Anglo-French Collaboration in the Nuclear Sector: The Human, Social and Ethical Dimensions

Graduate seminar, Maison Française d'Oxford, Monday 15 May 2017.

GUIDELINES & ABSTRACTS
V.4

CONTEXT

A graduate workshop will be held on Monday 15 May, at the Maison française d'Oxford, involving a little group of graduate students, from the UK and France. They will be invited to present their research and to engage in discussions over the place of nuclear energy in the context of the social sciences and humanities. If this first seminar proves a success, it could serve as the basis for a larger conference, which will involve senior policy and academic experts. The discussions held on May 15th could help draft the agenda of this larger seminar, potentially guided by the graduate students themselves.

Mr Cyril Pinel, Conseiller Nucléaire at the French Embassy in London, has initiated a small group of academics to:

- Identify and explore whether sufficient attention was being given to some of the social science and philosophical dimensions of nuclear energy in Britain and France.
- Consider whether there was scope through Anglo-French academic collaboration to improve the understanding and inclusion of these deeper human dimensions.
- Consider 'how' best such issues might be promulgated in future if it is confirmed that there is a need.

THEORETICAL FRAMING

Wider issues of relevance and interest regarding nuclear energy—such as its human, cultural and philosophical dimensions—have not received sufficient attention in either France or Britain. A number of specific areas were identified to be significant in this respect:

- The need for clearer, 'unbiased' information, explanations and better understanding of the wider human dimensions associated with nuclear energy.
- A better understanding of the influences upon, and differences in social attitudes towards nuclear in France and Britain.
- The factors influencing varying attitudes within Britain and France amongst different sections of society. Particular references were made to the younger age groups and gender differences.
- And understanding of 'changes' of attitude and support found in Britain and France, in more recent times.
- The importance of the community, social, cultural, ethical and human dimensions given the unique nature of the nuclear sector, and in particular the long term nature and scale of economic and social investments associated with nuclear energy.
- The impact of perceptions about the nuclear risk factors that may, or may not, be very different to reality over time.
- The global nature of the impact of the sector on Anglo-French interests and the opportunities for positive collaboration, and learning in the wider human, social, ethical, cultural and philosophical aspects.
- The multitude of social media channels available for disseminating information and opinions that influence social attitudes about nuclear energy.
- A lack of trust in policy or operational statements emanating from the government, company or organisation directly engaged in the sector.

Martin DENOUN
PhD Candidate

Groupe de sociologie pragmatique et réflexive
École des Hautes Etudes en Sciences Sociales

martin.denoun@ehess.fr

Global warming and nuclear future

1997 might be a crossing point for the French nuclear sector: SuperPhénix—the fast breeder prototype reactor—was shut down by a political decision, and the Kyoto Protocol was ratified. For a long time, the fast breeder technology in France has acquired a very specific status. SuperPhénix was supposed to prove that the French nuclear sector was the most advanced in the world, with a technology guaranteeing future without any energy supply problem. But, after a life full of technical problems and administrative appeals, the newly elected government decided to shut down the reactor.

The same year, the Kyoto Protocol was ratified, after other international conferences about climate change, as the pioneer Earth Summit in Rio de Janeiro in 1992. The argument in favor of the reflation of nuclear in France appears in 1997, considering the low carbon emission of this industry in comparison with other energy industries. This appearance in 1997 has already been described (Chateauraynaud, 2011). We would like to investigate dialectical exchanges between arguments and counter-arguments about the new fast breeder reactor project, Astrid. In 2006, the presidency decided to fund the conception of Astrid. Its construction is planned to begin around 2020.

Drawing on interviews and on a corpus of articles, reports and scenarios, this contribution will show how, about the case of Astrid, French nuclear actors lean on the Global Warming event to make an argument of comparative advantage in favor of nuclear energy, and how this argument is challenged by other actors, who often describe—but not always—antinuclear.

