### The French Civilian Nuclear Industry After the Roussely Report

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#### Introduction

On Sunday, February 21, 2011, the French Council of Nuclear Policy met to discuss the recommendations of the Roussely Report, a strategic review of the French civilian nuclear industry completed in June 2010.1 The Rousselv Report was intended to chart a corrective course for "Equipe France," a group of Paris-based corporations involved in the export of nuclear expertise and technology. 2 Although the report is exemplary in many respects, it has one fundamental weakness: its assumption that, when multiple French nuclear corporations express interest in the same contract, they should join together for a shared bid. In the short-term, this vision of a unified, integrated French nuclear export offer deprives individual French civilian nuclear corporations of flexibility, likely sacrificing competitiveness.

Commissioned by President Nicolas Sarkozv and chaired by former CEO of Electricité de France (EDF) François Roussely, the Roussely Report was highprofile and high-stakes. The report was greatly anticipated, and its potential contents became a point of lively discussion in the months leading to the July 2010 release of its 23-page summary.3 Beyond proposing the integrated French bid mentioned above, the report clarifies the roles of important industrial actors and explores ways to increase coordination. The Roussely Report provides a frank and sweeping assessment of the structure and strategy of the French nuclear system, advising a more centralized and consolidated export model. As indicated above, however, in a highly competitive global nuclear energy market, it is unclear whether a unitary French bid, an "Equipe France," stands the best chance of success.

The Roussely Report - and French nuclear export strategy generally - is best understood in light of the failed December 2009 bid by a French consortium for a \$20 billion contract for nuclear reactor construction in the United Arab Emirates (U.A.E.). The bid offers clear "lessons learned," illustrating the strengths and



weaknesses of the French nuclear export industry as well as the challenges that will face future French nuclear bids abroad. First, the bid highlighted the difficulty of overcoming the track record of Areva's Evolutionary Pressurized Reactor (EPR), which includes cost overruns and delays at construction sites. Second, the Emirates competition affirmed Electricité de France's strong international reputation for its project management and operation of the nuclear reactor fleet within France. Third, the U.A.E. bid exposed a lack of coordination among French corporations as well as the absence of clearly defined roles for French nuclear companies in export markets. Finally, the success of the South Korean nuclear consortium was a reminder of the stiff competition French nuclear corporations face worldwide.

This article explores the advantages and disadvantages of the Roussely Report's vision of an "Equipe France" competing

for civilian nuclear contracts abroad, and assesses whether the report's recommendations will re-invigorate the French nuclear export industry or hinder its progress.

#### Overview: "Equipe France"

The Roussely Commission was charged with reviewing a sector which, despite its recent struggles, had an impressive record of innovation and leadership. From the discoveries of Henri Becquerel and Marie and Pierre Curie to the decision in the 1970s to turn to *le nucléaire* for energy independence, France has prided itself on its role in developing and advancing civilian nuclear energy.

Today, French companies operate 58 nuclear reactors within France and perform the gamut of 'fuel cycle' operations (the processes involved in the fabrication and recycling of nuclear fuel). <sup>4</sup> Nuclear energy has had wide-ranging benefits for France, yielding low electricity prices, producing low levels of carbon,

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and employing significant numbers (~200,000) of French citizens.5 The major players in France's nuclear system, Areva and Electricité de France, trace their roots to the years following World War II. when the state consolidated resources in Electricité de France (EDF), the national utility, and the Commisariat à l'Energie Atomique (CEA). EDF is today the largest utility in the world (in terms of electricity produced and number of customers), with holdings in Europe and beyond. The CEA conducts nuclear research and is the principal stakeholder in .0Areva, the corporation formed in 2001 from the merger of two French companies, one specializing in reactor design and construction and the other in fuel cycle activities. Areva and EDF have enjoyed a strong collaborative relationship within France, providing complementary functions. While Areva has designed, constructed and provided certain upkeep functions for reactors, EDF has served as the architect-assembler (the project manager for reactor construction) and operator of the French nuclear reactor fleet. 6 This clear division of competencies was re-asserted in the Roussely Report as the working model within France and, significantly, as the preferred method for cooperation abroad between EDF and Areva.

