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New directions in the international political economy of energy

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ABSTRACT

Until relatively recently international political economy (IPE) scholarship on energy has tended to focus on oil, rather than energy understood in its full, current diversity through IPE's tripartite liberal, realist or critical lenses. Over the past decade or so there have, however, been far-reaching transformations in the global economy, not least in response to the increased recognition, and visibility, of damaging manifestations of fossil fuel usage and human-induced climate change. In the light of such changes this article, and the special section as a whole, represents a distinctive departure from earlier IPE of energy traditions by collectively deepening our understanding of how the IPE of energy is changing: in scalar, material, distributional and political terms. An appeal is made for greater engagement by IPE scholars with energy, given its wide-ranging relevance to debates about climate change, development, technology and equity and justice.

KEYWORDS Energy; climate change; development; scale; technology; fossil fuels; low carbon transitions

1. Introduction

The four articles gathered together in this special section represent a distinctive contribution by deepening our understanding of how the international political economy (IPE) of energy is changing: in scale, in constitution, in spatial characteristics and in distributional implications. To make sense of these changes, our authors have displayed a degree of theoretical rigor and empirical specification rare among energy-focused IPE scholars. Their analytical scope entails an ever-wider range of actors and sites of interaction. Energy markets, and broader systems, are more complex than mere manifestations of abstract forces of demand and supply, and they must be understood in relation to many agents' cross-cutting and often contradictory objectives. The relevant scope of such conscious agency within energy markets is now so great as to connect to arguably every major topic within

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modern-day IPE, including financialization, profit-making, rent-seeking and a lack of justice, fairness or global solidarity.

Why, then, has it been a repeated argument on and off across the last 30 years that there remains too little analysis of energy in IPE (Beaudreau, 1999; Gill & Law, 1988; Hancock & Vivoda, 2014; Keating, Kuzemko, Belyi, & Goldthau, 2012; Keohane, 2009; Krasner, 1996; Morse, 1999; Strange, 1988; Van de Graaf, Sovacool, Ghosh, Kern, & Klare, 2016; Wilson, 1987). After all, if IPE serves its most useful purpose as a 'hosting metaphor' (Brassett & Higgott, 2003), facilitating the creation of conceptual space in which different modes of analysis might be combined in a self-consciously interdisciplinary fashion, then the importance of further IPE energy research should be self-evident. Moreover, the complex strategies agents deploy within energy markets should be easily amenable to the interdisciplinary terms often favored by IPE scholars. The imperative of decarbonization; the need to provide sustainable energy for all; the embrace of arguments for cleantech; the recent increase in perceptions of all-encompassing energy crises; the ongoing institutional reconfiguration of both the demand- and supply-side of energy markets; the reverberation across national borders of volatility in energy prices: all of these plus many more examples besides would seem to have opened up a sizeable research area within easy touching distance of where so many IPE scholars position themselves in interdisciplinary terms. The question must therefore be asked again of why those IPE scholars who have actively engaged in studying energy feel so much like the exception to the rule. Is it just a case of forcing a dialogue so that IPE and energy scholars can form a genuine appreciation of what each might learn from the other?

Certainly, there is no shortage at present of important work on how the energy markets of today differ from those of the past, how the energy markets of the future are likely to differ still further, and how both of these facts have significant implications for understanding the ongoing evolution of the structure of energy governance. Indeed, energy-related research and policy work worldwide has experienced extraordinary growth and innovation (Aguirre & Ibikunle, 2014; Carley, Baldwin, MacLean, & Brass, 2017; Geels, 2010; Goldthau & Sovacool, 2012; Keating et al., 2012; Kern & Howlett, 2009; Mitchell, 2008; 2013; Newell & Paterson, 2010; Unruh, 2000). This innovation both responds and contributes to far-reaching transformations in the global economy. Even before the global financial crisis, the collapse of the Doha round of trade talks underscored ever more searching doubts about the uniform harmonization of growth, development and trade for all sectors and regions. The digital technology revolution has been a major driver both of cleantech innovations, such as smart meters and grids, and unprecedentedly low energy intensity of production, as well as a major cause of destabilization of commodity prices, labor markets and inflation targeting. Most fundamentally, the increasingly visible and damaging manifestations of human-induced climate change have instilled an unparalleled sense of urgency to rethinking and transforming basic elements of political-economic relations. The political economy of these energy-induced policy dilemmas would therefore appear to have an irrevocably global dimension, but this does not mean that an explicit IPE of energy has followed automatically in its wake. One of the most striking facts about the large recent increase in energy-related research and policy work is how little of it has been produced by card-carrying IPE scholars.

Our review of why this might have been the case begins at the end, chronologically-speaking. We start by showing just how impressive IPE research on energy can be when the full sophistication of conceptual work in the field is allowed to develop in the wake of acknowledging how the processes of energy policy-making and energy market-making have recently changed. There are modern-day trailblazers, then, and their work is due a great deal of respect. However, problems arise when trying to identify a lineage that links their research to that of another generation of trailblazers in the 1980s. In a much earlier incarnation, IPE scholars *did* talk about energy, almost as a matter of routine. But they did so in a way that reflected how they understood generic governance challenges in their own time, when energy policies and energy markets were very different entities to the ones that we are familiar with today. These trailblazers consequently left a conceptual template that was largely unusable when the subject matter of energy studies changed rather radically.

Later trailblazers have opened up the space to pursue their own research agendas by consciously breaking with their legacy. As we move on to show, this has bequeathed a series of tensions that cannot be resolved simply by denying the logic of past scholarship, tempting though it might be to suggest that this is the case. The conceptual template produced by the work of the early trailblazers focused on a tripartite split between liberal, realist and critical theoretical perspectives. This is what the later trailblazers have had to move away from. Yet it is still through some version of that same tripartite distinction that the vast majority of IPE textbooks introduce the field (Baylis, Smith, & Owens, 2017; Gilpin, 1987; O'Brien & Williams, 2013; Roe Goddard, Passé-Smith, & Conklin, 1996; Steans & Pettiford, 2001). It is also still the same three-way distinction through which most scholars in the field self-identify (Maliniak, Peterson, & Tierney, 2012). The debate about how best to construct an IPE of energy therefore cannot be resolved in one shot, either in this special section or elsewhere. It will require continual renegotiation of the acceptable limits of IPE theory before the outlines of a new settlement become apparent.