Miyuki TSUCHIYA
Postdoctoral researcher

Center of European Studies
Sciences Po Paris

mtsuchiya@hotmail.fr

Governing the energy policy : the pursuit of nuclear energy through the « energy transition » notion in France

The accident of Fukushima in March 11th 2011 acts as a « focusing event »[1] and challenges the French energy public policy, whose electricity mix is produced at 80% of nuclear energy. Energy policy is strongly linked to political systems[2]. Historically, France favoured a centralised system, a mass production one organised around public monopolies (EDF, Areva) and a restricted decision-making process[3]. The accident disrupts drastically this structure and a debate quickly came up around a nuclear phase out and more development of renewable energies. This occurs at a time when Germany announces phasing out from nuclear energy and France has to decide to proceed, or not, to its nuclear power plants refit. In such a context, how does the nuclear advocacy coalition[4] react to this crisis and try to maintain itself, regarding this strong challenge?

The storytelling elaborated (economical issues, energy independency, the fight against climate change etc.) in a peculiar political context (presidential elections in 2012)[5] « recoded »[6] and politicised the issue around the notion of « energy transition » , implying then the maintain of nuclear energy. Facing the erosion of public confidence and the criticism of the technocratic elite and the lack of transparency, the maintenance of nuclear energy is legitimated through the national debate implementation which should leads to a law on energy transition and to democratise the energy policy by its openness.

Thus, the notion of energy transition appears to be an « ambiguous consensus »[7] between stakeholders defending different interests and representations. The evolution of the notion *via* the adoption of the law reflects a blurred energy policy and an undecided State. These elements are reflected through the analysis of public action tools such as the law and the *programmation pluriannuelle de l'énergie* (multi annual energy program). This presentation is based on interviews made and analysis of documents (parliaments reports, legal texts, discourses analysis etc.).

—

[1] BIRKLAND T.A., *After Disaster. Agenda Setting, Public Policy, and Focusing Events,* Washington, Georgetown University Press, 1997.

[2] KITSCHELT H., « Political Opportunity Structures and Political Protest : Anti-nuclear Movement in four democracies », *British Journal of Political Science,* volume 16, 1986, p. 57-85.

[3] HECHT G., *Le rayonnement de la France: Energie nucléaire et identités nationale après la seconde guerre mondiale*, Paris, La Découverte, 2004 ; TOPCU S., « L'agir contestataire à l'épreuve de l'atome. Critique et gouvernement de la critique dans l'histoire de l'énergie nucléaire en France (1968-2008), Thèse de doctorat en sociologie, EHESS, soutenue le 24 septembre 2010 ; VAISSE M., « Le choix atomique de la France (1945-1958) », *Vingtième siècle. Revue d'istoire*, n°36, 1992, p. 21-30.

[4] JENKINS-SMITH H., SABATIER P., « The advocacy Coalition Framework : An assessment », dans SABATIER P., *Theories of the Policy Process,* Boulder, Westview Press.

[5] BROUARD S. et *al.*, « Un effet de campagne. Le déclin de l'opposition des français au nucléaire en 2011-2012», *Revue française de science politique* 2013/6 (Vol. 63), p. 1051-1079.

[6] BENFORD R., SNOW D., "Framing Processes and Social Movements: An Overview and Assessment", *Annual Review of Sociology*, n°26, 2000, p. 611-639.

[7] PALIER B., SUREL Y. et *al.*, *Quand les politiques changent,* Paris, L'Harmattan, 2010, p. 145.

Marie DÉGREMONT-DORVILLE
PhD Candidate

Centre de Sociologie des Organisations
Sciences Po Paris

marie.degremont@sciencespo.fr

What can we learn from decentralized energy systems in France?

In Europe, centralized energy systems, and, especially, electricity mixes dominated by nuclear energy like in France, are subject to critics regarding their lack of integration in local political decision-making. They are operated, financed and managed on a national scale, with national institutions and increasingly, international companies.

Challengers, such as local activists and NGOs, members of the Green party, use processes and trends like digitalization, public participation, emphasis on local distribution networks, and calls for empowerment of consumers to legitimize *their mobilization* for an energy transition towards more decentralized energy systems. They advocate against traditional energy systems, they call for more transparency and an increasingly territorialized management of energy supply and consumption.

