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# AICGS POLICY REPORT

**REDUCING VULNERABILITY:  
A TRANSATLANTIC APPROACH TO  
ENERGY SECURITY**

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American Institute  
for Contemporary  
German Studies

JOHNS HOPKINS UNIVERSITY

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## FOREWORD

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Energy security has become a major concern for the transatlantic community in the twenty-first century. In Europe, Russia's seizure of the Crimean peninsula has renewed focus on the European Union's energy policy. Germany has been a leader in the field, with a long-term strategy (the *Energiewende*) that started well before the Fukushima crisis in 2011 to phase out nuclear and diversify to other types of energy. However, this has come under renewed scrutiny given the country's interdependence with major suppliers like Russia. The *Energiewende* itself has less to do with securing existing sources of energy and more with a societal shift away from nuclear and fossil fuels and leading the development of clean, alternative sources of energy.

In contrast, securing reliable access to sources of energy around the world has been a cornerstone of U.S. foreign policy. Traditional U.S. policy promotes a global free market for energy and this is unlikely to change even in the current period of energy abundance, which itself is a result of heavy investment in technology to extract non-renewables, particularly shale oil and gas. Few have analyzed the geopolitical implications of both of these transformations in the energy sector.

Contrasting the German and American approach to changes in the global energy picture was the basis for AICGS' project on "The Geopolitics of Energy." In this Policy Report, German and American experts tackle this issue from several different issues with global implications. The essays focus on the changing relations between energy suppliers and importers and the problems of access to water and other basic resources, and offer important insights into shaping a transatlantic approach to the energy challenge.

This publication is an example of AICGS' commitment to comparing and contrasting the interests and policies of Germany and the United States in an effort to identify common policy challenges, choices, and opportunities. AICGS is grateful to the authors for sharing their expertise, to the Daimler-Fonds im Stifterverband für die Deutsche Wissenschaft for its generous support of this Policy Report, to Parke Nicholson and Kimberly Frank for their thoughtful contributions to and execution of the project, and to Jessica Riester Hart for her editorial efforts.



Jackson Janes  
President, AICGS

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**Dr. Severin Fischer** has been an associate at Stiftung Wissenschaft und Politik (German Institute for International and Security Affairs) in Berlin since 2011. He has six years of working experience in the field of energy and climate policy. Between 2008 and 2011, he worked as project coordinator at the Institut für Europäische Politik (IEP) in Berlin. During 2009 and 2010, he joined the office of the Chairman of the Environment Committee in the European Parliament as a policy advisor. In 2015, he earned his PhD for his dissertation on the “Europeanization of German Energy and Climate Policies.” He is currently working on topics such as the creation of an Energy Union in the EU and new models of governance for energy and climate policies in the EU.

**Andrew Holland** is the American Security Project’s Senior Fellow for Energy and Climate. He is a Washington-based expert on energy, climate change, and infrastructure policy, working at the center of debates about how to achieve sustainable energy security and how to effectively address climate change. He served as Legislative Assistant on Energy, Environment, and Infrastructure for U.S. Senator Chuck Hagel of Nebraska for three years from 2006 to 2008. He has also served in the U.S. House of Representatives Ways and Means Committee. He holds a Master’s Degree in international strategy and economics from the University of St. Andrews in Scotland and a Bachelor’s Degree in History and Economics from Wake Forest University in North Carolina.

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# ENERGY AND STATECRAFT: A GERMAN PERSPECTIVE

KIRSTEN WESTPHAL AND SEVERIN FISCHER

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## Introduction

Germany is the country of the “*Energiewende*.” The *Energiewende*, or energy transition, rests upon two major pillars: first, enlarging the share of renewable energy in energy consumption and, second, phasing out nuclear power by 2022. A third pillar is comprised of energy saving and energy efficiency. Germany’s energy transition is building upon a number of long-standing policies, despite its association with the decision for a nuclear phase-out after Fukushima in 2011. Since the 1980s, Germany has sought a “Green *Energiewende*” without nuclear and fossil fuels. Since then, renewable energies have been defined as the backbone of a more sustainable energy system. In that respect, Germany’s *Energiewende* is an issue of remarkable duration and rooted in developments that started thirty years ago. The realization of the energy transition has become a major political project driven by environmental and climate concerns, and is subject to large discussions and potential corrections in the set of instruments.

The Russia-Ukraine crisis of 2014-2015 has increased political sensitivity for asymmetrical mutual dependencies, which make Germany sensitive or even vulnerable to political pressure. A paradigm shift is taking place in German foreign energy policies critically analyzing interdependence with major suppliers such as Russia. Under these circumstances, the energy transition is perceived as a means also of enlarging Germany’s political room for manoeuvre. German energy policies have to be seen increasingly as an integral part of the European Union’s (EU) policy approach, though. A number of competencies have shifted to Brussels and the creation of the internal market has resulted in a transition of natural gas and electricity markets, transforming the political background within the EU, too. Moreover, the recent

price effects of the U.S. “fracking revolution” creating a significant price advantage for the U.S. as well as the conflict between Russia and Ukraine have altered priority-setting within the strategic triangle. Competitiveness and energy security have come to the forefront, even more so within the EU.

## Germany’s Import Mix and Foreign Energy Policy

Traditionally, German energy policy has been linked to domestic developments. Energy policy is primarily conducted through the lens of the power sector, despite the country’s high import dependency on oil, gas, and hard coal. This tendency has even been reinforced with its internal project of an energy transition (*Energiewende*).<sup>1</sup>

Germany conducts a variable geometry of external energy policies and relations based on a liberal approach. The major energy supplier for oil and gas to Germany is Russia, accounting for 34 percent of its oil imports and more than 38 percent of its gas consumption (see Figures 1 and 2 on page 15). Further important oil suppliers are Norway and Great Britain; substantial gas imports also come from the Netherlands and Norway. The share of Dutch gas in the German market, however, will be shrinking very quickly as the Netherlands has introduced a production cap on its Groningen field. Oil supplies from the Middle East and North Africa play a very limited role, with 4 and 10 percent, respectively.

Despite Germany’s high important dependency, the external dimension has been less predominant in the political discourse and energy security has been clearly framed in commercial rather than strategic terms. Herein lies the major transatlantic difference:



Energy is less defined as a strategic and foreign policy tool and rather as a commodity and service. In German foreign energy policies, creating and managing mutual interdependence has always been a paradigm, and not so much energy autonomy and autarchy. As a consequence of this paradigm, and in practical terms, the energy mix is an outcome of economic and corporate decisions: it is the private utilities and companies that are primarily responsible for supply security. In doing so, they pre-shape German energy relations with external partners.

### Historical Patterns of German Energy Statecraft

Russia has long been Germany's primary energy supplier. For four decades, the German gas sector was characterized by long-term supply relationships, above all with the Soviet Union, and later with Russia. The Soviet Union first began supplying gas to Germany in 1973 under the "pipes for gas" deal, which was an important pillar of Chancellor Willy Brandt's *Ostpolitik* and rapprochement with the Soviet Union. Later on, this energy partnership was further developed—also in an attempt to diversify away from oil and the Gulf countries. As part of the construct, the institutional setting "bridged" and connected two very different markets, was designed for the long term, and was based on a bilateral political and commercial consensus. The cooperation built on complementary economic structures and on shared interests between an energy-abundant and an energy-consuming country, as well as on corresponding business models between an exporter that delivered gas to the border and an importer that was responsible for selling and marketing.<sup>2</sup> Last but not least, this German policy approach relied on huge (private) corporations such as Mannesmann and Ruhrgas to realize the commercial side and secured the financial side with state-backed Hermes credits.

In the 1990s and 2000s, bilateral German-Russian institutions were dominated by increasing interdependence, which translated into a business model of ever closer transnational alliances along the entire natural gas value chain. Demarcation at the border was blurred. As a result of asset swaps and quid-pro-quo package deals, Germany's BASF Wintershall and E.ON Ruhrgas became involved in gas and gas-

condensate production in Western Siberia, while Gazprom expanded its transport, trading, and distribution activities in Germany.<sup>3</sup> Business ties were very close: Ruhrgas was Gazprom's largest foreign shareholder, with 6.5 percent. However, Ruhrgas and later E.ON Ruhrgas refused to sell strategic parts of the business to Russia, despite several Russian attempts. The package deals included the building of the Nord Stream pipeline through the Baltic Sea. Establishing direct pipeline links between Russia and Germany was a priority for the Schröder government with its close (personal) relationship with President Vladimir Putin, making the German gas market a major hub for Russian gas. A side effect of the strong symbiotic relationship was little diversification beyond the existing trade. This was rational from the perspective of corporate business interests, but not necessarily from a national economy's point of view.

To summarize, the political framing of commercial relations developed from "change through rapprochement" during the 1970s' *Ostpolitik* to "rapprochement through interdependence" in 2006, and to a "modernization partnership" in 2009.<sup>4</sup> Managing mutual interdependence became the major paradigm. From a German point of view, it was a remarkable success—Germany has not yet faced an interruption for political reasons. This is the source of the German mantra on Russia's reliability as an energy supplier: it has endured difficult times and has built up trust and close ties between companies and the political elites. However, a break with market structures initiated in the EU transformed business interests and commercial patterns. Even more so, the mantra was challenged by the reported experiences of Central and Eastern European member states, which had been subjected to Russian (price) pressure in their governmental energy supply agreements.

### EU Energy Policy: Challenge and Opportunity for Germany's Energy Statecraft

For many years, national statecraft has dominated energy policy in Europe. Germany, France, and the United Kingdom had their specific ways of dealing with security of supply and their special relationships with external suppliers. This situation has dramatically changed over the last couple of years. Germany has

had to adapt to a shift of competences from the national level to the EU level over recent decades. Thus, German energy policy—and the broader impact on foreign and security policy—cannot be understood without taking the EU context into account.

EU energy policies have been informed by the strategic triangle of sustainability, competitiveness, and supply security for many years. In general, balancing these objectives is a rather theoretical ideal; in reality, trade-offs and priority-setting take place. The EU's political and institutional approach has been influenced by a neoliberal market paradigm, putting a functioning internal energy market at the center of the debate and having a skeptical view on state-owned and/or vertically integrated energy companies. In addition, environmental policies have gained ground in EU energy policies since the beginning of the 2000s and are an important feature in energy policies. The underlying paradigm of a state or public sector-based approach, relevant in most EU member states, changed to a market-driven system with a decarbonization agenda.<sup>5</sup>

Regulatory and institutional change accelerated with the Commission's Green Paper in 2006, the internal energy market packages, the Treaty on the Functioning of the European Union (TFEU or Lisbon Treaty), and a new Energy Strategy 2020.<sup>6</sup> The Lisbon Treaty aimed at clarifying the division of competencies between the EU and the member states; with Article 194, energy policy became a field of shared competencies for the first time in the history of European integration. Although the Lisbon Treaty still grants national sovereignty on the energy mix, it also highlights the spirit of solidarity and the objective of a functioning integrated internal market. However, the greater need for coordination creates some tension: Member states retain their sovereign rights to decide about their respective energy mixes, but at the same time, coordinated action is needed to implement infrastructure projects of common interest, to face security of supply challenges, and to establish a functioning and integrated internal market. In practice, the national and the EU regulatory processes take place in parallel, but not always in harmony. The national regulators act on the basis of the actual situation in their respective national markets, which still differs widely from state to state, and may serve to

preserve tendencies of fragmentation in EU markets. Further change is set to take place through harmonization and coordination of network codes and tariffs.

Looking specifically at European gas markets, three internal market packages<sup>7</sup> were intended to establish a liberalized, competitive, well-functioning, and integrated EU gas market. The main components of this new order have been third party access, unbundling, and market opening, reinforced by ownership unbundling, antitrust enforcement, the abolishment of destination clauses in long-term contracts, access tariffs, and network codes.<sup>8</sup>

The Commission started to bring regulatory changes into the market that were intended to increase short-term transactions, spot price signals, and gas-to-gas competition. The outcome today is that in the EU, spot market-based transactions are said to make up more than half of trade settlements, while oil price linkages are losing ground.

Despite the regulatory developments on the internal market and the competition policy that changed the market structures themselves, the EU also influenced and will influence gas consumption patterns in the member states by environmental legislation. Looking to the future, the EU's climate and energy package for 2030 has produced a very ambivalent outcome.<sup>9</sup> The future outlook for gas strongly depends on the structure of the framework and on its further implementation. Against the background of demand uncertainty, supply security and aggregation of sufficient volumes remains a challenge.