In recent years, the French nuclear sector has looked increasingly to foreign markets for growth. In 2004, the French congress re-classified EDF, making it a Société Anonyme (SA). With this new legal title, EDF could finally open its coffers to foreign investors and expand its offerings beyond electricity. The 2004 law also meant that, per European Commission regulation, EDF would no longer be the sole provider of electricity within France, creating opportunities for other energy providers.7 Although EDF had international holdings before becoming an SA, the 2004 law meant that it would look even more toward foreign markets, as its role within France was pared back. Areva, intended from the start to be an international player, has significant holdings abroad as well.8

The French state remains tied to EDF and Areva, holding majority shares in each company.<sup>9</sup> French political involvement goes beyond this financial stake, however: for Paris, the sensitivity of nuclear technology coupled with the strategic value of cooperation abroad makes the nuclear sector a critical one. President Nicolas Sarkozy has had a visible role in its promotion around the world and coordination at home, calling for the Roussely Report and playing an important part in the ill-fated bid of a consortium of French civilian nuclear companies in the U.A.E.

#### The U.A.E. Bid

The French nuclear bid in the Emirates is an important case study, casting light upon the strengths and weaknesses of the individual actors of the French nuclear system as well as the unitary export model. For the first time, an exclusively French consortium was created for the purpose of selling Areva's 3<sup>rd</sup> generation EPR. The U.A.E. case offers lessons on a range of issues, including the weaknesses of the EPR. EDF's strong international reputation, the reasons for dissent and discord within "Equipe France," and the quality of French nuclear companies' opponents in foreign export markets. The French experience in the Emirates also confirmed that political support is valuable, if not determinative, in securing civilian nuclear contracts abroad. Although it is dangerous to extrapolate from any single bid, the experience of "Equipe France" in the U.A.E. confirmed some disconcerting (if also correctible) trends within the French nuclear export industry.

The prospect of a French sale of nuclear technology and expertise to the U.A.E. dates to Sarkozy's visit to Abu Dhabi in January 2008. Sarkozy often broached the prospect of bilateral nuclear cooperation during these visits, and significant diplomatic effort was directed toward North Africa and the Middle East. In the U.A.E., Sarkozy's visit included the signing of a bilateral nuclear cooperation agreement, which coincided with the announcement of a

French consortium's bid for a lucrative contract to build the Emirates' first nuclear reactors. <sup>10</sup> The consortium would be composed of Areva, GDF Suez and Total; EDF, noticeably absent from the initial bid, was unwilling to depart from a strategy eschewing nuclear investment in the Emirates. In contrast, Areva decided to pursue the contract only after political overtures had been made. <sup>11</sup> In the words of Jean-Pierre Hauet, "Areva found itself in the heart of a project which was off to a good start" despite earlier indifference about a bid in the U.A.E. <sup>12</sup>

The close political relationship (and, since 1997, formalized "strategic partnership") between France and the U.A.E. may have played a part in Areva's optimism about the nuclear bid. 13 Franco-Emirati collaboration was longstanding and deepening in defense. education, and culture. In the energy domain, consortium members Total and GDF Suez were active in the Emirates' oil and gas industry. Perhaps most important, French political support for the nuclear deal was consistent. Nicolas Sarkozy and his administration took a keen interest in the advancement of this and other "strategic" deals, assigning Claude Guéant. Secretary-General of the Elysée, to coordinate and promote the bid from his "war room." 14 Guéant and his team lobbied on behalf of the French nuclear bid while also working to ensure that the French pitch was coordinated and well-prepared. 15

Sarkozy's personal support for the bid did not end with his January 2008 visit. In May 2009, Sarkozy returned to the U.A.E. at the head of a star-studded delegation, accompanied by Minister of Foreign and European Affairs Bernard Kouchner, Minister of Defense Hervé Morin and Economic Minister Christine Lagarde. Although Sarkozy's second visit to the Emirates was ostensibly for the purpose of inaugurating a French military base overlooking the Strait of Hormuz, it had the added advantage of bolstering the French nuclear bid. This political support was timely, for Emirati

decision-makers had begun to voice their preference for EDF to join Areva, GDF Suez and Total in the French consortium. EDF's extensive track record as architect-assembler (the project manager for the construction of nuclear reactors) and reactor operator was attractive to Emirati decision-makers. TeDF announced its decision to join the French consortium during Sarkozy's visit to the Emirates, reportedly after the French President had been asked by U.A.E. leadership to bring EDF into the French consortium.

