

# The Politics of Energy

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## Keywords

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## Abstract

The politics of energy is reemerging as a major area of inquiry for political science after two decades of relative quiet. We survey the theoretical and empirical literature on the politics of energy, as well as recent developments that have revived interest in the topic—renewed oil price volatility, the rise of China, and concern over global climate change. We also outline several avenues for future research, arguing that there are ample opportunities for scholars of political economy to apply insights developed in other fields to the study of energy.

## MOTIVATION

The politics of energy is reemerging as a major area of inquiry for political science after two decades of relative quiet. One reason is the growth in demand in China and other emerging economies, which has driven real crude oil prices to heights not seen since the 1970s (Smith 2009). China's rising demand for oil and other natural resources has therefore become intertwined with anxiety over that country's economic and geopolitical rise. A second important reason for increased interest in the politics of energy is the growing focus of governments on climate change, given that the largest component of greenhouse gas emissions is the consumption of fossil fuels.

There are compelling reasons to believe interest in the politics of energy will remain strong. The International Energy Agency (IEA) estimates that \$26 trillion (2008 dollars) of investment will be required through 2030 to meet growth in energy demand, most of which is underpinned by the improving standards of living of huge populations in the Asia-Pacific and the Middle East (IEA 2009). The IEA also estimates that fossil fuels will make up more than 75% of this increase, with coal and oil remaining central to the primary fuel mix. By 2030, installed power generation, which accounts for a significant component of the demand for fossil fuels, is estimated to expand by five times the current capacity of the United States. The political, economic, and ecological implications of this demand growth are profound, and the tools of political science are essential to understanding the consequences for the environment, individual societies, and international relations.

A single article cannot hope to review all research being carried out on energy issues. Increasing demand for energy is a function of economic growth in both developed and developing states, and is associated with a variety of security and environmental externalities. The relationship between nuclear proliferation and civilian nuclear technologies, the politics of climate change, science and technology policy, and governance problems associated with natural resource ownership, for example, could each conceivably be tackled under the banner of "the politics of energy." The study of energy is also interdisciplinary, incorporating work in the natural and social sciences, and includes different levels of governance from the subnational to the national, regional, and global.

Rather than attempt to survey all of these areas, in this article we consider the politics of energy demand and supply management. What are the political determinants and consequences of different arrangements governing the procurement and use of natural resources and other sources of energy? We focus on advanced industrialized states, which have received the most attention in existing work, but many of the insights are relevant to developing countries that are emerging as major consumers of energy, such as China and India. For the sake of brevity, we place less emphasis on topics where excellent, recent reviews are available: energy politics in producer countries, particularly the implications for governance (Ross 2001, Jensen & Rudra 2011); and the international politics of climate change (Bernauer 2013 in this volume).

In our view, three major dimensions of cross-national variation deserve particular attention. First, what energy sources are prioritized? Although fossil fuels—oil, natural gas, and coal—have supplied the lion's share of energy in most developed economies over the past century, some countries have placed far greater emphasis on other energy sources. France generates close to 80% of its electricity using nuclear energy, whereas major economies such as Italy and Australia generate no nuclear energy (IEA 2011). Austria generates ~70% of its electricity from renewable sources, including hydropower, compared to ~10% for the United States (US Energy Information Administration 2010). Second, how efficient are countries in the use of their energy resources? For every unit of economic output produced, the United States uses ~40% more energy than Japan (IEA 2012). Although some of this variation is attributable to nonpolitical factors such as geography and demographics—e.g., mass transit is more feasible in countries with dense population centers close

together—government policies also likely play a role. Fuel economy standards in the European Union and Japan, for example, are ~80% more stringent than those in the United States (United Nations 2011). Third, what tools do governments use to achieve their energy objectives? In addition to tariffs, governments may choose (or not choose) various forms of regulations and taxes to target a particular energy profile. Internationally, there is a wide range of tools available to states, e.g., reliance on market mechanisms, bilateral agreements to secure access to energy resources, coercion, cartelization, and universalistic cooperation for demand management (exemplified by the Kyoto Protocol).

Answering these questions matters for our understanding of international and comparative political economy. Choices over fuel types, efficiency policy, and international strategies have important distributive consequences within and between countries in what is estimated to be a \$6 trillion global energy market (US Department of Commerce 2010). The environmental and national security externalities associated with energy use are important, and also differ across fuel types. Yet, as we will illustrate, the literature provides only partial answers to the questions posed above. Academic interest in the politics of energy peaked in the early 1980s—as governments responded to the challenges posed by the 1970s oil shocks—and waned thereafter.<sup>1</sup> Attempts to identify and explain cross-national and international variation in energy policy provided the basis for much of the early, seminal work in international political economy (IPE) (Katzenstein 1977, Krasner 1978, Keohane 1984, Ikenberry 1986). Much has changed in the subsequent decades—e.g., the adoption of alternative fuels and energy efficiency measures by many states, the rise of China and other developing countries as major energy consumers, and rising concerns about global warming—but academic scholarship has not kept pace.

We begin the review by surveying the first wave of research into energy politics in the advanced industrialized states, which followed oil price volatility in the 1970s. One goal of this early work was to discern who matters in energy policy and how to characterize their interests and strategies. One source of controversy was the role of governments as an independent actor in the formulation of national energy policy. A second motivation for early research was understanding the purpose and effectiveness of international cooperation with regard to energy. Scholars focused particular attention on the two major international organizations that coordinated the behavior of producers and consumers—OPEC (the Organization of Petroleum Exporting Countries) and the IEA—although cooperation was an important feature of energy markets prior to the oil shocks and in energy sources other than oil.

We then consider more recent work and summarize what we see as the most promising theoretical approaches for future research into energy politics. We note that theoretical developments in IPE since the 1980s coincided with waning substantive interest in energy issues. Compared to the 1980s, there is also now a much more rich set of data on energy issues collected by researchers outside of political science, national governments, and international agencies. The politics of energy is therefore ripe for new work that applies insights developed from more conventional areas of inquiry in IPE. The open economy politics approach (Frieden & Martin 2002, Lake 2009), which builds up from preferences to domestic institutions to international interaction, is well suited to establishing the micro-foundations for such a research program. Although some recent work has begun to move in this direction, much remains to be done.

