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China's Resource Drive into the South China Sea

Andrew S. Erickson and Austin M. Strange

China's consistently high economic growth in the postreform era has been accompanied by burgeoning energy demands that make Beijing increasingly dependent on external energy sources. As a result, Beijing increasingly looks beyond its (land) borders for energy resources and must balance energy-related economic interests with geopolitical factors to an unprecedented degree. Oil and gas account for less than half of China's aggregate energy consumption, and sovereignty and energy transit issues in the South China Sea (SCS) far outweigh the significance of potential oil and natural gas resources there. Nonetheless, China's approach to and development of the latter offers an instructive lens for observing the interplay of economic and geostrategic forces. It is precisely the considerable uncertainty as to the nature and scope of energy resources in this area that make it a compelling geostrategic case: the SCS offers an opportunity for analyzing how China's pursuit of new energy sources fits within its larger energy security equation and how Beijing balances economic and geostrategic concerns in the twenty-first century. Like many states in regions such as the SCS, China's quest for energy security is part of a larger calculus that involves other dimensions of Chinese national interests. While China and other nation-states would benefit from pragmatic, mutually beneficial solutions to energy needs amid a backdrop of complicated, persistent geopolitical security challenges, Beijing's recent actions suggest that it is increasingly taking a more unilateral, coercive approach.

Introduction: Beijing's Energy Security Backdrop

China's consistently high economic growth in the postreform era has been accompanied by growing energy resource demands. As the largest natural resource–consuming and greenhouse gas–emitting nation on Earth, China faces mounting energy needs and must address increasingly complicated

energy security challenges. Such challenges include managing environmental concerns while remaining the world's largest energy consumer, securing new sources of domestic and overseas oil and gas supplies to meet national supply and demand imbalances, and securing new sources of energy outside of China without tarnishing Beijing's image abroad. China's economic, political, and military ascendance in recent years has resulted in greater scrutiny vis-à-vis its internal and external policy behavior; Beijing's energy security policies are thus unfolding in front of highly interested domestic and international audiences. The ramifications of energy policies on Chinese diplomatic and geostrategic interests are relevant from a general foreign policy standpoint.

From the perspective of Chinese leaders, China's twenty-first-century energy security policies are occurring under formidable domestic growing pains, including growing economic and social inequality, waning (though still high) economic growth, and a range of internal political challenges such as restive border regions. Decisionmakers also face a complex international environment in which perceptions of China remain mixed, particularly among its neighbors. From a broad energy perspective, China's consumption and sourcing trends are moving in an unfavorable direction. While various resource discovery and extraction technology breakthroughs are steering developed countries such as the United States, Australia, Japan, and EU members toward higher levels of energy self-sufficiency—and thereby greater energy security—China is becoming more reliant on stable overseas energy supplies.[1]

No state looks favorably on increased dependency on foreign states and companies for its national energy supply. Here, the United States has recently encountered more positive conditions, whereas China is on course to experience challenges similar to those the United States faced in the mid- to late twentieth century. China is particularly wary of volatility in international oil markets and their frequent inability to provide stable supplies at relatively predictable rates. Moreover, reliance on other states for critical energy supplies creates negative diplomatic leverage.[2] After relying on crude oil imports from Middle Eastern and African states—including so-called rogue states—for decades, many Western states, the United States among them, are well versed in energy politics. By contrast, China previously enjoyed relatively low oil import dependency before becoming a net importer in 1993 and is just beginning to experience the challenges of sharper reliance on external oil supply during the twenty-first century.

Another element of this development is greater Chinese dependence on sea lines of communication (SLOCs) security through rising oil and gas import dependency. Like other major energy consumers, China already depends increasingly on importing energy supplies by tanker from sometimes unstable overseas regions, including Southeast Asia, Central Asia, the

Middle East, Africa, and South America. Incidents in which Chinese workers are endangered or harmed abroad continue to challenge Beijing as Chinese state-owned enterprises, especially national oil companies (NOCs), develop outward to exploit such supplies. Other factors, such as the challenge for China's enormous NOCs in securing resources for national energy security while trying to make prudent investments, further complicate energy security policies.[3]

Accelerating energy demand has long concerned Chinese and international observers. Coal has been the linchpin of modern Chinese energy consumption for decades, and continues to serve as the backbone for electricity generation. Oil, on the other hand, is indispensable for China's transportation sector, which has burgeoned as a result of major structural transformations over the previous two decades including feverish private car purchases. Since 2009, China has been the world's largest automobile market.

More broadly, even as overall consumption habits remain relatively conservative on a per capita basis, Chinese consumers are driving demand for conventional fuels such as coal and oil.[4] Although there is a growing consensus that Chinese economic growth is slowing, China's average annual gross domestic product (GDP) growth has been higher than 7.5 percent for twenty-two consecutive years beginning in 1991 and averaged 10.3 percent during the same period (World Bank 2013). In other words, potential declines in future economic growth notwithstanding, much of the growth needed to drive game-changing increases in energy demand have already occurred.

Sobering consequences accompany these macro-level trends. Aggressive burning of fossil fuels has severely damaged China's natural environment and economy, perhaps represented most succinctly by reports in 2013 that the rapidly deteriorating air quality could cause respiratory diseases and other consequences detrimental to the workforce (Chen et al. 2013). Besides the environment, there are striking regional imbalances within China in terms of energy supply and demand. Despite long-standing and intensive efforts to develop oil and gas reserves in northwest China's Tarim basin and Shandong and Heilongjiang Provinces to the east, the domestic oil reserve base appears insufficient to meet more than a minority share of the country's energy needs (Collins 2015).

While the state continues to promote the development of new, cleaner energy sources such as solar, wind, and hydropower, these channels are likely too expensive or otherwise limited to make a revolutionary impact on the midterm structure of Chinese energy consumption. In recent years, shale gas has also received great attention as a partial solution for burgeoning energy demand in China. According to a report published in June 2013 by the US Energy Information Administration (EIA), China has the world's most abundant technically recoverable onshore shale gas resources at over 1,115 tril-

lion cubic feet. Chinese shale gas deposits are primarily spread over seven basins in the southeast and northwest regions (US EIA 2013e). China is aiming to boost shale gas production by approximately 60 percent to 9.7 billion cubic feet per day (bcfd) by 2020; however, rapid commercialization might be challenging for many reasons: China's typically complex geologic structure (faulting, high tectonic stress), location of deposits in often hilly, less-developed terrain with severe water limitations, restricted access to geologic data, and the high costs and rudimentary state of in-country horizontal drilling and fracturing services that characterize China's shale gas industry. Because China's oil demand and extraction has already been documented and analyzed more extensively, and its gas demand and extraction represents a limited but growing area, this chapter focuses disproportionately on the latter.

