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# TOWARDS A GREEN KOREA? ASSESSING SOUTH KOREA'S ENERGY SECURITY FROM DIVERSIFICATION TO DIPLOMACY

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*The aim of this paper's first part is to focus on South Korea's present-day energy situation. It explores the impact of energy imports on South Korea's energy security and accesses how this leads to a certain degree of vulnerability. It also addresses its supply-side oriented strategies, including energy diversification and diplomacy, as it attempts to meet growing energy demand, develop a sustainable energy mix at home, and strengthen political and economic ties with resource rich countries.*

## Introduction

The notion of energy security—as defined by a sufficient access to an affordable supply of energy—can be developed in both the short and long term.<sup>1</sup> In the short term, it revolves around the idea of securing a supply of energy under exceptional circumstances, a political meltdown or even a natural catastrophe. In the long term, energy security is rather the capacity to secure energy resources through various investments, especially as demand and supply fluctuate.<sup>2</sup> Often cited as the world's tenth largest energy consuming nation in the world,<sup>3</sup> South Korea is more likely to be among the top twenty in terms of per capita use worldwide.<sup>4</sup> Meeting South Korean demand for energy has since brought increasing attention to the country's energy intensive industries, consumption

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1 Boris Solier and Raphaël Trotignon, *Comprendre les enjeux énergétiques* (Paris: Pearson Education France, 2010), 77.

2 *Ibid.*, 78.

3 Seong Kon Lee, Gento Mogi and Jong Wook Kim, "Energy technology roadmap for the next 10 years: the case of Korea," *Energy Policy* 37 (2009): 588.

4 BP, "Statistical Review of World Energy," June 2010, <http://bp.com/statisticalreview> (accessed November 3, 2010).

patterns and near-total dependency on energy imports. Following the economic downturn and the spike in crude oil prices in 2008,<sup>5</sup> energy security took center stage in South Korea due to the fear that rising prices might cause the economy to stagnate. South Korean media agencies, top business executives and government officials have all played a role in intensifying the public debate on energy security, and as of late, the issue appears to have escalated after South Korean President Lee Myung Bak remarked that securing oil and other energy resources is “a [global] life-and-death competition.”<sup>6</sup>

At first glance, this paints a rather sombre picture of South Korea’s energy security landscape and how it is becoming increasingly politicized. While taking heed of this, the aim of this paper is to make an assessment of South Korea’s current energy situation and supply-side oriented strategies. Although demand side oriented strategies are known to South Korea, a lower priority appears to have been assigned to industrial and residential energy conservation as domestic pressure rises to sustain current economic growth levels. How then does South Korea go about securing its energy supply? What makes South Korea energy dependant? Do energy imports have a bearing on its energy security? What is it prepared to do in order to meet energy demand? To frame the arguments presented in this paper, the first part will broadly focus on South Korea’s present-day energy situation. The second part will explore how imports have an impact on energy security and consider whether South Korea’s dependency on imports leads to vulnerability. At last, the third part of the essay will review strategies to diversify the country’s energy mix at home and abroad, as well as the latest attempts to strengthen political and economic ties with resource rich or oil-producing countries.

## **Current Energy Situation**

The first indicator of the energy situation of a given country is the notion of energy dependency.<sup>7</sup> It is often defined in two broad ways. Firstly, it consists of the energy requirements of a country. Secondly, it refers to the ways by which it secures its energy supply. In this part of the essay, we will explore the consumption of fuel types in South Korea followed by a look at the energy dependency of the South Korean economy.

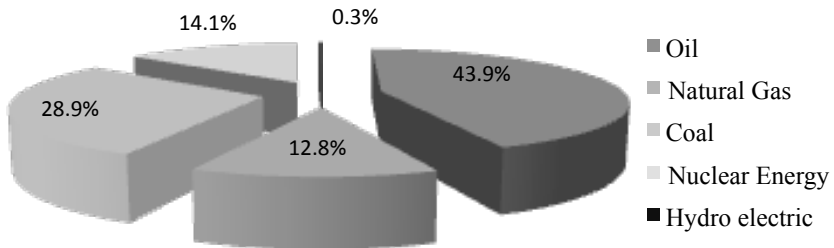
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5 BP, “Statistical Review of World Energy: Historical Data,” June 2010. <http://bp.com/statistical-review> (accessed November 5, 2010).