We also outline several features of energy markets that necessitate novel theoretical approaches. First, the structures of markets for fuels differ markedly, with some largely domestic and others

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<sup>1</sup>The exception is the growing literature on the politics of resource extraction in developing countries (see, e.g., Karl 1997, Dunning 2008, Ross 2012).

more international in scope. For those fuels that are international, a bottom-up approach that builds from the interests of domestic actors should be supplemented through careful consideration of the international markets these actors are embedded within (Nowell 1994, Oatley 2011). Second, the structure of energy supply and demand has been substantially influenced by the efforts of business and governments to alter relative prices in favor of particular fuels, with important feedback effects on forms of industrial organization (Hughes 2014), and this continues to be the case today. A historical institutionalist approach is therefore important in understanding variation in forms of industrial organization, and by extension the preferences of actors, as well as the relative importance of different fuels in the economy. Third, energy politics tends to be inherently complex for several reasons: there is no single government policy tool (akin to tariffs) that functions as a focal point for interest groups; energy is an important input into most economic activity in modern societies; and energy often has important environmental and security externalities. These factors complicate the interest group politics surrounding energy policies.

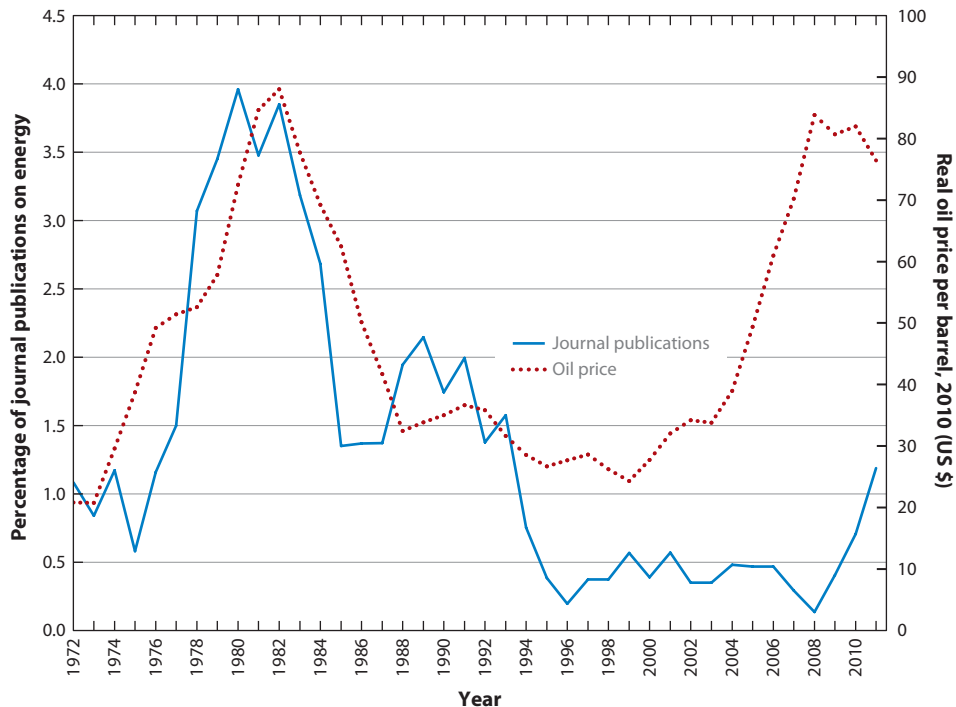
## STATE OF THE FIELD

A cursory examination of the literature on the politics of energy shows academic research on the topic has been fickle. **Figure 1** plots the percentage of journal articles primarily devoted to the study of energy politics in top political science journals since the 1970s. Of the journals surveyed, *International Security* covered energy issues most frequently, with ~5.8% of articles devoted to the topic. This was followed by *International Organization* (3.4%) and *World Politics* (1.1%). The three remaining journals—*American Political Science Review*, *American Journal of Political Science*, and *Journal of Politics*—devoted considerably less attention to energy issues, averaging only ~0.2%. This likely reflects the greater substantive interest in energy issues in the subfields of international relations and comparative politics than in American politics.

Attention to the politics of energy has also fluctuated over time. **Figure 1** includes a plot of real oil prices (the dotted line).<sup>2</sup> As the figure illustrates, there was a rapid increase in journal publications related to energy issues during the 1970s oil shocks—between the early and late 1970s, the percentage of top journal publications devoted to energy jumped from ~1% to 4% of the total. Academic interest waned in the 1980s and 1990s in lockstep with declining oil prices. This trend is not dissimilar to the pattern of policy response among major economies, in which energy efficiency measures undertaken in the 1970s were often rolled back in subsequent decades as oil prices declined.

Perhaps puzzling is the fact that recent increases in oil prices—to levels comparable to the 1970s in real terms—has not facilitated a comparable resurgence of academic interest in this area. Recent increases in oil prices appear to be associated with a modest pickup in relevant academic publications, but the small absolute number of articles makes us cautious about inferring a trend. In terms of substance, relevant articles published in the surveyed journals in recent years focus predominantly on the political effects of natural resource endowments (Morrison 2009, Colgan 2010, Hertog 2010) and nuclear energy, with a heavy emphasis on international security implications (Hughes 2007, Nincic 2010, Hymans 2011). There remains a surprising paucity of published work in top political science journals on the politics of energy demand and supply management, the primary focus of this review essay.

<sup>2</sup>We use data on the West Texas Intermediate Spot Oil Price, obtained from Dow Jones & Company. We adjust for inflation using the US Consumer Price Index.



**Figure 1**

Oil prices and political science journal publications on the politics of energy, 1972–2012. The figure shows three-year rolling averages of publication numbers to smooth out short-term fluctuations. We examined six high-impact journals that primarily publish academic work in political science: *American Political Science Review*, *American Journal of Political Science*, *International Organization*, *International Security*, *Journal of Politics*, and *World Politics*. To maintain consistency across journals, we only considered peer-reviewed research articles and research notes (omitting book reviews, comments, editor’s notes, front and back matter, letters to the editor, overviews, and symposia). Articles were deemed to be related to the politics of energy if the author explicitly stated that the article concerned energy issues or if a primary independent or dependent variable in the study was directly related to energy. Several articles in the sample concerned nuclear proliferation; we excluded these if they focused on nuclear proliferation solely from the perspective of nuclear weapons and international security, but we included them if nuclear energy and power generation were an important consideration. Oil prices are the inflation-adjusted annualized mean West Texas Intermediate spot price. The posted price is used prior to 1982.