Collectively these trends represent a decisive test for Chinese energy planners: China must find ways to use energy that supports sustained economic growth while managing the negative by-products of heavy reliance on traditional fuels. Passing this test requires a multipronged approach. For instance, no less-intensive energy sources—including renewables such as hydro, solar, or wind as well as natural and unconventional gases—can be developed on a scale (or cost efficiency) sufficient to shift the balance in China's overall energy portfolio. Growing reliance on external energy supply for economic growth has made Beijing's energy security strategy particularly complex since its economic interests overlap with overseas Chinese human, political, and security interests to an unprecedented degree. Given its economic and geopolitical significance, the SCS offers one possible case for assessing the overlap of these issues.

Following this introduction, the chapter begins by briefly surveying political, economic, and technological trends in Chinese energy security and related fields that are driving an increased demand for offshore oil and particularly natural gas. The prospects for offshore development of these resources in East Asia are then briefly explored. Natural gas development in the SCS provides a case study through which we analyze the broader impact of Chinese energy security on strategic regional energy competition and cooperation. As its role in Asian energy security gradually expands, natural gas and the way neighboring states work with or against each other to obtain it from disputed areas such as the SCS could potentially serve as barometers for larger global themes of strategic cooperation and competition for scarce resources that cross economic, political, and technological dimensions.[5]

That said, we cannot emphasize enough that the most strategically important issues in the SCS are the overlapping sovereignty claims of China and various other states and the maintenance of secure, stable maritime transport. Despite their economic and strategic differences,[6] oil and liquefied natural gas (LNG) are the two energy sources with inherent naval sig-

nificance: to the extent that domestic supplies or overland pipelines are insufficient, they must be transported by sea. Actual energy reserves in the region are relatively limited and remain poorly understood. This case study is provided to explore how larger geopolitical concerns interact with economic issues such as domestic energy needs.

The Economic Significance of Chinese Offshore Oil and Gas Development

Given the challenges outlined in the previous section, China is seeking to elevate offshore oil and natural gas in its energy mix hierarchy, even if these sources remain secondary compared with more traditional ones. Aside from developing its own continental reserves, China seeks to secure previously unavailable supplies of oil and natural gas through imports and offshore development. Because of the undesired risks generated by growing oil import dependency, offshore oil and gas development is of particular interest in the context of Chinese and East Asian energy security. Given its supply of natural gas reserves, the SCS offers a rare window for analyzing the interplay of China's domestic energy needs and geopolitical considerations.

The SCS is of great importance across the dimensions of geopolitics, trade, and energy. Two-thirds of world oil shipments transit the Indian Ocean, with more than 15 million barrels of oil transiting the Strait of Malacca daily in 2014. The Asia Pacific boasts eight of the world's ten busiest container ports; nearly 30 percent of global maritime trade transits the SCS annually, including about 1.2 trillion in shipborne trade bound for US ports. Home to 10 percent of global fisheries production, the SCS is estimated by the EIA to contain up to 11 billion barrels of oil and up to 190 trillion cubic feet of natural gas.[7]

A combination of political, economic, and geographic forces is driving China's demand for offshore natural gas. At roughly double the rate of domestic production growth, Chinese natural gas demand has grown by more than 15 percent every year since 2003. In particular, during 2010, national natural gas demand increased by 22 percent to 107 bcm, making China the fourth largest global gas user behind the United States, Russia, and Iran (Xu 2011). In 2011, China produced 3.6 trillion cubic feet (tcf) of natural gas and consumed roughly 4.6 tcf. From 2010 to 2011 gas imports as a percentage of aggregate national consumption increased from 12 percent to 22 percent (US EIA 2013h).

In 2013, meanwhile, China was the world's largest growth market for energy overall in absolute terms and for natural gas in percentage terms (8.6 percent). The fact that its natural gas imports rose even more rapidly (10.8

percent) reflects increased import dependence (British Petroleum 2014: 4). In 2014, mainland China had 122.2 tcf proven reserves (1.8 percent of the world total); it produced 134.5 bcm, or 121.0 million metric tons oil equivalent (up 7.7 percent from 2013). It consumed 185.5 bcm, or 166.9 million metric tons oil equivalent (up 8.6 percent from 2013) (British Petroleum 2015: 20–25). The fact that gas consumption as a proportion of China's energy mix remains roughly five times under the global average of about 24 percent suggests that there is significant room left for growth (Ma 2014: 168). Damien Ma estimates that "China's dependence on natural gas imports could easily reach 50 percent over the next five to ten years" (2014: 154). BP goes so far as to project that "China will become the world's biggest LNG importer after Japan by 2035" (Almeida 2015). Consequently, Beijing is feeling increasing pressure to develop long-term answers to its energy challenges, and natural gas offers one such answer.

Beijing's policy goals further suggest rationale for increased natural gas imports and consumption. China has repeatedly stated its official commitment to reducing greenhouse gas emissions and has identified natural gas as an important pillar of their twenty-first-century "low-carbon economy." Recent data suggest that residential gas use and industrial power generation will be increasingly vital structural components of Chinese natural gas consumption. Moreover, as demand increases, China's domestic natural gas supply deficit is likely to continue its incremental growth. Consequently, to the extent domestic onshore sources are unable to meet demand, imports or offshore development of natural gas will need to increase to offset this imbalance.

Of course, overall importance of natural gas, particularly to China, must be kept in proper perspective. Natural gas is one of several energy sources perceived by Beijing as significant for energy security, and its role should not be overstated. While natural gas is sometimes viewed as the favored "alternative" fuel at present, it is unclear whether Chinese planners favor it over other hydrocarbons. For example, natural gas represented 5.6 percent of total primary energy supply in China for 2014 (BP 2015: 41), still less than hydroelectric. Despite its significant potential to use more gas, China surprisingly has a "gas glut" at present and is struggling to effectively use the gas to which it currently has access.[8] This glut is driven by a number of factors, including higher domestic conventional production and Central Asian gas and LNG. In addition, the demand simply is not there at current prices. When coal remains so cheap (Rmb 400/ton) relative to other options, it is admittedly difficult to incentivize shifts in behavior, such as converting boilers to gas-powered alternatives, for instance. These factors—plus significant quantities of new renewables, nuclear and hydro plants coming on line—are likely to prolong China's relatively low gas penetration rate. It is indeed possible that China will *never*

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become a highly gas-intensive economy like the United States and Russia.[9] In any case, China will not be ready for gas "prime time" until prices come down considerably relative to other options, and although that may happen over time (with new supplies), it will be a long process.