6 Yonhap News Agency, “Lee says oil storage facility upgrades Korea’s energy security,” May 20, 2010.

7 Solier and Trotignon, *Comprendre les enjeux énergétiques*, 77.

Figure 1: 2009 Primary Consumption by Fuel Types in South Korea<sup>8</sup>



In 2009, the primary energy consumption based on all commercially traded fuel types in South Korea shows that 43.9 percent of energy consumed was oil. Although biomass and wind or solar generation are not included in these numbers, these statistics give an overview of the relative importance of oil and other fossil fuels consumed on the southern half of the peninsula. Figure 1 shows that the primary consumption of coal represented 28.9 percent of energy consumed, and natural gas stood for 12.8 percent. As for non-fossil fuels, it is interesting to note that although less than 1 percent of energy consumed was hydroelectric, nuclear energy consumed in South Korea was slightly greater than natural gas at 14.1 percent. This fact does not diminish, however, the importance of fossil fuels in meeting energy demand. If combined, it represents an astonishing 85.6 percent of all energy consumed.

In terms of resource endowment, South Korea itself is quite poor. In fact, when researching data, statistics show that South Korea has neither oil nor natural gas in proved reserves or production.<sup>9</sup> As for coal reserves and production, South Korea's world share in both cases is less than 0.05 percent.<sup>10</sup> Weak resource endowment, low levels of production and poor quality of fossil fuels have fundamentally been why South Korea is a net importer of fossil fuel. Under such conditions, imports are a necessary condition to meet demand. Although nuclear energy is produced on the peninsula, uranium is an unequivocal ingredient, and since it is unavailable on its territory, it must be imported. The near-totality of fossil fuels must also be imported, and this contributes significantly to South Korea's energy dependency vis-à-vis the exterior.

<sup>8</sup> BP Statistical Review of World Energy, June 2010.

<sup>9</sup> BP, "Statistical Review of World Energy: Historical Data," June 2010.

<sup>10</sup> Ibid.

In the regional context, the Asia Pacific's poor resource endowment and population density appears to add another dimension to South Korea's energy dependency. In 2009, only 10 percent of worldwide oil production came from this region, and its worldwide share of proved reserves were, in fact, much lower at 3.2 percent.<sup>11</sup> As for natural gas, the region's share tells a similar story with only 14.6 percent of the world production and 8.7 percent of proved reserves. While 64.9 percent of the coal produced worldwide in China, India and other parts of the Asia Pacific region, the latter's proved reserves are far smaller than one might expect. In fact, the region's worldwide share of proved reserves is half the value of its production. Meanwhile, the number of people inhabiting the Asian continent, which is estimated at 58 percent of the world population or approximately 4 billion people, compounds resource scarcity. With China and India dominating in terms of their population size, these two are far less likely to be net exporters of their own coal production, especially as energy demand at home surges.<sup>12</sup> In fact, this introduces the notion of resource competition. It is estimated that if China's energy consumption per capita rose to South Korean levels in the next two decades, "its energy demand would quadruple, [and] the increase alone would be greater than America's total consumption today."<sup>13</sup> In a word, South Korea is not only energy dependent vis-à-vis the exterior and unable to depend on countries in close proximity to meet its energy needs, but it may also face considerable energy resource competition due to increasing per capita energy consumption in the most populated continent in the world.

Finally, a particular challenge for South Korea has been its energy-intensive industrial infrastructure and residential energy consumption.<sup>14</sup> Energy intensity is a measure of the amount of energy used to generate a unit of economic output usually in relation to GDP.<sup>15</sup> Despite a number of energy efficiency improvement programs that have been created with the intention of reducing energy consumption, trends have continued to show an increase in energy intensity, i.e. energy/GDP, over the last two decades.<sup>16</sup> This is contrary to most mature economies such as members of OECD that have decreased their energy intensity over the same period. The latter can be explained in part by efficiency

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11 Ibid.

12 The Economist, "A hungry dragon: Does the world have enough resources for China to keep growing at its present pace?," September 30, 2004, [http://www.economist.com/node/3219503?Story\\_id=3219503](http://www.economist.com/node/3219503?Story_id=3219503) (accessed November 2, 2010).