2. The new trailblazers' points of departure

What had often been underestimated until the arrival of the new trailblazers is just how complicated, dynamic and politically charged problems associated with energy have become. There is a widespread assumption that energy is now global, because it is associated with many of the most acute dilemmas of global politics – most prominently, the joint imperatives of rapid decarbonization and improved energy access and security for the world's poorest countries and communities. Yet this on its own is not enough to ensure that either policy-makers or market-makers will respond in a genuinely global manner to create a homogeneous context in which decisions about energy might be taken. The simpler the IPE theory, the more a single explanation is looked for in an attempt to capture the underlying logic that drives the whole of the subject of interest. However, the more complex the problems associated with energy become, the greater the gap that opens up between what simple IPE theories can explain and what needs to be explained. Even a passing familiarity with the empirically oriented literature that studies how energy sources are extracted, energy stocks are traded and energy flows are distributed is

sufficient to show that different states now seek to manage in different ways the relationship between their own balance of social forces and their multiple geographies of energy. Each thereby attempts to plot its own specific path and, accordingly, conditions change differently. If these specificities are to be brought to life in research which does not attempt to wish differences away, then this might have to entail a wholesale reversal of priority. ‘The IPE of energy’ is itself an ambiguous term, because it could mean either what IPE can tell us about the current structure of energy governance worldwide or what that structure can tell us about IPE. The new trailblazers have made their mark most obviously by starting from this latter position.

2.1. Conceptualizing energy

Until quite recently, IPE analyses of energy issues have tended to view energy through the lens of pre-existing IPE theories. In this way, it has been usual to treat IPE theory as the given to which contemporary energy-related dilemmas can be made to conform. We hope that this special section provides added impetus for a change that is already afoot, which is to ask what happens when a greater effort is put into understanding contemporary structures of energy markets and governance *in their own terms* and then reflecting outwards from here about how well pre-existing IPE theories serve that task. As suggested by Newell (2019, this special section), this requires that energy should take its appropriate place as a lens for comprehending and revising established understandings of political, economic and social progress.

Yet this in itself first requires making a fundamental move. Typically, when IPE theory has been treated as the given which might explain energy issues, energy itself has been viewed largely as an exogenous factor that requires no special conceptualization. This view may be linked to the tendency to use energy as a synonym for oil. The new desire to emphasize specificity, though, demands much greater attention on how best to conceptualize energy that breaks the bonds of this implied exogeneity (Van de Graaf et al., 2016, p. 26). Below we set out its growing material diversity, the ways in which energy systems are changing, and the range of possible politico-economic consequences. Doing so highlights how the increasingly common language of ‘global energy shifts’ might serve to mask local, national and regional specificities in its appeal to the global. The new IPE of energy being showcased here attempts to highlight these specificities, which means recognizing how combinations of ideational, institutional and material sources of power are changing at different levels of governance in ways that defy the imposition of a universal template when answering the apparently straightforward question of what energy is. We therefore discuss next not only elements of energy’s diversity, but also their implications for IPE more broadly.

2.1.1. Energy’s diversity ...

A good place to start conceptualizing energy, and explicitly as more than oil, is by recognizing its technological and material diversity. Although sometimes referred to as the ‘world energy system’, energy can be categorized in many ways – one of which is to differentiate between primary and secondary fuels. Fossil fuels, such as

oil, gas, coal and renewables, such as solar photovoltaics (PV), onshore and offshore wind and biofuels, can all be classed as primary fuels. Secondary fuels, which are derived from converting primary sources, include electricity and petrol. Taken together primary and secondary energy underpin a very wide variety of, often fundamental, socio-economic functions (Mitchell, 2013). Although often very closely interlinked, each of these sets of subsectors also has its own technological norms, supply chains, including varied subsystems of production, transport, marketization and use, as well as its own embedded rules, cultural norms and power relations (Geels, 2010; Unruh, 2000).

It is worth reminding ourselves of the enduring dominance of fossil fuels. Oil makes up 32% of world energy consumption, with coal at 27%, gas at 22%, biomass 10% and electricity 9% (Enerdata, 2018). Crude oil and natural gas production continue to grow, with the big producers remaining Saudi Arabia, the US, Iran and Russia. Furthermore, it remains the case that huge quantities of capital are tied up in fossil fuel companies: indeed, in 2017, they made up six of the global top ten companies as measured by revenues.¹ Even within this apparent dominance of fossil fuels there are, however, significant changes taking place in terms of who the producers are, of demand profiles, as well as of *types* of fossil fuels being produced. In terms of changing production profiles, it is most notable that the US share of global oil and gas production is expected to grow significantly, due to its unconventional (shale) oil and gas ‘revolution’, with production levels forecast to double between 2005 and 2025 (IEA, 2018). This will leave Saudi Arabia and Russia in relatively less dominant positions within global oil markets. At the same time, on the demand side, although expectations are that oil demand will continue to grow to 2040, the rate of this growth is forecast to steadily decrease.

Gas markets have also markedly changed, not least in terms of the recent ‘coming of age’ of their global rather than regional scope (Boersma & Losz, 2018, p. 138). Forecasts are that gas demand growth will continue, partly as some coal-fired electricity generation switches to gas and renewables (IEA, 2018), although there are doubts about its emissions advantages over coal due to methane leakage which may curb its appeal (Scott, 2018). Arguably the biggest change for gas, however, has been the rapid growth of shale gas and liquefied natural gas (LNG), particularly in the US, unlocking huge amounts of previously inaccessible gas and challenging notions of peak supply (Boersma & Losz, 2018, p. 138). With regard to coal, however, the outlook seems clearer. Consumption growth is already starting to fall, with the expectation that the long-term, 2040, outlook is not good (IEA, 2018), with some countries already targeting a phase out of coal use and many divestment campaigns targeted at coal.