This lack of attention is striking given the substantive importance of energy in the world economy. The global energy market in 2010 is estimated to be ~\$6 trillion annually, or ~9% of world GDP (US Department of Commerce 2010, World Bank 2010). This compares to ~\$15 trillion for world merchandise trade, \$1.5 trillion for world foreign direct investment flows (World Bank 2010), and \$0.1 trillion for bilateral foreign aid (OECD 2010). According to the IEA, trade in crude oil alone is valued at 4% of global output and is expected to rise to 5% by 2030. The politics of energy appears to be neglected despite its importance relative to other, more conventional topics. This is an important omission in comparative and international political economy. In the section below, we summarize research from the first wave of political science research on the politics of energy before expanding the discussion to include more recent work.

## EARLY RESEARCH ON THE POLITICS OF ENERGY: OIL AND THE POLITICS OF EXTERNAL DEPENDENCE

The markets for nonrenewable resources—from which much of our energy is drawn—differ from other products because the distribution of production is determined by where resources are found and the costs of extraction and transportation. This establishes an inescapable barrier to market entry: governments and firms that secure ownership of reserves can become producers; those that do not cannot.<sup>3</sup> Coupled with the ubiquity of energy use in industrial societies, this makes the problem of resource dependence central to energy politics in major economies. Oil price volatility in the 1970s was particularly important in motivating policy makers and scholars to focus on the problems posed by energy demand and supply management. Governments intervened to shift relative prices in order to encourage greater use of fuels that act as partial substitutes to oil, and to facilitate the more efficient use of energy. Importer states also employed diplomatic tools designed to counter the perceived exercise of market power by OPEC.

Scholars focused particular attention on explaining differences in national responses to oil price volatility. A number of different dependent variables are identified, reflecting the broad range of instruments, including regulations, “market-based” instruments such as taxes and permits, and diplomacy, that are available to governments seeking to shape energy supply and demand. Numerous studies on US oil policy, for example, sought to explain why government first imposed, and then abolished, price controls in order to distribute the costs of oil market volatility (Kalt 1982, Ikenberry 1988, Vietor 1984). Others distinguished between degrees of government intervention in comparative context, using measures such as the extent of state ownership of firms operating in the energy sector (Ikenberry 1986, Samuels 1987). Another area of interest was the diplomatic policies adopted by governments; scholars focused on questions such as whether governments responded to the 1973–1974 oil shocks by realigning their foreign policies toward the Arab-Israeli conflict (Licklider 1988), and how firms and governments negotiated national responses to energy crises (Blair 1978, Nowell 1994).

Regardless of the different outcomes informing research, scholars commonly focused on the interests and strategies of governments, and firms and other nonstate actors, in explaining variation. Three models, in particular, were used to explain energy policy making: state-centered explanations, firm-centered explanations, and coalitional explanations. There was also substantial interest in explaining the causes and effectiveness of international cooperation in energy markets.

### The Role of the State

Early studies of energy politics were motivated by the national security implications of resource dependence. On the demand side, the rise of mechanized warfare made oil products important to the ability of states to prosecute war. On the supply side, the most important centers of demand and supply for oil—other than the United States—were geographically distant from one another. This made it plausible that firms or governments that controlled production might extract economic or political benefits through the exercise, or the threat of exercise, of market power.

Early books popularized this view of the politics of energy—and particularly oil—as a problem of national security (Kenny 1928, Brunner 1930). In academic work, the realist tradition most prominently asserts the centrality of national security interests in the politics of energy.

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<sup>3</sup>Geology is one important determinant of the location and economic value of deposits. In the case of oil, for example, rock porosity and the existence of geological formations that act as traps influence its distribution globally.

Morgenthau (1963, p. 115) identifies control over natural resources as a central element of national power in both war and peace. Gilpin (1981) argued that resource competition is an important driver of state behavior. Krasner (1978) also focuses on the interests of the state, proposing that states have an independent set of policy preferences in markets for raw materials. This view is extended by Melby (1981) in his analysis of French oil policy. The underlying model focuses on government as the most important actor in the design and implementation of energy policy and proposes that state strategies are shaped by the national security implications of import dependence.

Two important criticisms of the state-centered view advanced our understanding of the politics of energy. The first questions the predictive power of state-centered theories that focus on the national interest.<sup>4</sup> Nowell (1994), for example, argues that explanations for policy outcomes in energy markets that focus on the national interest make indeterminate predictions. Krasner's important contribution to the reemergence of the state as an analytic concept focuses on US policy making in natural resource markets, including oil. However, while he seeks to show that policy makers have a set of interests that are autonomous from socioeconomic actors, he finds that it pursues multiple objectives, including promoting market competition and more general foreign policy goals, in addition to enhancing the security of energy supplies (Krasner 1978).

Two sources of variation, in particular, make it difficult to draw a simple relationship between import dependence and national policies in energy markets. First, the structure of energy markets, from which the most important national security externalities emerge, vary across fuel types and across time. There is general agreement that external dependence matters as a function of the importance of a given product to the state, the availability of substitutes, and the degree of market power (Caporaso 1978, Russett 1984). The oil price collapse of 1986—which was caused by a rise in oil production in non-OPEC countries and falling demand in the advanced industrialized states—demonstrated, however, that the long-run elasticity of oil supply and demand is not a constant. This suggests that the degree to which resource dependence generates national security concerns among policy makers also changes over time. Indeed, Hughes (2014) shows that governments in most of the advanced industrialized states reduced the degree of government intervention in oil markets over the 1980s and 1990s, in common with other economic sectors.