Sarkozy's efforts were met in kind by the South Korean government, on behalf of a consortium by the Korean Electric Power Corporation (KEPCO), which quickly emerged as the principal rival of "Team France." Korean political authorities oversaw, streamlined and promoted the KEPCO-led bid. According to diplomat Han Seung-soo. the Korean consortium's proposal included sharing South Korean "information technology and leadingedge capabilities" with the U.A.E.<sup>19</sup> President Lee Myung-Bak, like Sarkozy, was reportedly involved. Lee would later describe the Korean consortium's successful bid as a "heaven-sent national fortune."20

In Paris, more events were unfolding that would affect "Team France." EDF replaced CEO Pierre Gadonneix with Henri Proglio in September 2009. The change signaled a move toward a corporate management style that more closely resembled a conventional private sector model.<sup>21</sup> Proglio's public criticism of Areva for its involvement at every stage of the fuel cycle and his statement that EDF should take the lead in the French nuclear sector set off a public rivalry between EDF and Areva.<sup>22</sup> A crisis erupted regarding the delayed

delivery of spent nuclear fuel from EDF to Areva, with each firm blaming the other, and rumors circulated of a personal animus between Proglio and Areva CEO Anne Lauvergeon.<sup>23</sup> In January 2010, Prime Minister François Fillon invited Proglio and Lauvergeon to his residence to settle the dispute. <sup>24</sup> These incidents reflected the challenges of coordination that "Team France" would face.

Far from the swirling intrigue of Paris, the Emirates Nuclear Energy Corporation (ENEC) had been charged with choosing among the competing offers.25 ENEC's evaluation of the French bid would turn in large part on its assessment of the EPR, the controversial 3rd-generation model engineered by Areva and German industrial powerhouse Siemens.<sup>26</sup> The EPR is intended to be the safest, most efficient and most secure reactor in the world. However, delays and cost overruns at EPR construction sites at Olkiluoto, Finland and Flamanville, France raised questions about whether the EPR could be constructed on schedule and at cost.27A joint letter produced by French, Finnish and British authorities regarding the "interconnectivity between the control and safety systems" of the EPR confirmed that the new design still needed refinement.28 Further, EDF's absence from the initial consortium combined with Areva's limited experience in project management weakened the French bid.<sup>29</sup> Making matters worse, the Korean team was reported to have offered reactors at a lower price than that of its French competitor.30 And, although KEPCO proposed a modified reactor design to meet the high standards of safety and security demanded by Emirati authorities, it had a track record of

building reactors, albeit simpler ones, on time and at a low cost. 31 The French experience in the U.A.E. contract competition, although not the sole precipitating factor in the recommendations of the Rousselv Report, was highly influential. The most positive lesson of the U.A.E. deal was that EDF enjoyed a positive reputation internationally: otherwise, the deal was a harsh encounter with a highly competitive bidding process. Perhaps unsurprisingly, the rejection of the French bid underlined the negative effect of questions regarding the EPR's cost and deliverability. Similarly, the public disputes between EDF and Areva had undermined the French proposal, calling into question the consortium's ability to cooperate. When the extensive efforts of the Elysée were met in kind by the South Korean government, the limitations of political support became evident. In sum. François Rousselv and his committee would have much to review.

#### The Roussely Report

The December 2009 decision in the U.A.E. was preceded by an announcement from the Elysée: a comprehensive review of the French domestic nuclear system would be undertaken by a commission headed by former EDF President François Roussely.<sup>32</sup> The report was highly anticipated, and its potential contents became a point of lively discussion in the months leading to the July 2010 release of its 23-page summary.33 The Roussely Report addresses major points of controversy, such as the U.A.E. deal, the roles of EDF and Areva, issues of coordination and the place of the Elysée. Calling for "adaptation," the report identifies two overarching objectives: the revitalization of France's



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domestic nuclear system and building a substantial presence in an expanding international nuclear market.<sup>34</sup>