In terms of changes relating to sustainability the major area of change has been the growth of renewables, not only in absolute terms but also as a percentage of the global electricity mix. This has largely resulted from policies enacted by some national and local governments (IEA, 2016). Public research and development (R&D) budgets have shifted to renewables, storage and energy efficiency. For example, in 2015, 55% of public energy R&D budgets went to sustainable energy from about 18% in 1974, when over 70% of research investments went into nuclear energy (IEA, 2018). Emerging indications, such as the \$290 billion world market for renewables (Renewable UK, 2017), and the \$310 billion energy efficiency market (IEA, 2016), suggest that new sustainable energy markets have emerged. This

starts to tell a somewhat different story from some critical IPE scholarship which, through a focus on the political power of fossil fuel corporations, has been more focused on the lack of threat to fossil fuels from renewables (DiMuzio & Ovadia, 2016; Mitchell, 2013). One explanation for this viewpoint might relate to the fact that the shift towards so-called cleantech has been so rapid that it is, in effect, hard to keep up. DiMuzio and Ovadia (2016) refer to 2012 figures, which showed a total market capitalization of renewables at \$185bn, to evidence how insignificant renewables were versus oil and gas. Already, however, in 2014 (excluding biofuels) the market capitalization of renewables had grown to \$476.3bn, versus \$5 trillion for oil and gas, with predictions of \$777.6bn in 2019 (Investopedia, 2018). This growth trend also highlights new understandings of cleantech as economic opportunity, rather than politico-economic cost (Lachapelle, MacNeil, & Paterson, 2017).

Demand for energy is growing overall, and it is expected that it will continue to do so, but with some quite clear differentials opening up globally. While demand has already fallen in Europe, the US and Japan, partly due to energy efficiency policies, it has been rising in India, China, Africa, Central and South America, the Middle East, South East Asia and Eurasia (IEA, 2018). This demand growth is related to economic growth, as well as energy development policies such as Sustainable Energy for All. There are clear demand differentials appearing between energy subcategories, as seen with coal and renewables above, but the most marked area of demand growth is, however, electricity, which some term the electrification of energy. The International Energy Agency (IEA) predicts that electricity demand will grow at twice the pace of energy demand as a whole (IEA, 2018). This is in large part because of expected shifts towards electricity as a source of energy for motor cars, heating, new appliances and cooling systems for sustainability reasons. Predictions that electricity will make up a far higher percentage of world energy consumption are significant, not least in that greater analytical attention will be needed to understand the socio-political implications of greater reliance on electricity.

Demand growth overall could put huge pressures on the need to make significant, albeit achievable, investments in clean primary and secondary power. One recent estimate is that, in order to reduce current global CO₂ emissions by 40% within 20 years, investments of between 1.5% and 2% of global GDP per year are required (Pollin, 2015). However, improvements in energy efficiency are expected to take some of the strain off more expensive supply side investments (IEA, 2018). Indeed, without improved efficiency the projected rise in final energy use would more than double (IEA, 2018), while energy efficiency is the most cost-effective means of driving sustainable energy change. Partly in recognition of these arguments many countries are increasingly turning towards demand-side policies, although as yet with insufficient vigor (Warren, 2014). New energy efficiency regulations in China are expected to contribute towards a continuation of falling rates of demand growth there, while a number of EU countries already appear to have broken the longstanding, and deeply embedded, link between economic and energy demand growth. Indeed, the secular trend worldwide is that the energy intensity of production has been decreasing for decades: since 1990, the global average decreased from over 8 quadrillion British thermal units (BTUs) per trillion US dollars of GDP to about 5.5 trillion (EIA, 2016).

Assumptions about the continuation of the historical link, between energy demand and economic growth, have long underpinned arguments about the all-encompassing power of fossil fuels, which have featured prominently in IPE studies of energy where the pre-existing IPE theories have been taken as a given (DiMuzio & Ovadia, 2016). This more recent data that recognizes the central role of demand reduction within sustainable energy transitions requires greater analytical attention. There is a clear need to understand more about the political consequences of energy becoming less about the unquestioning need for ever greater supply, which has heretofore underpinned corporate energy power.

2.1.2. ... and what this means for understanding the IPE of energy

The great majority of the energy-focused IPE literature has followed in the footsteps of the first generation of trailblazers in its almost universal focus on oil (Frynas, 2003; Meckling, Kong, & Madan, 2015; Nitzan & Bichler, 1995; Strange, 1988; Vivoda, 2009). Perhaps this is understandable given that the ongoing diversification of major sources of energy is in a real sense historically unprecedented. The same is true of the development of energy efficiency and other demand-side response measures which are recalibrating the overall feel of energy governance structures. However, transformations in even the most basic issue of what energy is cannot be wished away simply to protect the integrity of theoretical approaches that were developed to speak to the material realities of a very different world. As the most comprehensive account of energy transformations in Europe over the past five centuries observes, although the end services energy provides may be similar – i.e. heating and cooling, cooking, motive power, machine power, light – in the twenty-first century none of those services in a domestic home are coming from the same sources as they did in the nineteenth century (Kander, Malanima, & Warde, 2014, p. 2–3). A structural transition to electrification as the dominant means of transport as well as heating, cooling and illumination in the coming decades – although no less epochal – would probably accelerate, this trend toward source diversification.

These changes imply concerted recognition of a range of new actors, at different scales, new geographies of energy as well as shifting patterns of who bears the costs and who benefits from the ways in which energy systems are structured. What can also be revealed are the different characteristics of energy subcategories in relation to trade, production, security and emissions. The early observation by Susan Strange that different fuels have different mobility of factors of production is an even more telling insight today than when she first made this argument three decades ago (Strange, 1988, p. 212). This is why she took the shift in global demand from coal to oil to be so significant, and part of what made energy the fifth global power structure in her eyes. Indeed, coal was difficult to transport and therefore less easy to trade, whereas oil could be transported around the world becoming one of the five primary factors of production in the industrializing world economy (ibid). There are some similarities with LNG now as, unlike other forms of gas, it can be shipped globally, making it more of an international than regionally based market (Boersma & Losz, 2018). At the same time LNG can only be extracted locally, within the context of states trying to balance the social forces over which they govern in nationally-specific ways.