13 Ibid.

14 Sang-Hyeon Jin, "The effectiveness of energy efficiency improvement in a developing country: Rebound effect of residential electricity use in South Korea," *Energy Policy* 35 (2007): 5622.

15 Solier and Trotignon, *Comprendre les enjeux énergétiques*, 53-54.

16 Jin, "The effectiveness of energy efficiency improvement in a developing country," 5622.

gains due to technological advancements and the transition to a more service-based economy.<sup>17</sup> The apparent inability to follow this trend has caused public backlash, however, with the South Korean media calling high energy consumption a national failure, but the actual causes of recent increases draws a more nuanced picture of residential energy consumption.<sup>18</sup> Unseasonable temperatures in South Korea may explain the surge in energy consumption, especially in 2009.<sup>19</sup> Contrary to the media buzz, the International Energy Agency reports that “if the weather effect were excluded, OECD Pacific (Japan and South Korea oil) demand would probably have stagnated or even declined” in the last year.<sup>20</sup> In either case, energy intensity in the world economy has recorded a fourfold decrease in thirty years, but South Korea’s energy intensity appears to have grown steadily.<sup>21</sup> As the economy’s main driving force, this increase is yet another reason why South Korea is highly dependent on energy imports (particularly those of fossil fuel), and why demand side oriented strategies for reduced consumption, such as China’s jiejue shehui for moving toward “a conversation society”, are limited.<sup>22</sup>

## Energy Security

With regard to energy security, the relationship between South Korea’s fossil fuel consumption and its imports is a crucial one, and it is the key to determining whether or not its near-total dependency on energy imports leads to vulnerability. Indeed, it can be argued that a country that imports energy massively to meet energy demand is not necessarily vulnerable. If its imports originate from reliable sources that are sufficiently numerous, it could benefit from relatively high energy security and be in no way vulnerable.<sup>23</sup> In this part of the essay, we will assess South Korea’s vulnerability by examining the link that exists between South Korea’s energy consumption and its imports.

The aim will be to examine the reliability and the relative importance of fossil fuel imports coming from the Middle East, Southeast Asia and Australia, as well as China and Far East Russia. These regions supply the largest part of

17 BP, “Statistical Review of World Energy,” June 2010.

18 Korea Times, “Save Energy,” July 7, 2008.

19 International Energy Agency, “Oil Market Reports,” October 13, 2010, <http://omrpublic.iaea.org/currentissues/full.pdf> (accessed November 7, 2010).

20 Ibid.

21 Solier and Trotignon, *Comprendre les enjeux énergétiques*, 54.

22 Thierry Kellner, “La politique pétrolière de la République populaire de Chine: stratégies et conséquences internationales,” *Géopolitique de l’énergie* (2006): 465.

23 Solier and Trotignon, *Comprendre les enjeux énergétiques*, 80.

South Korea's energy imports, and each produces or can potentially produce different type of fossil fuels. Regions also offer ways of substituting sea transport by other means of transportation. This might reduce risks associated with its peninsular geography, and lead to mutually beneficial cooperation for other economies in East Asia, albeit with some challenges in sight.

