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WHY WIND? A COMPARISON OF GERMANY, THE UNITED STATES, AND CHINA

INTRODUCTION

Almost every aspect of everyday life uses energy. Governments throughout the world have prioritized providing their citizens with reliable and abundant energy, though some countries use a very different mix of energy sources than others. This raises the question of how states choose their energy sources. This paper explores states that have chosen to draw much of their energy from renewable sources. The working hypothesis is that renewable energy policy would be linked to climate policy, and thus that states with an aggressive climate change policy – for example, internationally binding emission reduction targets, or carbon taxes – would also have a more aggressive renewable energy policy. In short, this is not the case. Rather, states choose to promote renewable energy for a variety of reasons, any of which can lead to effective action.

Germany, the United States, and China served as case studies because they lead the world in wind power capacity. The US and China also boast large amounts of hydropower and Germany tops any list of installed photovoltaic capacity (International Energy Association, IEA Scoreboard 2009 78). These three countries each have different stances on climate change, which allows isolation of the relationship between renewable energy policy and climate policy. Germany has agreed to binding emissions targets under European Union agreements and the Kyoto Protocol, while the United States refuses to ratify the Kyoto Protocol. China has acknowledged the issue of climate change by ratifying the Protocol, but, as a developing country, is not obligated to reduce its emissions. In short, Germany has promised to do something about climate change; China has acknowledged the problem but not taken action; and the U.S. ignores the threat. Yet despite these differences, all three countries have developed considerable capacity in renewable energy, particularly wind. Thus, concern about climate change cannot be the only cause for promoting renewable energy. Rather, each country has its own reasons, which also influence the shape of its policy.

Germany: The Environmentalist

Germany gradually developed interest in wind power as nuclear and other sources fell out of favor. First, the oil crisis of the 1970s spurred German interest in alternative energy. While nuclear was an initial area of expansion, the 1986 explosion at the Chernobyl nuclear reactor raised public fears about the safety of nuclear energy. The German nuclear industry never recovered from the blow; it began to decline, and in 2000 the government announced a phase-out of all nuclear energy (Laird and Stefes 2621; IEA



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Shortly after Chernobyl, climate change began to garner scientific and public attention. By 1987, Chancellor Helmut Kohl acknowledged that Germany must address climate change (Jacobsson and Lauber 264). Ever since, Germany has been a leader in the international fight against climate change. The threat of climate change and the backlash against nuclear power, as well as growing scrutiny of coal subsidies, convinced German parliamentarians of the need to promote renewable energy. The policies they chose, discussed below, follow logically from Germany's commitment to reducing its carbon emissions. With the Kyoto Protocol imposing on Germany legally binding obligations to reduce its carbon emissions, Germany cannot depend on private entrepreneurship or consumer goodwill to replace fossil fuels with renewables. Thus it has instituted a series of mandatory tariffs, ensuring that any wind power capacity built will be used.

The Bundestag passed the first such law, the Feed-In Law (Stromeinspeisegesetz, StrEG), in 1990. The law required utilities to connect renewably generated electricity to the grid and buy it at fixed prices, a policy known generically as a feed-in tariff. Because the prices were more favorable to wind energy than to other forms of power, the StrEG boosted the wind industry most dramatically. In the ten years of the law's existence, installed wind power capacity in Germany leaped from 68 MW to over 6000 MW (Laird and Stefes 2622). Germany's commitment to environmental protection became more strongly institutionalized in 1998 with the election of the so-called "red-green coalition," an alliance of the Social Democratic and Green parties (Bechberger and Reiche 50). The coalition updated the StrEG, ultimately replacing it with the Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz, EEG) in 2000. The EEG adjusted tariff prices. Where the StrEG allowed variable rates based on utility revenue, the EEG set fixed prices. Although the feed-in tariff is the dominant policy in Germany, it is by no means the only one. The government's September 2010 "Energy Concept" and its associated 10-point immediate action program outlined other planned initiatives. The Energy Concept focuses on offshore wind power and improving grid connection. Other programs include incentives for solar roofing, loans, and tax allowances (Federal Ministry of Economics and Technology and Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety). The Energy Concept is only the latest development in Germany's long standing, consistent commitment to wind power.

The U.S., by contrast, has found other reasons to promote renewable energy. Both major parties in the U.S. espouse the goal of energy independence or energy security, claiming that the U.S. should provide its own energy rather than depending on oil imports. However, the parties differ greatly in how that should be achieved. Based on original review of official party platforms from 1974 to 2010, Republicans tend to support expansion of domestic energy supply in any way possible, including drilling for oil and natural gas. Democrats are less enthusiastic to drill, especially in ecologically sensitive areas such as the Alaskan National Wildlife Refuge, and also tout renewable energy's potential for creating jobs.

In the U.S., climate change has become a politicized issue. While Democrats push for ratification of the Kyoto Protocol, Republicans refuse to fully accept scientists' warnings and balk at an international agreement which might "harm economic growth and destroy American jobs" (Republican party platform 2004). Perhaps to avoid the wrath of climate change-doubting voters, yet maintain an opportunity to promote renewable energy, Democratic platforms have only twice (2000 and 2008) mentioned reducing carbon emissions and generating renewable energy in the same section, suggesting that they prefer to keep these concepts separate.