Shifting energy geographies are also evident in the fact that the US is becoming an oil and gas exporter once more, thereby starting to align its energy interests more with other exporters than with the International Energy Agency (IEA). At the same time, China, India and a range of other emerging industrial countries are becoming world leaders in green energy (Lachapelle et al., 2017), and even large fossil fuel exporters, like Russia and Saudi Arabia, have started to invest in renewables. Shifting energy geographies are causing traditional distinctions between energy consumers and producers to become blurred (IEA, 2017). Lastly on the ever-evolving global politics of energy, a shift towards renewables gives a great many countries the opportunity to become more self-reliant in energy terms, and less dependent on imports, with clear geopolitical implications. At the same time, however, cleantech also has its own set of dependencies on resources, not least rare earth metals and natural graphite where China heavily dominates global production (BP, 2018, p. 50). And there are quite severe environmental downsides of shale processes, particularly in relation to water security (Neville, Cook, Baka, Bakker, & Weinthal, 2018), while higher levels of global LNG shipping have clearly negative carbon emissions implications.

By recognizing the increasing diversity of energy what also comes to light is the vast range of socio-technical choices now facing policy-makers and market-makers alike, related to multiple possible technical pathways over which significant political struggles typically ensue. While some countries might consider nuclear to be a poor environmental, and economic, choice and prefer renewables, for example South Korea (Paik, 2018), others, such as the UK and Finland, consider nuclear to be very much a viable part of a sustainable energy system. Even here, though, there are voices in each country on either side of the debate, and different energy-related interests find that they enjoy differential ease of access to the relevant policy network. Whereas some space has recently been given over to the politics of choosing which low carbon technologies to support (Shen & Xie, 2018), there has been less discussion of the lack of decisions taken to phase out fossil fuels or, indeed, to start reducing the vast global subsidies still underpinning fossil fuel markets (Lockwood, 2015).

Work featured in this special section suggests that such choices now lie at the heart of energy politics, at the same time as revealing some of the complexities of making technological choices and of outcomes (Kuzemko, 2018; Neville et al., 2018; Newell, 2019; Sovacool & Walter, 2019 – all in this special section). Take, for example, hydroelectricity as a ‘clean’ energy choice. Both Sovacool and Walter (2019, this special section) and Keating (2018) point to the complexities of this choice partly by revealing the strong arguments for and against – some of which are found in development scholarship. Sovacool and Walter set out the often negative implications that a heavy concentration on hydropower can have for security, poverty, corruption, economic growth and the environment (2019, this special section). This level of focus on one source of electricity reveals the trade-offs that can occur as the transition to low carbon sources of energy supply is embraced in different places around the world (see also Shen & Xie, 2018).

The burgeoning, although still somewhat neglected, IPE of transitions scholarship points to the importance of institutional contexts and patterns of state-economy interaction in structuring the choices that states make regarding technologies (Mikler & Harrison, 2011; Baker, Newell, & Phillips, 2014; Kuzemko, Lockwood,

Mitchell, & Hoggett, 2016; Lachapelle et al., 2017). In many countries, political approaches to developing new, sustainable energy markets appear to have included a reasonable degree of state involvement, suggesting some recognition of the state's role in innovation. Indeed, both the US and China are viewed as having adopted a developmental state strategy towards renewables (Chen & Lees, 2016; MacNeil, 2012). While it might be expected from a varieties of capitalism perspective that China would take this course, that is not what would be predicted for the US if we are unable to look beyond its standard designation as a liberal market economy. This suggests that the development of energy innovations can challenge political institutions. Shen and Xie (2018) argue that Chinese development of renewables has resulted in quite significant challenges to, and restructuring of, the state regulatory system.

These approaches should draw increasing attention to different interrelations between energy and politics according to subsectors, as well as according to their stage of development and how easy they are to discursively institute as a social priority. A more in-depth look at energy also allows us to tap into other debates about the relationship between technology and politics. Although one approach is to claim that political decisions have led to material changes in world energy systems, influence can also work the other way round as technologies influence political decisions (Kuzemko, 2019, this special section). Technologies are man-made but, because human ends are also 'made to adapt to technical means', choices of technologies 'may require or strongly enable certain political relationships' (Winner in Burke & Stevens, 2018, p. 82). Schmidt and Sewerin (2017) argue that the Paris Agreement would have been less likely if there had not already been some considerable technological innovation in solar PV, wind and battery technologies. This suggests a need for further energy scholarship to contribute to a more thorough understanding of the broader impacts of energy technologies, and of the assumptions underpinning their expansion, in order to better allow policy-makers (and, indeed, market-makers) to properly weigh up their costs, benefits and future role (Sovacool & Walter, 2019).

2.2. Who and for whom?

We thus urge others whose intention is to seek new avenues of research within the IPE of energy to consider in greater detail the ways in which world energy systems are diversifying into entities whose genuinely systemic properties are increasingly difficult to identify. This would allow everyone who chooses to follow this particular path to ask some quite critical IPE questions about which actors are involved and in what ways their enactment of conscious agency is driving changes to energy governance structures. It also facilitates a focus on the distributional implications of different political choices about energy, including the differential freedom market-makers are being given to make energy markets that solely reflect the logic of the profit motive. The fate of energy systems, and the manner in which they change, will have implications for everyone's future, not least in light of forecasts that energy-related carbon emissions are still set to rise by 5% by 2040 (IEA, 2018).

2.2.1. *A growing multiplicity of actors*

The tendency to think about energy-related dilemmas through the lens of oil has, until quite recently, tended to draw our attention to a somewhat narrow set of actors involved in the design of energy systems: states, transnational oil companies and global governance bodies. We take a somewhat different approach by encouraging our authors to highlight a wider range of actors who are worthy of analysis in contemporary energy governance structures. These include activist investors (Neville et al., 2019, this special section), niche technology providers and different fractions of capital (Newell, 2019, this special section), local government (Kuzemko, 2019, this special section), and those affected by energy policy decisions (Sovacool & Walter, 2019, this special section). As Kuzemko (2019, this special section) points out, shifts in world energy systems, including the growth of renewables and the development of storage technologies, can explicitly be seen as enabling new actors to emerge and new forms of agency to be manifested. Specifically, she argues that some renewable forms of electricity, to the extent that they can be produced at small and medium scales, open energy generation up to a far wider range of actors including local governments, communities and households.