For the foreseeable future, therefore, the ratio of natural gas use to China's aggregate energy use is and will remain low in comparison with many other large states, as Table 7.1 shows. For example, as of 2010 major energy consumers such as the United States, Japan, India, Russia, and Brazil relied on natural gas to a higher degree than China. In the United States, Japan, South Korea, and Russia, natural gas plays a much more central role in national energy supply than it does in China. Despite its modest role in the nation's persistently coal-centric energy consumption structure, however, China's natural gas supply and demand still offer an interesting demonstration of how energy needs fit into larger geostrategic overlays.

More specifically, the trajectory of China's natural gas development explains why offshore oil and natural gas development in the SCS and other maritime regions is, aside from geopolitical implications, significant for Beijing's energy security future. In the government's energy security calculus, the aforementioned geopolitical and environmental drivers are enhancing the role of natural gas, especially offshore. Even if gains are modest and incremental, the challenging position of growing external dependence means that every potential channel of supply matters to some degree.

Environmental Policy Concerns

Growing concerns about ecological degradation in China have intensified searches for alternative energy sources to coal and oil. Despite retaining one of the world's lowest levels of energy consumption per capita, China infamously became the world's largest emitter of greenhouse gases in 2006 and the largest total energy consumer in 2009 (Swartz and Oster 2010). The

Table 7.1 Percentage Share of Natural Gas in Aggregate Energy Consumption, Selected Countries in 2015

Country	Share of Natural Gas (%) in Total Energy Consumption
Russia	52
United States	31
Japan	22
Germany	20
South Korea	14
India	6
China	5

Source: British Petroleum (2016: 41).

Chinese government has acknowledged the urgent need to improve environmental conditions and lessen China's dependence on coal, especially as air quality in cities deteriorates with high-carbon and high-sulfur fossil fuel burning and as environment-related rural unrest mounts as a result of heavily polluting development projects in inland China. On March 28, 2011, the Ministry of Industry and Information Technology set China's carbon emission and energy intensity reduction targets at 4 percent in 2011 and 18 percent in 2015, relative to 2010 levels. This corresponds with China's broader agenda to reduce the carbon emission intensity per unit of GDP by 40–45 percent by 2020 (*Xinhua*, March 28, 2011). Of course, the merits of natural gas (which is essentially methane) as a clean fossil fuel are highly questionable. Considered a "bridge fuel" by some experts, it emits less than half the CO_2 produced by burning coal, but in some cases natural gas produced through fracking can release excessive amounts of methane into the air, which has a significantly higher impact than CO_2 (Schiffman 2013). Additionally, shale gas extraction through fracking creates formidable risks to regional water quality (Vidic 2013). Natural gas is ultimately a fossil fuel, and its precise implications on the environment are still relatively ambiguous. China's shale geology is very complex; fracking is currently not economically competitive and likely will not be for at least another half decade. Given the dubious cost efficiency and potential detrimental effects of hydrofracking natural gas, the other aforementioned Chinese limitations, and the high greenhouse gas emissions associated with creating synthetic natural gas from China's abundant coal supplies, offshore gas development extracted using other techniques is arguably an option with less uncertainty in terms of unintended environmental consequences.

While "dirtier" than renewable energies such as hydro, solar, and wind power, natural gas is still considered to be relatively environmentally friendly because it emits roughly 40 percent and 30 percent less carbon dioxide than coal and oil, respectively (Natural Gas 2010). Chinese policymakers have taken clear steps to enhance its role in China in the context of mitigating negative environmental effects of energy consumption. The eleventh Five-Year Plan for Energy Development (2006–2010) submitted to the 2006 National People's Congress reaffirmed China's ambition to boost natural gas consumption to 10 percent of total energy use by 2020, a target originally set in the tenth Five-Year Plan (2001–2005) (Higashi 2009). In the twelfth Five-Year Plan, released on January 1, 2013, Beijing expressed plans to make natural gas fulfill 7.5 percent of national energy consumption by 2015 (Ma 2013). Clearly, Beijing has recognized the important if modest role that natural gas can play in alleviating China's heavy reliance on coal, potentially reducing air pollution, and helping satisfy growing demand in its most vibrant regions.

Structural Consumption Trends in China's Gas Market

Although natural gas was historically used for fertilizer production and industrial applications, it is now increasingly used for city gas and power generation.[10] In 2000, urban gas consumption and power generation accounted for only 18 percent and 4 percent of total natural gas use, respectively, according to Goldman Sachs (Goldman Sachs 2011; Duan 2010). These proportions increased to an estimated 43 percent and 12 percent by 2008, the first time that the residential and power sectors accounted for more than half of total gas consumption in China. In 2009, city gas alone represented a greater share of consumption than the industrial sector, which accounted for 26 percent. This trend is not surprising, since the National Development and Reform Commission labeled both sectors as priorities for natural gas use in 2007. Increased penetration into coastal urban areas is a large reason for this shift. Power generation is also an emerging area of application for natural gas in China. In 2006 the total capacity of gas-fired power plants was 15.6 gigawatts (GW) and accounted for just 2.5 percent of China's power generation capacity (Higashi 2009). However, the twelfth Five-Year Plan (2011–2015) called for significant increases in gas-fired power plants. In recent years such plants have been constructed in coastal areas such as Shanghai, Jiangsu, Guangdong, and Zhejiang. These are concrete commitments to growing gas consumption.

Compounding these structural market shifts is the reality that China's demand for natural gas is quickly outpacing domestic production. This is exacerbated by China's pipeline infrastructure, which remains underdeveloped relative to demand growth in the gas-poor East Coast. China became a net natural gas importer in 2007. Import dependence has subsequently increased and is expected to increase substantially further, as unconventional gases such as shale gas and coalbed methane (CBM) remain in relatively early stages of development.