The report outlines a set of immediate recommendations along with a longer list of strategic ones. The most urgent priorities are the completion of the Olkiluoto and Flamanville projects with the least delay possible. On the other hand, the report suggests delaying the construction of the second proposed EPR in France (at Penly) until the lessons of the Olkiluoto and Flamanville projects can be assessed and internalized. The problems at these sites were attributed only in part to the design of the EPR, perhaps implying that the architectassemblers (Areva for the EPR in Finland and EDF for the one in France) were responsible as well. 35

The Roussely Report also calls for a more intimate relationship between EDF and Areva in light of their recent tension.<sup>36</sup> This partnership would include clearly defined roles, with EDF to be "within France and abroad, the architectassembler of Equipe France" in spite of the difficulties at its Flamanville site.37 Areva, however, would not emerge intact, as the report outlines a spin-off arrangement for the corporation's mining activities. The mining consortium proposal in the Roussely Report was adopted by the Council of Nuclear Policy in its February 2011 meeting. Areva will be a majority stakeholder in the consortium, presumably with EDF to have a role as well. 38

The Roussely Report provides more recommendations regarding "Equipe France" and the export market. First. Areva would continue to develop reactors to sell alongside the EPR.39 Second, when venturing beyond the métropole (mainland France), French civilian nuclear corporations should be bound in "an industrial structure dedicated to exports."40 The report also calls for a stronger, more centralized political presence, namely "either ... a Minister of Energy or... a Secretariat General of Energy attached to the Presidency" to support and coordinate bids.41

Beyond its structural recommendations, the Roussely Report emphasizes a simple but important concept, that the track record of civilian nuclear companies within France impacts their sales abroad. French competency in recycling, its high standards in safety and security, and the planned permanent waste depository are important, as is the efficiency of the fleet of French reactors. Continued research and development, including the ASTRID breeder reactor, will be critical.42 As Jacques Figuet, French nuclear attaché to the United States, observed about reactors at Penly and Flamanville: "they are a showcase, but they are also today a reality." 43

Although the Roussely Report is critical of the French nuclear industry as a whole, its criticisms fall particularly harshly on Areva. The report's affirmation of EDF as architect-assembler, in spite of the issues at EDF's Flamanville site. amounts to a rejection of Areva's management of the Olkiluoto EPR. Similarly, the mining consortium and emphasis on security of supply (which is set to materialize in a long-term nuclear fuel deal between EDF and Areva) will likely work to EDF's benefit at Areva's expense. If fuel prices increase, as is expected. Areva will be bound to sell at a set, lower price to its French colleague, a significant blow to the world's top uranium mining company. Still, although the report favors EDF, it does not cut EDF's ties with Areva in the export market. In fact, the Roussely

Commission deepens the commitment to an integrated French bid, proposing a "strategic partnership" between the two corporations as well as a formalized structure for joint work abroad.

#### Conclusion

"Equipe France" faces a daunting international landscape as it looks to the future. Korean, Russian, American and Japanese companies will ensure competition in markets in North America, Europe and, the region in which the most growth is expected, Asia.44 Against this backdrop, the Roussely Report identifies a number of weaknesses in the French nuclear export offer. Although certain weaknesses relate to the definition of roles and coordination among corporations, both quickly correctable through the measures proposed by the Roussely Report, others are more fundamental. The report's commitment to a unified and consolidated French nuclear export industry therefore entails considerable risks.

"Equipe France" will face significant challenges in the coming years due to questions about the 3rd generation EPR's deliverability, cost and operation. Although a comparison of construction time at the Olkiluoto, Flamanville and Taishan (China) sites demonstrates a learning curve (and compares favorably with average construction times during France's initial expansion of its nuclear fleet), the EPR will be a "tough sell" until the Olkiluoto and Flamanville reactors are completed and online.45 And, as Professor Jacques Percebois observes, although the EPR's size (1650 megawatts) and sophistication (e.g. advanced safety and security measures, technical complexity) make it ideal for countries with high electricity demand and large grids, these qualities preclude it from countries with more modest electricity needs and smaller grids.46 Furthermore, global construction statistics confirm a broad preference for the simpler, cheaper and proven 2<sup>nd</sup> generation reactors: of the 42 reactors under construction, only 13 are

3<sup>rd</sup> generation. The performance of the forthcoming Atmea and Karena reactors will thus be very important for "Equipe France," particularly in emerging markets without nuclear experience. 47 More fundamentally, as François Roussely has noted independently of his commission's formal report, France's advantage lies more in EDF's experience than in Areva's technology:

Today, we are no longer the only ones who know how to make quality reactors and turbines. On the other hand, we are the only ones who are able to provide a newcomer (to civilian nuclear energy) with the field experience of an operator that has managed 58 nuclear reactors for thirty-five years with no major accidents.<sup>48</sup>

It should be added that, despite the risk entailed in an integrated French nuclear export model, Areva and EDF remain well-positioned to answer calls for nuclear reactor contracts abroad, individually and as a unit. French corporations, particularly Areva, have cast a wide net over recent years as countries began to discuss investment in nuclear energy. Plans are in motion to construct EPRs in the United Kingdom, India and Italy.<sup>49</sup> The Kuwaiti Investment

Authority's recent €600 million investment in Areva bodes well for the export of French civilian nuclear technology to this Gulf state, and South Africa is considering French nuclear technology for its planned reactor fleet expansion. The reactor fleet within France is also aging and in need of replacement.

It is unclear, however, whether a unitary French nuclear export offer is the optimal arrangement for both EDF and Areva. By depriving both corporations of a free hand in countries in markets where the other indicates interest, the Rousselv Report may preclude Areva or EDF from making the most competitive bid. Areva brings advantages of its own, namely its fuel cycle operations, to an integrated French export bid. However, until Lauvergeon's corporation widens its portfolio of reactors and demonstrates that the EPR is deliverable, cost-effective and lives up to its billing in terms of safety and security, Areva is likely to be the weaker partner in joint reactor contract deals. Alternatively, the long-term nuclear fuel deal between Areva and EDF is designed to benefit EDF at Areva's expense. In short, both corporations are asked to sacrifice for the "greater good."

The Roussely Report is impressive for its candor and scope, addressing the host of issues ailing the French nuclear industry. However, on the fundamental question of how EDF and Areva will act when targeting the same market, it essentially "doubles-down" on the principle of unitary French action abroad. Instead of choosing an export structure that provides complete freedom of action to EDF and Areva. allowing each to pursue projects abroad irrespective of the nation-of-origin of its partner, the Roussely Report casts their lots together when both express interest in a given deal. And although much of EDF and Areva's future activity abroad will be conducted independently, the value of reactor deals is so large (as seen in the Emirates) that sacrificing competitiveness in even a few markets could mean billions of dollars in lost revenue. This model increases the risk of failure by making the French bid more inflexible and less adaptable to the particular dynamics of different contract competitions. The Roussely Report's proposed export arrangement will almost certainly be to the disadvantage of members of "Equipe France," particularly EDF, in the shortterm.50 **FAS** 

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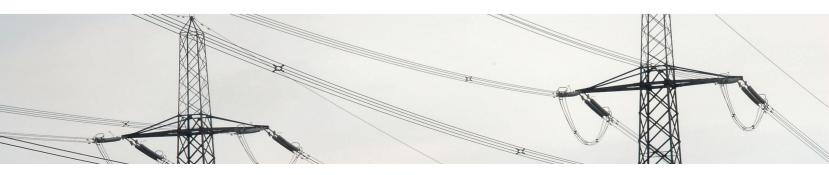