One useful dividing line in identifying, and differentiating between, various groups of actors is that between the broad coalitions of social forces driving sustainable energy transitions and those that seek to conserve the existing, fossil fuel based, institutional arrangements (Kuzemko et al., 2016; Prinz & Pegels, 2018). Such an approach also allows us to make critical distinctions within broad actor categories. For example, energy corporations remain central actors for analysis but it no longer suffices to combine all energy corporations into one category. Doing so provides a very stilted account of the challenges that new, sustainable market entrants are already bringing to established firms, while also missing out on emerging differences between incumbent energy corporations. Indeed, while some incumbents have heavily resisted change, others have been at the forefront of cleantech development (Geels, 2014). The danger is always the likelihood of falling back on existing templates of explanation rather than embracing the genuinely novel. Yet many of these companies have business plans that defy easy categorization because they have specifically set out to organize themselves into politically active groups both within national boundaries and on an international basis, see IRENA, with growing but differing degrees of influence. Lachapelle et al. (2017) show us that there is also a global division of labor emerging between cleantech companies that operate at different ends of the supply chain: innovators (R&D), manufacturers and installers.

Analysis of the German energy transition can provide further insight into the proliferation of new forms of agency which do not map easily onto an account of who sits where in the divisions of forces for change and continuity. Change has certainly been commodified as a means of profiting financially from energy market-making, but so has continuity, and so have a multiplicity of combinations of change and continuity. Sühlsen and Hisschemöller (2014) point to the growing diversity of energy industry associations in terms of the interests that they reflect, in particular to show the growth in organized green energy lobby groups. They also assess the effectiveness of renewable energy associations' lobbying practices, concluding a growing ability to influence political decision-making about Germany's energy transition. Prinz and Pegels (2018), through their analysis of

German labor unions, widen the scope of actors to be considered by positing labor as a central collective political actor in sustainable energy transitions. They are presented, often according to whether the unions represent ‘green’ or ‘brown’ energy industries, as forces both for continuity and change, but the internal politics of these unions is in turn more complicated than can be captured by such binary labels.

As another example, Neville et al. (2019, this special section) draw our attention to a more differentiated view of energy capital, by revealing contestations between purely financial interests and environmental activism within shale gas shareholders. They do so by focusing their analysis on the role of the private sector in energy governance and, within this, on how certain sets of institutional investors and socially responsible investing networks create opportunities for environmental and social governance. This focuses our attention on shareholders as activists, forcing company boards to position themselves in a way that they would otherwise deem to be contrary to maximizing shareholder dividends. The implied emphasis on links between investor groups and wider social movements also calls to mind the growing influence of divestment campaigns. Holders of financial assets, under these approaches, become a force for sustainable social change, albeit with clearly expressed limitations. This is significant given the documented power of corporations in shaping state policies on climate change (Newell & Paterson, 1998), and the significance of the relationships between state leaders and corporate executives in determining decisions about security and energy production (Nitzan & Bichler, 1995).

2.2.2. Energy system changes for whom

In this special section, Newell (2019) poses questions about whether sustainable energy companies and green financiers can be interpreted as just seeking to carve out some lower-emissions market share, or whether we can see the seeds of something more profound emerging. His analysis opens up avenues of inquiry about types of sustainable system change by differentiating between ‘trasformismo’, a less profound form of change, and more sustainable and just transformations (see also Sovacool, Heffron, McCauley, & Goldthau, 2016). At the heart of these debates lie classic IPE questions about ‘cui bono’ (Strange, 1988), which should all the more be asked if we interpret a transition as including major redistributive aspects (Prinz & Pegels, 2018).

Here, we can turn to debates about the differential societal consequences of pursuing different energy pathways (Burke & Stevens, 2018; Kuzemko, 2019, this special section; Lovins, 1976). Before even the first generation of trailblazers had attempted to map out an IPE of energy, Amory Lovins (1976) posited that a ‘soft’ energy pathway, made up of high degrees of conservation and a switch to renewable energy, constitutes far greater social benefit. This is not only because of the long-term mitigation benefits but also because it involves widely distributed energy assets, far lower costs and greater public involvement. These observations tie in with more recent claims about renewables being more politically salient, to the extent that they are more visible thereby increasing awareness of wider groups of people as opposed to nuclear, fossil fuel extraction and large-scale grids which are less visible (Burke & Stevens, 2018; Goldthau & Sovacool, 2012; Hirsh & Sovacool,

2013). Just transitions, and/or deeper transformations, intend to open up related questions of who owns and has access to production, finance and technology, as well as throwing the overall development pathway open to negotiation.

Such debates become yet more pertinent when energy is understood not just as a driver of economic growth, industrialization and/or as underpinning technological modernization, but also as providing fundamental societal services. As Van de Graaf et al. argue access to basic energy services has become so indispensable for a decent quality of life that it now constitutes a universal human right (2016, p. 18). At the same time, it has been estimated that 1.6 billion people globally do not have access to electricity services, with considerable attendant safety and poverty complications (Chevalier & Ouédraogo, 2009, p. 115; Pachauri 2011, p. 191–192). Such conceptualizations of energy as important to development underpin recent arguments that none of the Sustainable Development goals can be met without major improvements in the quality, quantity and sustainability of energy services (UN, 2015; UNDP, 2009). They also underpin national projects like the Brazilian ‘Luz para Todos’¹ project that has, since 2003, connected 11 million people to electricity grids (Gómez & Silveira, 2010). Opportunities arise here to ensure that new energy access is met by affordable, low-carbon forms of energy, such as solar PV with a battery, rather than high carbon forms of energy. In Kenya, for instance, more people gain their first access to electricity from solar panels than from the central electricity grid (Vidal, 2014).

There are some further dynamics of energy systems, and how they link to social outcomes in ways that are more or less just, that are explored in this special section. Sovacool and Walter argue that although hydro-electricity delivers a lower carbon form of electricity, which in climate mitigation terms offers long-term, broad social benefits, there are other less socially beneficial aspects (2019, this special section). They pose justice-related questions about which nations and companies build dams, who benefits from them, what the costs are, and who suffers these costs. Such questions are all the more pertinent given, as discussed above, that there are quite a few sustainable pathways that remain open. They also resonate with debates about inter-generational justice, and about those bearing the burden of current energy systems being at a distance from those gaining financial benefits (Neville et al., 2019, this special section).