In France, such claims exist since the 1970s. How did these critics manage to gain more influence since the 2000s? How did this opposition against this centralized energy system and institutions (French ministry of Industry, French ministry of Economy, EDF…) get structured? When and where did it succeed? This question justifies examining the alternatives they propose in order to make them more convincing, and, to some extent, appealing. The communication will address the strategies of those actors (local NGOs, environmental networks, Green movements and parties) who opposed to the centralized energy systems, in particular their outcomes and the lessons to be learnt from the emergence of this alternative energy system.

Based on a research with more than 155 interviews, I will underline why some challengers of the traditional energy system have been more successful than others in turning into opportunities the changes in the energy and policy context (Europeanization and liberalization of energy markets; climate change and environmental regulations; decentralization of French institutions). I will focus on three regional systems that were especially proactive on these issues, namely the PACA region, the Nord-Pas-de-Calais region and the Rhône-Alpes region.

Jérémy BOUILLET
PhD Candidate (EDF, PACTE Grenoble)

Sciences Po Grenoble

jeremy.bouillet@sciencespo-grenoble.fr

Energy consumption behaviours in France: patterns and main trends

Pour réduire la pression engendrée par nos modes de consommation, une solution souvent envisagée est de faire changer les pratiques et de modifier les attitudes. Or, en matière d'économie d'énergie, les injonctions normatives pour définir les « bonnes pratiques » ne sont ni stables, ni homogènes : elles font l'objet de controverses et donnent lieu à des reformulations discursives parfois dissonantes. Entre enjeu technologique, économique, écologique ou social, l'énergie comme problème public est alors soumise à des cadres normatifs dynamiques, qui définissent certaines déviances, qui légitiment certaines solutions au dépend d'autres, et qui sont, au final, diversement appropriés par les citoyens ordinaires.
Ces derniers, ni surcompétents, ni incompétents construisent du sens à travers ces ordres normatifs concurrentiels et cherchent à les rendre compatibles avec leurs modes de vie et leur perception du problème de l'énergie. La thèse cherche à comprendre les arbitrages auxquels la question de l'énergie donne lieu entre impératifs citoyens, d'utilisation et de consommation. Elle resitue les opinions dans leur contexte de formation, tout en étant attentive aux modalités de partage et d'ajustements collectifs.

Deux terrains sont mobilisés : la campagne présidentielle de 2012 comme moment politique fort ; et un contexte de routine en région PACA, à travers des méthodologies qualitatives (deux forums online) et quantitatives (deux vagues de sondages).

Eva DERONT
PhD Candidate

PACTE (Grenoble)
Université Libre de Bruxelles

eva.deront@umrpacte.fr

National social and economic effects of the European framework

I propose here to analyse some examples of the impact of the European framework on the perception of social and economic risks linked to the use of nuclear energy in France and in the UK.

Established in 1957 the scope and content of the Euratom treaty have almost never been changed. Despite the fact that energy remains a national prerogative, we will see through the example of radioactive waste policy that the European level has been and still is an important channel to promote national policies and orientations regarding waste management (deep geological storage) and legitimize the use of nuclear energy among the population in the UK and France.
On the contrary the European safety framework seems to be a rather depoliticized field which has been pushed forward by the safety authorities (especially the French one) during the window of opportunity opened up by the new international safety convention of the IAEA, but without a noteworthy effect on citizens' position towards nuclear energy.

Second, we intend to analyze another renewed impact of Euratom on the French and English policy sector: its initial promotion goal, pleading for the development of nuclear energy in Europe. This statement has been recently used by the European Commissioner for Competition Margrethe Vestager to justify state aids by the Hungarian government to build a new reactor at Paks. This is symptomatic of the now widening discrepancy between the liberal paradigm of the European Union and the intensive capital costs of nuclear energy whose potential development now relies on utilities backed by states. These national economic hurdles are a burning issue for the UK and France, since the Contract for Difference planned to finance Hinkley Point C (built by EDF) has been challenged in front of the European Court of Justice, which judgment may be determining for the future of nuclear energy in Europe. They also opened up a new area of debate, the economic risk, besides the traditional safety and health issues.

