide a blueprint for a general financing model. However, these are currently hampered by the high uncertainty over the legal framework and competition coming from the private banking sector. Clarifying the legal

framework for third-party financing will thus be crucial to enable a wider deployment.

Financing the transition

Considering the ambitious objectives, recent studies have estimated that between 20 or 30 billion euros of additional investments are needed to implement the French transition. In order to create a positive macroeconomic impact, this would have to be additional finance in order to avoid crowding-out effects. This means that new innovative financing and refinancing models are required in order to leverage low-cost long-term capital on international capital markets.

Several propositions are currently under discussion in the French context, but all fall short of satisfying the overall needs. Indeed, most initiatives target one specific sector (refinancing of retrofits in public buildings, guarantee schemes to facilitate loans for private households, etc.) but do not address the issue of the overall refinancing model. If implemented, the juxtaposition of these mechanisms might in the end generate more complexity and fail to create the needed economy of scale effects, thus reinforcing the challenge. Simultaneously, the French debate proposed a clear recommendation to create a French version of the German *Kreditanstalt für Wiederaufbau*, which provides up to €40 billion per year for investments in the energy transition and sustainability projects. To date it is unclear how this debate will end, but the financing issue will clearly be one of the great challenges in the short term that will have to be overcome to trigger the French transition.

Interestingly, new innovative proposals with a high level of relevancy for Europe have emerged very recently in France. These include first the option of modifying the European treaties on public budgets and debt in order to facilitate public investments in “productive” and economically viable investments, such as building retrofitting. Another, more radical proposal presents the idea of supporting monetary creation at the European Central Bank in order to provide up to one per cent of GDP of low- or zero-interest loans for each member state, specifically earmarked for the energy transition, to support the green growth agenda in Europe.

Addressing the issue of mobility

Dealing with the transport sector remains a big challenge for all decarbonisation strategies, and France – where the transport sector is both the largest emitter (28 per cent of overall GHG emissions) and the biggest consumer of energy (30 per cent of final consumption) – is no exception. To address this issue, the current law proposal concentrates on the supply side, with three main measures: an industrial plan to develop an affordable low-consumption vehicle

(2L/100km) by 2020, an equivalent industrial plan to support innovation on electric vehicles and charging stations, and the deployment of up to 7 million charging stations throughout the territory by 2030. Existing subsidies for the purchase of electric or low-emission vehicles remain and might be increased (up to €10,000).

However, other relevant measures identified during the energy transition debate have not been pursued. This concerns in particular the reduction of urban sprawl through new planning rules, as well as stronger support for public transport, a modal shift and “soft” mobility options (bicycle, car-sharing). Thus the current strategy is essentially based on the rapid deployment of backstop technologies, rather than a more structural approach to understand and reduce mobility needs and lift the barriers hampering the wider development of public transport and less energy-intensive modes.

The French transition from outside: implications for Europe

Uncertainty over implementation could still raise unknown barriers and difficulties, since many points remain unclear, and the credibility of the French strategy depends on the political will and the actual implementation of measures in the near future. The French push presents a new opportunity to strengthen the EU framework and confirm EU leadership ahead of upcoming United Nations Climate Change Conference to be held in Paris in 2015. It should be perceived as a great opportunity to build a strong European alliance oriented to welfare and an economic recovery while playing a key role in writing the next chapter in the building of a united European future.

Ralf Boscheck

State Aid, National Energy Policy and EU Governance

On 31 March 2014, in a report summarising the work of 772 scientists, the Intergovernmental Panel on Climate Change (IPCC) used its strongest language yet to call on world leaders to cut carbon emissions and avert dramatic disruptions of natural ecosystems and human life.¹ Of course, the United Nations 2015 summit in Paris will debate joint mitigation actions. But in mid-2014, there was no shared sense of urgency and it seemed that any

¹ IPCC: Climate Change 2014: Impacts, Adaptation, and Vulnerability – Summary for Policymakers, Working Group II Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, 31 March 2014.

The emergence of an ambitious transition strategy in France is a good sign for Europe and might help foster a political alliance for an ambitious 2030 climate and energy framework. A right combination of contents under the European energy union once imagined by Jacques Delors and now re-introduced by Donald Tusk in a version focused more on “energy security” may play the role of a positive driver for an economic recovery and a solid pathway towards an efficient and decarbonised Europe.

However, to make the European vision for a low-carbon transition tangible for the citizens, it will be crucial to go beyond the techno-economic approach of system transformation and introduce a more social angle. In this sense, the fight against energy poverty should be recognised as a main objective of European policy, including appropriate indicators and targets, following the recommendations of the European Economic and Social Committee. Furthermore, given the importance of public acceptance to succeed with such a challenging transformation, the EU could support participative approaches on different governance levels to foster local ownership of the transition.

If implemented at the pace foreseen in the current draft law, the French transition might accelerate the transition of the European power sector and require a rethinking of the current electricity market design. Consequently, structural issues of electricity market design should already be addressed in the 2030 framework through dedicated measures and provisions within the new governance framework for renewables. France’s ambition is laudable, but it will require the support of a consistent European framework, both at the EU level and among neighbouring countries.

nation’s unilateral initiative could have been thwarted by global accords safeguarding the interests of others.

Already in 2013, the UK Energy Research Centre had published a survey showing that the share of British citizens denying climate change had almost quadrupled since 2005.² Whatever the reasons, similar findings ex-

² In 2013, 28 per cent of British citizens denied climate change; W. Poortinga, N.F. Pidgeon, S. Capstick: Public Attitudes to Nuclear Power and Climate Change in Britain Two Years after the Fukushima Accident, Working Paper, UK Energy Research Centre, 19 September 2013.