Geological surveys have discovered abundant reserves of CBM and shale gas in China, prompting speculation that China's LNG demand boom might slow as domestic production rises. China began developing its CBM reserves during the 1990s, yet did not begin producing shale gas until 2009. CBM faces considerable obstacles to development in the immediate future. Most CBM resources lie in northern China, yet no pipeline infrastructure existed before 2009. This has led to underconsumption of CBM by regions with relatively high natural gas demand. Moreover, several obstacles are impeding shale gas from becoming a relevant source of energy in China's natural gas mix in the immediate future (Brennan 2013). Chinese shale gas reserves are located deep underground, and some contain high levels of nonhydrocarbon gases, which require additional extraction procedures and

will lead to higher development costs (Beveridge and Lou 2011; Fu 2011). Hydrofracking to facilitate shale gas development can require 100,000 barrels of water, a problem given water shortages in northern China, where most reserves are located. Rugged terrain in these regions raises procurement and transportation costs; reports speculate that shale gas may be extractable by 2023 at the earliest (Beveridge and Lou 2011; Gascoyne and Aik 2011).[11] All these factors underscore LNG's appeal for China.

Geographic Supply Dynamics: Gas Pipelines and LNG Terminals

For now, then, imports and offshore supplies can help bridge the gap between China's natural gas supply and demand. Here it is important to emphasize that gas geopolitics differs from oil geopolitics in ways amenable to Chinese security perceptions. Whereas a dearth of large-volume oil suppliers has drawn Chinese NOCs to unstable frontier markets as part of a "Go Out" policy, a diverse portfolio of potential suppliers—many relatively stable (Qatar, Australia, Turkmenistan, Papua New Guinea)—are willing to sell China gas (Ma 2014: 162).

Another important distinction concerns overland versus overseas supply, both of which China continues to pursue actively. Imported gas enters either inland from the west as pipeline natural gas or from the east in the form of LNG at receiving terminals located in coastal regions. Currently, China imports pipeline natural gas from several nearby nations. In 2014, China imported 31.3 bcm of natural gas by pipeline: 25.5 bcm from Turkmenistan, 3.0 bcm from Myanmar, 2.4 bcm from Uzbekistan, and 0.4 bcm from Kazakhstan (British Petroleum 2015: 28). China National Petroleum Corporation (CNPC), China's largest NOC, has been in negotiations with Russia's Gazprom for over seven years concerning the construction of a Sino-Russian pipeline. In late 2015, their respective executives signed a memorandum of understanding to support research to determine the project's technical and commercial details.[12]

China's domestic pipeline network has expanded rapidly, and some assessments expect China to construct over 300,000 km of additional gas pipelines between 2010 and 2022 to service and distribute overland gas domestic and imported supply (Economides and Xie 2010). Despite this rapid progress, Chinese analysts and policymakers retain concerns about the security of pipelines, including routes being considered under the aegis of Beijing's heralded One Belt, One Road infrastructure development and trade initiative. A senior Chinese government think-tank expert with whom one of the authors spoke in early 2015 emphasized in particular concern by Beijing that the pipeline through Myanmar was vulnerable to

ethnic minority guerrillas. Given the possibility of long-term deterioration in Sino-Russian relations, Chinese planners likely seek to avoid overreliance on pipelines from Russia. Meanwhile, sabotage or terrorism concerns could extend to China's pipeline from Turkmenistan. Clearly, overland pipelines have significant limitations and vulnerabilities. Pipelines are more vulnerable to sabotage and military interdiction than is seaborne shipping, which is very flexible and can be routed around disruptions.

Seaborne imports, by contrast, offer more diverse supply options, with far less risk in many respects, and are virtually always cheaper than overland alternatives thanks to the cost-efficiency of tanker shipping. In 2014, China imported 27.1 bcm of LNG by sea from more than sixteen nations, from a far greater variety of nations than the four pipeline supplier nations listed above. Of this, China imported 9.2 bcm from Qatar; 5.2 bcm from Australia; 4.1 bcm from Malaysia; 3.2 bcm from Indonesia; 1.4 bcm from Yemen; 1.0 bcm from Equatorial Guinea; 0.4 bcm from Papua New Guinea; 0.3 bcm each from Algeria and various European countries; 0.2 bcm each from Trinidad and Tobago, Norway, the Russian Federation, Oman, Angola, Egypt, and Brunei; and 0.1 bcm from South Korea (British Petroleum 2015: 28). LNG imports thus represent a wave of the future for China.

This supply diversification has been facilitated by an uptick in LNG terminal construction in recent years.[13] After China National Offshore Oil Corporation (CNOOC) opened the Guangdong Dapeng terminal in 2006, for instance, the energy giant completed two more terminals in Fujian and Shanghai within three years. CNPC and Sinopec have also entered the market. China currently has more than ten LNG receiving terminals in operation—an impressive feat for a nation that did not consume LNG until 2006, when it opened its first terminal.

Terminal construction in the past decade has likely been facilitated in part by the geographic reality that China's coastal urban areas lack natural gas resources. The majority of domestic reserves are located in western regions and hinterland provinces such as Heilongjiang, Inner Mongolia, Shaanxi, Shanxi, Sichuan, and Xinjiang. Though coastal regions are the primary drivers of natural gas demand, only about 10 percent of China's domestic gas reserves are located along the coast (Ni 2007). Thus, most cities in China's coastal provinces must rely on some form of transported natural gas, either pipeline gas or LNG. Purchasing natural gas via pipelines, as opposed to nearby terminals, is often relatively uneconomical for coastal cities because the gas must be transported long distances to reach end users (Kang and Wang 2009).[14]

Conversely, LNG from China's trading partners arrives directly at coastal terminals. Once regasified, it can be shipped via regional pipeline networks to urban centers along China's eastern seaboard at prices that are

likely to be competitive with pipeline gas from Central Asia and Western China. At the very least, overland transportation distances can be significantly reduced. With lower transport costs from terminals to city end users along the coast, LNG is increasingly attractive to a modest but growing share of coastal Chinese consumers. Furthermore, at less than 1/600 the volume of natural gas in the gaseous state, LNG is also very convenient to store, which is beneficial given seasonal fluctuations in residential gas demand. This is especially advantageous for crowded coastal regions with peak energy use seasons and thus the need to store energy reserves locally.