A second source of variation lies in cross-national differences in energy policy. The influential volume of *International Organization* edited by Peter Katzenstein on foreign economic policy, for example, argues that the advanced industrialized states responded quite differently to oil market volatility induced by the Arab-Israeli war of 1973–1974 and that this variation is best explained by cross-national differences in domestic institutions (Katzenstein 1977). Ikenberry (1988) accepts the assumption of state centrality in oil policy making but argues policy outcomes are crucially shaped by domestic institutions. Ikenberry shows that even during the oil shocks, when the national security interests of the state appeared to be ascendant, the response of the United States was constrained by its limited state capacity in energy policy making. This made it choose diplomatic strategies and price liberalization over more interventionist approaches adopted elsewhere. Ikenberry (1986) extends this argument to examine how differences in institutional capacity conditioned different countries' ways of adjusting to oil price volatility. France adopted neo-mercantilist strategies focused on increasing state control through the promotion of nuclear energy and energy-firm nationalization, whereas the United States used what he terms a "market response," centered on price liberalization.

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<sup>4</sup>Most generally, constructivists argue the concept of national interest is problematic because it ignores processes that can alter domestic actors' understandings of its meaning (Finnemore 1996).

## Interest Groups and the Politics of Energy

The second criticism of the state-centered view is that it assumes that the state is autonomous from social forces. Yet while oil has often been analyzed through the national security interests of the state, this ignores the fact that subnational actors have interests in energy markets. The most obvious of these are firms, which are the most important entities investing and producing resources that are used as fuels. Early studies demonstrated the dominant role of the Standard Oil Company in the development of the US oil industry (Montague 1903, US Commissioner of Corporations 1907). Business histories by Denovo (1956) and Nordhaus (1974) showed federal oil regulation in the United States, as well as diplomatic efforts to improve the commercial position of US firms internationally, reflected the interests of business. Even when firms are state-owned, as is the case in many oil- and gas-producing countries, evidence shows there is substantial variation in the strategies used by governments to exert control over these firms, as well as the degree of control achieved (Marcel & Mitchell 2006, Victor et al. 2012). Blair (1978) also documents that energy policies were often an artifact of the strategies adopted by international oil firms as they sought to restrict market entry in order to establish a floor on prices. Nowell (1994) makes an important contribution by demonstrating that national regulation in France in the interwar years was shaped by competition between Standard Oil (New Jersey) and Royal Dutch-Shell, along with their domestic allies in banking. The French government, in contrast, was divided over how best to regulate the national market. Feigenbaum (1985) similarly argues that the image of a “strong” French state disguises a variety of bureaucratic organizations that have divergent interests. Finally, outside the oil industry, VanDoren (1991) also finds that private economic interests influence forms of regulation in coal and nuclear energy in the United States.

Other interest groups are also likely to have interests in outcomes in the energy sector, as we describe in the next section. Gasoline prices, for example, are a pocketbook issue for voters, making high prices potentially costly for political representatives. District-level benefits such as increased growth and employment associated with resource production are also likely to influence patterns of government intervention in energy markets, as Oppenheimer (1974) finds in his study on the United States. The ideological predisposition of legislators also appears to have an independent causal effect on forms of state intervention (Kalt 1982, Hughes & Flores-Macias 2012). Industries in which energy is an important input into a set of productive processes are also likely to care about the politics of demand and supply management. Recognizing this, a smaller number of studies propose coalitional models of policy making that incorporate interest group politics. Cowhey (1985), Samuels (1987), and Vietor (1984) propose that governments have an independent set of interests in the energy sector but are forced to negotiate with other interest groups in designing and implementing policy.<sup>5</sup> As we describe below, the interest group politics surrounding energy demand and supply management remains an understudied area in international and comparative political economy.

## INTERNATIONAL COOPERATION IN ENERGY: OPEC AND THE IEA

A second area of inquiry in the politics of energy focused on the role of foreign economic policy as a tool of sovereign governments. Much of the early work on international energy cooperation

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<sup>5</sup>Recent work on the politics of energy in China echoes these earlier debates about the role of the state. Zweig & Bi (2005), for example, argue China’s oil firms and the state coordinate their strategy in oil markets and present a challenge to the US-Chinese security relationship. In contrast, Daojiong (2006) echoes Ikenberry’s earlier work by arguing that the Chinese government’s institutional capacity in the energy sector is weak, hampering its ability to make policy.



focused on two international organizations: OPEC and the IEA. OPEC was created in 1960 and developed into a cartel that sought to influence oil prices by coordinating the national production levels of member states (Parra 2004). A large body of scholarship in economics and political science investigates whether OPEC functions as an effective cartel, focusing on the asymmetric ability of Saudi Arabia to affect supply as the residual producer (Osborne 1976, Doran 1980, Gately 1984, Ahrari 1985, Adelman 1995), as well as the relative bargaining positions of member states (Alt et al. 1988, Blaydes 2004). Several studies question the ability of OPEC to enforce discipline among its ranks, given limited enforcement mechanisms and incentives to overproduce (Moran 1987, Blaydes 2004, Colgan 2011).

On the consumer side, the IEA was created in 1974 as a club of major petroleum-importing countries to enhance coordination and increase bargaining power vis-à-vis producer governments. Keohane's (1984) seminal study of international cooperation examines the role of the IEA in response to the oil price volatility of the 1970s. According to Keohane, the 1973–1974 oil shock exposed the costs of an uncoordinated, competitive policy response among consumer states. The IEA mitigated these problems by providing information and facilitating coordination among consumer states and oil companies. One role of the IEA is to coordinate the release of stockpiles by member states that are maintained as a physical hedge against physical supply disruptions.

Once again, a focus on the state alone, however, ignores the important role of private forms of governance in managing energy demand and supply. Blair (1978), Nowell (1994), and others have shown that the international regime regulating the rate of production in the international oil market prior to the 1970s was organized by a small number of international oil companies that sought to stabilize prices. Cooperation was formalized through agreements such as the 1928 Red-Line Agreement, which promoted the joint development of resources in the Middle East through a no-compete clause. The Achnacarry Agreement also stabilized market share within the national markets of the most important oil-consuming states. These arrangements proved remarkably successful, maintaining price stability into the 1960s, despite the enormous growth in supply and demand. Cooperation has also played an important role in energy markets aside from oil. Most notably, an influential study by Haas (1968) argues that the European project was initiated by states' decision to cooperate in pooling natural resources in the wake of World War II by forming the European Coal and Steel Community. We return to a discussion of cooperation in other energy markets later in the article.

