

# National Policy and the Intersection of Science Within Nuclear Energy

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## Introduction

Since the advent of the Industrial Revolution in the 19th century, the intersection of public policy and science has continued to expand rapidly; in the 21st century, states will continue to have numerous laws concerning patents, research grants, and protection/regulation in the technology market. However, what undergirds these past and present political interactions into the STEM field is the general control of the production and distribution of energy. Energy is the lifeblood of the state and of societies at large; whosoever controls the energy markets (in effect) controls the functioning of the entire world's economy. With these cursory points thus posited, I will detail two models from the European continent that best exemplify the differing approaches to energy policy and the role science plays in geopolitical considerations. These two models will be the French and German systems, respectively. Before defining the parameters of the aforementioned models and beginning a closer analysis, it must be first assumed axiomatically that nations (or states) have a set of interests and that these interests guide the socio-political, economic, and military actions we can observe states' using.<sup>1</sup> With this guiding assumption now established, a more detailed study of French and German energy policy can begin.

## The French Model

Since the widespread adoption of nuclear-powered energy in the 1950s/1960s, France has become a leading investor in nuclear power plants—dozens of these facilities carpet the French countryside and provide energy for burgeoning urban populations in places like Paris and Lyon. Currently, France generates over 70% of its electricity from nuclear plants. In February 2022, the government announced plans to build an additional six plants with

an option to build another eight more.<sup>2</sup> However, France has also developed significant nuclear research programs through state grants. 17% of France's annual aggregate electricity comes from recycled nuclear fuel which has become easier due to this state-directed research. It should be noted that France does not pursue this energy policy for purely "carbon-free emissions" purposes but to retain "energy independence" and have greater political capital for projects abroad. The energy policy also benefits the average household as French citizens pay under 90% of the average electricity cost in the EU-27.<sup>3</sup> Following the Oil Crises of 1974 (an event which shocked global supply chains and dramatically rose the price of crude oil), the French government under President d'Estaing decided that France must pursue an interest of total independence within the production of energy and began to practically 'dump' millions of francs per year into the development of France's nuclear energy sector.<sup>4</sup> Presently, the decades-long allocation of state resources into the project has been a boon for France and has benefited the nation in both geopolitical and economic terms. Furthermore, with President Macron announcing further builds and Euros to cut France's consumption of fossil-fuels by 40%, the benefits of pursuing a unified energy policy are becoming quite clear.<sup>5</sup>

## The German Model

The German approach to energy policy is nearly the opposite of how France directs its energy production with Germany only producing a paltry 12% of its aggregate energy through nuclear processes. Instead, the official German policy since the early 2000s has been the much-publicized *Energiewende* revolution which has catapulted renewable sources (wind, solar, hydro, biomass, etc.) into the forefront of Berlin's political policy throughout the Eurozone.<sup>6</sup> As it

<sup>1</sup> Korab-Karpowicz, W. Julian, "Political Realism in International Relations", *The Stanford Encyclopedia of Philosophy* (Summer 2018 Edition), Edward N. Zalta (ed.), URL: <https://plato.stanford.edu/archives/sum2018/entries/realism-intl-relations/>

<sup>2</sup> Nuclear Power in France | French Nuclear Energy - World Nuclear Association. (n.d.). Retrieved March 21, 2022, from <https://www.world-nuclear.org/information-library/country-profiles/countries-a-f/france.aspx>

<sup>3</sup> *Country Nuclear Power Profiles*. France 2020. (n.d.). Retrieved March 21, 2022, from

<https://cnpp.iaea.org/countryprofiles/France/France.htm>

<sup>4</sup> Boyle, Miriam J., and M. E. Robinson. "French Nuclear Energy Policy." *Geography* 66, no. 4 (1981): 300–303. <http://www.jstor.org/stable/40570437>.

<sup>5</sup> *Macron Sets Out Plan for French Nuclear Renaissance*. Nuclear Policies - World Nuclear News. (n.d.). Retrieved March 21, 2022, from <https://world-nuclear-news.org/Articles/Macron-announces-French-nuclear-renaissance>.

<sup>6</sup> *Timeline: The Past, Present and Future of Germany's Energiewende*. Carbon Brief. (2016, September 28). Retrieved March 21, 2022, from