LNG's modest market capture is not unique to China. Its role in global and regional markets has risen in recent decades. LNG's role in global gas trade has increased considerably throughout the end of the twentieth and beginning of the twenty-first century. While LNG accounted for just 10 percent of all gas traded worldwide in 1975, nearly 30 percent of all internationally traded gas was in the form of LNG by 2010 (Stern 2012: 41). Between 1982 and 2010, Asian imports of LNG accounted for an average of approximately 70 percent of total world imports. In 2010, Asian countries combined to make up 60 percent of global LNG imports (Stern 2012: 41–43). Although maritime gas imports may be more convenient for China's coastal economy for the above-mentioned reasons, offshore gas development holds more attractions. It allows China to avoid the risks of relying on land-based natural gas development outlined above while lowering dependence on other states to provide reliable gas supplies.

All of these facets of China's intricate energy security outlook have motivated Beijing to diversify the sources of its energy supply, albeit incrementally. This is one reason that pursuing energy and security interests in the SCS and other geopolitically volatile regions is important for China. As the following section demonstrates, core strategic issues such as national sovereignty remain paramount. It is thus important to consider the moderate rise of natural gas as a fuel source in China within regional and global contexts. The interplay of energy economics and geostrategic forces can create both opportunities and constraints on China and other states; so far, it is largely China that is enjoying opportunities, and its neighbors that are constrained.

The Geopolitics of Chinese Oil and Gas Development in the SCS

From China's perspective, the SCS demonstrates to some extent the geopolitical value of local hydrocarbons. It is important to note that Chinese oil and gas development in the SCS is only one of many ways Beijing could

develop or obtain new sources of energy, and the energy gains from this region are comparatively modest. Examples of alternatives include working to expand pipeline gas and oil supplies from neighboring states such as Myanmar, Turkmenistan, Kazakhstan, and Russia; developing offshore oil and gas in other regional waters such as the East China, Bohai, and Okhotsk Seas; securing greater import volumes from current LNG suppliers such as Australia, Malaysia, Mozambique, and Qatar; and pursuing higher levels of gas development from primary domestic reserves such as the Tarim basin.[15] The significance of the SCS and China's offshore development therein lies not in the size of energy gains Beijing can secure form the region but in the interplay of pragmatic economic and energy concerns and Beijing's long-term geostrategic interests in Asia.

Beijing's overseas initiatives to secure pipeline gas and seaborne LNG imports are one component of China's push to diversify its energy stocks. From a strategic perspective, these initiatives may be less than ideal because they increase China's reliance on external partners. This logic is by no means unique to China. Beijing is thus understandably interested in finding new sources of natural gas closer to home, including in the maritime regions surrounding China in which it has unresolved sovereignty claims and calls the "Near Seas," which allow Beijing to achieve greater energy diversity and security without increasing dependency on distant trade routes. As this section argues, offshore LNG development in its current emerging state is but a small component of long-standing regional geostrategic complexities; however, it has the potential to create distinct security challenges and opportunities for China and neighboring states as natural gas development here expands in both scale and intensity. China will likely be at the heart of regional gas engagement, since it has the best technology and largest investment capacity among SCS coastal states needed to sustain long-term natural gas development and LNG conversion offshore in the SCS. Because the notion of an East Asian unified gas grid remains a pipe dream for the foreseeable future due to strategic mistrust among regional states,[16] shipborne LNG will likely be a useful channel for distributing offshore gas to consumers.

What is unique to China among SCS coastal states is its overwhelming power and willingness to brandish that power to pressure and coerce its neighbors. China's behavior in the SCS is arguably the strongest example of increased assertiveness in Chinese foreign policy since 2010 (Johnston 2013). Nearly all analysts accept, to varying degrees, the notion that Chinese policies in the SCS have grown bolder in recent years, reflecting the economic and strategic significance Beijing attaches to this region. The SCS thus offers a rare glimpse into how China behaves when "core" political interests intersect with strategic economic opportunity.

Regional Perceptions on Energy Development in the SCS

China is one of several states in the region with escalating energy security concerns. The majority of East and Southeast Asian states are relatively poorly endowed with energy resources and currently have economic systems characterized by high energy intensity and trade dependency (Schofield 2011: 3). States such as the Philippines, Vietnam, and Indonesia are industrializing and otherwise developing their economies from a low baseline, resulting in greater expectations by citizens in these countries for higher standards of living and more modern amenities. The Philippines and Indonesia are now net oil importers, and during 2000–2012 Vietnam experienced a 100 percent oil products demand increase (US EIA 2013i). Similarly, developed Asia Pacific states such as Japan and South Korea are enormously import-dependent with regard to energy and other inputs to their economies. They rely on stable maritime commerce through regional waterways, including those of the SCS. Indeed, IEA figures suggest that Southeast Asian and Chinese demand growth, coupled with maturing production there, are likely to quadruple net oil imports by 2030. If that is indeed the case, imports would account for 74 percent of Southeast Asia's oil demands, compared with 25 percent in 2008.

More broadly, according to the IEA, Asian states collectively accounted for 12 percent of world energy supply in 2010, up from just 5.5 percent in 1973 (IEA 2012c: 8–9). In 2011 Asia produced just 4.2 percent and 9.6 percent of world crude oil and natural gas, respectively, and has consumed over three times the amount of oil it produces throughout much of the twenty-first century (IEA 2012c). In 2009 SCS states relied on imports for nearly 60 percent of their oil consumption. Concerns about sea lane security and other supply security issues are driving forces behind East and Southeast Asian states' desires to secure more domestic oil and gas resources, including in offshore territories (Owen 2011). Brunei became the only East/Southeast Asian crude oil net exporter.

China's Natural Gas Aspirations in the SCS

The SCS has long been viewed as a maritime region fertile with offshore resource stocks. Others have argued that energy, minerals, and fish are the three resources that will most likely affect SCS states' behavior (Rogers 2012: 86–87). Energy stocks in particular have resulted in the region being dubbed hyperbolically as a potential "new Persian Gulf" (Rogers 2012: 88) or, as some People's Liberation Army (PLA) and other Chinese government sources have called it, a "second Persian Gulf."[17] Wu Shicun, director of China's National Institute on South China Sea Studies, states,

> The South China Sea is one of the most important economic assets in the eastern hemisphere. Not only is it the main economic lifeline between the Pacific and the Indian oceans, but its rich natural resources are strategically significant to all surrounding nations. Its underlying reserve of petroleum and natural gas is so enormous that the South China Sea has been dubbed "the second Persian Gulf," drawing the attention of countries beyond its immediate area. (Wu 2014: xv)

The PLA's first English-language volume on strategy goes so far as to state that the SCS possesses "rich oil reserves equivalent to that of [the] Middle East" (Peng and Yao 2005: 441). Two analysts state, "oil and gas reserves could reach 3.5 billion tons [or more than 25 billion barrels of oil equivalent] . . . [and is] extremely important for China's economic development" (Zhang and Zhang 2003: 47).