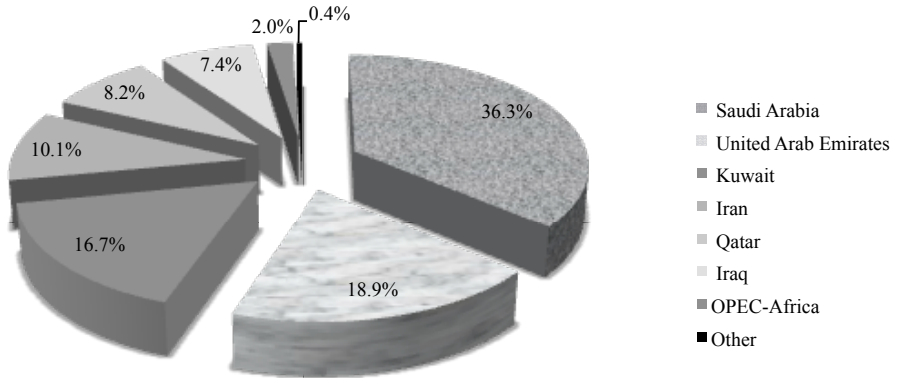
### *Middle East Imports*

As we have seen in the first part of this essay, 43 percent of energy consumed in South Korea is oil and its derivatives. As such, it is crucial to consider where oil imports originate from and how they eventually reach the southern part of the Korean peninsula. Table 2 shows that, in reality, South Korea heavily relies on one region of the world, the Middle East, to supply its oil. In fact, over 50 percent of all its oil is imported from two major producers: Saudi Arabia and the United Arab Emirates. From a trade perspective, both can be considered reliable suppliers in light of data compiled since 1996. It shows that since that time, Saudi Arabia and the United Arab Emirates have either maintained or slightly increased their exports to South Korea.<sup>24</sup> In terms of energy vulnerability, however, the fact that South Korea relies on only two oil producers in order to meet half of its demand is worrisome, but most striking of all is that over 97 percent of all oil imports originate from the Middle East. As for Iraq and Iran, these two countries contribute nearly a fifth of oil imports to South Korea. Although this is a rather small sum in relative terms, any trade failure due to political instability would represent a significant loss for South Korea in absolute terms and could send the country spiralling into a state of emergency. It is worth noting, however, that this dependency is also two-sided. Iran, just to name one, exports 60 percent of its crude oil to four countries primarily: Japan, Spain, Italy and South Korea.<sup>25</sup> If these countries were to boycott Iran simultaneously, it would have a severe economic impact on oil returns. All the same, since South Korea's import sources are judged to be insufficient in number, any lack of reliability could wreak havoc as it relies heavily on Middle East oil imports.

24 U.S. Energy Information Administration, "South Korea–Petroleum (Oil) Imports: Annual," September 2010, <http://www.eia.doe.gov/ipm/imports.html> (accessed November 7, 2010).

25 International Energy Agency, "Oil Market Reports," October 13, 2010, <http://omrpublic.iea.org/currentissues/full.pdf> (accessed November 7, 2010).

Figure 2: 2009 Oil Imports by Source in South Korea<sup>26</sup>



When importing oil from the Middle East, another possible dimension to South Korea’s vulnerability is the implications of its geographical positioning. As a peninsula, South Korea borders the Yellow Sea to the West, the East China Sea to the South and the Sea of Japan to the East. Its only land border is shared with North Korea, but its relationship with the latter is characterized by a total cut-off between both parts. Although there are oil pipelines linking production in Northeast China to the East China Sea, South Korea must rely on tanker or super tanker shipments even when imports are available in relative proximity, and oil imports from the Middle East are no exception. These are exclusively transported by tanker shipments. Faced with a lack of alternatives, South Korea’s geographical positioning produces conditions in which imports are shipped by a single mode of transportation. This appears inherently precarious.

*Southeast Asia and Australia Imports*

Last year, South Korea’s natural gas consumption represented 12.8 percent and coal 28.9 percent of all energy consumed. Although the Asia Pacific Region produces limited quantities of fossil fuel, Australia, Indonesia and Malaysia all produce more natural gas than they use, and are, as such, net exporters. While a small circle of developed countries such as Japan, Taiwan and South Korea have traditionally imported natural gas, emerging economies in the same region

<sup>26</sup> U.S. Energy Information Administration, “South Korea–Petroleum (Oil) Imports,” September 2010.

are now building the necessary infrastructure to import liquefied natural gas (LNG). In fact, the Asia Pacific region now absorbs 70 percent of internationally traded LNG.<sup>27</sup> South Korea, for its part, is one of the principal consumers of this, and its suppliers are Indonesia, Malaysia, Brunei and Australia, as well as Qatar and Oman.<sup>28</sup> While keeping in mind the relative proximity of the first four of these natural gas suppliers, South Korea appears to have found reliable trading partners that are sufficient in number whereby decreasing its energy vulnerability. It is worth noting that South Korea's contract with ExxonMobil for natural gas from Indonesia expired in 2007, and that it has since sought to diversify the sources and means of transporting natural gas by turning to Far East Russia.<sup>29</sup>