2.3. Transcending ‘levels’ of analysis

The contributions in this special section also explicitly move beyond the binary distinction between either a national or an international focus which has marked much scholarship on IPE and energy thus far. In doing so it builds upon wider IPE traditions of recognizing the co-constitutive relationships between politics, the economy and society that cut across any analytical distinctions between ‘levels’ of analysis, such as domestic and international (Baker et al., 2014; Phillips, 2005). The papers gathered here consider how global aspects of energy (transitions), international approaches (to domestic hydro) and considerations of the subnational scale (civil society and local authorities) interact with one another. In so doing, they show not only how scale is relevant to energy politics, but also that there exists a politics of scale which is likely to differ on a case-by-case basis.

Sovacool and Walter (2019, this special section) take an avowedly IPE approach to exploring some of the consequences of hydropower across a wide number of different countries. They do so in an attempt to address the fact that so many hydropower studies have either been single country or single dam focused, thereby making it more difficult to detect what is distinct in the politics of different cases. They suggest that, informative as these studies are, taking an international approach illuminates some broader trends in terms of how countries interact with each other and how well (or not) they perform on important metrics. This is by no means, for them, a case of either/or. IPE trends can be born in mind in analyses of more micro actions, like community responses to climate change in Bangladesh (Sovacool, 2018).

Underpinning Newell's analysis is a recognition of the interconnections between levels within world energy systems, but also of the notion of the commons stretching across any conceptual distinctions between global, regional, national and local (2019). He argues that some clues regarding prospects for steering the forces of human history in more sustainable directions can be provided by analysis that takes account of: the role of states in energy transitions, the enabling and constraining effects of current globalization and the role of global governance institutions and relations between them. He is thus able to point not only to how re-orderings of the international economic system, partly in the form of the globalization of production and its associated shifts in power, have imposed various constraints, but also that they have created vulnerabilities and opportunities to lever change that might fruitfully be exploited. Like Lachapelle et al. (2017), Newell foregrounds the importance of the globally connected patterns through which states and firms pursue energy system change. Variability emerges as a result of comparative political economy measures, such as patterns of state-society interactions, as well as through interactions with powerful structuring forces operating at the global level, such as financial flows, and global institutional pressures.

Both Neville et al. (2019, this special section) and Kuzemko (2019, this special section) focus their analytical lenses onto the subnational – but in different ways. Neville et al. link the activities of growing numbers of organized environmental shareholder groups in the US to Federal energy policy as well as to broader access to corporate management structures. With reference to the political economy of commodity chain literature, however, they also show how the actions of environmental shareholders are situated within global trends, such as shifts in power along commodity chains. This approach shows a very careful placing of the subnational in relation to private energy governance, national energy politics and global political economy.

An explicit appeal is made by Kuzemko (2019, this special section), both to IPE of transitions scholars and to IPE more broadly, to take a more localized view of how energy systems are changing in order to then reflect back on national and global governing structures. Her approach is fashioned partly through attention to energy geography which argues that, in order to understand transitions, a grasp of the spatial dimensions of change is required (Bridge, Bouzarovski, Bradshaw, & Eyre, 2013; Goldthau, 2014). Her focus on inter-scalar relations reveals how some sustainable energy, like distributed renewables and local energy balancing, tend to disrupt centralized energy infrastructures and national energy governance regimes. Her approach highlights a growing tension emerging between national policy-

makers intent on the lowest cost national scale transition, and those in local government who seek to further transitions that provide the most benefit to local citizens in line with prevailing local geographies. These tensions are also recognized by Chen & Lees who point to tensions emerging between the Chinese developmental state model, organized at central political scale, and arguments for a more decentralized mode of energy transition (2016, p. 4).

3. Situating the special section in relation to IPE and energy

Although it cannot be stressed enough that studies of energy have been underrepresented in IPE as a whole relative to the significance of world energy systems to the global economy more generally, energy-related themes have been present in key debates within IPE over the past four decades. Interest in the subject field was given a large boost in its earliest days by the political and economic fallout from the 1973–1974 oil crisis (Watson, 2005). This set something of an early trend of scholarship on the crisis itself, the associated rise of energy nationalism and OPEC, the role of major transnational oil corporations, and approaches to development and underdevelopment in the context of some of the previous certainties being once again up for grabs. Indeed, energy concerns informed even older literatures on international organization, regionalism (e.g. Diebold, 1960; Haas, 1970; Greenwood, 1974; Avery, 1976) and security (Scheinman, 1971). These works reflected how the energy imperatives for rebuilding post war Europe had implications for extra-regional foreign policy, international organization and theory-building, and how newly established oil markets similarly transformed regional relations.

In the 1980s, there was a relatively brief revival of interest in energy in IPE as scholars sought to understand how the oil crisis of the previous decade had had important knock-on effects for the politics of their own decade (Gill & Law, 1988; Jentleson, 1984; Strange, 1988; Wilson, 1987). Yet although much of the scholarship that emerged at this time viewed energy as an important driver of the choices that policy-makers could make within the world economy, the assumptions underpinning this view were neither revealed nor well examined. One of the main claims of this introductory article is that this has, until very recently, remained the case. There have been a number of journal articles and book chapters over the past few years that, in attempting to set out an IPE of energy, also start from the argument that energy has been under-theorized (Hancock & Vivoda, 2014; Keating et al., 2012; Kuzemko, Keating, & Goldthau, 2018; Van de Graaf et al., 2016). This scholarship provides us with comprehensive literature reviews of the results of IPE scholars from the 1980s, 1990s and early 2000s training their sights on issues related to energy governance. However, valuable as they are in enhancing the overall stock of knowledge related to policy-making and market-making in the field of energy, most of these interventions take the standard IPE approach of setting out what they see as the main theories before then showing how each theory can be expected to treat energy as an issue area. Moreover, as the useful tables in Kuzemko (2013, p. 16) and Van de Graaf et al. (2016, p. 15) amply demonstrate, this standard approach itself reifies the textbook presentation of a tripartite theoretical distinction in IPE between liberal, realist and critical approaches.