Tae-Hoon KIM
PhD Candidate

University of Cambridge
thk22@cam.ac.uk

The great nuclear divergence: how France overtook Britain in the civil nuclear stage

This paper provides a historical examination as to why the development of nuclear energy in UK and France took divergent paths from the 1960s onwards. For both countries, entering into the uncertainties of the Cold War, nuclear energy was an important geopolitical and geostrategic asset and symbol. With the emergence of nuclear power stations in the 50s and 60s, it became associated with the nation's scientific, industrial, and technological advancement and prestige. From the mid 1970s, however, this commonly trod nuclear path diverged significantly. Whereas France launched an ambitious program of nuclear expansion, with the result that now over 70% of France's electricity is generated by nuclear energy, Britain's nuclear development stalled. This is all the more revealing, given that it was Britain that first embarked on an ambitious expansion of nuclear power stations in 1965, almost ten years earlier than France. In addition, it was Britain, not France that opened the first industrial scale nuclear power station in the world in 1956. The extant literature has largely focused on technical and economic factors in accounting for this divergence. The most popular view was that this was the result of the UK sticking with its own indigenously developed nuclear reactor, which turned out to be obsolete, while the French made the switch to the more popular US designed water reactor. The case is explained as France taking a pragmatic technical decision whereas the UK opting for a nationalist policy that was technologically faulty.

The objective of this paper is to move away from such simplistic diagnosis. Instead of describing it as an example of technological nationalism obstructing technological efficiency, it will instead argue that these different technical decisions were products of the distinctive political and institutional background of both countries. Furthermore, it will also underline how the cultural assumptions of progress which were attached to nuclear energy in both countries translated differently in actual policy making. By analyzing these decisions from the larger socio, economic, and cultural context, instead of focusing on technology, this presentation will emphasize the importance of understanding nuclear energy policy from a social science and humanities perspective.

Krzysztof KOBYŁKA, Antony NITHESH
Master's Students

ENSTA Paris Tech

krzysztof.kobylka@ensta-paristech.fr
antony.nithesh@ensta-paristech.fr

Importance of risk perception and its impacts in the nuclear industry

In this post-truth era, where clickbait headlines are far more important than the content; where sensational stories are more important than facts, nuclear energy, suffers from the polarized narrative in the media. Even more so on the global energy arena that is dominated by stories of extraordinary strides made by solar and wind technologies. This has inadvertently lead to a feedback cycle of the public perceptions being influenced by the media, and the media covering stories that reinforce this point of viewpoint of view. More often than not, the hot button issues in the nuclear industry are about spiraling costs and safety. Economics aside, the latter subject is, by far, the most misunderstood. The unfortunate reality of nuclear safety and reliability is that it is a very complex subject which the media outlets fail horribly at simplifying for the masses. The fact of the matter is that Nuclear plant design and emergency planning is the gold standard for non- nuclear applications, yet there is a long standing perception that nuclear plants are somehow more dangerous than other activities that are quantifiable riskier.

Perceptions about nuclear have far reaching impacts beyond one's Facebook feed. Government policies are swayed by the general opinions of people which ultimately lead to the stunted development of nuclear technology. This is upsettingly clear in the case of development of 4th generation reactors which have been delayed by at least 10 years from the original roadmap. Furthermore, the opinions of an uninformed public serve as the go-to tool for politicians to serve their agendas. For instance, Germany's strong stance on nuclear is often portrayed as the consequence of Fukushima, yet the reality is that this policy had absolutely nothing to do the risk factors of their plants, and was largely driven by the strong public disfavour and political policy since the 1970s.

The remedy to this sociological crisis is not a simple one. Perceptions are notoriously difficult to change, often requiring one to wait an entire generation. One obvious strategy would be for academics and professionals in the nuclear industry to take on more active role in education and in aiding the public to clarify the complexities surrounding nuclear technology. The fact that most people are completely oblivious to the very basic facts about nuclear, yet have a strong opinion about it, is a wake-up call that something serious needs to be done about the way we are informing ourselves. Now more than even, we live in a world where media dominates the way we get our information and formulate our opinions. As such, it is paramount that media outlets end their modus-operandi of sensational clickbait content and, instead, should be focusing on presenting the facts and providing complete information.