As for coal, South Korea is the second largest importer in the world, and is surpassed only by Japan.<sup>30</sup> While the Asia Pacific's resource endowment appears adequate to meet demand in the region, the reality is that emerging economies such as China and India are its primary producers and consumers.<sup>31</sup> It comes as no surprise that South Korea's most important suppliers are, in fact, Australia and Indonesia.<sup>32</sup> Interestingly, "coal consumption in South Korea increased by about a third between 2005 and 2009, driven primarily by growing demand from the electric power sector. The electric power sector accounts for more than half of coal consumption, while the industrial sector accounts for most of the remainder."<sup>33</sup> It can be concluded that South Korea is heavily dependent on coal to meet both industrial and residential energy demand, but suppliers appear to be reliable and are located in relative proximity. Even if the suppliers may not be sufficiently numerous to caution against vulnerability, coal is the fossil fuel most evenly distributed across continents and, as an alternative, could be provided by other major exporters such as South Africa, Russia and Colombia.<sup>34</sup> Consequently, South Korea's energy vulnerability for this fuel type is quite low.

At last, marine routes have come to play a sizeable role in South Ko-

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27 Jean-Pierre Favennec et al., *Géopolitique de l'énergie: Besions, ressources, échanges mondiaux* (Paris: Éditions Technip, 2009), 248.

28 Ibid.

29 Se Hyun Ahn, "Framing Energy Security between Russia and South Korea?," *Asian Survey* 50 (2010): 598-599.

30 U.S. Energy Information Administration, "Country Analysis Briefs: South Korea," October 2010. Accessed November 7, 2010. [http://www.eia.doe.gov/cabs/South\\_Korea/Full.html](http://www.eia.doe.gov/cabs/South_Korea/Full.html)

31 BP, *Statistical Review of World Energy*, June 2010.

32 U.S. Energy Information Administration, "Country Analysis Briefs," October 2010.

33 Ibid.

34 Favennec et al., *Géopolitique de l'énergie*, 251.



rea's energy security and require close analysis, albeit brief in this paper. Energy is most vulnerable when being transported.<sup>35</sup> In fact, two thirds of the worldwide production of oil is transported by tanker shipment.<sup>36</sup> The entire energy industry appears dependant on reliable transport, but for the Asia Pacific, there are few alternatives to marine transit choke points between the Middle East and Northeast Asia. Strategic energy routes include sea-lanes through the Straits of Hormuz and Malacca where speed and mobility are reduced. "Piracy, congested traffic, possible collisions, terrorist attacks, and especially naval forces of major powers" could all be potential causes of disruption.<sup>37</sup> In fact, the Asia Pacific relies heavily on Middle Eastern countries that appear to control the Straits of Hormuz and where nearly 90 percent of their oil exports transit.<sup>38</sup> Mounting political tensions due to the Iranian nuclear program and sanctions against it have strained relations with United States' allies in the Asia Pacific including South Korea. In fact, the mere physical threat of disruption to energy cargos have caused an increase in oil prices, but growing concerns over disruptions are primarily centered on the possibility of energy shortages at home. Dependency on marine routes is also compounded by the fact that "the region separating the Caspian Sea and Western Russia from the Eastern coasts of Eurasia have not offered and still don't offer the necessary conditions for [a sufficiently developed] export infrastructure."<sup>39</sup> Political instability in Central Asia, tensions between China and Russia and the severity of geological conditions are just a few reasons why South Korea has yet to find a land or subsea pipeline alternative. Due to South Korea's total reliance on sea transport, the possibility of physical disruption, especially in the Straits of Hormuz, spells energy vulnerability in a very real way.

### *China and Far East Russia Imports*

Recently, South Korea has turned to China and Far East Russia as a potential alternative to securing fossil fuels and reducing its dependency on Middle Eastern imports. Not unlike China, it "has contemplated alternate routes on land to bypass the Straits [...] by expanding its oil imports" from this region.<sup>40</sup> Em-

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35 Ibid., 129.

36 Ibid.

37 Hongyi Lai, "Introduction: Understanding and Enhancing Energy and Maritime Security in Asia," *Asian Energy Security: The Maritime Dimension* (New York: Palgrave, 2009), 10.