## AVENUES FOR FUTURE RESEARCH

In this section, we argue that the politics of energy deserves more attention from IPE scholars. We also believe that the topic would benefit from what is becoming known as the open economy politics approach (Frieden & Martin 2002, Lake 2009), which builds up from preferences to domestic institutions to international interaction. The first wave of research on energy politics made some progress in this direction, but much has changed in subsequent decades. After the 1980s, while interest in the politics of energy waned, scientists, individual countries, and international organizations such as the IEA collected voluminous, detailed data on energy issues. Concurrent advances in quantitative and qualitative methods today present an important opportunity to reconsider the politics of energy in ways not possible 30 years ago.

Two changes in global energy markets that have occurred over the past several decades warrant particular attention. First, in recent years, the developing world, and particularly China, has emerged as a major source of demand. Under the IEA's current policy scenario, global oil demand is expected to grow 24% from 2010 levels by 2035, and ~48% of the increase is from China, with another 33% coming from India (IEA 2011, pp. 107–8). China is also a significant driver of energy

demand in natural gas and coal markets, as well as in renewables and nuclear power. Differences in the interest group politics of developing states, and in nondemocracies, are therefore growing in importance empirically.

Second, although oil continues to dominate total primary energy supply because of the lack of cheap substitutes for oil products in the transportation sector, there have been important changes in the structure of demand in electricity, heating, and other areas, as well as changes in the mix of fuels used to meet this demand. The markets across these fuels differ significantly, meaning the interest group politics that shapes outcomes also differ across fuels. Although the basic building blocks in analyzing the politics of energy—the interests of policy makers, business, and other socioeconomic actors; the role of domestic institutions in aggregating interests; and the goals and effectiveness of cooperation—remain the same, the details of energy politics exhibit important differences across fuel types.

Below, we separately discuss preferences, domestic institutions, and international interaction over energy policy. We highlight how the politics of energy is similar to or different from traditional research areas of IPE, such as trade, investment, exchange rates, and foreign aid. We also discuss several caveats that may pose challenges to an approach that builds upward from domestic micro-foundations.

## PREFERENCES

Energy policy can be conceptualized as a joint product (Cornes & Sandler 1984, Broz 1998), with features of both a private and a public good. There are individuals and interest groups that have a stake in energy policy because of their direct involvement in the production or consumption of energy resources. In addition, the effective management of energy consumption is associated with positive externalities—e.g., mitigating environmental consequences and improving energy security—that have the characteristics of a public good. We first consider the strictly private distributional effects of energy policy. We focus greater attention on the public goods aspect of energy policy in the next subsection, when we examine the role of institutions.

How well do standard theories of preferences in IPE transfer to the politics of energy? Exhaustibility is an important factor that distinguishes many types of energy sources from more traditional goods commonly analyzed in the field of IPE, such as manufactured products and services. However, economists generally argue that the classical predictions from the Heckscher-Ohlin trade model hold under the assumption of exhaustibility, assuming no market failures or other distortions (Kemp & Van Long 1984). Across a large subset of countries, Leamer (1984) finds support for the propositions that countries with relatively abundant oil tend to be net exporters of oil and that countries with a relative abundance of coal and mineral resources tend to be net exporters of raw materials. Models that incorporate complexities, such as imperfect competition and cartelization, reach similar conclusions, with the caveat that the pace of resource extraction will vary according to predicted changes in demand elasticity over time (Stiglitz 1976, Bergstrom 1982). However, under certain assumptions, trade may flow in ways contrary to predictions derived from comparative advantage. For example, intraindustry trade in essentially identical natural resources can occur under conditions of market power and segmentation between domestic and foreign markets (Brander & Krugman 1983, Vasquez Cordano 2006).

Taken together, this suggests that it is generally appropriate to apply well-known insights from trade theory (Ricardo 1817, Stolper & Samuelson 1941) to the international flow of energy products. As with other goods, free trade in energy resources and products is beneficial in aggregate, but the gains from trade are distributed unevenly. For example, there are nontrivial cross-national differences in energy endowments, and the costs of extraction vary. It follows that producers

in countries where extraction costs are higher will tend to seek protection. The history of US oil policy bears this out, with small producers based in the United States instrumental in the imposition of first voluntary and then mandatory quotas on oil imports in 1957 and 1959.

While cross-national differences in the relative abundance of natural resources and extraction costs are thus helpful in explaining patterns of production, variation in forms of industrial organization within and across energy-related industries also plausibly shape interest group politics in energy. Energy firms tend to have highly specific assets and are therefore more likely to lobby along industry lines (Alt et al. 1999). Energy firms are also capital intensive and highly technical, meaning their size and expertise provide them with formidable financial and informational resources through which to influence policy outcomes.

The literature on the politics of trade shows that differences in the characteristics of firms and industries can affect the strategies they adopt (Milner 1999, Hart 2004). In the case of energy, forms of industrial organization are likely to be shaped by the characteristics of specific fuel markets. Firms operating in power markets tend to be concentrated within domestic markets, for example, whereas many oil companies are vertically integrated and international in scope. One implication is that these firms will have different preferences concerning the regulation of trade and investment in energy markets: firms that have a large international presence, for example, are less likely to support barriers to trade and investment whereas domestically focused firms may be more likely to do so.

Studies of the emergence of new sources of energy also suggest that forms of industrial organization are shaped by institutional legacies, which in turn shape preferences. Firms operating in natural gas, for example, enjoy a significant share of the market for heating and electricity generation in many advanced industrialized states today. Yet, natural gas was marginal as a fuel until the 1970s, and the mobilization of capital needed to invest in the infrastructure necessary to create and expand gas markets was substantially influenced by the willingness of government to take the risks associated with project development (Jaffe et al. 2006). The nuclear industry also plays an important role in the energy mix in some states, and its growth was substantially influenced by the efforts of government and business to diversify fuels used in electricity generation, as well as pressure from environmental groups and civil society (Aldrich 2010). This suggests that although variation in forms of industrial organization probably help explain political outcomes in energy markets, this variation itself is often a function of historical technology and infrastructure choices that created new industrial and political interests.