Camille DEFARD, Charles GIACHETTI, Audrey NIVOLE

INSTN–EET
camille.defard@sciencespo.fr
charles.giachetti@gmail.com
nivole.audrey@gmail.com

Nuclear risk perception among the French civil society

The 2011 Fukushima nuclear disaster had various impacts in Europe. While France and the UK did not radically change their nuclear policy, the disaster accelerated Germany's nuclear power phase-out and led Angela Merkel to decide an anticipated phase-out of nuclear by 2022 at the latest. The accident indeed made this energy source politically and socially unacceptable in the eyes of an already widely hostile population. Meanwhile, climate change has been labeled as one of the greatest challenges of our time by the G20 and reducing our carbon emissions ranks among top priorities for our societies. While the risks associated with this energy source are undisputed, nuclear energy is also a technology currently able to provide low-carbon baseload power. It even proved to be affordable in the case of France, and contributes to alleviate energy poverty. Nuclear could be part of the solution to climate change, at least in the short and medium term. For the sake of future generations, there is a need to debate about nuclear energy. Nonetheless, it seems that the debate remains very emotional, and that the benefits of nuclear energy can be obliterated by mental images of disaster. as well as environmental and human destruction. Risk perception of nuclear energy seems to be out of scale with the objective risk. The greater the risk, the higher is the need for accurate and reliable information. The lack of an actor perceived as independent is in our view also partly responsible for the disproportionate risk perception of nuclear power and emphasizes the need for more transparency in this sector. The case of Germany further highlighted the weight of social acceptability in energy policy.

In this context, we would like to investigate the different factors that influence nuclear risk perception among the civil society in France, especially the youth. We think that a major element is the way the debate is shaped by the actors in place. What parameters might induce public distrust in nuclear energy?

To that end, we want to provide a comprehensive overview of the various actors of the nuclear debate in France, be they institutional, like the government, the CEA or the ASN, but also community associations and NGOs like Greenpeace and Sortir du Nucléaire. We will provide a mapping of actors and analyze their various discourses and way to present risks. We will complement this study with an empirical research by way of a questionnaire investigating the various factors that influence the risk perception, as well as the literature on that topic such as 2016 French IRSN baromètre, the OECD report Public Attitudes to Nuclear Power (2010), or Brenot et al. paper on Nuclear Risks perception (1996), among others. We would like to focus on youths' perception of nuclear, making the assumption that our generation would be less impacted by dramatic nuclear events such as Hiroshima (our grandparents) or Chernobyl (our parents). But we would like to understand to which extent Fukushima had a detrimental effect on nuclear risk perception among the youth. Besides, beyond the already well investigated social and cultural factors such as the political preference, sex and academic background, we also want to ask them to rate their trust in the various actors of the nuclear debate (government, research centers, associations), in order to better understand which kind of viewpoint they are the most likely to adopt.

Makoto TAKAHASHI
PhD Candidate

Department of Geography
University of Cambridge

mt520@cam.ac.uk

Framing nuclear power: how the Fukushima Daiichi nuclear power plant disaster has become understood as an issue of class, gender and geography

Critical theorists and behavioral economists have recently focused their attention on intractable political controversies, including the debates surrounding the use of nuclear power. This work has demonstrated the importance of discursive and cognitive "frames": "organizing principle[s] that transform[ ] fragmentary information into a coherent and structured whole" (van Gorp, 2001:5). This presentation builds on and empirically develops this insight, demonstrating how Japan's anti-nuclear movement has framed the 2011 Fukushima Daiichi nuclear power plant disaster in relation to issues of class, gender and geography. I draw on a core of 20 interviews, of one to five hours in length, with leading figures in the anti-nuclear movement. Arguing that these frames are of critical importance, I question the capacity of educational schemes to resolve political controversies, and speculate as to how nuclear power might be framed if there were to be an incident in the UK or France.