A number of themes and/or debates emerged that could be fitted around this orthodox three-way understanding of the field, including the resource curse; energy

security and geopolitics; the role of international energy organizations; relations between governments and oil companies; and energy trade and transit issues (Hancock & Vivoda, 2014; Van de Graaf et al., 2016). At the same time, though, a challenge to the suitability of this tripartite theoretical distinction had already been raised really rather vociferously before the majority of the energy-focused literature which utilized it had been written (Murphy & Tooze, 1991). That literature might therefore be thought of as being old, possibly outdated, even before it first saw the light of day. What, then, if anything, can an IPE literature that is constructed around the standard division of liberal, realist and critical theories tell us about energy today? A review of what it said before the new generation of trailblazers entered the fray is perhaps enough on its own to caution against accepting its limitations when trying to understand the complexities of modern-day structures of energy governance.

3.1. *The liberal-realist divide*

A standard lament of reviews of the existing IPE literature is that so much of it sees energy either through liberal or realist lenses (Goldthau & Witte, 2009; Keating et al., 2012; Kuzemko, 2013). Liberal approaches to energy have been dominated either by liberal economic thinking, or neoliberal institutionalism. Liberal economics is an outlier in terms of the assumptions that it makes about energy in that energy is quite explicitly assigned little intrinsic value in and of itself (von Hippel, Suzuki, Williams, Savage, & Hayes, 2011). Instead, its stocks and flows – both in the present and in the future – are seen as a replaceable commodity that can be traded on open markets and then sold, via utilities, to consumers (Littlechild & Vaidya, 1982). The internationalization of energy commodity pricing and competitive markets, underpinned by positive economic interdependence, is explicitly seen as the route to reducing state interference and to global energy security (Mitchell et al., 2001). As such, this theoretical framing makes little attempt to understand energy in any specific material terms, whether that is in terms of its underlying technologies or infrastructures. It also tends to make prescriptions about how energy stocks and flows should be governed, assuming that the private sector will better deliver what consumers, producers and states require as long as it is as lightly regulated as possible.

Neoliberal institutionalism begins from a similar starting point, but tends to stress the importance of establishing the correct international institutions to ensure open energy trade (Goldthau & Witte, 2009; Keohane, 2009; Keohane & Victor, 2011). As such, in addition to the space that is carved out for the role of cooperation, there is some recognition both of the range of actors in the international (energy) system, as well as the high levels of international trade, particularly in oil, that have ensued (Colgan, Keohane, & Van de Graaf, 2012). What emerges is a view that interests in energy sectors, such as oil, are now so fragmented that it has become a mistake to think in terms of a single overarching global framework of regulated demand-and-supply networks. Instead, certain energy regimes govern particular issue areas, like OPEC as a regime of energy producers and the IEA as the regime of consumers. One prominent message coming out of this literature is the likely limitations of international attempts to cooperate on energy (Lesage, Van de Graaf, & Westphal, 2010), which is particularly pertinent in an era when some

energy markets, like gas, have become more internationalized and when greater recognition exists of climate change as a global threat. The underpinning liberal ontology, with its focus on the efficient allocation of resources that only markets can provide, channels research into questioning the wisdom of political action to resolve energy-related dilemmas.

Conversely, realist accounts have tried to activate the space that liberal accounts have vacated for thinking through the relationship between political action and the process through which energy needs are satisfied. Indeed, realist scholars tend to self-identify within IPE as those who will ask the political questions that might otherwise remain suppressed. Yet it has always been a particular approach to politics that drives their work, as their interest in ‘the political’ typically reduces to focusing only on the importance of energy to nation states. Put simply, energy becomes merely another example of how states might establish power in an anarchic, zero-sum world while the resource base to which securing adequate energy stocks contributes is merely one of many policy areas in which states compete with one another for absolute gain (Klare, 2008; Venn, 1986). Energy resources are seen as ‘critical factors’ to the extent that they alter the balance of capabilities between states and therefore they affect the distribution of power in the international system (Hancock & Vivoda, 2014, p. 207). The emphasis in these accounts tends to be on the likelihood of conflict as states compete for energy resources (Bromley, 2006; Painter, 2002), such as through the troublesome international politics of Eurasian energy transit pipelines (Stulberg, 2012). Such approaches provide further explanation as to why international co-operation on energy has been compartmentalized, according to consumers and producers, as well as why energy has so often become securitized (Natorski & Surrallés, 2008; Wilson, 2015).

Realist approaches would seem to be better placed than liberal approaches to explain the recent return of ‘resource nationalism’ and the enhanced prominence of national oil companies (Goldthau, 2012; Meckling et al., 2015; Wilson, 2015). This view reflects recent ‘second image’ observations about the rise of a statist capitalism in the erstwhile periphery as a thriving counterpoint to Western liberal capitalism (Hertog, 2010; van Apeldoorn, Bruff, & Ryner, 2011). Examples frequently given are the degree of state involvement in Chinese and Iranian energy markets, and the nationalization of energy companies in Russia, Venezuela and Argentina (Mahdavi, 2015). These changing market structures represent usually popular decisions in these countries to reject the privatized energy model as adopted at the height of the Washington Consensus, but they are also significant in how they feed into a restructuring of global markets. Indeed, partly as a result of these changes, national oil companies have come to control access to the majority of the world’s oil reserves and production (Tordo, Tracy, & Arfaa, 2016).

3.2. Critical approaches to energy

Although most IPE accounts of energy in the 1980s, 1990s and early 2000s came from liberal or realist perspectives, there were some attempts to take a more structural view as a means of adopting a more critical lens on ongoing practices. Here we can detect substantially more concern for revealing the nature of relationships between state and private sector actors. Liberals typically wish this issue away

through their ontological loyalty to the view that markets will always be able to provide efficient outcomes (Littlechild & Vaidya, 1982). Realists can also be said to do likewise, although this time through their ontological loyalty to the idea that states are forever locked-in to competition with one another over finite energy resources (Klare, 2008).

The early critical scholars who showed an interest in developing an IPE of energy took from Strange (1988) the idea that energy was a source of structural power within the global economy and that whoever was able to enact control over that structure produced a considerable source of economic advantage for themselves. Again, as with realist approaches, there was often an overwhelming focus on oil, which was understood to be deeply embedded within modern systems of trade and production, and where transnational private oil companies were highly influential over government decisions. The main point of departure here with Strange's work is that, for her, the state would nurture structural power in the energy arena for its own self-preferment, whereas from a critical perspective the state would nurture structural power for the benefit of the companies that are best placed to derive profits from it.