In recent years, distributive conflicts over energy policy have tended to focus less on tariffs and other forms of import restriction, and more on domestic measures that affect the relative demand for energy products, i.e., diversification and efficiency policy. Here we should expect producers of conventional energy resources to support energy policies that encourage domestic production but discourage energy efficiency, for example, because energy conservation reduces demand for their product. Hence, countries with large domestic producers of natural resources such as coal, oil, or natural gas generally face greater domestic political opposition to policies promoting energy conservation (e.g., Ward & Cao 2012). Similarly, “big oil” has historically been one of the principal lobbies against energy efficiency policies in the United States. The American Petroleum Institute and the Global Climate Coalition lobbied to defeat domestic measures such as the BTU (British thermal unit) tax proposal of 1993 and supported the Byrd–Hagel Senate Resolution of 1997, which opposed US participation in the Kyoto Protocol (van den Hove et al. 2002).

Producers specializing in energy-efficient products and alternative energy sources should also generally prefer policies that encourage energy conservation. Such policies will tend to increase demand for efficient products and renewables. On the other hand, producers specializing in energy-inefficient products should oppose policies that promote efficiency. This appears to be one

explanation for the considerable difference between automobile fuel economy standards in the United States and Japan. In Japan, where energy efficiency policy has been implemented aggressively, an important constituency for such policies has been producers that specialize in the manufacture of energy efficiency products. In the Japanese automobile industry, the largest producers, such as Toyota and Honda, have specialized in fuel-efficient vehicles and therefore have fewer incentives to resist strict fuel economy standards (Lipsy & Schipper 2013). Conversely, US automakers have been a consistent and adamant lobby against domestic fuel economy standards. Similarly, South Korean automakers lobbied to limit government subsidies for hybrid vehicles, which were produced primarily by foreign competitors (Ramstad & Shin 2009). Identifying the sources of such specialization is important—production profiles of firms are likely to be determined by a variety of influences beyond factor endowments, such as historical government regulation and domestic consumer preferences. Methodologically, there is an important endogeneity issue to be addressed: specialization in efficient products facilitates stronger regulations, which in turn facilitate further specialization. Quantifying cross-national variation in firm-level specialization is also an important task for future research. Existing measures, such as international patents in related fields, are crude proxies at best.

The interest group politics surrounding energy products is complicated by differences between fuels. Over the past three decades, the number of actors with preferences toward energy policy outcomes has expanded with the rise of alternative energy sources and concerns about the environmental externalities of fossil fuel consumption. There is important cross-national variation in the interests of such actors that has only begun to be explored (Aklin & Urpelainen 2013, Cheon & Urpelainen 2013). An important task of future research is to characterize the diverse set of preferences over energy policy and understand how they are aggregated into policy outcomes. Investments in nuclear power, wind, photovoltaics, and other renewables, for example, vary by country, and are influenced by political bargaining between business, government, and other interests over appropriate forms of regulatory intervention by government. Meyer, for example, identifies significant variation in the regulatory schemes used to promote renewable energy sources in Europe (Meyer 2003). Jacobsson & Lauber (2006) show how interest group politics drove Germany's success in promoting the diffusion of solar and wind power, relative to other states. Indeed, although public aversion to nuclear energy surely played a role in the German government's decision to abandon nuclear power following the 2011 Fukushima Daiichi nuclear plant meltdown in Japan, the outcome can also be plausibly explained by interest group politics.

The preferences of consumers also shape energy politics, and this is another area that requires additional research. From the perspective of a myopic, self-interested consumer, for example, policies that increase energy prices would appear undesirable. However, recent research on the politics of trade finds considerable evidence for sociotropic factors in the formulation of preferences over economic outcomes (Mansfield & Mutz 2009). If so, pocketbook considerations may be counterbalanced by concerns about the environmental and security implications of low energy prices. Although recent work has begun to explore individual preferences about energy policies through survey research (Bechtel & Scheve 2012, Tingley & Tomz 2012), this remains a promising area for further research.

The preferences of more concentrated consumers of energy products are also likely to matter in the politics of energy. For many firms, energy is an input into a set of productive processes. Dedicated refiners, for example, are located in a single segment of the oil supply chain that takes crude oil and refines it into a range of products for final consumption. Manufacturers and firms that utilize road-based transport in production should have a set of concentrated interests associated with lowering the price of inputs. This leads to an intriguing set of possibilities about the nature of interest group politics in the oil sector, and across the energy sector more broadly, which has yet

to be examined systematically. Gawande et al. (2012) finds that lobbying competition between upstream and downstream interests in manufacturing is an important component of the endogenous models of trade protection, and these insights are readily adaptable to the energy sector.

Finally, it is worth noting that the production, transportation, refining, and distribution of products for many sources of energy occur within global commodity markets. These markets involve strategic interaction between governments, and between firms and governments. Domestic choices, in this sense, are a function not only of domestic actors' interests but also of "second-image reversed" effects, such as the independent production choices made by international producers. Decisions by governments to reduce active intervention in energy markets in the 1980s and 1990s, in this formulation, are a function not only of the interests of domestic actors but also of the Saudi Arabian government's decision to stop defending OPEC market share by restraining domestic production.

The importance of international effects is also likely to vary by fuel type. Electricity markets, for example, remain substantially domestic in character, as noted above (although the fuels used in electricity generation are not), whereas the market for crude oil is international. The market for natural gas has historically been national or regional, but it is being increasingly internationalized through investments in liquefied natural gas infrastructure. Whether energy markets can be examined as a function of domestic interests alone, or whether we need to understand domestic outcomes as a function of the interaction of domestic with international variables, is therefore an empirical question that is substantially influenced by the structure of the market.