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### **ENDNOTES**

- 1. The Roussely Report's formal title is « Avenir de la filière française du nucléaire civil Roussely, François et al. « Synthèse du rapport : Avenir de la filière française du nucléaire civil » Presented to President Sarkozy on June 16, 2010. Summary released publicly July 27, 2011. <a href="http://www.elysee.fr/president/root/bank\_objects/Synthese\_ROUSSELY.pdf">http://www.elysee.fr/president/root/bank\_objects/Synthese\_ROUSSELY.pdf</a>
  "Compte rendu du Conseil de Politique Nucléaire du 21 février 2011. » from the Elysée. February 21, 2011. <a href="http://www.elysee.fr/president/les-actualites/communiques-de-presse/2011/compte-rendu-du-conseil-de-politique-nucleaire-du.">http://www.elysee.fr/president/les-actualites/communiques-de-presse/2011/compte-rendu-du-conseil-de-politique-nucleaire-du.</a>
- 2. "Equipe France" or "Team France" in English is a term that appears in the Roussely Report. It refers to French industrial giants Electricité de France, Areva, Alstom, Bouygues and Vinci. EDF and Areva are the two most important "team" members and stand at the center of French nuclear export strategy.
- 3. Monicault, Frédéric de. « Nucléaire : les pistes du rapport Roussely. » *LeFigaro.fr* March 16, 2010. <a href="http://www.lefigaro.fr/societes/2010/03/17/0415-20100317ARTFIG00040-nucleaire-les-pistes-du-rapport-roussely">http://www.lefigaro.fr/societes/2010/03/17/0415-20100317ARTFIG00040-nucleaire-les-pistes-du-rapport-roussely</a>
- 4. "Nuclear Power in France." World Nuclear Association. January 21, 2010. http://www.world-nuclear.org/info/inf40.html
- 5. Schnieder, Mycle. Nuclear Power in France: A Model? In Nuclear Power's Global Expansion: Weighing Its Costs and Risks by Henry Sokolski. December 2010. p. 238.
  Roussely, François et al. p. 6. The 200,000 estimate includes "direct and indirect employees," i.e. subcontractors and contractors as well as full-time employees.
- 6. The responsibility of the 'Architect-Assembler' includes the oversight, management and coordination of the construction of reactors. For example, at the Flamanville site, where an EPR is currently being built, EDF oversees Areva and one hundred other contractors, organizing and directing construction activity.

  "Futures centr ales nucléaires EPR avec participation EDF en France et à l'international." Conférence des Groupes Professionnelles Energie et Nucléaire des Ingénieurs et Métiers. January 7, 2008. <a href="http://www.mines-energie.org/Conferences/PR\_080107\_Pays.pdf">http://www.mines-energie.org/Conferences/PR\_080107\_Pays.pdf</a>
  "Flamanville 3- France: Logistique d'Approvisionnement." Areva.com. 2011. <a href="http://www.areva.com/FR/activites-2397/france-flamanville-3.html#tab=tab5">http://www.areva.com/FR/activites-2397/france-flamanville-3.html#tab=tab5</a>
- 7. "Legal Status," EDF. <a href="http://shareholders-and-investors.edf.com/corporate-governance/legal-status-42864.html">http://shareholders-and-investors.edf.com/corporate-governance/legal-status-42864.html</a> « Loi n°2004-803 du 9 août 2004 relative au service public de l'électricité et du gaz et aux entreprises électriques et gazières » French Assemblée Nationale and Sénat after approval by the Conseil Constitutionnel. August 9, 2004. <a href="http://legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000787077">http://legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000787077</a>
- 8. Matlack, Carol. "Areva's High-End Bet on Nuclear Power." BusinessWeek. March 4, 2010. http://www.businessweek.com/magazine/content/10\_11/b4170046338890.htm
- 9. The French state's ownership of EDF is direct. Its stake in Areva is channeled through CEA.
- 10. "President Sarkozy on a state visit to the UAE (January 15, 2008)" Internet site of the French Embassy in the United Arab Emirates. http://www.ambafrance-eau.org/france\_eau/spip.php?article1003



### **ENDNOTES**

- 11. « Press Release: Signature of a Partnership Agreement for a Nuclear Power Plant Project in the United Arab Emirates." Areva. January 14, 2008. <a href="http://www.areva.com/EN/news-6527/signature-of-a-partnership-agreement-for-a-nuclear-power-plant-project-in-the-united-arab-emirates.html">http://www.areva.com/EN/news-6527/signature-of-a-partnership-agreement-for-a-nuclear-power-plant-project-in-the-united-arab-emirates.html</a>
- 12. Hauet, Jean-Pierre. « Le nucléaire français après Abu Dhabi. » *la Revue Passages*. « Passages50 : Lettre n. 6: le nucléaire dans tous ses états. » pp. 16-40. Here is the sentence in the original French: « Areva, pour lequel Abu Dhabi et les pays proches de la Méditerranée ne constituaient pas une priorité, s'est ainsi retrouvé au cœur d'un projet avec le sentiment qu'il était bien parti. » (p. 33)
- 13. « Emirats arabes unies » France diplomatie. July 20, 2010. <a href="http://www.diplomatie.gouv.fr/fr/pays-zones-geo\_833/emirats-arabes-unis\_428/index.html">http://www.diplomatie.gouv.fr/fr/pays-zones-geo\_833/emirats-arabes-unis\_428/index.html</a>
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- 15. Ibid.
- 16. "Emirats arabes unies: Présentation. » France diplomatie. July 20, 2010. http://www.diplomatie.gouv.fr/fr/pays-zones-geo 833/emirats-arabes-unis 428/france-les-emirats-arabes-unis 1138/presentation 5026/index.html
- 17. Hauet, Jean-Pierre. p. 34.