True to the time at which they were being developed, the early critical approaches to the IPE of energy typically emphasized the role of fossil fuels in helping constitute global political, economic and ideological orders (Cox, 1987; Gill, 1993; Rupert, 1995). Gill and Law (1988, p. 272) set out East-West and North-South relations as international dividing lines in the political economy of energy. This led to later studies of the way in which some developing countries have become locked-in to arrangements whereby transnational corporations have received the gains from resource exploitation and they receive only a marginal share (Nitzan & Bichler, 1995), as well as to the way in which Middle East wars have been interpreted as 'energy conflicts' driven in part by the actions of 'Weapon-dollar-Petro-dollar' coalitions of large defense companies and oil companies (Bidder & Nitzan, 1996). The methodological starting point here is the differential accumulation of capital and the convergence of politics and business (Bidder & Nitzan, 1996, p. 609), rather than any particular understanding of energy markets or trade. As such, transnational corporations are important actors, but not just oil companies – also defense companies and financial corporations (Gill & Law, 1988, p. 277).

3.3. The need for recent points of departure

The IPE of energy developed by the first generation of trailblazers only took the debate so far, hence the need for the recent points of departure that have reinvigorated the field and ultimately given rise to this special section. A number of key themes emerge from any retrospective analysis of the argumentation structures of this early work: energy in almost all of these accounts equated to oil (or sometimes oil and gas); the main actors were states, transnational corporations and sometimes intergovernmental organizations; the national level was the main focus of enquiry, and analysis of that level was typically conflated with a straightforward account of states following their interests; and the relationship of energy to the broader instantiation of economic relations was substantially under-theorized. These accounts were, in addition, too static. There was little or no acknowledgement of ongoing,

material changes in energy systems, as well as the new pressures being placed on energy politics through the emergence of new actors attempting to open up new points of contestation over acceptable energy futures. New social pressures on energy politics (and material systems) include, but are not necessarily restricted to, the need to address climate change through mitigation, intergenerational justice, water and food security, energy poverty and development.

It is these changing energy circumstances that have driven the perceived need by some in IPE for the more nuanced and also expanded account of energy, the likes of which appear in all of the papers brought together in this special section. One of the most prominent strands of literature that has started to emerge within the IPE of energy focuses empirically on energy transitions, often seen through interdisciplinary lenses that combine insights from IPE and socio-technical transitions scholarship (Meadowcroft, 2005; Baker et al., 2014; Chen & Lees, 2016; Kern & Markard, 2016; Kuzemko et al., 2016; Power et al., 2016; Johnstone & Newell, 2017; Lachapelle et al., 2017; Shen & Xie, 2018). These were transitions that could not possibly have been called to the imagination in the form they take today back in the 1980s, 1990s or even early 2000s, let alone studied for their contemporary relevance. There can be no criticism, then, of the early trailblazers' inability to predict the future. But there is a need to ensure that the IPE of energy does not get stuck in a past that is no longer how the world looks today, simply because of the difficulties that are always involved in breaking the shackles of those who are deemed to be a subject field's pioneers.

Moreover, it is also necessary to recognize that the theoretical approaches that underpinned the earliest work in the IPE of energy were ideally suited to asking the sort of questions that work posed. At the same time, though, they were always destined to struggle to cope with the changes within energy systems that have inspired the work of a later generation of trailblazers. If the theoretical starting point has to be placed somewhere on the spectrum of liberal and realist positions, then it is likely that the research which follows will focus on the relationship between states and markets within energy systems, and it will ask 'how much state?', 'how much market?' in relation to pretty much every issue area related to energy policy-making and market-making. Similarly, if the theoretical starting point mirrors that of the original self-styled critical scholars working on the IPE of energy, then it is also largely inevitable that subsequent research will focus on how the state/market relationship will embed corporate interests at the heart of energy regimes. It will treat the 'how much state?', 'how much market?' question as being subsidiary to how much surplus the corporations which dominate the energy sector can extract from their privileged position within the energy policy network. The same theoretical positions do tend to lead to the same style of questions being asked and to the impression emerging that scholarship has become stuck in a rut.

This clearly presents the IPE of energy with a problem. IPE energy scholars are likely to have had their first experience of the subject field mediated through the tripartite theoretical distinction. They are also likely to have been encouraged during graduate school to decide once-and-for-all whereabouts they are going to position themselves within the tripartite distinction. And when they don a different hat to act as guides to the field for their own students, the textbooks that they can call upon to assist them in this endeavor will almost certainly also reify the same tripartite theoretical distinction. The new subject matter of the IPE of energy

demands that scholars embrace the logic of escape from their own disciplinary inheritance, but most of the experiences involved in being an IPE scholar serve merely to reinforce that inheritance.

We hope that this special section – including our introductory essay with which it begins – achieves two things. First, we would like to think that it highlights the limitations of failing to challenge sufficiently vigorously the constraints that the early trailblazers placed on the development of the literature. We recognize, of course, that every literature has to start somewhere, and that without the farsighted interventions of a few isolated scholars there would be no IPE of energy of which to speak. Yet this cannot be an excuse for failing to recognize that scholarly progress will forever be stunted if all it is possible to do is to take liberal, realist and critical IPE theories as a given and then see what they can say about energy. Second, we would also like to think that the articles which now follow highlight what can be achieved when the exact opposite approach is taken. All of them start by revealing important challenges to, and changes in, energy systems and associated power relations. The aim is to present and understand these challenges and changes in their own terms, rather than to fit them somewhere on IPE's dominant tripartite theoretical framework. The question then becomes how IPE theories might need to be further refashioned if we are to take better account of how and why energy is changing and the broader politico-economic consequences of change. This, to our minds, is the right priority for the next phase in the development of the IPE of energy.

Notes

1. According to 'fortune.com', these are the Chinese State Grid; Sinopec Group; China National Petroleum; Royal Dutch Shell; British Petroleum and Exxon Mobil.
2. This translates as 'Light for Everyone'.

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