## DOMESTIC INSTITUTIONS

Beyond a better specification of interests and preferences, a second area of promising research lies in applying theories on the role of domestic institutions developed over the past three decades to the politics of energy. In particular, variations in domestic political arrangements conducive to the provision of public goods are likely to account for some important cross-national differences in energy policy. Energy is a ubiquitous input in modern societies—all residents of a country stand to benefit from policies that facilitate stable access to energy. In addition, the environmental benefits of energy efficiency and energy conservation are generally diffuse. The nonexcludable and nonrivalrous nature of these benefits implies weak incentives for individuals to pursue unilateral actions that impact energy demand or supply. Hence, energy policy can be viewed as a public goods issue, akin to national defense or education, in which government intervention is necessitated by insufficient private incentives to pursue energy security and energy conservation.

Government intervention may be necessary to facilitate socially optimal levels of energy efficiency for several additional reasons. Even for efficiency improvements that have negative net financial cost, the private sector will not necessarily make the investments unilaterally. Efficiency improvements, such as the installation of solar panels or better insulation, often involve high initial costs followed by a stream of long-term cost savings. Firms and consumers with limited access to capital may find the initial outlays too steep to overcome. In addition, in a competitive market environment, the opportunity costs associated with efficiency improvements may prove unjustifiable to corporate shareholders, particularly over short time horizons. Even energy efficiency improvements with negative financial costs may be an inefficient use of capital for firms facing high costs of capital or considering other attractive investment opportunities.

Recent work has begun to explore how these choices are affected by the way domestic institutions aggregate domestic interests and facilitate or constrain the ability of governments to implement such measures. Bättig & Bernauer (2009) find that countries with democratic institutions—traditionally associated with greater provision of public goods—are more likely to accede to global

climate change agreements. Other studies consider the impact of electoral arrangements. Broz & Maliniak (2009) argue that malapportioned electoral systems can impede energy conservation by overrepresenting energy-intensive rural residents, who prefer low energy prices. Lipsy (2011, 2012) finds that electoral systems that encourage narrow targeting of interest groups—such as Japan’s single-nontransferable-vote, multimember-district system prior to 1994—have enabled countries to pursue energy efficiency by raising the cost of energy use diffusely. Electoral arrangements necessitating broad appeal to the general public, such as majoritarian systems, are associated with lower energy prices and, consequently, energy inefficiency.

Existing studies that consider the effect of electoral arrangements on energy policy have primarily emphasized the transportation sector. In transportation, the crucial choices that affect total energy consumption—how far to travel, whether to fly or ride the train, what kind of automobile to purchase—are decentralized, individual-level decisions. For this reason, it is difficult to facilitate efficiency without imposing higher costs on energy use by the general public. By contrast, in the industrial sector, energy efficiency is typically achieved by targeting a relatively small set of energy-intensive producers. Power generation lies in between—utilities are concentrated, but overall electricity consumption is determined by the autonomous decisions of individuals. The interaction of electoral incentives and energy policy choices in these sectors is likely to be more complicated and remains a relatively unexplored field.

Finally, an interesting feature of energy policy is that there is ambiguity about the public good to be delivered through government policy, particularly when considering energy prices. Low energy prices benefit consumers diffusely, given the ubiquitous nature of energy inputs in economic activity. On the other hand, the environmental and security externalities of energy consumption mean citizens stand to benefit diffusely from high energy prices, which facilitate energy conservation (e.g., Aklin & Urpelainen 2011). Although existing work sheds light on political institutions that are more or less likely to generate public goods, it has not offered a convincing answer to the choice between mutually conflicting public goods.

## INTERNATIONAL COOPERATION

In recent years, the politics of energy has become intertwined with concerns about the impact of greenhouse gas emissions on the Earth’s climate. This is another area where greater attention to domestic micro-foundations is likely to yield important advances. Much of the existing literature on climate change approaches the issue as one of international cooperation through formal agreements (Stone & McLean 2004, von Stein 2008, Broz & Maliniak 2009, Bättig & Bernauer 2009). A primary question in this literature is under what conditions countries sign or ratify international agreements mandating reductions in greenhouse gas emissions. Accession to such agreements has been attributed to agreement characteristics such as legalization and flexibility (von Stein 2008), European hegemony (Stone & McLean 2004), and domestic electoral distortions (Broz & Maliniak 2009). However, research has also identified a wide gap between commitment and implementation in climate change agreements. In particular, the Kyoto Protocol is increasingly regarded as a failure and has had essentially no perceptible effect on the emissions trajectory of signatory states (Victor 2004). More generally, Bättig & Bernauer (2009) find that democratic states are more likely to accede to international environmental commitments but no more likely to follow through with implementation.

This suggests that the literature’s emphasis on multilateral climate change agreements may be somewhat misplaced. The more important action is often at the domestic level, where implementation of international agreements negotiated by government officials is constrained by domestic institutions as well as private sector resistance to associated policy measures. This is underscored

by the fact that much of the variation in energy policies across states predates global climate change concerns (e.g., Katzenstein 1977). For example, Japan has pursued energy conservation aggressively since the 1970s oil shocks. However, recent changes in electoral incentives have made it more difficult for politicians to maintain policies that promote energy efficiency, most crucially in the transportation sector (Lipsy 2011, 2012). These domestic political impediments played an important role in convincing Japanese policy makers to opt out of the Kyoto Protocol after 2012, a development that came as a surprise to many delegates of the United Nations Framework Convention on Climate Change (e.g., Environmental News Service 2010, Feldman 2010).

Although a comprehensive, effective regime to address climate change remains elusive, scholars are beginning to document alternative forms of cooperation that potentially show more promise. There are myriad bilateral and multilateral arrangements that have evolved to address various aspects of climate change, albeit in an often fragmented manner (Abbott 2012). Green (2013) argues that private forms of authority are an important and understudied element in international cooperation over climate change. Keohane & Victor (2011) argue that such institutions represent a “regime complex,” a concept first defined by Raustiala & Victor (2004) as “an array of partially overlapping and nonhierarchical institutions governing a particular issue area.” The regime complex in climate change evolved through what Colgan et al. (2012) characterize as a punctuated equilibrium, driven by coalitions of dissatisfied states. The regime complex in climate change may also be more effective than the universalistic alternative because its greater flexibility and adaptability allow for cooperation to move forward even where universal consensus is unattainable.