In sum, the EU has gained more influence on national energy policies, but with different effects in the various member states. In eastern Europe, the internal market package provided the tool to lessen the close dependencies on Russia and put energy trade on a new institutional basis. In Germany, the outcome was much more mixed as it destabilized the traditional business models. Russia profited in its divide-and-rule strategy from a fragmented EU market and its market dominance in eastern Europe. Finally, the business cases and economics—e.g., for Gazprom's infrastructure project Nord Stream, the connecting pipeline to Central European markets, OPAL, and South Stream<sup>10</sup>—changed under the Third Market

Package. The room for maneuver on the side of German energy policy has become more limited, the more the role of the Commission is growing. Brussels energy statecraft is represented by its regulatory power.<sup>11</sup> The Commission's legalistic and regulatory approach to shape integrated, competitive, and liberalized markets increasingly determines the EU's external energy policy, as it is the final authority to approve specific agreements with non-EU suppliers under the Third Market Package. Russia's latest attempt to question the Commission's role by negotiating bilaterally with Bulgaria on the South Stream pipeline was stopped by legal action. Russia opted for Turk Stream instead, landing the off-shore section of Black Sea in the European part of Turkey.

Last but not least, if there is political willingness (depending on the course of the conflict in eastern Ukraine), there will be a need for energy diplomacy, political re-framing, and a new commitment to the energy relationship with Russia; most likely, this will have to be done in consensus among the EU-28. Germany will not embark on a bilateral approach. Business-as-usual beyond the existing long-term contracts will hardly be possible. Finally, the search for a new balance, as well as the role of natural gas in the current EU energy mix, presupposes a long-term perspective, which in times of systemic uncertainty will have to be politically backstopped by a consistent energy and climate package. The Commission's proposal to create a "resilient Energy Union" from February 2015<sup>12</sup> is shifting attention again toward EU-level action and the development of an EU energy foreign policy. This includes a renegotiation of the terms of trade with Russia and a clear focus on diversification of natural gas imports. In how far this will come true depends on the will of member state governments to accept a further integration and harmonization of their national approaches. In the past, the EU Commission tried to export this normative approach of liberalized markets and limited state influence to its direct neighborhood to the east and south. However, European Neighborhood Policy and the Energy Community showed very limited success in the Balkans and slow progress in Ukraine and Moldova.

## German Actual Statecraft vis-à-vis Major Hydrocarbon Exporters

Germany is a taker of (price) developments in the global fossil fuel markets. Yet, Germany conducts strategic energy partnerships with big energy suppliers (and consuming countries). These partnerships aim to facilitate energy cooperation, particularly offering special technologies (hydrocarbon exploration/processing) and renewable and energy efficiency technologies. Surprisingly enough, Germany has not established an energy partnership with a Middle Eastern country.

When it comes to the Middle East, Germany (as well as the EU) relies on the U.S. role as a guarantor of stability and free trade in the region. Germany has also joined the U.S. policies of an oil import embargo from Iran. However, in 2010, imports from Iran made up only 1.6 percent of all oil imports; oil product imports were negligible. For the EU as a whole, imports from Iran represented approximately 5 percent.<sup>13</sup> Yet the Middle East will remain important for Germany and Europe as the backbone of the global oil markets and determinant of price trends. While several southern EU member states are strongly dependent on imports from the Persian Gulf, many others do not presently import strategically significant proportions of their oil and gas supplies from there. However, in Germany as well as in the EU the impact of the shale revolution on U.S.' role in the Middle East is being discussed with some concern. Most likely, the EU will commit to more burden-sharing with the U.S.<sup>14</sup> Germany (as well as the EU) has to rely on a functioning internal market and free, unrestricted global trade flows. Protecting maritime trade routes will therefore remain a priority in transatlantic relations, for global security and international energy cooperation.

This may also be abetted because of the fact that major shifts could happen in the European refining sector, too. There are indications of a global refinery capacity surplus. Refineries compete for cheap high-grade crude and for markets for their products. The competitiveness of European refineries is declining, and in the future the continent might have to import more of its oil products. But if refinery closures in Europe shift trade flows to such an extent that more

oil products have to be imported from the Gulf region or from the large refinery complexes in Asia, direct dependency on the Gulf would increase for the European Union as a whole. Germany's approach to the region will be conducted with and through Brussels, e.g., in the European Security and Defense Policy and/or the EU-OPEC dialogue.

Germany has been pursuing a liberal, commercial, and market-based approach to energy. This is why it has relied on the U.S. with respect to strategic energy issues. This same held true in the past for the Caspian region, where the U.S. was one of the major promoters to link the landlocked region to world markets by bypassing Russia with the Baku-Tbilisi-Ceyhan pipelines. EU projects of the Southern Corridor so far have not materialized. Thus, German as well as EU conduct of foreign energy relations very much concentrates on the European Economic Area with Norway, the Mediterranean region, and Russia. Yet, it failed to create a common Pan-European internationally-binding regime (e.g., comparable with NAFTA). The real test cases are the Mediterranean, the Black Sea, and the Caspian region—and if Germany and the EU can get their energy landscape in order.

Russia is the best case to illustrate Germany's limitation in exercising statecraft in and through energy relations, in particular vis-à-vis big hydrocarbon producers. The integration of Germany in EU energy policies and the effect of EU market regulation resulted in a break of path dependencies: the close commercial ties and corresponding business models no longer exist. As a result, the relationship between Russia and Germany flared with contentious issues on the Russian-EU level (contractual mismatch, OPAL and South Stream exemptions, an anti-trust case against Gazprom, and Russia's WTO suit against the EU) even before the Russian-Ukrainian crisis. A solution to these issues was outside Berlin's realm. This would have required political dialogue in order to hedge the conflicts and find a solution. Yet, this is stalled with the overall deterioration in the Russian-German relationship. In turn, energy relations are increasingly combative, destroying the traditional channel of interest-balancing and rapprochement. With the Crimea annexation in March 2014 and continuing military conflict in eastern Ukraine over the course of 2014 and 2015, the level of import depend-

ency on Russia has become a source of concern. This is a clear paradigm shift, as interdependence is no longer seen as a part of a solution, but defined as a problem.

One observation worth highlighting is that, in German-Russian (and previously German-Soviet) relations, Germany's tools of statecraft were most prevalent in times of corresponding political, economic, and commercial interests. However, this has not resulted, as many hoped, in a harmonization of the legal framework in Russia. Interdependent business relationships cannot be seen as a substitute or an automatic inroad for creating a level playing field and institutionalized reciprocity under an enhanced rule of law. Instead, the relationship was limited to a particularly close corporate alliance. Gazprom internationalized its business in the EU, but this did not promote an area of common rules and norms. The gas markets remained fragmented and characterized by conflicting modes of governance. This reinforces competition over the integration of transit countries in between, because institutional settings determine market power.

The new market design in the EU had an ambivalent outcome for Germany's political and market power. Final approval of the OPAL exemption, for example, has shifted from Berlin to Brussels as a consequence of institutional change. Moreover, competition in trading, distributing, and marketing has increased inside Germany, but the oligopoly of suppliers basically persisted due to the German pipeline-based import structure:<sup>15</sup> Germany's top supplier remains Russia (Gazprom), followed by Norway (mostly Statoil), the Netherlands (mostly Gastera), domestic producers, and other countries. Diversification is taking place only at the margins. Moreover, the EU's market package had an impact on the companies, which are major instruments for supply security. Large exporters like Gazprom are dealing with "unbundled" companies, with much smaller market capitalization and less leverage, representing a shift in relative power if aggregation of market power downstream does not really work. To put it very bluntly: the former backbone of the German gas market, Ruhrgas, merged with E.On, later downgraded to E.On Commodities and Trading, and is now vanishing from E.On's core business because of the announced split

of the company in December 2014.

Given new market conditions and political deterioration, Gazprom is revisiting its downstream engagement in Europe. It has withdrawn from a number of projects (the OPAL exemption, a 100 percent takeover of WINGAS, and South Stream). In that respect, the Russian-Ukrainian crisis is a watershed, as interdependence is viewed through the lens of dependencies creating vulnerabilities to political pressure—even more so in the EU context. This can be explained by the fact that eastern EU member states face high dependencies on Russia, leading to a perception that natural gas supplies have been used as blackmail and even as an integral part of hybrid warfare in Ukraine.<sup>16</sup>

Last but not least, Germany and the EU have agreed on sanctions as part of their statecraft, but these have been thoroughly limited to oil companies (not tackling refinancing of e.g. their refining activities in the European markets) and to Arctic and shale oil exploration. For good reasons, the EU's sanctions are not covering gas production and trade.

Finally, there is a major factor with global implications: Germany is no longer the home country for a large company in the fossil fuel markets. Even more so, as a consequence of the existing structures and a laissez-faire (non-strategic approach to energy issues) of the German government, its major oil and gas companies have merged (into electricity companies) and/or have been unbundled, split, and sold such as Ruhrgas, Veba Öl, or Deminor. With the takeover of RWE DEA by Fridman's Alfa Group, Wintershall will remain the only oil and gas producer, not playing in the league of IOCs. There exist no big companies that have the market capitalization to realize huge infrastructure projects on their own. This also sets Germany apart from the U.S. The fact that Germany lacks an international energy company is a determining factor (and not really discussed in Germany) that plays out vis-à-vis Russia as well as alternative suppliers in the Caspian and Central Asian region, North Africa, and the Middle East.

## German Statecraft and International Governance

The above illustrates why Germany (and the EU) has put so much emphasis on bilateral partnerships and multilateral governance. It is a rational step for a “soft energy power”—without the hardware of hydrocarbon resources and an IOC—to push for energy partnerships (in particular for a sustainable energy transition), know-how, and technology transfer (in particular for renewable and energy efficiency technology). In order to pursue this approach successfully, Germany needs a strong transatlantic partnership.

Historically, international governance such as the OECD and the G7 has developed from joint initiatives with other big consuming countries, i.e., the U.S. and Japan, which were exposed to similar supply and price risks. Beyond the EU neighborhood, international governance has been developed in close cooperation with the U.S.: primary examples are the International Energy Agency (IEA), the Joint Organisations Data Initiative (JODI) of the International Energy Forum (IEF), and the G20. Since the oil crises in the 1970s, transatlantic cooperation on global oil markets has been and still remains close.

One of the major outcomes of the moving geographies is that the trade picture between the EU and the U.S. and among OECD countries changes. Energy availability highly affects the wealth and security of a state. The U.S. is a key player not only as a consumer, but also as a producer and exporter of energy. U.S. exports of natural gas and (crude) oil can be seen as crucial for globalization of natural gas markets. The U.S. net import-export balance has improved significantly, whereas the position of OECD partner countries such as the EU and Japan, as well as China and India, is moving in the opposite direction.

Refocusing the agendas of existing institutions, expanding membership, and providing more coherence are major imperatives. During its G8 presidency in 2007, Germany initiated the Heiligendamm process—later transformed into the Heiligendamm/LAquila process, which kicked-off closer cooperation in energy and climate policies with emerging countries. From an energy perspective, the EU has to seek broad, inclusive, and intensified coop-

eration with the U.S. and its North American neighbors, with Russia, and with new emerging powers in such formats as the IEA association process, G20, and the International Renewables Energy Agency (IRENA), among others. Russia has always been a special (bilateral) partner that stayed outside the regulatory and legal reach of the EU. The deterioration of the West's relationship with Russia over the Ukraine crisis in 2014 has stalled any continental and international governance initiative, such as the IEA's association process with key emerging powers like Brazil, China, India, Indonesia, Mexico, Russia, and South Africa. EU external energy governance with China, India, Brazil, and South Africa is a major component in addressing the global trilemma and moving international energy governance forward. It remains a pressing issue, and should be pushed forward with or without Russia. Certainly, the EU will need a functioning transatlantic tandem to move international energy cooperation forward.

## Conclusions

Germany is a "taker" of developments and prices. It has no big commercial player to pursue a security of supply strategy. Its major energy companies are electricity companies. The attractiveness of the German (and EU) market builds on prices, infrastructure, and demand expectations. Yet, demand is flattening or even decreasing for oil and gas. Germany has relied on companies, markets, and free trade flows and as a result, a strategic approach to energy security has hardly been formulated. It remains to be seen how and whether the EU balances its legally and regulatory based approach internally with a more strategic conduct of foreign energy relations. In any case, there is an inherent tension between markets and statecraft as well as moving competencies between the national and the supranational level.