This political baggage has given U.S. policy several distinct features. First, U.S. programs to promote renewable energy are voluntary. Tax credits for producers of wind (and other renewable) power and research funding are available, but only serve to incentivize private action, not mandate it as Germany's feed-in tariff does (U.S. Office of Energy Efficiency and Renewable Energy). This allows politicians to avoid the wrath of utilities saddled with mandates for a problem those same politicians will not admit exists. Second, U.S. policy is inconsistent. The production tax credit, which started in 1992, has been scheduled to expire in 1999, 2001, and 2003. Although it was extended each time, the possibility of discontinuation created a discouraging uncertainty for potential investors. Similarly, the budget for the Renewable Energy Production Incentive, a financial incentive for public utilities to produce renewable energy, depends on yearly Congressional appropriations and thus varies annually (Bird et al. 1398-99). Thirdly, renewable energy policy is fragmented. The Departments of Energy, Agriculture, Interior, and Defense all administer renewable energy programs (United States Department of State 65-68).

On closer inspection, U.S. policy is even more fragmented than it appears at first glance. In addition to the

myriad federal agencies with some jurisdiction over energy policy, each state has its own energy policy. Although the political battles of the federal level do often appear in the states, the states are by no means a simple microcosm of the country. Notably, many states are unafraid to implement mandatory policies. As of August 2009, 30 states had passed renewables portfolio standards, requiring utilities to draw a certain percentage of energy from renewable sources (United States Department of State, 63). State policy does not follow party lines as clearly as federal policy does. The five states with the most wind power capacity are Texas, Iowa, California, Minnesota, and Washington, a group of states that spans the political spectrum (U.S. Energy Information Administration). Texas and Iowa particularly stand out as surprises: both are Republican-controlled. Given the trends at the federal level, one would expect this to mean a lukewarm endorsement of renewable energy at best. Indeed, the state Republican parties take a similar view toward energy and climate change as their national counterpart. Despite this, both states have implemented a variety of policies to aggressively promote renewable energy. Party politics, then, does not predict a state's action on renewable energy. Overall, however, individual states add to the fragmentary and inconsistent nature of U.S. policy.

China: The Latecomer

China's overall demand for energy is growing rapidly as China develops and brings electricity to previously off-grid rural areas. For China, renewable energy is not a replacement for fossil fuels but a supplement to them to meet growing demand. At the same time, wind power provides an opportunity for China to develop its domestic manufacturing industry and demonstrate environmental consciousness to the international community. Up to 2005, renewable energy growth in China came mostly from small wind systems in isolated places. Small subsidies from certain provinces and the national government, low-interest loans to manufacturers, and technical support from Sweden, the Netherlands, Germany, and Italy spurred this early growth (Lew 276-7). In what Lema and Ruby describe as the "import phase," lasting from 1986 to 1993, soft loans from Denmark and other countries helped China build wind capacity but not develop domestic manufacturing industry. The "Strategic Development Plan for Generation of Wind Energy in China," issued in 1994, laid out the government's goals for wind power and established regulations requiring utilities to buy available wind power at fixed prices. Wind power did increase after the plan, but high prices, conflicts among different government agen-

cies, and lax enforcement of the laws hindered growth (Lema and Ruby 3883). Bureaucratic and power sector reform in the early 2000s helped fix these problems. Such restructuring, plus a wind power concession program lasting from 2003 to 2007 that sold wind farm development rights to the lowest bidder, led to a significant increase in China's wind capacity. All of this paled, however, in comparison to the effects, discussed below, of the 2005 Renewable Energy Law (REL). The REL set quantified renewable energy goals and fixed prices, guaranteed renewable energy grid access, established a public fund for renewable energy development, and provided tax benefits for renewable energy (Wang, Yin, and Li 1873-4).

The shift in Chinese policy mirrored a parallel shift in Chinese motivation. When China's goal was to electrify rural areas, small wind was the best choice and policy was tailored accordingly. Beginning in the late 1980s, Chinese policymakers began to consider the environmental and health effects of coal. International cooperation exposed China to a variety of policy options (Lema and Ruby 3881-2). However, China's attempted market creation strategies were ineffective until the early 2000s with power sector reform and the wind power concession program (Lema and Ruby 3884). Recently, China has learned to leverage carbon finance and global climate concern to help meet its own domestic renewable energy priorities (Lewis 2875). In its first National Communication to the UN Framework Convention on Climate Change, China touts its efforts to slow greenhouse gas emissions "in the spirit of being responsible for the global environment" (The People's Republic of China 73). In other words, China realizes that the world will more favorably view its efforts to increase electric capacity and domestic manufacturing if those efforts are framed as climate mitigation efforts. It is with this attitude that China found a big, flashy policy like the REL attractive. Fortunately, the REL has also been effective: since its passage, China's wind power capacity has doubled every year (Liu and Kokko 5521).

Conclusions

Germany, the U.S., and China display significant differences in their reasons and policies for promoting wind power, yet, unexpectedly, all are leaders in wind energy. In other words, each country achieved the same result, but through very different means. Therefore, states can and should tailor their policies to their individual needs. International organizations such as the UN need not dictate any specific approach. Rather, they should set goals and let states reach those goals individually. The possibility for such an approach to be effective is exciting, especially for

the U.S., because it would avoid conservatives' objections that international cooperation surrenders sovereignty.

These three countries offer a long list of reasons for promoting wind power: environmental protection, energy independence, meeting new electricity demand, boosting domestic manufacturing, creating jobs. All of these reasons have provided sufficient incentive for political action. Thus any person or group who wants to promote renewable energy can potentially use any of these reasons to persuade others. Environmentalists looking to mitigate climate change, for example, can appeal to manufacturers by pointing out that policies which encourage installing wind turbines will increase demand for turbines and parts to be made. In short, groups with separate interests can all have an interest in working toward the same final result: increased renewable energy capacity and use. The differences among Germany, the U.S., and China ultimately show that there are many paths to a renewable energy future.

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