In terms of their ability to secure East and Southeast Asian economies' growing energy requirements, however, these resources' scale and significance has been exaggerated in several major dimensions, including volume and ease and efficiency of extraction. Although substantial resources exist, Asian economies that would potentially develop more energy resources from the SCS face common energy challenges whose magnitude outweighs potential SCS seabed energy gains, such as burgeoning domestic economies spurred by industrialization and productivity declines in existing onshore energy resources. As Nick Owen argues, secure energy imports are more important to the energy security of China and other states in the region than are SCS energy deposits (Owen 2011: 11–14). This makes the security of the SCS as an energy transit corridor considerably more important than its role as a source of energy supply, for China and other Asian states alike.

To be sure, an important dimension of China's "Going Out" policy is to secure regime legitimacy through sustained economic prosperity. One component of economic growth has been acquiring resources—including energy supplies, raw materials technology, and human capital—outside of China. Energy security is certainly a notable subcomponent of this broad calculus, as all modern economies rely on fuel, electricity, and various forms of power generation to operate and expand.

Thus, energy development in the SCS is not simply a matter of fulfilling energy needs. The highest priority for states in the region, including China, is upholding and consolidating national sovereignty. The second priority is arguably securing stable maritime transportation routes. Diversification of supply makes actually exploiting these energy stocks less pressing than upholding sovereignty and safeguarding transit. For instance, any one of the three pipelines running in parallel from Central Asia (Turkmenistan, Uzbekistan, and Kazakhstan), or two LNG terminals combined, can each bring in roughly as much gas as the SCS and East China Sea fields combined.

If local geology and reserves were as significant as some Chinese sources claim, the private sector would be pushing harder to get in; in fact, most international energy analysts remain deeply skeptical about the size and extractive efficiency of SCS reserves. Rather, security- and other state-connected forces in claimant states (China first among them) tend to hype reserves to generate domestic support for such activities as sovereignty promotion and (para)military presence expansion in the SCS.

Generally, Chinese estimates of potential SCS oil and gas reserves are far more optimistic than those of other governments or Western oil corporations, reflecting the high value China places on sovereignty and SCS energy potential and its NOCs place on controlling local resources. Some Chinese analysts also see SCS energy stocks as a way to lower dependency on stable SLOCs in the Far Seas. China's oil reserve-to-production ratio is 9.9 years, according to BP, and as such SCS production could more than double China's reserves (Owen 2011). Estimates range from 1.6 to 21.3 billion recoverable barrels of oil. As has been noted previously, significant extractable oil and gas in the SCS would shift a portion of China's energy assets from the Middle East and Indian Ocean to areas more accessible by Chinese air and naval military forces. Manifold factors such as political tensions and technological constraints have prevented major transitions from speculation to actual development. In terms of actual discoveries to date, the SCS is yielding considerably more recoverable natural gas than crude oil.

However, it is misleading to equate potentially valuable offshore energy resources with onshore oil and gas deposits. Offshore surveying and extracting know-how and technology is expensive. As one analyst put it, SCS extraction "will depend not only on countries' claims to offshore deposits but also on the technological capacity to access such deposits" (Rogers 2012: 86–87). One regional investment analyst with whom the authors spoke in August 2015 adds, "The oil guys I talk to agree that geologically SCS is exciting but they are skeptical that vast offshore gas pipeline networks a thousand clicks off China's coast would be viable. In other words, a 'pipe dream.' Hong Kong is supplied from a CNOOC offshore gas field but it's only 30 or 40km away." While China possesses the capabilities to produce oil and gas from deepwater reserves, it is equally important to avoid the assumption that technological capability will prompt immediate action. Another common trend is energy diversification. Many Asian states strive to develop energy sectors besides oil as part of their long-term sustainable energy security strategies. Beijing will have to decide the most cost-effective and politically desirable methods for protecting its assets. Thus far, Beijing's calculus is weighted heavily in favor of sovereignty- and security-supporting over money-making per se.

Given burgeoning domestic resource demands and sensitive regional territorial sovereignty disputes, speculation and confusion over the precise quantity and quality of SCS hydrocarbon resources is not surprising. For years, debate persisted among Chinese strategists over how to proceed in the SCS. One end of the mainstream policy debate spectrum held that China, after enduring the "Century of Humiliation" and its various embarrassing naval defeats, should forcefully use its regional maritime superiority to pursue its claims assertively. The other end of the spectrum advocated the prioritization of joint development amid claims disputes; while members of this camp share the ultimate goal of recovering island and maritime claims, they were "more patient and more flexible with regard to means" (Raine 2011: 77). Since about 2009, however, the first school of thought is clearly prevailing. China's official stance regarding SCS disputes is quite clear: Beijing will only work through disputes using bilateral communication and has no desire for multilateral discussion or international arbitration. At the enterprise level, China's record on SCS energy development appears similarly to be hardening. While it previously appeared that Chinese energy companies were interested in development over disputes, Beijing is increasingly using its NOCs to assert China's maritime claims. CNOOC CEO Wang Yilin, for instance, has made a series of statements about how his enterprise is pressured to perform operations that are less profitable than political. In 2012, he publicly declared the degree to which his profits are less important that CNOOC's service as a strategic arm of state sovereignty: "Large-scale deep-water rigs are our mobile national territory and a strategic weapon" (Spegele and Ma 2012).

China's desire to sustain naval and other maritime developments in regions of the SCS, such as near the Spratly Islands, is already well-documented. Moreover, China has bolstered its regional security presence by deploying maritime law enforcement vessels and even state-controlled fishing vessels operated by maritime militia, as well as enhancing its intelligence collection efforts (Erickson and Kennedy 2016). Such activities are further supported by industrial-scale dredging and construction that has yielded well over 3,000 acres of land and transformed rocks and reefs occupied by China—primarily its seven Spratly features—into artificial islands now undergoing fortification (Erickson and Bond 2015).