In this environment, Germany's statecraft is best used in promoting an energy transition, determining best and worst practices in policy formulation, and integrating industrial and technology policy. International governance is important, and transatlantic partners are key. Even within the OECD, positions increasingly diverge: The U.S. is embarking on a completely different trajectory with the fracking revolution. The shale gas and light tight oil revolution has increased

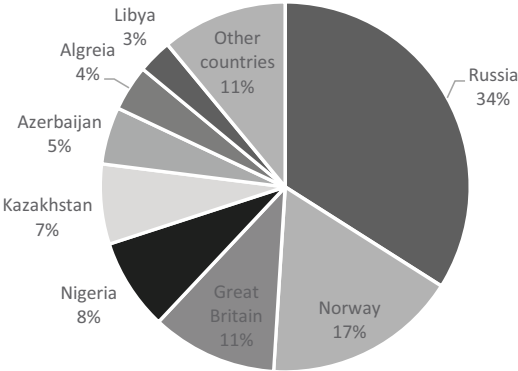
energy security due to increasing self-sufficiency; the U.S. has seen relatively lower energy prices and, with natural gas substituting coal and oil, the U.S.' greenhouse gas emissions have decreased significantly.<sup>17</sup> Across the Atlantic, meanwhile, America's shale revolution and its impact on relative prices and GHG emissions has prompted a debate on competitiveness.

Germany's integration in EU energy markets and the emerging EU external energy policy will be crucial for analyzing German statecraft in energy matters. The success of German actors in shaping this new policy will be decisive for Europe's bilateral and multilateral impact on traditional supply partners.

## Notes

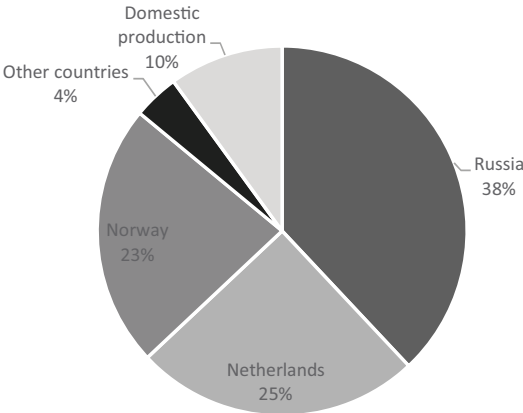
- 1 See in more detail: Sybille Röhrkasten and Kirsten Westphal, "Energy security and the transatlantic dimension: a view from Germany," *Journal of Transatlantic Studies* 10(4) (December 2012), p. 328-342.
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Figure 1: Oil Imports 2014 (January to November)



Source: Federal Office of Economics and Export Control, <[www.bafa.de/bafa/de/energie/mineraloel\\_rohoel/energieinfo\\_rohoel/2014/november.pdf](http://www.bafa.de/bafa/de/energie/mineraloel_rohoel/energieinfo_rohoel/2014/november.pdf)>

Figure 2: Gross Gas Consumption 2014



Source: BMWi, Gesamtausgabe der Energiedaten - Datensammlung des BMWi, Letzte Aktualisierung: November 2014, <[bmwi.de/BMWi/Redaktion/PDF/E/energiestatistiken-grafiken,property=pdf,bereich=bmwi2012,sprache=de,rwb=true.pdf](http://bmwi.de/BMWi/Redaktion/PDF/E/energiestatistiken-grafiken,property=pdf,bereich=bmwi2012,sprache=de,rwb=true.pdf)>.





# ENERGY AND STATECRAFT: AMERICAN DIPLOMACY FOR THE ENERGY REVOLUTION

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## Introduction: America's Energy Outlook is Rooted in History

Part of the American “founding myth” is that to make your fortune, one must “go west, young man” because of the country’s vast resources on an open frontier. These seemingly limitless resources powered the country’s industrial expansion, helped it win two world wars, and helped turn the country into the richest nation on earth—or so the story goes. And there is truth to it: on the eve of U.S. entrance into World War II in 1940, American oil fields produced 63 percent of the world’s oil.<sup>1</sup>

This endowment has proved to be a curse as well as a blessing. Of the world’s major economies, the United States ranks near the bottom in terms of energy efficiency.<sup>2</sup> Furthermore, it created a consumer dependence in the postwar years on low oil prices that drove cars, trucks, and the rest of the economy to guzzle ever more petroleum.

To understand American foreign policy and statecraft regarding energy, one has to first understand the longstanding history of abundance, and then pair that with the trauma to policymakers when it became apparent that the infinite resources actually had a limit.

That trauma was instigated four decades ago, with the 1973 OPEC oil embargo in which global oil prices shot up, price controls were enacted, and Americans were forced to wait in gas lines. As the narrative of astounding natural abundance abruptly changed, the American public and their elected representatives were rudely awakened to their vulnerability.

Today, the narrative is changing again. The United

States is in the midst of an energy revolution. The country is producing more oil than it has in almost thirty years. The country has gone from a position where it was expected to need to import significant amounts of natural gas to where it holds more than a century of gas reserves and is completing plans and infrastructure to export significant quantities of gas. This revolution is not just about fossil fuels, though: installation of solar and wind power for electricity is growing at an almost exponential rate, and new standards for efficiency mean that the country can do more with less energy.

The energy revolution is altering America’s geopolitical outlook. Around the world, foreign crises have elements of energy diplomacy in them, from the Ukraine crisis, to disputes over territory in the South China Sea, and even the disputes over Iran’s nuclear program, among others. Some policymakers have argued for the U.S. to use energy as a “weapon,” while others argue for the country to husband its resources for domestic use only.

This essay argues that the role of energy in America’s international relations has echoes of both the days of abundance and the days of shortage. For that reason, American actions and policies can sometimes seem contradictory. However, as a global trading power with the naval power to ensure open sea lanes, the U.S. bias is always toward free and open markets. The United States is unique among the world’s great powers in that it is both one of the world’s largest producers of energy and one of the world’s largest consumers. That means that how energy affects American foreign policy is very different than its allies in Europe or Asia, whether Germany, Japan, France, Singapore, or others. American energy statecraft has often been used to support these allies and to

buttress their energy security (sometimes even when they have not asked for it), but that does not mean that American and allied interests always converge. As a general rule, American interests will converge with allies when they favor free and open markets, but when allies seek preferential treatment or work with monopoly producers, then their interests will diverge.

The remainder of this essay will first discuss how American policies have evolved since the 1970s, and how that has affected American national security and foreign policy. It will then discuss how the American bias toward free markets has evolved. Finally, it will offer several case studies for how energy plays into American foreign policy.

#### A NOTE ABOUT AMERICAN PERCEPTIONS OF ENERGY SECURITY

Because of the bounty of American energy resources, concerns about energy security by American policymakers and the public are almost exclusively about oil. Unlike most other major economies, the United States is able to produce virtually all of the energy domestically that it uses to produce electricity and to heat and cool its buildings. Vast resources (and the infrastructure to utilize them) of coal, natural gas, hydropower, sun, wind, and nuclear power ensure that domestically-produced energy can meet the country's needs. It is only in transportation—with its 94 percent dependence on oil—that American consumers are vulnerable to global swings in prices and to concerns about security and availability. This vulnerability in oil has driven domestic energy policy, national security policy, and foreign policy for four decades since the trauma of the OPEC crisis.

#### Energy Policy Stuck in the 1970s

To understand U.S. statecraft on energy security, it helps to begin with the response to the OPEC embargo. It is from this crisis that much of American policy on energy stems.

The OPEC crisis was a true economic crisis for the United States, just as it was for American allies in Europe and Asia. As major oil consumers, all of the developed economies were harmed by the steep oil price increases brought about by the OPEC

embargo. It initiated the era of “stagflation” in which inflation was paired with mass unemployment. The economic crisis was paired with vast upheavals in both foreign and domestic policy as well. The Watergate scandal, breaking at the time of the embargo, would bring down a president and forever alter the public's trust in government; the withdrawal from Vietnam would humble the country's foreign policy for a decade and leave scars that last through today. When paired with the oil crisis, it seemed that the country no longer controlled its own destiny. In his 1974 State of the Union address, President Richard Nixon exhorted the country: “By the year 1980, the United States will not be dependent on any other country for the energy we need to provide our jobs, to heat our homes, and to keep our transportation moving.”<sup>3</sup> Even though the ensuing years proved that statement to be misguided and virtually impossible to achieve, in the four decades since that statement, every presidential administration has identified some version of “energy independence” as a central goal. The elusive goal of “energy independence” has animated both American foreign and domestic policy, even if such a goal is neither desirable nor possible in today's globalized world.

#### Reforms Have Ensured American Energy Security

Today, the United States is one of the most energy-secure large countries in the world, by almost any measure.<sup>4</sup> Importantly, “energy security” does not mean “energy independence” in the sense that all of the energy used in the United States comes from within its borders without international trade. In addition, energy security does not depend on the percentage of supply that is imported. In a world of globally traded commodities, it is no longer possible to be truly energy independent: even domestically produced energy sources are subject to fluctuations in global commodity markets.

In any realistic view, the United States no longer faces traditional “energy security” threats that are existential: the country is not at war with a nation that could stop our access to global markets, nor is there any potential adversary who could possibly take such an action. Since the oil price crises of the 1970s, the risk of absolute oil supply shortages has been reduced

significantly. The creation of the International Energy Agency (IEA) and its requirement that all member countries hold oil stocks capable of replacing ninety days' worth of imports acts as a buffer against disruptions in oil supplies. The Strategic Petroleum Reserve acts as a strategic buffer against threats and manipulation by energy-producing states that would seek to affect American policy.

It is not accurate to say that the U.S. relies on any single country for any percentage of oil imports—because those percentages change daily. Instead, the U.S. relies on markets to provide the oil the economy needs. As the world's pre-eminent maritime power, one of the prime missions of the U.S. Navy is to assure freedom of the seas—ensuring that global markets are allowed to function. This policy of favoring markets over preferred access to certain countries, regions, or companies is a unique aspect of American foreign and economic policy.

Deep and liquid markets for energy allow price signals to give warnings of impending supply and demand imbalances. Today, then, for the United States, energy security concerns are no longer about physical disruptions in supply. These concerns instead stem from a fear of price increases causing undue harm to economic growth. Finally, as the world faces an unanticipated fall in oil prices, we know that concerns about energy security will once again fall down the political priority list.

The reforms instituted in the 1970s gave the United States and other developed countries real energy security, in the sense that they assured access to energy in a global marketplace. The Strategic Petroleum Reserve, and others like it around the world, provide a shield against possible market manipulation by adversarial energy producers. The IEA provides the world's policymakers and energy professionals with a much deeper level of knowledge about energy production and global prices than was available in the early 1970s. Finally, global trading markets allow for a true global price of oil—seen on newscasts every night—that allows market participants to see potential shortages and problems before they occur. Global energy markets are very different today than they were in the early 1970s.

## Oil Dependence Drew America into the Middle East

Even though the United States may not actually be threatened by an energy shortage, for many years, policymakers and the public have come to believe that their security is under threat from oil dependence. Even though good policy reforms have largely solved the country's energy security problems (combined with the luck of living in a country endowed with vast resources), American policymakers came to believe that they must protect the sources of oil with American power. This militarized solution to what is essentially a domestic problem has had long-lasting repercussions on America's relationship with the Middle East.

Once policymakers felt that American dependence on imported oil was a threat, and that access to oil could determine the economic future of the United States, it was inevitable that the U.S. military would be drawn into protecting the oil. The foreign policy response to these developments was the creation of the "Carter Doctrine." In response to Soviet aggression in Afghanistan and threats toward the Middle East, President Jimmy Carter pronounced the doctrine in his 1980 State of the Union address, stating that "an attempt by any outside force to gain control of the Persian Gulf region will be regarded as an assault on the vital interests of the United States. And such an assault will be repelled by any means necessary, including military force."<sup>5</sup> The clear reason for this strategic interest in the Persian Gulf was oil stability. This was the first formal commitment of U.S. military power to the Middle East.

To enforce this doctrine and to counter an increasingly belligerent Iranian Revolutionary state, the Carter administration created the Rapid Deployment Joint Task Force. Its mission was to deter Soviet invasion or influence, discourage conflict among regional states, and protect the flow of Persian Gulf oil to the United States and its allies. The Task Force would be reorganized by the Reagan administration into U.S. Central Command, the military command that exists today overseeing operations across the Middle East and Central Asia.