Paul-Etienne PINI
Master's Student

Department of Geography,
École Normale Supérieure de Lyon
School of Geography and the Environment,
University of Oxford (Visiting Student)
paul.etienne.pini@gmail.com

Framing the regional socio-economic impacts of nuclear power plant decommissioning: structural underpinnings and empirical displays of territorial resilience

Currently, more than 90 commercial nuclear reactors are being decommissioned in the world. Specialists point out to the inexplicable heterogeneity of the impacts of their shutdowns: some cases display a regional economic collapse; others present barely measurable effects. Like some large-scale industrial complexes located in rural or semi-rural settings—in most cases—nuclear power plants generate and dominate a wide local business activity area: 500 to 5,000 direct jobs per plant; 1.5 to 3 times more indirect jobs created through subcontracting, equipment purchases and local plant workers household expenditures. Besides, a nuclear plant's property tax revenues can cover up to 90% of a town's budget, particularly in small municipalities (2,000 to 5,000 inhabitants). The extended lifespan of nuclear power plants (NPP)—an average of 40 to 60 years—renders difficult a clear understanding of planning policy, local management, and effects of their shutdown. Such impacts are of a nested and diffuse nature. Fuelled by job and added value losses caused by the plant closure, they spread like a wave across the social and economic fabric, exposing the relationship of dependency shared by the area and the nuclear infrastructure.

Nuclear decommissioning and its impacts on society are among the least planned aspects of energy policy strategies and agendas. So far, these socio-economic impacts have been studied by few scientific research: detailed case studies are rare, often dated; their respective paradigms and approaches have little in common, which accounts for the lack of explanatory models that could be standardized and applied to the regional contexts of nuclear decommissioning cases. Such imbalances in the literature stem from the fact that socio-economic data sources, theory, and methodology are often juxtaposed and rarely thought of jointly. This explains why most documents focus on engineering, economic or public health aspects of nuclear decommissioning—in other words, the aspects that seem handily measurable and directly relevant to political decision-making.

The present study tasks to construct the theoretical and analytical relevance of a *spatial analysis* protocol for the geographical assessment of the regional socio-economic impacts of NPP decommissioning cases. This method resorts to a cross-analysis, via statistical mapping software (GIS), of data sets on commuting and residential mobility flows extracted from French national censuses (INSEE data). The study thus explores and extends the concepts of "spatial system," "energy territory," "nuclear power policy," and "regional economic resilience". It intends to shed additional light on the theoretical reflections, political decisions and industrial strategies used and made in the management of regional impacts of nuclear decommissioning and, more generally, in the socio-economic framing of energy-related deindustrialisation cases.

Clara LLOYD
PhD Candidate

University of Cambridge
cal65@cam.ac.uk

Manufacture and Construction of Small Modular Reactors

The future of nuclear does not lie with large PWR reactors such as the EPR or AP1000. These projects (Flamanville in France, Hinkley Point C in UK, Vogtle and in US) have, in recent years, been inordinately costly and time-consuming to build, with each project being essentially a stand-alone effort. SMRs have the ability to reverse this upward trend in construction cost and build time because of their reduced physical size and increased volumes of production; however, this can only be realised if the construction process and overall SMR programme is substantially different from that of the large reactors built today.

For SMRs to be competitive in the wider energy market, aggressive economic targets (electricity cost of £65/MWh) and scheduling targets (build time of 2-3 years) have been set. This project shows that, in order to meet these economic and scheduling goals, the nuclear power plant must be extensively modularised; moreover, modularisation efforts should not be limited to large equipment items alone but should extend to civil structures, safety systems, piping networks, and so on. At least 60% of the work that typically occurs *in-situ* should be modularised and shifted to an offsite production facility. This radical modularisation approach, coupled with development of a global supply chain network that facilitates module manufacture and high production learning rates, could significantly decrease the cost of SMR construction.

This project seeks to investigate the principles and practices employed by other industries that use modular construction and manufacture with the intent of incorporating these ideas into the SMR build process, with the ultimate goal of reaching the required degree of modularity. Future project work will focus on the specific effects a range of modularisation techniques are expected to have on both the construction cost and build duration of SMRs.

Developing a new, modular process by which small reactors are manufactured, with the aim of lowering the cost of construction and reducing the build time, could help SMRs overcome the largest economic barrier to implementation of this low-carbon source of electricity in both current nuclear and non-nuclear countries. It would involve not just changes in the reactor design but also a revolution in the industry and the way it thinks about nuclear construction and cost.