Shortly after Xi Jinping assumed leadership of China's civil, political, and military governance, Beijing announced that four of China's five separate maritime law enforcement bodies would be consolidated under the State Oceanic Administration into the China Coast Guard (CCG). A broad objective of the reform is to ensure that Beijing can more effectively control and consolidate its paranaval forces' activities to better support national policy. Prior to the CCG's establishment, ships from among its

component forces engaged in multiple coercive activities to strengthen China's energy-related positions in the SCS. According to the US Office of Naval Intelligence, the State Oceanic Administration's China Maritime Surveillance was responsible for "protection of Chinese oil and gas survey ships operating in contested waters and preventing other countries' exploration of similar areas." Specifically, in 2011, China Maritime Surveillance "ships severed the cable towing sensors of a survey ship contracted by PetroVietnam." In 2011 and 2012, Chinese maritime law enforcement ships cut survey cables of Vietnamese seismic survey ships *Viking II* and *Binh Minh 02* (US Navy, Office of Naval Intelligence 2015: 44, 46). Most recently, China's navy, the CCG, and China's maritime militia have coordinated efforts in the May 2–August 15, 2014, Haiyang Shiyou 981 standoff; an event that was specifically initiated and guided by PLA organs (Kennedy and Erickson 2016). Here CNOOC deployed its billion-dollar HYSY/HD-981 oil rig much as the "mobile national territory and a strategic weapon" that Wang Yilin envisioned, moving it into waters roughly 12 nautical miles from Triton Island, disputed with Vietnam, and only 120 nautical miles from Vietnam's coast. There China announced a security radius six times the 500-meter safety zone allowed by the UN Convention on the Law of the Sea. It deployed the maritime forces coercively to maintain an exclusion zone and thus frustrate Vietnamese efforts to prevent it from establishing a fixed position. China used CCG cutters, a fishing trawler, and commercial ships to fend off Vietnamese vessels with water cannons and ramming, while navy ships conducted "overwatch" and PLA fighter and reconnaissance aircraft and helicopters patrolled above. Beijing has thus removed previous "stovepipes" frustrating coordination and made assertive action to promote its claims.

In a dedicated section of its annual report on China security issues titled "Using Hydrocarbon Rig as a Sovereignty Marker," the US Department of Defense (DOD) documents that

> Chinese paramilitary ships frequently resorted to ramming and use of water cannons to deter Vietnamese ships and enforce the security cordons around the rig. In mid-May, anti-Chinese protests over the rig's deployment erupted in Vietnam and resulted in at least two Chinese deaths and more than 100 injured, after which more than 3,000 Chinese nationals were evacuated from Vietnam. China also suspended some plans for bilateral diplomatic exchanges with Vietnam. (US Deparment of Defense 2015b)

The Department of Defense offers the following timeline:

- May 3: China's Maritime Safety Administration announced that HD-981 would conduct drilling operations off the disputed Paracel Islands.

- May 4: China announced the start-date of drilling operations; Vietnamese Foreign Ministry protested China's actions.
- May 3–July 15: Ramming/harassment between Chinese and Vietnamese ships near HD-981.
- May 11–14: Anti-China protests erupt in Vietnam over drill rig; foreign factories are damaged.
- May 17–19: China evacuates citizens from Vietnam after two citizens die in anti-China protests.
- May 26: Vietnamese fishing boat capsized after collision with Chinese fishing boat.
- May 27: China's Ministry of Foreign Affairs reports that HD-981 completed the first phase of exploration and was transitioning to the second phase.
- June 18: Chinese State Councilor Yang Jiechi held talks with Vietnamese officials in Hanoi; first high-level direct official contact since standoff began; no substantive progress over tensions.
- July 15: China announced the completion of HD-981's drilling activities one month earlier than scheduled; departure of rig.[18]

Coming after several years of other Chinese energy-related coercion against its neighbors, the HD-981 oil rig incident suggests the lengths to which Beijing will go to use energy extraction–related activities to shore up its sovereignty claims. To a CNOOC employee who spoke with one of the authors in 2014, Beijing managed the incident as an exercise in sovereignty assertion and pressuring Vietnam, with actual energy extraction activities being minimal and exaggerated in their portrayed substance. He described Chinese reports of normal drilling benchmarks (e.g., "spud down") as being merely a "paper drill" contrived for geopolitical purposes. He likewise emphasized the substantial Chinese maritime forces escort that the rig received. In June 2015, Beijing once again dispatched HD-981 near waters disputed with Vietnam (Panda 2015).

Although SCS hydrocarbons have offered a convenient domestic rationale for actions such as those surrounding the HD-981 oil rig incident, the importance of the SCS for China may lie less in gas and oil than in controlling a maritime bastion large enough to protect its SLOCs and submarines and ultimately to develop greater potential to achieve sea control closer to the Malacca and Hormuz Straits, which really are a bottleneck for hydrocarbon imports. As a regional investment analyst told the authors in 2015, "Whether or not China succeeds is another matter, but I believe they are

much more concerned about protecting their Persian Gulf imports than hoping to discover 'a new Persian Gulf' within its claimed waters. I'll be proven wrong if there are gigantic, unexpected new discoveries—but I'm not holding my breath." Control of the SCS is like an "option" play, the analyst opined—sovereignty and security and politics first, plus a possible additional bonus of resources. How China uses its burgeoning shipbuilding industry to supply its sea forces will telegraph its evolving approach to energy opportunities and security at sea (Erickson 2016).

Conclusion

Massive amounts of energy supplies are transported via the SCS in the form of maritime commerce, a dynamic on which all regional nations rely. For China, too, the SCS is important first and foremost as an energy transit corridor. Against this larger and far more important backdrop, however, offshore energy resources (real or assumed) help support geostrategic behavior by China and its neighbors to support sovereignty claims while providing some energy supplies in the process.

Regardless of its regional supremacy with respect to offshore energy investment capacity, China cannot achieve total self-sufficiency across all energy sectors. This suggests that in some cases Beijing may be favoring mutually beneficial energy security gains, even with some of its largest adversaries, over more unilateral approaches. This rationale for cooperation would appear to apply far less in the context of the SCS, where sensitive overlapping territorial claims currently represent an important geopolitical flashpoint. Here, as in so many other areas, China is sovereignty-focused and coercive in the Near Seas, while potentially more cooperative in its behavior in areas beyond where it lacks sovereignty claims.