Although the U.S. would not fight a war in the Persian Gulf for another eleven years after President Carter made his guarantee, the military was swiftly drawn into local conflicts: during the Iran-Iraq War, the U.S. Navy escorted oil shipments in convoys through the Persian Gulf in the so-called “Tanker War.” Notably, thirty-seven sailors were killed aboard the U.S.S. Stark when it was attacked by an Iraqi Air Force plane (even though it can be argued that American policy in this period tilted toward Iraq over Iran). From there (to vastly oversimplify): the 1990 Iraqi invasion of Kuwait led to President George H.W. Bush’s security guarantee for Saudi Arabia, the victory over Iraq in Desert Storm, the implementation of a no-fly zone over Iraq, the permanent presence of American troops in Saudi Arabia, extremist reaction against that American presence, the attacks of 9/11, the 2003 invasion of Iraq and the instability and insurgency that followed, the American military surge then withdrawal, the Arab Spring, ISIS, and American military re-engagement in Iraq.

All the while, the American Fifth Fleet based in Bahrain has been guaranteeing oil shipments through the straits of Hormuz—a mission that a 2009 RAND report estimated to cost between \$86 billion and \$104 billion per year.<sup>6</sup> From what started as a relatively small “Rapid Reaction Force” intended to keep the Soviets from meddling with the flow of oil out of the Persian Gulf, American military engagement in the Middle East has turned into a massive and continuing part of American foreign policy.

The original sin of American military involvement in the Middle East was the understanding that the U.S. no longer controlled its ability to provide its citizens with a stable, secure source of petroleum. This awareness led to a series of military engagements that continue to this day—and have a momentum all of their own. Today, even as the American energy outlook has changed dramatically, the U.S. will remain hopelessly entwined in Middle East security for the foreseeable future. Oil once drove the U.S. to the Middle East. Now, it seems, nothing can pull the U.S. out.

### The American Energy Revolution Has Now Changed Everything—And Nothing

Today, more than thirty years past Nixon’s deadline,

the United States may actually be on a course to meet that elusive goal of energy independence. Although American oil imports will never completely go away, and in a global marketplace, no country can ever be truly “independent,” America is much more in control of its energy future than it has been for at least fifty years.

The U.S. is seeing an unprecedented boom in oil and gas production, as the impacts of the technologies and expertise around hydraulic fracturing and horizontal drilling have expanded America’s accessible resources. The shale gas boom means that the U.S. now has more than a century of gas reserves. Similar technology opened up new shale oil fields in places like the Bakken field in North Dakota and Eagle Ford in Texas. Since January of 2011, U.S. crude oil production has increased from 5.5 million barrels of oil per day (mbd) to over 9 mbd in October 2014 (the most recent date for which numbers are available).<sup>7</sup> See Figure 1 on page 25.

Put together, the combination of rapid growth in renewable sources of energy, a boom in production of oil and gas, and increasingly greater efficiency is a real American energy revolution. The implications are mostly positive: the U.S. is poised to become a major exporter of natural gas over the next decade—while less than a decade ago, energy companies were building natural gas import facilities. Low costs for electricity and natural gas are driving a “manufacturing renaissance” that is seeing a massive “re-shoring” of industrial production. Greenhouse gas emissions have dropped since their peak in 2006 due to a combination of greater efficiency, fuel switching from coal to gas for electric power, and the recession. A globalized market for solar photovoltaic production has caused a drop in installed prices of solar panels to less than \$1 per watt. In a time of recession and low job growth, energy has proved to be a valuable tool of economic growth.

Importantly, the American energy revolution was a product of choices about energy made decades ago by politicians and business leaders. Scientists, financiers, and entrepreneurs then sustained their investments in these choices through a variety of market conditions and predictions. Repeatedly, the story for today’s energy revolution starts in the energy crisis of

the 1970s—and while some investments from that time failed, others are bearing fruit today.

### How the American Government Uses Energy in Statecraft

However, policymakers are slow to respond to the revolution—just like the cliché about generals, they are always fighting the last war. American politics is still stuck in the energy battles of the 1970s, with a “Drill, baby, Drill” crowd arguing for expanded access to fossil fuels, while environmental campaigners organize to block any projects that emit greenhouse gasses or intrude on the habitat of any animal. The result of this is a stalemate in which changes to energy and environmental policy can only move forward by going around Congress.

Fortunately, in this case, most foreign policy is made outside of Congress. After the first Quadrennial Diplomacy and Development Review (QDDR) in 2010, Secretary of State Hillary Clinton created a new Bureau for Energy Resources in order to better manage the diplomacy of energy and strategic resources. Under the leadership of first Ambassador Carlos Pascual and now Special Envoy Amos Hochstein, this Bureau has brought energy to the center of many of the State Department’s initiatives.

In the Department of Defense, a growing awareness of both the strategic and tactical risks of dependence on oil—and the growing ability to reduce that dependence—led to the creation of a new office of Operational Energy Plans and Programs under then Assistant Secretary of Defense Sharon Burke, as well as empowering energy officials within each of the military services.

Thanks to these bureaucratic changes and to the attention from high-level policymakers in both the Obama administration and Congress, energy is now at the center of American statecraft. However, it comes in many different forms: this is not simply an issue that is the same around the world. Whether it is initiatives like Power Africa or the Caribbean Energy Security Initiative, the response to crises in Ukraine, or the global effort to address climate change, energy is at the center of American foreign policy. A few case studies will show how it works.

### RUSSIA AND EUROPEAN ENERGY SECURITY

Ever since the Trans-Siberian Pipeline was first proposed in the late 1970s to link Soviet natural gas to Western European markets via Ukraine, American policymakers have warned European leaders about excessive dependence upon Soviet, and then Russian, energy. In the early 1980s, this concern went so far as for the Reagan administration to place an export embargo on supplies for the pipeline and sanctions on Western European companies that helped build it—leading to one of the most difficult transatlantic disagreements of the Cold War.

Throughout the last two administrations, American policy in Europe has been to promote alternative supplies of energy—especially natural gas—to Europe. The predominant method for this has been to promote the building of a pipeline for gas through the “Southern Corridor” through Turkey, which would provide gas from Azerbaijan outside of the Russian pipeline network. In the winters of 2006 and 2009, the project of energy security in natural gas was given a boost by the cutoff of gas through Ukraine over pricing disputes between Russia’s Gazprom and the Ukrainian state energy company. American diplomacy focused on helping European allies find alternative sources and offering support for building an internal natural gas market.

When the crisis in Ukraine began, with the Russian covert invasion and then annexation of Crimea, energy was again at the center of the crisis. For over six months in 2014, no gas flowed from Russia into Ukraine due to a pricing dispute. Fortunately, this dispute happened in the summer, when demand for gas is low, and no one is in danger of freezing to death. American diplomacy accelerated European efforts to provide gas to Eastern European states as a buffer. In addition, the American response to Russia’s aggression in the crisis also put energy at the center, as sanctions were placed on energy firms that were invested in helping Russian firms drill for oil and gas in the Arctic. Meanwhile, the concurrent decline in oil prices has dealt a damaging blow to the Russian economy and the ruble.

## IRAN

The problem of how to prevent Iran from building a nuclear weapon has bedeviled American foreign policy for almost two decades. However, for all the pressure and unilateral sanctions placed on the Iranian government by the Clinton and Bush administrations, it was only in early 2014, after the 2013 election of Hassan Rouhani as president, that Iran agreed to come to the table and negotiate over its nuclear program.

While it is difficult to know the motivations of a government as opaque as Iran's, it is likely that the economic hardship brought on by sanctions was what brought the country to the table. And, unlike the decades of sanctions before, the reason that the sanctions implemented on Iran's oil production starting in 2012 were so successful was their comprehensive, multilateral nature. The governments of the U.S., EU, Japan, the Republic of Korea, Canada, and others agreed to targeted sanctions that would reduce the amount of oil Iran could export. Although it has seldom been stated officially, the reason these countries agreed to take Iran's oil production off the global marketplace is that the surge in oil production from American shale producers could replace the lost Iranian oil in the marketplace. Although not explicit, this is probably the closest that American diplomacy has come to using its newfound energy as a "weapon."

## CARIBBEAN ENERGY SECURITY INITIATIVE

On islands with few resources, virtually all energy must be imported. Because of the lack of scale, costs for infrastructure are often much higher than for mainland, continental states. In the small states of the Caribbean, outside powers have used this vulnerability to their advantage. The best current example of this is the Petrocaribe program, where Venezuela sells fuel oil at reduced costs to Caribbean nations. In some countries, like Jamaica or Haiti, these subsidies amount to around 4 percent of GDP.<sup>8</sup> One of the hallmarks of Hugo Chavez's presidency, this agreement has essentially brought accession to Venezuela's preferred policies in the region.

However, there are alternatives to a dirty dependence on subsidized petroleum imports—the two resources the islands have in abundance are sun and wind, making renewable energy attractive even without subsidies. The American revolution in natural gas could provide an alternative source through imports of Liquefied Natural Gas (LNG) or in fuels like propane and other liquefied petroleum (LP) gases. In the longer run, the domestic renewable resources of the islands could provide more than enough power for their energy needs. Recognizing that the upfront costs in infrastructure and technology, as well as governance issues, have held back progress, Vice President Joe Biden and the State Department have initiated a new Caribbean Energy Security Initiative that directly engages with the governments and stakeholders on each island in order to help facilitate solutions to the problems each faces. While the initiative is in its infancy, this shows a model for how the U.S. can directly engage with countries in the future.

## PROSPECTS FOR FOSSIL FUEL EXPORTS

The American Energy Revolution could provide the United States with a new tool of geopolitics, if the government chooses to allow it: natural gas exports. Unlike oil, the market for natural gas is not truly global. Rather, natural gas is priced differently in different parts of the world. This is due to the nature of natural gas—it is not easily transportable.

This means that there are geopolitical opportunities presented by allowing LNG exports to move forward. Permitting new LNG export capacity in the United States will provide more liquidity to the global LNG market, provide alternative sources of energy for our allies, and accelerate the trend away from the oil-linked pricing system in Asia and Europe. LNG export capacity will undermine the ability of major energy suppliers to use energy as a political weapon.

LNG exports will help American allies in two key regions—Europe and Asia—by undercutting the political clout of dominant producer states and by expanding the quantity of total energy supplied to allies starved of energy. As of February 2015, the Department of Energy has approved nine LNG export facilities, with a further twenty-nine applications under review.<sup>9</sup> If only the approved are all built, the U.S. will

have a combined export capacity of 12.2 billion cubic feet (bcf) per day, more than the consumption of any single European country (Germany, the largest consumer, averages about 8.6 bcf per day).

In the negotiations for the Transatlantic Trade and Investment Partnership (TTIP), European negotiators have asked for unfettered access to American energy exports. However, the global marketplace seems to indicate that most gas would flow from the U.S. to Asia, where prices have been almost double that of Europe.

Ironically, though, it does not matter if a single molecule of American gas reaches European shores for the geopolitical benefits of American LNG exports to accrue to importers. Because the potential supply of U.S. LNG is so vast, American exports will help create a more liquid marketplace, with deliveries based on supply and demand fundamentals, not based on monopoly rules, political connections, and extorted transit fees. In essence, buying natural gas would become more like buying oil. This would allow America's allies to diversify their energy sources, reduce the burden on their economies, and free themselves from dependence on monopoly providers—countries like Russia.

#### CLIMATE POLICY

Ever since the negotiations leading up to the Kyoto Protocol in the 1990s, climate change was seen as a separate part of diplomacy. It was seldom talked about by the same people who handled energy, even though they are two sides of the same coin. That is increasingly changing. The 2005 G8 meeting in Gleneagles Scotland prioritized action on global warming, and was the first multilateral statement validating that humans were responsible for warming.

Today, action on climate change has returned to the international stage: it is a central part of the agenda of every major international meeting. Over the coming decades, one of the measures of a country's "soft power" is likely to be how it is perceived to be acting on climate change.

Developments in late 2014 provide an example of how climate policy is becoming a mainstream part of

diplomacy along with energy. The United States and China came to an agreement about emissions at the 2014 APEC Summit in Beijing that will commit China to peaking its emissions before 2030. Later in that same week, at the G20 meeting in Brisbane, Australia, the U.S. and other nations came together to pledge over \$10 billion to a new Green Climate Fund that will help developing nations adapt to climate change and move to low-carbon, sustainable development. Put together, these developments show how addressing climate change has become a key part of diplomatic engagement.

In 2015 and for the foreseeable future, the U.S. will be at the center of international diplomacy on climate change. With Germany chairing the June 2015 G7 summit in Schloss Elmau, Chancellor Merkel and President Obama have pledged to work closely on a commitment from the G7 to move toward a global agreement on climate change. Europe and the U.S. have a long history of both collaboration and confrontation in climate diplomacy. For now, renewed American domestic action on climate change means that Europe and the U.S. are moving in the same direction. In November 2015, leaders from around the world will converge on Paris in an attempt to forge a global agreement to effectively address climate change. Success will only follow if the world's major emitters, especially the U.S., Europe, and China, can find common ground to work together.