stands, 50% of German energy comes from renewable sources (27% wind, 10% solar, 9.3% biomass, and 3.7% hydroelectric), and this number is expected to rise as Germany continues to cut carbon emissions by 40% before 2035 and restore emissions to pre-1990 levels.<sup>7</sup> This expected increase comes as German residents pay the highest electricity bills in Europe (estimated at EUR 0.3193 per kWh) due to mandatory shifts toward (currently) more expensive renewable markets and the country's notoriously high VAT (value-added tax) adding to production costs.<sup>8</sup> Nor should this project be confused as an "ethical" decision by the Berliner policymakers, but as the larger geopolitical interest of the *Bundesrepublik* to corner European energy markets and set the price of natural gas imports into the continent.<sup>9</sup> Natural gas (though making up a small percentage of German electricity consumption) comprises 25% of all European energy use and is dominated by the Russian fossil-fuels industry (41% of all natural gas in Europe comes from Russia).<sup>10</sup> The German fossil-fuel industry is the world's largest importer of natural gas and received 49.8 billion cubic meters (bcm) of gas from the Russian state-controlled company Gazprom in 2016 alone. This dependence on Russian gas poses a serious geopolitical concern for NATO and EU functionality given the modernization of the Russian military in 2014; that dependence combined with current events in the Ukraine create a serious challenge to the security architecture of Europe. The German government has recently decided to cancel their joint venture with Gazprom in building the Nordstream 2 pipeline in the Baltic Sea.<sup>11</sup>

## **Geopolitical Manipulation of Sciences**

With the two paradigms of European energy policy above described, a more abstract form of analysis can take place. A driving question that one gets from comparing such distinct policies is how did science become so politicized and frequently used to achieve national interests? This problem should not come as a surprise; states have been using "science" to achieve political goals since at least the Progressive Eugenics of the late 19th century.<sup>12</sup> Of course, the Apollo missions were primarily concerned with besting the Communist system of the Soviet Union and Warsaw Pact. However, with the 21st century revealing ever-increasing technological changes to human society, it becomes more obvious that science will continually be utilized to advance broad national interests. Additionally, as the previously unipolar world of the post-Soviet era recedes, geopolitical tensions have risen significantly and brought concerns over global stability; such tension and concerns will incentivize greater R&D grants to researchers to improve military and economic competition. The imperialistic ambitions of the Chinese Communist Party have also become a major obstacle for Western actors and threatened to upend American hegemony in the Pacific.<sup>13</sup> The consequences of these escalating conditions could lead to greater state control of energy policies, especially given that supply chains will be strained by any large-scale conflicts that emerge.

<https://www.carbonbrief.org/timeline-past-present-future-germany-energiewende>

<sup>7</sup> Tsafos, Nikos. *In Defense of the Energiewende* | Center for Strategic and International Studies. (2022, March 21). Retrieved March 21, 2022, from <https://www.csis.org/analysis/defense-energiewende>

<sup>8</sup> *Electricity price statistics*. Electricity price statistics - Statistics Explained. (n.d.). Retrieved March 21, 2022, from [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Electricity\\_price\\_statistics](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Electricity_price_statistics)

<sup>9</sup> Stelzenmüller, C. (2022, February 22). *Energy Trilemma Causes a Headache for Germany's New Leaders*. Brookings. Retrieved March 21, 2022, from <https://www.brookings.edu/blog/order-from-chaos/2022/01/18/energy-trilemma-causes-a-headache-for-germanys-new-leaders/>

<sup>10</sup> M., & Wettengel, J. (2022, March 14). *Germany and the EU Remain Heavily Dependent on Imported Fossil Fuels*. Clean Energy Wire. Retrieved March 21,

2022, from

<https://www.cleanenergywire.org/factsheets/germany-s-dependence-imported-fossil-fuels>

<sup>11</sup> Person, & Sarah Marsh, M. C. (2022, February 22). *Germany freezes Nord Stream 2 gas project as Ukraine crisis deepens*. Reuters. Retrieved March 21, 2022, from

<https://www.reuters.com/business/energy/germanys-scholz-halts-nord-stream-2-certification-2022-02-22/>

<sup>12</sup> Kaelber, L. (2012). *Eugenics in All 50 American States*. Eugenics: Compulsory sterilization in 50 American states. Retrieved March 22, 2022, from <https://www.uvm.edu/~lkaelber/eugenics/>

<sup>13</sup> Sutter, Robert. "China's Recent Approach to Foreign Affairs—Is There a Durable Strategy?" *American Journal of Chinese Studies* 16, no. 1 (2009): 1–13. <http://www.jstor.org/stable/44289304>.

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## **Conclusion**

States have national interests that they pursue in the field we call “foreign policy” and as studied in international relations. These states frequently use these interests as means to control scientific and technological sectors to gain leverage in the grand international game of diplomacy. Energy production is an increasingly politicized and important subfield of politics and science; states continue to organize sectors for benefits like energy independence or economic control of delivery chains. France and Germany are two such competing powers in the EU/NATO block. Though they are considered to be friends or allies, both Paris and Berlin pursue energy programs that directly engage each other. France hopes to be an independent bastion of energy through nuclear power, while Germany aspires for increased profits and economic dominance by working with Russian oil and gas interests.<sup>14</sup> As the century progresses, we should expect to see more interference by states into energy sectors and continual disturbances within STEM more broadly.

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<sup>14</sup> *Germany's Emerging Grand Strategy*. (2020). *Good Times, Bad Times*. Retrieved from 17. <https://youtu.be/23vKGVrjjeA>.