38 Favennec et al., *Géopolitique de l'énergie*, 129.

39 Favennec et al., *Géopolitique de l'énergie*, 256.

40 Lai, "Introduction," 50.

barking on what is often called energy cooperation, these countries and others in Northeast Asia have collaborated on the production or, more frequently, the distribution of oil and natural gas. Although the aim of energy cooperation is often to secure energy resources at a relatively low cost while diversifying the sources and types of energy imports, countries seeking to do so may not have an equal say in the process. This is often the case when negotiated between or alongside major economic powers. In fact, if energy cooperation appears to benefit one more than others or intensify political tensions, oil and gas production and distribution networks often fall through rather than make inroads.

Here is one recent example of this. The Kovykta natural gas field in Eastern Siberia has proved gas reserves enabling production for an estimated 30 to 40 years.<sup>41</sup> In December of 1997, South Korea, Russia, Japan, China and Mongolia all began undertaking a feasibility study for these natural gas deposits. Many bought shares of Russia Petroleum in order to promote early development, and discussions immediately began on how Kovykta gas would be transported in the region. Expecting the gas field development to take several years, the parties involved considered building a 4,100-kilometre pipeline linking Irkutsk in Russia, Ulaanbaatar in Mongolia, Beijing in China and Pyongtaek in South Korea.<sup>42</sup> This initial plan was later revised by China, which was opposed to Mongolia serving as a transit nation. South Korea endorsed North Korea as an alternate route over land, but major shareholders in Russia Petroleum, Tyuman Oil Company and BP, ruled out this bid. It was later concluded that the pipeline would travel through Northeast China and under the bottom of the Yellow Sea to South Korea. Although South Korea invested over US\$12 billion in the project over the last 13 years, the Russian government has yet to endorse it. The Kovykta project that would have offered a 30-year supply of natural gas to China, Far East Russia and South Korea has since faded away. While this attempt at regional cooperation may have failed, the experience goes to show how influential Russia and China have been throughout the process. Their cooperation plays a crucial part in the production and distribution of oil and gas in the region. If energy cooperation is achieved, it will likely become a pivotal aspect of energy security in the region over the next decades, and South Korea is by no means exempt. Large deposits of oil and gas in Central Asia and the Russian Far East are reason alone to pursue other such regional projects.

Yet, there are several other problems that have contributed to the delay of energy cooperation between East Asian economies. Harsh environmental

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41 Ahn, "Framing Energy Security," 607.

42 *Ibid.*, 593.

conditions hinder the development of distribution networks, which has notably been the case with subsea pipelines and ice-related geological limitations. Most importantly, however, is the “chronic economic, social, and political underdevelopment of the region” that causes problems for the future energy market in the region.<sup>43</sup> Despite its vast energy resources, Far East Russia “still faces a severe energy crisis because of its poor infrastructure and ineffective economic policies.”<sup>44</sup> Resource nationalism is also to blame for the slow development of the energy sector in the Far East, but it is also probable that “Russia is [...] seeking to limit China’s growing power with the use of [its] strategic energy resource, natural gas.”<sup>45</sup> By pursuing a wait-and-see policy, Russia slows the distribution of energy to developing parts of Northeast China and expects a higher return by causing China, Japan and South Korea to compete against one another. Even so, developing a distribution network and agreeing to energy cooperation in the Far East will ultimately weigh in its economic and political favour. It would “not only diversify its energy exporting market but also prompt it to become a regional player in Northeast Asia.”<sup>46</sup> These economic and political interests may soon outweigh nationalist sentiments over oil and natural gas resources.

The case of Kovykta has also shown how China’s interests have an impact on energy cooperation. Its political and economic interests have slowed the potential distribution of natural gas and oil from Eastern Siberia. One of the reasons for this is China’s concern for stability. By forcing Mongolia out of the distribution network, China exercised a degree of caution vis-à-vis the ethnic Mongolians within its borders. The aim was to avoid confrontations with those who may have laid claim over oil or gas pipelines, and even gone so far as disrupting its service. As for Mongolia itself, China appears uneasy with its general lack of infrastructure and access to energy resources. By mapping out a route in its own Northeast provinces, it chose a longer pipeline route for greater control over the flow of oil and gas, in addition to the access of neighbouring countries to energy imports.

All the while, South Korea’s energy vulnerability appears heightened. While it faces higher prices for LNG and other potential difficulties associated with importing oil from Middle Eastern suppliers, South Korea remains cautious when investing in the development of the energy sector in Far East Russia and

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43 Ibid., 608.