#### Conclusion: The American Bias is Toward Free Markets

America's energy revolution is also proving to be a revolution in its diplomatic engagement. While discrete decisions like licensing exports of natural gas would help America strategically, this is not really about the energy: it is about American support for free trade. Since the end of World War II, the U.S. has been the world's champion in creating a free global trading system. The U.S. is a beneficiary of the global, open trading system and it is not in its interest to restrict trade or to provide preferential or monopolistic access.

The most important thing energy can do for American diplomacy is to help build an open trading system—with U.S. energy as a part of that system. That means



the U.S. must re-engage with and complete both the Trans-Pacific Partnership (TPP) and the Transatlantic Trade and Investment Partnership (TTIP). Once a trade deal is formalized, U.S. law ensures that natural gas exports are deemed in the “national interest,” allowing access to exports to all parties in these deals.

American support for free markets will inevitably bring it into conflict with monopolistic energy producers like Russia, Venezuela, and the other members of OPEC. However, if these countries embrace the discipline of free and open markets in energy, they can also benefit over the long run.

American policy will sometimes clash with allies like Germany over their relations with monopolistic energy providers. For example, few American policymakers can understand the desire of Germans to build the Nord Stream pipeline to Russia, further deepening the energy relationship with a country that has demonstrated its desire to use energy for geopolitical ends. While Americans have no doubt that Germany can protect its own interests against Russia, they are concerned that such exclusive agreements between the two major powers will allow Russia to cause trouble with more vulnerable neighbors along its borders.

It is not in the U.S. government’s interest to use American energy resources as a “weapon” against any nation. In the long term, U.S. energy resources will provide a significant strategic benefit to the U.S. through American advocacy for a free and open trading system. Such a system will prove to be even more powerful than any energy “weapon” because American energy in a free global market will neuter the weapons that other countries think they have built.

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8 “Cheaper Oil: Winners and Losers,” *The Economist*, 25 October 2014, <<http://www.economist.com/news/international/21627642-america-and-its-friends-benefit-falling-oil-prices-its-most-strident-critics>>.

9 U.S. Department of Energy, “Long Term Applications Received by DOE/FE to Export Domestically Produced LNG from the Lower-48 States,” <<http://energy.gov/sites/prod/files/2015/01/f19/Summary%20of%20LNG%20Export%20Applications.pdf>>.





# THE GLOBAL RESOURCE NEXUS: WATER CHALLENGES AND POLICY CONCLUSIONS

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## Introduction

Resource security issues, despite being around for centuries, are much debated these days. This essay considers the resource nexus, i.e., the interlinkages between the use of various resources. Such interlinkages are manifold, as all resources need others for their production and delivery to final customers. Yet, planning for future production and management often is organized in resource silos. With increasing demand becoming more erratic and uncertain, and supplies being dependent on some producing regions under stress, the nexus amplifies single issues and drives regions toward instability and conflicts. Our proposition is that these nexus issues raise new security challenges in different realms, be it for supply chain security and markets, or be it for interstate conflicts, or for public services and human security on the ground. Scholars and analysts thus should pay attention and search for solutions that engage with actors in those different realms.

Grappling with the resource nexus is easier said than done. Some interlinkages are relatively well known and not yet fully conveyed into action, such as the water demand for energy production or the water – energy – food nexus for biofuels. Predominantly, however, the future demand by the multitude of users is not taken into account and will become aggravated by stress multipliers resulting from weather extremes, climate change, and a number of socio-economic factors.

Three factors make these resource nexus uncertainties relevant for a geopolitical perspective: first, global drivers exert considerable pressures on fragile local management structures and reduce the resilience of long-standing mechanisms. Second, the interconnectivity of global flows allows local turbulences to

spread farther and faster, with greater risks of impacts on other resources and outbreaks in other regions. Third, powerful countries are affected and may not adhere to principles of a liberal order that have long characterized international relations.

This essay describes the resource nexus in more depth in the next section, explaining the scope and relevance for international business leaders and policymakers. The paper will analyze water, its interlinkages with other resources, and the multitude of services derived from water, in subsequent steps. It will address potential socio-economic impacts resulting from water stress, the human security angle, transboundary river management issues, and the potential threats to international shipping lanes.

Written as a discussion paper, our aim is to stimulate a debate. Recognizing the potential for a “perfect storm,”<sup>1</sup> a confluence and mutual exacerbation of challenges in these areas in the next few decades, the contribution also underlines potential opportunities by addressing common challenges across sectors and across the realms of markets, interstate relations, and the people on the ground. Developing a step-by-step strategy of grasping some opportunities while establishing capacities to deal with risks and unleash further action is probably the wider aim of our approach.

## The Resource Nexus

The simple meaning of what we are calling the resource nexus should be readily apparent: understanding the interconnections between demand for, production of, and use of multiple natural resources simultaneously. That these interlinkages exist may seem painfully obvious. Mesopotamian agriculturalists

five thousand years ago knew about the ties between water, fertilizer, land, and energy, and they certainly knew that the interplay among different inputs would determine whether there was enough food in their pots at the end of a growing season. They also understood that weather, population growth, conflict, and political decisions were additional variables to consider, and they did not just throw their hands up in the air and hope for the best, but rather planned, adapted, and on occasion took up arms. The Stele of the Vultures, the earliest known monument to a battle, commemorates a battle over the fertile, irrigated land that lay between the city-states of Girsu and Umma in what is now southern Iraq.<sup>2</sup> Much more recently, the ability to cope with such interconnections is part of the wider debate about “planetary boundaries” where earth scientists give a warning that some of such limits might be transgressed and, *inter alia*, feature the resources nitrogen, phosphorus, and freshwater.<sup>3</sup>

In spite of the intuitive importance of thinking across the artificial boundaries between different categories of resources, the structures of governments, corporations, and the globalized economy more broadly are not set up to acknowledge, much less make productive interventions in, the resource nexus. Moreover, policymakers and business leaders are effectively discouraged from thinking about the unintended consequences of the use or production of one resource on another.

Take, for example, recent trends in car sales. In January 2015, automakers sold 1.5 million new vehicles in the United States, 14 percent more than in the previous January.<sup>4</sup> Of those, more than half were trucks and sport utility vehicles (which saw nearly 20 percent higher sales than the year before), suggesting that low gasoline prices coupled with a strong economy are making gas guzzlers attractive again after years of pallid sales (see Figure 1 on page 41). No serious observer of energy markets views the precipitous drop in the price of oil since summer 2014 as a trend that will continue—and most see the price stabilizing and rising over the next few years. American consumers, though, like consumers elsewhere, typically do not consult the International Energy Agency (IEA) forecasts when thinking about what car to buy; rather, they make decisions based on

needs, wants, and short-term price signals. Governments and businesses, though, also treat oil as if it exists in its own silo, fundamentally distinct from water, food, minerals, and materials.

This is where we are not well positioned to understand how such developments cascade beyond just the increased demand for petroleum that more SUVs on the road should create. One might expect cheap oil to cause the markets for biofuels in the U.S., European Union (EU), Brazil, and elsewhere are likely to perform below expectations, with resulting downward pressures on the prices for corn, soybeans, palm oil, and sugarcane, and less new land being converted to grow biofuel crops. However, policy interventions such as the U.S. Renewable Fuel Standard (RFS) mean that ethanol and biodiesel will still need to be produced in large quantities, at least in the U.S. But outside the U.S. and Europe, cheap oil in some cases is already depressing food prices, making farmers less likely to plant crops that will be more costly to produce than their selling price. Will this cause a Chinese investor to decide against purchasing and deforesting a plot of land in Indonesia to plant oil palm trees? As Ford makes more F-150s and Porsche more Cayennes to meet demand, they will be consuming more steel, aluminum, rubber, polyester, leather, and a host of chemical elements, all of which require in various quantities water, energy, and land to produce. The automakers and producers of mined materials will use more water. The increased demand for cheap oil, brought on in part by more people driving longer distances in their new SUVs, will have its own impacts on supplies and prices, as well as on the environment and the use of other resources. In varying degrees, each of these micro-events has implications for the climate and for security as well. These are explored below.

The fact of the matter is that we do not understand the resource nexus very well. Governments and individuals tend to compartmentalize such issues because their interrelationships are too complicated to capture, too difficult to model, and too challenging to address. Yet if the transatlantic community is going to play a constructive role amid the profound changes in the global economy, population, and consumption habits, and in light of the profound threats to livelihoods and security posed by climate change, better under-

standing the resource nexus will be of utmost importance.

A number of academics, policymakers, and others have in recent years taken up the theme of the resource nexus, but yet there is little consensus as to what precisely is meant by the idea. Early conceptualizations from the policy community and think tanks came out of the 2011 Bonn Nexus Conference,<sup>5</sup> by papers from the Dutch environmental assessment agency,<sup>6</sup> the Transatlantic Academy,<sup>7</sup> the European Union's development report,<sup>8</sup> and Chatham House.<sup>9</sup> Most of these reports foreground the ties among water, food, and energy. A number of academic studies examined various aspects of the resource nexus as well,<sup>10</sup> including specific facets such as water and electricity,<sup>11</sup> land,<sup>12</sup> and geographically specific cases in South Asia<sup>13</sup> and the Middle East and North Africa.<sup>14</sup> In several instances, government organizations have included resource nexus analysis in their planning, such as the United Nations Economic and Social Commission for Asia and the Pacific<sup>15</sup> and the U.S. National Intelligence Council, which identified the food, water, and energy nexus as one of four "megatrends" in its most recent quadrennial "Global Trends" report.<sup>16</sup>

Figure 2 (page 41) shows the many ways in which key resources interact. Some nexus issues may be more obvious than others, such as the connection between food and water suggests. Others have become more pressing recently, such as the water inputs needed for energy production. The implication for decision-making is that all activities that are intended to manage a specific resource shall have knowledge about the estimated inputs needed from other resources.

If these ideas are gaining some traction in academic and policy communities, it is nevertheless important to ask whether this is simply a re-branding of what we have known for a very long time. In other words, what is new? Earlier accounts focused attention on physical scarcity of natural resources: that unregulated population growth and consumption meant that we would literally run out of the stuff ("limits to growth"). Current analysis treats physical scarcity as a second or third order problem ("planetary boundaries," see above). The cases of fossil fuels and minerals are

illustrative. The problem with oil is likely its abundance rather than its scarcity, as new technologies have opened up new possibilities from tight oil and gas to oil sands. The exceedingly low price of oil currently does not signal that oil is inexhaustible—of course eventually on present course we will have burned most of it by some point in the future—but rather that there is likely very little incentive to make changes necessary to avoid the alarming impacts related to climate changes<sup>17</sup> that will accompany releasing all of that carbon into the atmosphere. Minerals such as rare earths and iron ore are fairly abundant as well. The issue with scarcity is not so much physical scarcity (with the notable exception of water in particular geographic contexts) but rather the scarcities created by governments, poorly functioning markets, environmental change, and geopolitical upheavals. It is probably one of the strengths of the nexus approach that these governance and security ramifications are actively addressed rather than implicitly suggested.

In addition, there have been tectonic shifts<sup>18</sup> in the global economy, political geography, and the environment that require us to re-visit nearly all assumptions about resources. Humans are a formidable geophysical force, causing the global climate to warm, putting more nitrogen into the earth's system than the earth does on its own each year,<sup>19</sup> likely causing tectonic activity with oil and gas extraction<sup>20</sup> and dam building.<sup>21</sup> Further highlighting the law of unintended consequences, carbon capture and storage schemes—injecting carbon dioxide into underground reservoirs to help mitigate climate change—if put into place may cause more earthquakes,<sup>22</sup> potentially harming not only lives and property but also re-releasing the CO<sub>2</sub>. Humans have also drastically altered the earth's biodiversity. In light of anthropogenic changes to the environment, some scientists have waved goodbye to the Holocene and pronounced a new geological epoch, the Anthropocene.<sup>23</sup> As the U.S. Department of Defense and many others have argued, climate change itself is a "threat multiplier."<sup>24</sup> The long and the short of it is that these changes to the natural environment, and policy responses to them, will also impact natural resource production and consumption on a variety of levels.