In short, although universalistic international cooperation on energy has been largely ineffectual, alternative mechanisms of cooperation have emerged, reflecting the diversity of issues and actors in the field of energy policy. It remains an open question, however, whether such limited but flexible cooperation will reduce carbon dioxide emissions to a level consistent with long-term sustainability. Bobrow & Kudrle (1979), for example, focus on energy-related research and development in the OECD countries and argue that there are important constraints to interstate cooperation in pursuit of joint gains in the energy sector because of states’ unwillingness to invest in public goods. The origins, functions, and effectiveness of these alternative mechanisms have only begun to be explored and remain a promising area for further inquiry.

Climate change is by no means the only important substantive area of international cooperation in energy. Important variation in cooperative arrangements arises from differences in the structure of markets across fuels and across time for single fuels. In the case of oil, for example, the collapse of prices in the 1980s led to a shift in the nature of bargaining as security of demand emerged as an important concern for producer governments (Mabro 2006). Consumer–producer dialogue became institutionalized through the International Energy Forum (IEF) (Florini & Dubash 2011). The IEF includes members of both the IEA and OPEC, as well as new consumer countries, and conducts a biannual producer–consumer dialogue (Colgan et al. 2012). Although it has no delegated power, the IEF emerged as a cooperative framework built around the interest of both oil producers and consumers in stable oil prices, in contrast to the adversarial relations between IEA and OPEC member states in the wake of oil price volatility in the 1970s. Indeed, the shared interest of producers and consumers in ensuring stable prices has led some scholars to recast the international cooperation in oil markets as a problem of energy governance (Goldthau & Witte 2009, Florini & Dubash 2011).

In the case of natural gas, on the other hand, infrastructure constraints mean trade remains largely regional: transportation of natural gas by ship is only economical if the gas is transformed into liquid natural gas (LNG) by placing it under high pressure, and the facilities to carry out this transformation, as well as regasify the LNG for end-use by consumers, are expensive. As a result, the majority of gas is transported by pipeline within regional markets, although the

volume of trade through LNG is growing (Victor et al. 2006). Forms of international cooperation reflect this difference: although producer cooperation emerged in 2001 through the Gas Exporting Countries Forum, analysts are skeptical that cooperation between the major producers will lead to the emergence of a global cartel to coordinate supply as in the case of oil (Jaffe & Soligo 2006). Instead, the problem of external dependence remains largely regional, most obviously in Europe where governments focus on the energy security risks associated with natural gas trade with Russia (Reymond 2007, Bilgin 2009). Power markets, similarly, remain largely domestic or regional. Here, the role of international cooperation has been less important. Instead, a more important issue has been the organization of power markets within national borders. Jabko (2006), for example, shows European governments substantially liberalized electricity markets and credits European institutions' influence over national governments for this change.

## CONCLUSION

The IEA argues in the 2008 *World Energy Outlook* that “the future of human prosperity depends on how successfully we tackle the two central energy challenges facing us today: securing the supply of reliable and affordable energy; and effecting a rapid transformation to a low-carbon, efficient and environmentally benign system of energy supply. What is needed is nothing short of an energy revolution” (IEA 2008). As this review illustrates, politics will play a critical role in determining whether these challenges will be successfully addressed. Yet academic research in political science on the issue remains relatively underdeveloped.

In particular, the literature provides only partial answers with regard to the three dimensions of variation posed at the beginning of this article: which energy sources are prioritized, how efficient are countries in the use of their energy resources, and what tools do governments use to achieve their energy objectives? The first wave of research into the politics of energy called attention to the interests of policy makers in influencing outcomes in energy markets. Resource diversification and energy efficiency policies were an important element of state intervention, particularly after the oil shocks of the 1970s. Debates over the role of the government in energy markets have returned with renewed salience as China has emerged as a major energy consumer pursuing a relatively interventionist approach toward energy security and energy efficiency. However, as much of the early literature also pointed out, a state-centric approach cannot wholly explain cross-national variation in energy policy outcomes. The early literature made important progress in identifying and characterizing a subset of interest groups and institutions that influence the formulation of energy policy. Particular attention was paid to the economic interests of producers, as well as consumers who use energy products as inputs in industrial processes. The early literature also foreshadowed more recent work by focusing on cross-national differences in political institutions as sources of variation in policy responses—e.g., measures that directly influence prices such as taxes and tariffs, standards and other regulatory instruments, and foreign economic policy.

This article makes the case that the politics of energy deserves more sustained attention from IPE scholars. The politics of energy was central to many of the formative debates in the field in the 1970s. However, academic attention waned along with energy prices in the 1980s and 1990s, and the topic was neglected as the subfield developed and matured. Interest has revived in recent years, primarily owing to renewed price volatility and concerns over global climate change. During the interim, technological development, resource diversification, and increasing concerns about global climate change have considerably altered the political context of energy policy.

Recent research is beginning to make use of the better data collected by researchers, national governments, and international agencies, as well as new methodological approaches, to make headway into the question of how preferences, institutions, and international interaction



combine to shape the politics of energy demand and supply management. For example, research has begun to establish that electoral institutions play an important role in explaining cross-national variation in gasoline taxation and energy efficiency policies. The political influence of domestic energy producers also clearly matters. Nonetheless, the interest group politics of energy is complex and subject to considerable endogeneity problems—e.g., are US energy efficiency standards lax because the interest groups that favor efficiency are weak, or are such groups weak because they are not supported by strong standards? Addressing such endogeneity issues will be an important task for future research. Another complication is path dependence. Energy and transportation infrastructure is generally characterized by high initial costs and a long lifespan, which makes it difficult for countries to depart dramatically from historical trajectories. For example, an important impediment to high-speed rail transportation in the United States is the underdevelopment of local train lines onto which passengers can transfer, and their development is in turn impeded by the interstate freeway system, which encourages automobile ownership and population dispersion. Actors are constrained not only by political institutions but also by such variations in local infrastructure. Recent work on international cooperation in energy focuses primarily on climate change—we argued that this literature could be strengthened by building up from domestic political micro-foundations and conceptualizing climate change cooperation as one policy tool among many available.

As this review shows, many important questions in the politics of energy remain unanswered or are only beginning to be addressed. There are ample opportunities for scholars to apply theoretical and methodological innovations developed over the past two decades to new sources of data, deepening our understanding of how politics shapes the demand for, and supply of, energy products.

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