44 Ibid., 607.

45 Ibid., 609.

46 Ibid., 591

China. Energy cooperation could potentially mean greater vulnerability as both Russia and China continue to assert their influence in the region and compete in the implementation of energy cooperation projects. “Political tensions, cultural, ethnic, and institutional obstacles, as well as economic differences among the Northeast Asian states had compelled each country to cope individually with its own energy problems – while blocking development of an effective regional system of energy security.”<sup>47</sup> In fact, with the growth in energy demand in the region, some analysts claim that national rivalries could go as far as destabilizing the region. South Korean media seems to have adopted a similar position, polarizing the nation against China’s so-called “fear-inspiring” economy and depicting it as a growing threat to economic prosperity. Public opinion also appears to have been swayed by the idea that rivalry is not only inevitable but might require desperate measures. Under such circumstances, South Korea will begin to justify resource acquisition by any means possible and act accordingly. This will be further examined in the next part of the essay.

On the other hand, an optimistic outlook might stress the fact that regional energy cooperation would enhance “South Korea’s energy security because they ensure against disruptions and serve competitive prices.”<sup>48</sup> Russia’s oil and gas could provide South Korea with the opportunity to solve energy shortages and diversify energy sources, while reducing its all-around dependency vis-à-vis the Middle East. Although South Korea may appear vulnerable in the face of neighbouring China’s rising demand for oil, the fact that “China has started to take close note of external developments and make preparations in order to ensure smooth transport of oil imports and peaceful exploration of energy resources” is highly favourable for its neighbours.<sup>49</sup> As long as China views oil as a strategic economic interest and is concerned with its own high stakes in energy security, South Korea’s quest for energy resources will likely benefit from Chinese investments and influence into “technical assistance and dialogue.”<sup>50</sup> Energy cooperation with China and Far East Russia may quickly become a determining factor for South Korea’s successful acquisition of energy imports and the diversification of its energy mix.

### Supply-side Oriented Strategies

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47 Ibid., 610.

48 Ibid., 612.

49 Hongyi Lai, “Security of China’s Energy Imports,” *Asian Energy Security: The Maritime Dimension* (New York: Palgrave, 2009), 50.

50 Ibid.

A crucial issue for South Korea's energy security is the disposal of a secure and competitive supply to which it has access over the long term.<sup>51</sup> In this part of the essay, a review of South Korea's most recent supply-side oriented strategies will be conducted. It will include a study of strategies for the diversification of energy sources, which has led to investments in nuclear energy and, as of late, renewables. In addition to this, energy diplomacy has played a role in energy diversification with South Korea making unprecedented investments in overseas energy exploration and production. In doing so, it has also funded development projects in Africa, Central Asia and the Middle East. Between 2008 and 2010, South Korean oil, gas, and electricity companies have been pursuing an aggressive campaign for present and future energy trade. This appears to be part of a publically backed effort to improve the nation's energy security.

### *Energy Diversification Strategies*

In order to diversify and reduce dependency vis-à-vis the exterior, South Korea has aggressively invested in nuclear and renewable energy at home. Since 1977, South Korea has produced and consumed small amounts of nuclear energy, but it is only in the late 1980's that data suggests that it began playing an important part in South Korea's energy mix.<sup>52</sup> Today, it represents 14 percent of all energy consumed in the country, and it is primarily reserved to produce electricity. With 20 nuclear power plants, South Korea is ranked sixth in the world in terms of nuclear infrastructure, and growth in this industry is not likely to stop either.<sup>53</sup> Currently, six reactors are under construction.<sup>54</sup> The Korea Hydro and Nuclear Power Corporation's most optimistic forecasts that by 2030, nearly 60 percent of all electricity generation will be nuclear.

Previously, the "development of nuclear power technology [has been primarily] driven by government funding, as well as centralized through government research institutions"<sup>55</sup>. Although public opinion seemed to favour such developments until recently, authoritarian regimes under the Park Chung Hee and Chun Doo Hwan eras of the 1970's and 1980's squelched initial dis-

51 Jean-Pierre Favennec et al., "*Géopolitique de l'énergie: Besions, ressources, échanges mondiaux*," 71.

52 BP, "Statistical Review of World Energy: Historical Data," June 2010.

53 Korea Hydro & Nuclear Power Co. Ltd, "International Business: Overseas Project," 2008, <http://www.khnp.co.kr/en/020100> (accessed November 14, 2010).