The shift in the center of gravity of the global economy will also continue to impact natural resources. The arrival of China on the stage of global economic powerhouses is by now a truism, but it is only one of the key trends shaping the twenty-first century.<sup>25</sup> Global trade has expanded from \$5.5 trillion in 1998 to \$16 trillion in 2012. The physical volume of stuff traded has increased by 250 percent over the last thirty years; 10 billion tons of goods are now traded, many of them moving vast distances by ship, rail, and truck.<sup>26</sup> Robust economic growth in various corners of the globe has also fed into and led to American and European consumption habits being copied elsewhere. Governance institutions and supply chains—not to mention the natural environment—are being stretched to cope with the desire of billions of earth's residents converging on consumption ideals that seek not only a chicken in every pot, but a car in every garage and a television in every room. The evidence is striking:<sup>27</sup>

■ Since 2008, non-OECD countries have consumed more energy on an annual basis than the OECD. If everyone in the world burned fossil fuels as Americans do, CO2 emissions would increase by 400 percent.

■ There are more people in the world now classified as overweight (1.4 billion) than undernourished (842 million), and the shift to meat-heavy diets means ever more land, water, and energy are required. One-third of food produced in the world goes to waste.

■ Global water use over the past century has grown twice as fast as the population.

■ Humans extract 50 percent more natural resources than they did thirty years ago, and now pull the equivalent to 41,000 Empire State Buildings by weight out of the ground each year.

Of course, not everyone has seen or will see benefits from this unbalanced growth, so that yawning global inequality also impacts the resource nexus in numerous ways.

There are also geopolitical shifts that make the current situation different. The rising power of China, Russia's regional hegemonic posturing, and America's shifting

focus to the Pacific carry with them important consequences for natural resources. These are important and well documented, from China's investments in Africa and naval maneuvers in the South China Sea and Indian Ocean, to Russia in Ukraine, and U.S. base building in the Philippines. But this just scratches the surface of the political re-ordering that is occurring globally and regionally. There are ninety democracies in the world today, but the beginning of a transition to democracy does not guarantee accountability of leaders, functioning state institutions, inclusion of marginalized communities, civil tranquility, etc. Indeed, the order of the day in far too many places is violence and migration, which are but two of the possible scenarios that usually have clear ties to resource issues. The headlines are filled with cases: North Africa, Syria, South Sudan, Bangladesh, and elsewhere.

The resource nexus offers a fresh look at these inter-linkages and an analytical tool for dealing with both the metrics of key technology developments and the diverse security and governance ramifications. To illustrate this approach in light of the theme of the papers in this AICGS project, we now turn to the issue of water.

## Water-Related Challenges

### ENVIRONMENTAL AND ECONOMIC DIMENSIONS

Water is fundamental for human life and well-being. While access to clean drinking water is a key UN Millennium Development Goal and considered a human right, the current provision is unsatisfactory for some 750 million people lacking such access, and for the 2.5 billion people without access to improved sanitation.

The challenges of supplying 7 billion people with clean and safe water, with a further 1 billion expected by 2030, are likely to increase. Just 1 percent of the world's total supply of water is freshwater, with a high proportion being badly managed, spoiled, and polluted. Looking ahead, the growing middle class, ongoing urbanization, and the risks of climate change are all adding to the pressure.

Environmental research highlights the "planetary

boundary” of transgressing the safe operating space for using freshwater.<sup>28</sup> Such freshwater flows and use occur at the largest sub-global level in the major river basins around the world, transforming the local and regional challenges into international and global ones. While rivers, lakes, reservoirs, and renewable groundwater stores replenish a stream of “blue water” to overall availability, wide-spread eutrophication from agricultural fertilizers and land-use changes perturb supply especially at a regional scale. Accordingly, research seeks to estimate a maximum monthly withdrawal as a percentage of mean monthly rivers flows<sup>29</sup> (which may change over the course of a year) that’s being transgressed in some areas worldwide, indeed with a lot of economic and security ramifications.

Environmental research also underlines water supply as an essential service that can be derived from ecosystems, if those are properly managed. Indeed, the estimate for the value of total global ecosystem services in 2011 is \$125 trillion/year with losses over the last few years in the order of approximately 10 - 15 percent and more deterioration going on.<sup>30</sup> While such monetary values may be contested for a number of methodological and other reasons, the important point to stress is that water is more than a constituent to all those ecosystems (open ocean, coastal zones, forests, grasslands, wetlands, lakes and rivers, desert, tundra, ice, cropland, and urban ecosystems): the supply of water is dependent on the ability of ecosystems to perform both their regulatory and provisioning functions as part of the wider natural capital that underpins all economic activities.<sup>31</sup>

A resource nexus view may be helpful to deal with the complexities of environmental change, water, and supply issues. It is often placed centrally in the nexus debate and is strongly interrelated with energy and food, but also quite relevant for the use of minerals and land. The interesting angle from a nexus perspective is the intersection with drivers for demand, security of supply, governance, and innovation.

Analyzing the water challenges as part of a nexus approach, therefore, are likely to allow better decision-making for cooperation across sectors, along value chains, and for transboundary management structures. That is also been the main message from

the 2014 Bonn conference on the resource nexus.<sup>32</sup>

More recently, business has become worried about future access to water. Acknowledging the water dependencies of many industrial processes and electricity generation, the water disclosure report<sup>33</sup> can be seen as a wake-up call. Conducted on behalf of 573 investors with assets of \$60 trillion, it states that 68 percent of responding companies say water is a substantial risk to their businesses. The perceived risk is not just a short-term one: the data indicate that business is more worried about long-term water stress rather than responding to short-term droughts. In contrast, the response strategy of water productivity and its implications for production and innovation is not yet high on the priorities of strategic management. (See Figure 3 on page 42.)

Wide-ranging efforts and investments will be needed to improve water productivity, from stemming leaks to making better use of recycled water on to collaborating with users about overcoming wasteful consumption of water. Are the utilities prepared to meet such challenges? Are their regulatory agencies and customers willing to accept a need for higher investments and, most likely, higher downstream costs for using water? A 2012 survey conducted on behalf of The Economist Intelligence Unit reports that most utilities will increase their investments but are faced with a number of barriers and risks.<sup>34</sup> Most important will be changes in the behavior of regulation, customers and consumers, and effective strategies to cope with the risks of pollution and impacts of changing weather patterns. Again, the nexus perspective kicks-in here as a way of looking at water in a more integrated manner and organize demand management.

In a wider perspective research underpins the importance of water for economic growth and human development. It’s a common misunderstanding to assess the importance of resources according to their relative share in GDP (such as the share of the water sector), which evidently would suggest a low relevance. In contrast, it should be quite clear that water (as is the case with other resources) affects the economic performance of downstream manufacturing sectors, services, and private consumption. A recent OECD paper looks at market distortions and



concludes that water shortages can have a devastating impact—particularly in the near term and at a local scale, with power outages, retirement of irrigated crop land, and unemployment.<sup>35</sup> If societies are unable to manage water much more sustainably, this could become a significant drag on the economy.

Looking at affected countries and regions such as India, China, the MENA region, and many others (including the southwestern U.S. and southern Europe), the strategic implication is that relevant hubs of the world economy are at risk. Water stress will most certainly correlate with food stress in many regions, and is likely to have an impact on electricity generation, manufacturing, and extraction activities. This article will analyze the implications for energy, transboundary river management, and international shipping lanes in subsequent sections below.

Climate change is increasingly seen as a stress multiplier. If current trends continue, the world would warm by 4°C by the end of this century, i.e., twice as much as the commonly agreed 2°C target suggests. Drawing upon IPCC findings, a recent report<sup>36</sup> names the regions that are likely to experience a decline in precipitation of 20-50 percent and others with severe flooding risks, all contributing to enhanced global food security issues and risks of poverty, displacement, and migration as well as for economic assets. The agriculture-water-food security are probably most obvious in North Africa and the Middle East,<sup>37</sup> a region strongly dependent on virtual water imports (i.e., water embedded in the trade of agricultural commodities), but also in Central and South Asia where irrigation-based agriculture and groundwater pumping are common practices.

We conclude here in line with a previous paper<sup>38</sup> that water-nexus related conflicts are likely to increase and may escalate in a number of countries, many of which are relevant for the global supply of strategic materials or essential as suppliers of key product components. The critical variables go beyond a stove-pipe approach of water management and require a wider analysis of how water is used as an input for other purposes and how societies cope with the challenges of security and adaptive governance.

## ACCESS TO WATER

Access to fresh water is considered a fundamental human right by the United Nations. This normative ideal hits up against the challenges of how to provision huge and growing urban populations with water, especially as climate change alters the availability equation in unpredictable ways.

There are now around 600 cities in the world with a population of over 750,000. By 2050, there will be more city dwellers than the entire world population of 2004. Population growth and the dramatic concentration of people in urban areas pose a set of nexus-related challenges, especially surrounding access to clean, fresh water. Most urban population growth is occurring in the poorest parts of the planet, and in places where local water supplies are insufficient to meet demand. Urban and industrial use of water is projected to double by 2050.<sup>39</sup> Poor people, meanwhile, pay more for the water they use than the rich: the slum dwellers of Kibera in Nairobi, Kenya, who rely on private vendors for their water, pay up to seven times more per liter of water than a North American, and fifty times more than their richer neighbors in Nairobi.<sup>40</sup> While the percentage of people living in slums decreased over the last decade, the actual number of slum dwellers increased over the same period because cities are growing so rapidly.

This is a multi-layered challenge, then, for policymakers: one is infrastructural, in investing in supplies, laying the pipes, building pump stations and treatment facilities. But another more daunting challenge is political, in securing access to water supplies located in many instances long distances away from the city itself, in other political jurisdictions.

Water transfers, the process by which water is physically moved across basin boundaries from source to consumer, are nothing new. In the early twentieth century, Los Angeles tapped into Owens Valley water (runoff from the Sierra Nevada) and the Colorado River, both sources 200+ miles away, in legendary fashion. Chinatown-esque scenarios are bound to set the stage for conflicts in the future as cities dig deeper and build pipes farther afield to meet the water needs of growing populations. Mexico City, one of the largest cities in the world, gets 43 percent of its water

from inter-basin transfers over distances of up to 154 km, and 0.6 percent of the country's electricity production goes toward pumping the water over the mountainous terrain to the Valley of Mexico.<sup>41</sup>

As for the transatlantic community, issues of water provision in lesser developed countries have both humanitarian and security ramifications. Consider this: in 2010, nearly all of the megacities (greater than 10 million population) in the world experienced water shortages of one form or another. As cities continue to grow, their leaders will have no other choice but to seek additional sources of fresh water (or risk social unrest if they are unable to meet local needs). Yet the means at their disposal are limited: additional withdrawals from local sources such as groundwater, rivers, and reservoirs, at some point are no longer possible. Drawing from well outside the cities raises the potential for conflict, especially between cities and the farmers who depend on water as well and who resent outsiders taking "their" water.

How those conflicts are resolved is highly dependent on governance, but it does not take an overly fertile imagination to envision regional flare-ups in which struggles over water act at least as a stressor. Las Vegas, Nevada, is faced with massive shortages of the Colorado River water upon which it depends, and billions are being spent to build a third intake pipe under Lake Mead (the so-called "third straw,"<sup>42</sup> and, in the longer term, to pipe Great Basin groundwater 300 miles from northern Nevada. The latter project has been hugely controversial with Native American and environmental groups and is currently held up in the courts. The potential for armed conflict over water in Nevada is perhaps not great (Cliven Bundy notwithstanding<sup>43</sup>), but water has been the genesis for urban riots in various quarters of the world in recent decades. For example, there are thirteen documented incidents of water violence and conflict in Pakistan since 2001, much of it related to water allocation in rural areas and municipal service delivery.<sup>44</sup> The nexus approach is likely to facilitate thinking about different water users and their needs, thereby helping to establish participatory planning methods able to deliver on the right to water.

## WATER AND ENERGY

Energy and water go hand in hand. Everything from making electricity to refining transportation fuels requires water, while treating and conveying water for human use requires large quantities of energy (about 4 percent of U.S. power generation). Meanwhile, the ways we use water in homes and businesses use an even larger quantity of energy: water heating and clothes washing and drying are responsible for 14 percent of California's electricity consumption and 31 percent of natural gas consumption, for example.<sup>45</sup> Given the changes in the global economy, political geography, and environment described in previous sections, the water-energy nexus will only grow in importance globally as American and European lifestyles are replicated in other parts of the world. These changes will pose policymakers, businesses, and individuals with a host of challenges.