Although GDF Suez operates and has constructed reactors in Belgium, it does not have as much experience as EDF (due to the scale of EDF's reactor fleet). "GDF Suez: Activités: Le Renouveau de l'Energie Nucléaire. "GDF Suez. <a href="http://www.gdfsuez.com/fr/activites/nos-energies/nucleaire/le-renouveau-de-l-energie-nucleaire/">http://www.gdfsuez.com/fr/activites/nos-energies/nucleaire/le-renouveau-de-l-energie-nucleaire/</a>

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  - « EDF conjoint le consortium français pour le nucléaire émirati. » Challenges.fr. May 26, 2009. <a href="http://www.challenges.fr/actualites/entreprises/20090526.CHA3989/edf">http://www.challenges.fr/actualites/entreprises/20090526.CHA3989/edf</a> rejoint le consortium français
- 19. Woo, Jaewyn. "Seoul's U.A.E. Deal Caps Big Sales Push." *The Wall Street Journal*. December 29, 2009. <a href="http://online.wsj.com/article/SB10001424052748704134104574623934045786504.html?KEYWORDS=UAE+korea+nuclear+france">http://online.wsj.com/article/SB10001424052748704134104574623934045786504.html?KEYWORDS=UAE+korea+nuclear+france</a>
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- 22. "Proglio veut revoir la carte du nucléaire français" *LeFigaro.fr.* November 23, 2009. http://www.lefigaro.fr/societes/2009/11/19/04015-20091119ARTFIG00010-proglio-veut-revoir-la-carte-du-nucleaire-français-.php
- 23. Monicault, Frédéric de. « Lauvergeon/Proglio : condamnés à s'entendre » *LeFigaro.fr* January 29, 2010. <a href="http://www.lefigaro.fr/societes/2010/01/29/04015-20100129ARTFIG00631-lauvergeonproglio-condamnes-a-sentendre-.php">http://www.lefigaro.fr/societes/2010/01/29/04015-20100129ARTFIG00631-lauvergeonproglio-condamnes-a-sentendre-.php</a>
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- 25. In his Passages article, Hauet assesses France's ability to meet ENEC's requirements in great detail.
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- 28. Schnieder, Mycle. p. 254. The questions raised in the UK regarding the EPR have since been answered with satisfaction, and the Finnish and French regulatory authorities are in the process of resolving their objections.
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- 33. Roussely et al. pp. 5-7
- 34. Ibid. p. 7
- 35. *Ibid.* p. 14. The Roussely Report places emphasis on EDF and Areva's strategic partnership, calling it a pressing necessity ("nécessité impérieuse").
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- 48. Stiel, Nicolas. « La vérité sur... du rapport Roussely. » *Challenges.fr* February 17, 2011. <a href="http://www.challenges.fr/magazine/analyse/0244.034197/la\_vrit\_sur\_du\_rapport\_roussely.html">http://www.challenges.fr/magazine/analyse/0244.034197/la\_vrit\_sur\_du\_rapport\_roussely.html</a>
  - Here is the original quotation: « Aujourd'hui, nous ne sommes plus les seuls à savoir faire un réacteur et une turbine de qualité. En revanche, nous sommes les seuls à pouvoir fournir à un nouvel entrant un retour d'expérience d'un opérateur qui gère 58 réacteurs nucléaires depuis trente-cinq ans sans incidents majeurs. »
- 49. EDF is involved in the EPR projects in the UK and Italy, but not the one in India. "Être un acteur majeur du renouveau du nucléaire. » EDF. http://strategie.edf.com/notre-strategie/leader-du-renouveau-40478.html
- 50. I owe a debt of gratitude to Dale Swartz, Cheryl Miller, and Wesley O'Dell for their help in editing this piece.