Currently natural gas represents a small fraction of Chinese energy use. While this proportion and the weight carried in China's long-term energy security strategy will continue to increase during the twenty-first century, natural gas and specifically LNG will not replace coal and oil as the pillars of China's energy supply. This does not mean, however, that valuable lessons about China's energy development path cannot be learned from studying these alternative sources. Moreover, as this chapter has documented, analysis of coastal China's growing demand for LNG is a lens for examining fundamental issues that China is facing as it is increasingly forced to obtain energy supplies beyond its continental borders. This introduces a complex calculus and may yet yield new areas for cooperation. Unfortunately, in recent years in the SCS, China has been attempting to beggar and coerce its neighbors.

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The views expressed here are solely those of the authors, who thank Gabriel Collins, George Gilboy, Benjamin Purser, an anonymous investment analyst, and several anonymous reviewers for useful inputs.

1. As Yang Yufeng, senior researcher at China's Energy Research Institute (ERI) explains, "The United States already is heading toward energy independence. China is just beginning to work on it. . . . We need to strengthen international cooperation and increase energy sources with more bilateral arrangements" (Snow 2013). There is strong sentiment among Chinese observers that global energy markets are controlled by the United States, which, as the world's lone superpower, can manipulate the market at will to constrain China and other competitors (Herberg and Zweig 2010).

2. For example, the ongoing US shale boom is reducing its dependence on imported energy supplies (Jaffe 2013). Lower reliance helps states in many ways: it mitigates the impact of higher oil prices and reduces the need to sustain a military presence in energy-rich but unstable regions. Conversely, rising import dependency increases a state's vulnerability to shocks that could result from economic, political, or security instability abroad, presumably beyond its control. Greater foreign energy reliance might also produce relative benefits for rivals who would presumably benefit from a greater portion of a state's forces being deployed outside of regions central to its national interests.

3. For example, it is difficult to ascertain precisely the degree of autonomy with which these organizations operate, and the extent to which their overseas operations are tied to state interests and the pursuit of corporate profits. As Bo Kong of the University of Oklahoma puts it, "The global expansion of these Chinese NOCs will be like a symphony without conductor" (Kong 2010: 158–159). Moreover, increased international exposure ineluctably subjects China and its NOCs to greater risks, such as legal penalties incurred as a result of operating in relatively unfamiliar regulatory environments.

4. See, for example, Erickson and Collins (2011).

5. Given the unpredictability of natural and technological discoveries in this sector and alternative energy markets that affect demand for gas, strategic analysis on Chinese gas demand has been limited and inconsistent. For example, following the Fukushima nuclear disaster in 2011, Japan halted nuclear energy usage, resulting in increased demand for natural gas imports. Conversely, Japan's recent discovery of significant methane hydrates in its southern coastal seabed could reportedly yield 40 trillion cubic feet of methane, equivalent to eleven years of current gas imports, though it is unclear whether initial optimism will be followed by gains of that size. Similarly, it is unclear whether Chinese shale gas will satiate the country's gas demand by 2020. These game-changing events could have effects on regional gas prices, which influence the behavior of all regional states, including China. Rather than forecasting Chinese demand for natural gas, this chapter focuses on broader and presumably more stable trends that help explain Beijing's strategic gas development.

6. Oil and LNG differ fundamentally in commercial and strategic significance. There is a single world oil market, because transport is inexpensive and the import infrastructure is ubiquitous. The trade of LNG, by contrast, is shaped by a series of bilateral agreements and regional markets because LNG is costlier to store and to move on and off ships. For cogent discussion of the strategic implications of China's small but increasing LNG imports, see Herberg (2008: 61–80).

7. EIA estimates for the East China Sea are 200 million barrels of oil and 1–2 trillion cubic feet of natural gas. See US Department of Defense (2015a: 5).

8. "Reforms Urged as Natural Gas Glut Falls on China," *Want China Times*, August 11, 2015, http://www.wantchinatimes.com/news-print-cnt.aspx?id=20150811000029&cid=1202.

9. Author's interview with regional investment analyst, August 13, 2015.

10. City gas usually includes gas consumed for residential use, public service facilities, vehicles, and heating and cooling systems in urban areas.

11. Furthermore, vested Chinese energy majors' interests in alternative energy supplies may be a significant barrier to a shale gas boom. Many believe that even if production of CBM and shale gas increased enough to be able to alter LNG demand, its presence may actually have a complementary effect. Although alternative gas sources may have potential to affect LNG demand in the long run, prospects for such a shift in domestic gas supply are unlikely in the foreseeable future. See Gascoyne and Aik (2011).

12. "Gazprom, CNPC Ink Gas Supply MoU," *LNG World News*, September 3, 2015, http://www.lngworldnews.com/gazprom-cnpc-ink-gas-supply-mou/.

13. Infrastructure development, relatively expensive, was long a limiting factor.

14. Transport tariffs rise incrementally with distance, and coastal cities are often over thousands of kilometers away from the source of natural gas. As China continues its strategy of energy diversification, these distances are likely to increase—as with imports from Turkmenistan. In many cases the pipeline transport tariff expenditures can even exceed original natural gas wellhead prices for coastal cities purchasing energy from western China via the West-East Pipeline. See Kang and Wang (2009: 2–7).

15. The SCS is not the only major body of water surrounding China. Other maritime regions, though also rife with contentious island and maritime disputes, are less strategically relevant in the context of natural gas development. The East China Sea (ECS), for example, has relatively fewer gas reserves. Moreover, while the Bohai Sea has yielded substantial offshore oil, natural gas reserves are much smaller there than in the SCS. This discussion thus focuses on potential Chinese gas and subsequent LNG development in the SCS.

16. Unfortunately, energy security is not the only factor driving tensions in the SCS. National sovereignty issues, including claims disputes, are arguably far more important.

17. One Chinese government website page elaborates: "There are rich oil and gas resources in the South China Sea. Some experts call it 'the second Persian Gulf.'" "Rich Resources in the South China Sea," http://webcache.googleusercontent.com/search?q=cache:erOp5U7cn9wJ:www.coi.gov.cn/scs/introduction/ziyuan.htm+&cd=3&hl=en&ct=clnk&gl=us. See also Chen and Ming (2004: 12).

18. Timeline inputs taken verbatim from report. See US Department of Defense (2015b: 7).

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