Fossil fuels require water in their production phases, and newer "unconventional" forms of fossil fuel extraction, such as hydraulic fracturing, require even more water than their conventional counterparts. Refining and processing of fuels such as oil, gas, and uranium requires large quantities of water. Much of the coal used in power generation is transported as slurry—ground coal mixed with water—and coal is the largest fuel source for electricity.<sup>46</sup> Meanwhile, emissions controls at power plants use water to extract materials such as sulfur, mercury, and CO<sub>2</sub> from emissions. Biofuels contain massive quantities of "embodied water," when one considers the amount of water needed to grow the biomass and then process it into combustible hydrocarbons. When irrigated corn or soybeans are used to make bioethanol or biodiesel, water use per gallon of fuel exceeds that of the equivalent quantity of refined petroleum by a factor of 1,000 or more.<sup>47</sup> (See Figure 4 on page 42.)

Electricity production is a major user of fresh water. In the U.S., upward of 90 percent of electricity is produced using thermally driven water-cooled energy conversion (thermoelectric power plants),<sup>48</sup> while the remaining power generation comes from hydroelectric dams, solar panels, and wind turbines. Thermoelectric plants use 39 percent of all water withdrawals in the U.S., with only agriculture requiring

a larger percentage.<sup>49</sup> Much of this use is not consumptive, since most of the water used for cooling or turning turbines is not lost to evaporation, but some is, and the water leaves the plant warmer than when it entered. Both thermoelectric and hydroelectric plants require dependable access to water.

As water becomes more precious, the water-energy nexus becomes more apparent. Periods of droughts can lead to blackouts in electricity, or put electricity production at risk. The shutdown of nuclear power plants in France in 2003 may serve as an example. Furthermore, water-stressed regions in the Middle East, Australia, and North America are looking to desalination as a means of ensuring stable supplies of freshwater. Desalination is an extremely energy-intensive method to obtain freshwater, and the saltier the water, the more energy-intensive it is. In California, there are seventeen desalination plants in the planning stage, with the largest plant in the Western Hemisphere under construction at Carlsbad near San Diego.<sup>50</sup> California's recent drought has led farmers to intensify their groundwater withdrawals in the Central Valley, so that water-intensive high value crops such as almonds can continue to be harvested, while coastal communities attempt to speed progress toward desalination as a silver bullet to deal with growing demand amid constrained supplies. In April 2015, Governor Jerry Brown announced mandatory 25 percent cuts to municipal water providers but spared farmers, who account for 80 percent of the state's water use.

In the Persian Gulf region, several countries have embarked on plans to construct nuclear power plants. The UAE signed contracts with a South Korean consortium to build four reactors by 2020, with a total capacity of 5.6 gigawatts.<sup>51</sup> The original feasibility study for developing nuclear power capacity in the Gulf cited desalination as a major need for the additional energy capacity need.

Like California, much of Brazil has faced an epic drought last year, its worst in eighty years. Despite being the country with the largest volume of freshwater in the world—12 percent of the global total—the geography of Brazil has most of the population in the south and most of the fresh water in the north, while high inter- and intra-annual variability of rainfall

make planning for water shortages challenging. Shortages and extreme heat have affected many of the country's key commodities, including coffee, sugar, soy, and beef.<sup>52</sup> There are numerous ripple effects of drought on energy production in Brazil. Reservoirs in southeastern Brazil (close to the major population centers of Rio and Sao Paulo) produce most of the country's hydroelectric power, which accounts for two-thirds of electricity generation. Dramatically low water levels could lead to electricity rationing in the country if conditions do not improve, and a massive blackout in January 2015 may be a harbinger of future challenges. The causes of the drought are undoubtedly complex, but deforestation is emerging in the scientific community as a major culprit. Amazonia's forests churn huge quantities of water vapor into the air, described as "flying rivers," which then circulate elsewhere in South America providing a moisture source for otherwise dry areas.<sup>53</sup> So the sinister nexus scenario is thus: deforesting the Amazon to advance an agricultural frontier so that farmers may grow soybeans and sugar, much of which goes toward Brazil's massive and growing appetite for beef and biofuels, may in fact be cutting off the water that supplies not only the megacities of South America with water, but also much of the electricity fueling its economic growth. One can easily see how social unrest would result from drought-induced brownouts.

In short, water and energy are thoroughly integrated, yet they are not treated as such by policies and markets. Water efficiency measures are de facto energy saving measures, and the waste of either of these resources constitutes waste of the other. The resource nexus suggests that accounting for the interlinkages across these resources, and numerous others, would have benefits in a variety of realms, bolstering human security and national security while also making markets more efficient and making a dent in anthropogenic climate change.<sup>54</sup>

#### TRANSBOUNDARY RIVER MANAGEMENT

In 2012, the National Intelligence Council released a study that began with the following sobering statement: "We assess that during the next 10 years, water problems will contribute to instability in states important to U.S. national security interests. Water short-

ages, poor water quality, and floods by themselves are unlikely to result in state failure. However, water problems—when combined with poverty, social tensions, environmental degradation, ineffectual leadership, and weak political institutions—contribute to social disruptions that can result in state failure.”<sup>55</sup>

The report paid particular attention to transboundary rivers, and concluded that water in shared basins was likely to become more politicized as demand increases and climate change alters its availability. It further said that transboundary water was likely to be used by terrorists to further their causes in coming years.

Indeed, although there are legion examples of cooperation between states that share transboundary water resources, such as rivers and lakes, the centrality of water to life, transportation, energy generation, and agriculture, also provides ample tinder for conflict as well. Hydropolitics are central to the resource nexus. The strength of institutions designed to manage water resources across boundaries, meanwhile, varies widely across geographic contexts, as do vulnerability and resilience to changes that occur naturally or artificially that affect water resources.<sup>56</sup> A host of factors impact transboundary rivers and a population’s ability to utilize the resource, from upstream dam building, to pollution, to drought and floods (and the management of drought and flood). Some changes occur rapidly, others over long time spans. While certain ripple effects of changes can easily be predicted, others are incredibly difficult to model and predict. Because transboundary rivers involve state security and sovereignty, incentives to cooperate and negotiate are too often trumped by political gamesmanship and hubris.

Positive examples of transboundary cooperation on issues of water management include several from the transatlantic community. The Columbia River Treaty, for example, has governed relations between the U.S. and Canada over the Columbia since the 1950s, and has generally been viewed as a positive example of collaborative management of transboundary water, although it is worth noting that after 2024 the treaty may be renegotiated or terminated by either side.<sup>57</sup> The European Union requires every member state to work with neighboring states on managing water

resources through its Water Framework Directive, and the history of managing the European river of the Danube also dates back to times of the Cold War. Both examples highlight the role that institutions play in successfully managing competing demands and interests and avoiding conflict, which is not to say that in either North America or the EU that conflict over water is out of the question.

Several additional cases outside transatlantic space serve to highlight transboundary water issues and how the resource nexus can help shed light on them.

The Nile Basin covers 3.2 million square kilometers, spanning 35 degrees of latitude and eleven countries. The river is the basis for Egypt’s economy and population, but most of its flow originates in upstream states, especially Ethiopia, where an estimated 82-95 percent of the water comes from in the form of runoff from the highlands to Nile tributaries.<sup>58</sup> There are tremendous growing pressures on the Nile’s water resources and on the institutions that currently govern the river. Population is growing in the basin, its waters are increasingly being viewed by Ethiopia and Sudan as an engine of economic development in the form of hydro power, and climate change is impairing water availability in the basin. The Nile Waters Agreement of 1959, which currently governs the river’s water allocations, only has Sudan and Egypt as signatories, and other upstream countries view it skeptically and have pursued their own instruments to govern the river.<sup>59</sup>

Enter Ethiopia and its ambitious Grand Renaissance Dam. Ethiopia is a largely agrarian country that nevertheless has seen double digit growth rates recently.<sup>60</sup> The dam is being built on the main stream of the Blue Nile near the country’s border with Sudan, and its 6,000 MW of generating capacity is part of the government’s plan to lift much of the population out of poverty by 2025. Egypt has voiced numerous concerns about the dam’s possible impacts on flows in the Nile, and some, including former Prime Minister Mohamed Morsi, have used bellicose language toward Ethiopia. What is clear is that the new dam will have not only impacts on the flow downstream upon which Egyptian agriculture depends, but also impacts on electricity generation at existing Nile dams in Sudan and Egypt.

South and Southeast Asia present further, even more complex, cases of the resource nexus and hydropolitics.<sup>61</sup> China's downstream states, basically all of the countries in mainland South and Southeast Asia, depend on rivers rising in China and are worried about China's massive dam construction and the impact this will have on both the quantity and quality of water flowing through their territories. The major rivers of these regions all originate on the Tibetan Plateau, and climate change threatens source waters because of glacier melt. More immediately, perhaps, the spate of dam building on the Mekong poses a serious challenge to downstream populations that depend on fisheries, dependable flow patterns, and silt and nutrients to sustain agriculture. While the Mekong River Commission (MRC) is a reasonably successful multilateral institution governing the river basin, China—which of course manages the headwaters and three provinces of the country through which the river flows—only participates in the MRC as a “dialogue partner.” China's seven megadams and twenty further planned dams are a source of serious downstream concern, but even downstream states are planning or constructing an additional eleven hydro dams.<sup>62</sup> A bevy of research suggests that the dam building will have negative impacts on food security—fisheries and agriculture—in Southeast Asia. Plus, the plans require energy and materials for their construction and will have impacts on regional ecosystems. Looking at water and energy issues as well as at other resource interlinkages in a more integrated manner, the nexus approach is likely to enhance risk analysis and facilitate the deliberation for solutions in transboundary river management across scales.

#### WATERWAYS, INTERNATIONAL TRADE, AND MARITIME SECURITY

There is yet another dimension related to water and the resource nexus that should be of interest: the world's oceans and the many waterways used for shipping and international trade.

Again, this is not entirely new. Dating back to the Bible, mankind always has had a strong religious and symbolic notion of oceans. The ancient Romans called “Mare Nostrum” what is today the Mediterranean Sea, considering it a homeland for

their citizens. What's relevant today is the amount of goods traded on international shipping lanes and the erosion of an international order that was established after World War II.

Some 80 percent of all goods traded internationally use international shipping lanes according to UNCTAD data. Oil, coal, iron ore, bauxite and other aluminum pre-products, phosphate, and a few other commodities make up for roughly one-third of international maritime trade measured by tonnage, with staple goods, mass goods, and containers contributing other significant shares. The share of containers is rising constantly due to international supply chains, and one may also expect a rise in liquefied natural gas (LNG).

The environmental importance of the oceans is increasingly recognized.<sup>63</sup> Research shows that being used as sinks for waste—including chemical hazardous substances such as persistent organic pollutants (POPs), radioactive waste, and plastics—gives alarming signals about acidification, warming, and the pollution of oceans. The waste water dimension is especially important from a nexus perspective, as nutrients flowing into the oceans cannot easily be recovered and contribute to lower yields in fishery and other parts of the food chains. No surprise that the estimations about the world's natural capital give oceans and coastal ecosystems highest values.<sup>64</sup>

There are high the expectations about using the oceans and the seabeds as a future source for extraction of energy and materials. Existing processes feature sand and gravel extraction used for many construction purposes, but also diamonds, pearls, salt, manganese, and gas hydrates. Future seabed mining is seen as lucrative because the quantity of minerals occupying the ocean floor is potentially large. The EU is fascinated about a future “blue growth,”<sup>65</sup> while companies with illustrative names such as “Nautilus Minerals Inc.” have started activities all over the world.

Besides environmental concerns about potentially negative impacts and safety and health issues, there are also severe maritime security ramifications that need to be considered.

The rise of China to exploit the “string of pearls,” a colloquial term for Chinese-funded ports and related infrastructure along the Indian and Pacific Oceans, becomes more and more visible. It stretches from small islands such as the Kingdom of Tonga in the South Pacific on to the Indian Ocean and the European port of Piraeus. One may expect raw material partnerships to arise that give China a preferred exploration right or access to seabeds located in the 200 mile zones of those areas.

Gunboat diplomacy continues in the Chinese Seas. The Chinese claims on “their” South and East China Seas are antagonizing the neighbors in Japan, the Philippines, and Vietnam. The now more nationalist government in Japan has started to develop a tough position. With historians such as Herfried Muenkler reminding us that the Great War emerged out of a similar constellation in Europe in 1914,<sup>66</sup> one should clearly be worried about what potentially could escalate into a serious confrontation. Access to the manifold resources is clearly one of the driving forces in this conflict. (See Figure 5 on page 43.)

What also adds to the picture are asymmetric threats such as piracy and maritime terrorism along essential choke points of international shipping.<sup>67</sup> Piracy in and around the Strait of Malacca has been on the rise recently, despite accounts of ongoing stringent measures by the concerned littorals. The situation off the West African Gulf of Guinea is also serious. Piracy off Somalia has been another example of the maritime consequences of instability and lawlessness on land, albeit the situation there has become slightly better since 2011. With volatile adjoining regions, one may expect more “professional” types of piracy with more engagements of terrorists and international organized crime using ungovernable spaces as territory.

We have called this a “redux of the resource curse”<sup>68</sup>: triggered by the emergence of a food and/or water crisis—whatever the causes may be—local and national governance mechanisms are vulnerable and may not be able to cope with such a shock. If people start rioting for access to water and food and if the existing institutional resilience is low, fragile states and regions will be put at risk of further instability, where the mechanisms of piracy, fundamentalism, secessionism, terrorism, and organized crime might

escalate. Any such escalation may then lead to interruptions of supply chains for essential materials and have international repercussions.

To a certain extent, shipping is immune to security risks because if one area of the ocean becomes unsafe then ships will re-route. For example, if Suez becomes impassible, then it would be possible for more ships to go around Africa. In the present market there may even be enough spare capacity for this to happen with only a minimal impact on freight rates. Industry now uses Automatic Identification System (AIS), which enables the positioning of vessels as they move around the globe. The other way that the industry has dealt with piracy is just to treat it as an insurance cost—plenty of operators who are still actively trading with, for example, East Africa charge a higher price and buy back the ship with ransom money if it is captured. There is also a rise in the use of privately contracted armed security personnel (PCASP). That’s not to say that there are not strategic sea lanes; clearly a conflict that blocks the Straits of Hormuz and Malacca would be enormously disruptive to world oil supply and other value chains.

The International Maritime Organization (IMO) is actively dealing with those issues. They host a registry of piracy incidents and security arrangements. For the Strait of Malacca, for instance, it shows 148 allegedly committed attacks, 40 attempted attacks, and further 405 incidents without a geographical position system. There are amendments to the 1974 Safety of Life at Sea Convention (SOLAS), the most far-reaching of which enshrined the International Ship and Port Facility Security Code (ISPS Code), which contains detailed security-related requirements for governments, port authorities, and shipping companies in a mandatory section (Part A), together with a series of guidelines about how to meet these requirements in a second, non-mandatory section (Part B). Regional cooperation among states has an important role to play, too, as evident through the Regional Cooperation Agreement on Combating Piracy and Armed Robbery against ships in Asia (RECAAP) and the Djibouti Code of Conduct. In addition, there is an unprecedented international mobilization of maritime security coalition between the EU naval forces of Operation Atalanta, plus two U.S. and NATO task forces, along with ships from other countries (China,

Japan, South Korea, and Russia).

A main root cause for piracy, however, is the poverty and lack of livelihood along major coastlines that motivates people to join criminal gangs. It is here where the resource nexus might become a key abatement strategy: securing a better management for water, energy, and food in rural areas is probably the best strategy to minimize the risks of piracy and environmental degradation. It is here where the action emerging for a sustainable energy for all, a right to water, a responsible supply chain management, low carbon shipping, and eco-innovations shall converge.

## Conclusions

The resource nexus raises a number of challenges for international security. It deepens existing conflicts and leads to new ones.

Quite often, water is at the heart of such dynamic instabilities. The provision of water is essential for energy production and a number of industrial processes, for human life, and for the provision of ecosystems services that are essential for food production. The resource nexus helps to understand which resources depend on a well-functioning water provision, what risks may emerge in case of disturbances, and what opportunities may arise from crossing the silos of water, energy, and others. If societies are unable to manage water much more sustainably, this could become a significant drag on the economy.

The security implications are manifold. Water has been the genesis for urban riots in various quarters of the world in recent decades, with nexus ramifications amplifying outbreaks of fundamentalism, piracy, terrorism, threats for supply chain security and homeland security, and international conflicts.

Probably most important is to understand the resource nexus as a preventive tool to understand such interlinkages and translate them into action on the ground where business, citizens, and policy coalitions have a role to play to minimize risks and turn them into opportunities for sustainable resource management. The transatlantic policy toolbox should be widened to include resource efficiency, supply chain security, and greening international trade.

## Notes

\* We wish to thank Tristan Smith, Tim Boersma, and Steve Szabo for helpful comments and remarks on a draft version of this paper.

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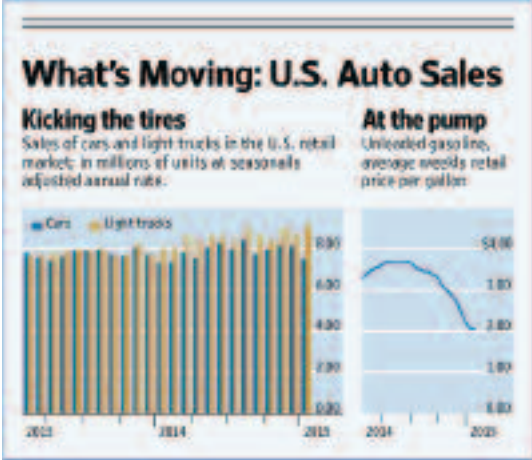
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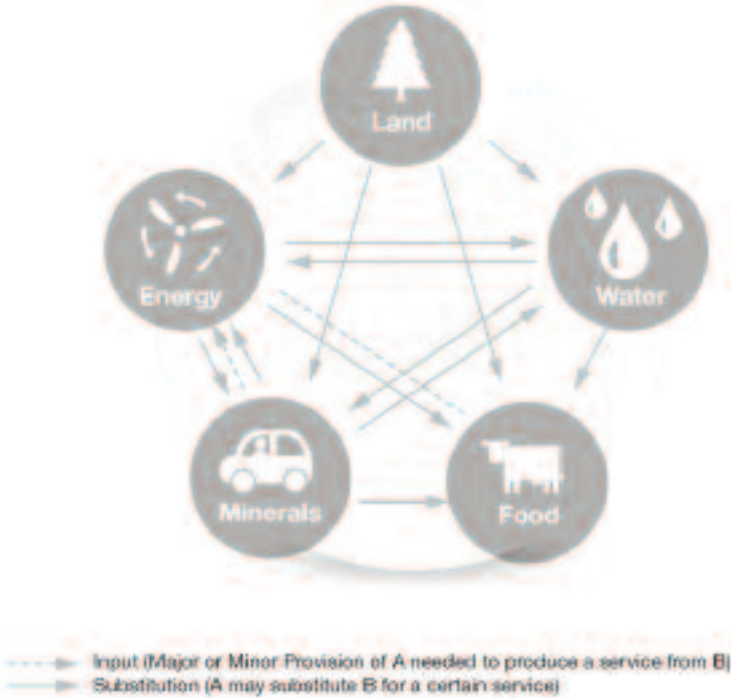
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Figure 1: U.S. Auto Sales and Gas Prices



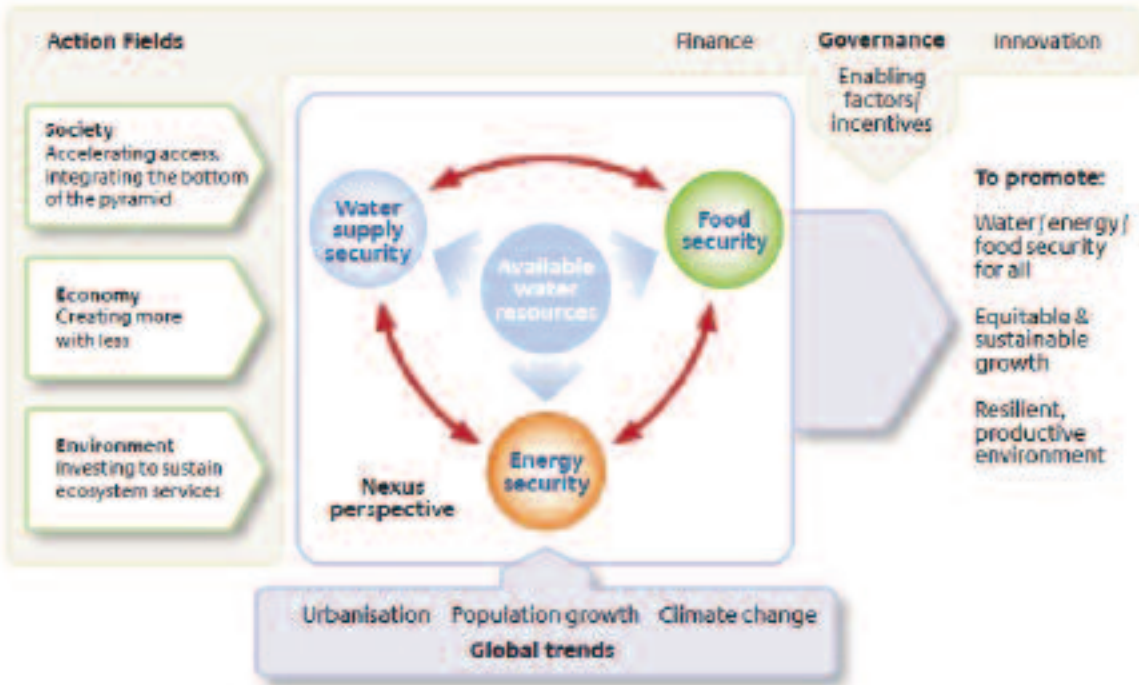
Source: Wall Street Journal, [http://online.wsj.com/mdc/public/page/2\\_3022-autosales.html](http://online.wsj.com/mdc/public/page/2_3022-autosales.html)

Figure 2: The Resource Nexus



Source: P. Andrews-Speed et al., *Want, waste or war?: the global resource nexus and the struggle for land, energy, food, water and minerals* (London, New York: Routledge, 2015): 9.

Figure 3: The Water, Energy, and Security Nexus



Source: H. Hoff, "Understanding the Nexus (Background paper for Bonn 2011 Conference: The Water, Energy and Food Security Nexus)," Stockholm Environment Institute (Stockholm, 2011).

Figure 4: Water and Energy Nexus

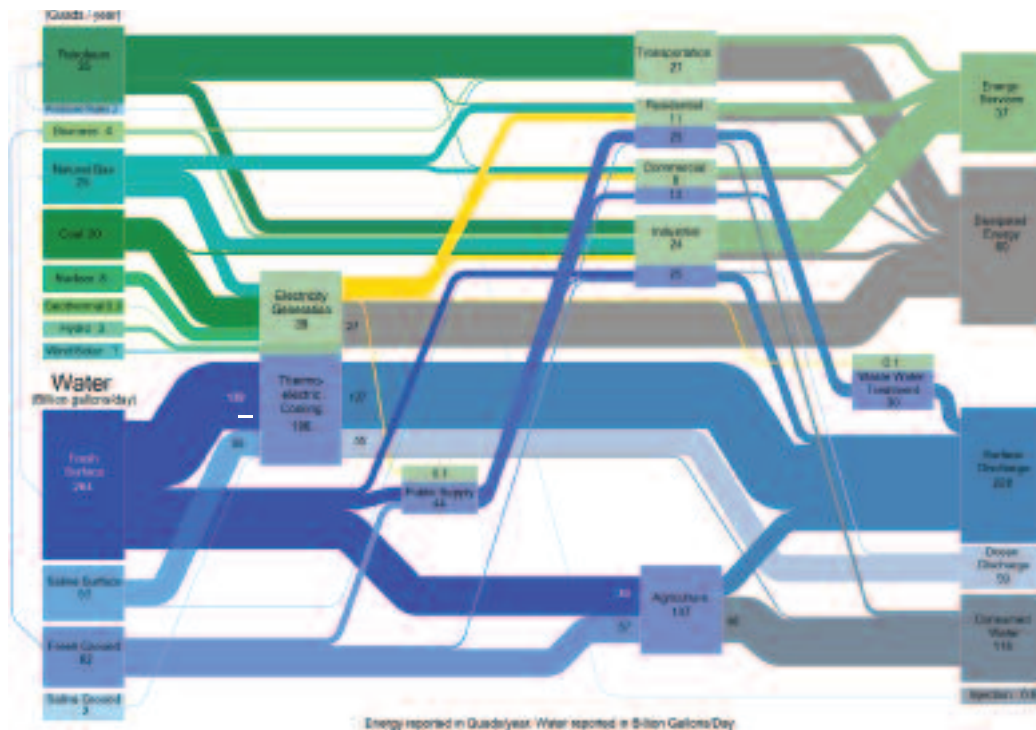


Figure 5: China Seas



Source: P. Andrews-Speed et al., *Want, waste or war?: the global resource nexus and the struggle for land, energy, food, water and minerals* (London, New York: Routledge, 2015).



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