54 Murat Selahattin Sirin, "An assessment of Turkey's nuclear energy policy in light of South Korea's nuclear experience," *Energy Policy* 38 (2010): 6147.

55 Scott Victor Valentine and Benjamin K. Sovacool, "The socio-political economy of nuclear power development in Japan and South Korea," *Energy Policy* 38 (2010): 7975.

sent towards the nuclear industry. The use of force was not uncommon, but present day South Korean government officials justify nuclear advancements by emphasizing its importance on the global scene. Government-owned agencies claim that it provides energy produced domestically at a relatively low cost but also “secures [South Korea’s] competitive edge through continued growth of the nuclear power plan industry”<sup>56</sup>. In other words, South Korean nuclear power technologies and expertise are developed with the explicit intention of commercializing and exporting it abroad. In fact, the first project of this kind was a US\$2 million contract signed with China in 1993. South Korea provided technical support for the first stages of operation and maintenance of Guangzhou nuclear power plant<sup>57</sup>. As of 2009, 39 contracts have been signed with overseas clients over the years, including the first plant construction project in Nepal and a US\$40 billion nuclear power plant project in the United Arab Emirates<sup>58</sup>. Currently, South Korea is also in the process of signing agreements for the export of nuclear power plants to Turkey and India. For the southern half of the Korean peninsula, nuclear energy appears to provide more than an answer to the diversification of its energy mix and its dependency vis-à-vis the exterior. It has become a means of asserting its influence in at least one energy-related industry and of emerging as a global leader in the field of nuclear technology.

Although currently limited to small-scale projects, renewables are being developed by South Korea with the objective of producing energy at home. In some cases, green or renewable energy can be a substitute for fossil fuels or nuclear power and is one way South Korea intends to decrease its dependency on imports. Following the adoption of a green energy development strategy in 2008, the South Korean government focused primarily on offshore wind power. Considered the most price-competitive of all renewables, wind power has been one way for South Korea to acquire shares in a rapidly expanding global market. In September 2010, the South Korean government announced the launch of the largest wind farm project in its history. At an estimated cost of US\$8.2 billion, the offshore wind power complex will include 1,000 wind turbines off the coast of the North and South Jeolla provinces. The most optimistic forecasts predict that once completed, it will generate power equivalent to four nuclear reactors.<sup>59</sup> If said targets are achieved, this could signify an unprecedented shift for South Korea’s energy mix. Although the nuclear industry is very present on

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56 Korea Hydro & Nuclear Power Co. Ltd, “International Business: Overseas Project,” 2008.

57 Ibid.

58 Ibid.

59 Yonhap News Agency, “Seoul unveils US\$8.2 offshore wind farm project,” November 2, 2010.

the peninsula, economic interests in renewables have not entirely ruled out the possibility of “going green.” Not unlike the idea of commercializing its nuclear technology and expertise, South Korea’s experience with offshore wind farms may serve as a comparative advantage and a means of differentiating itself from its neighbours, while diversifying its energy mix in a sustainable way.

At last, unexplored Ulleung, Yellow and Jeju Basins off the peninsular coast has presented South Korea with a first-time opportunity to reduce its dependency on natural gas imports.<sup>60</sup> New technologies have allowed the Korea National Oil Corporation to investigate oil and national gas deposits in its sovereign waters. Although this initiative would not diversify South Korea’s energy mix per se, it would help develop expertise in off-shore oil and gas drilling and shift away from the refined products it has historically produced.<sup>61</sup> A recent push for research and development has translated into Korea’s oil industry acquiring as many as 155 overseas oil and gas projects in 36 countries as of 2008, including off the coast of Vietnam and the Gulf of Mexico.<sup>62</sup> This could put South Korea’s second most advanced oil refineries in the world to good use and eventually translate into greater energy security.

### *Energy Diplomacy Strategies*

In order to gain access to affordable supplies of fossil fuels, energy reforms in South Korea began in 2008.<sup>63</sup> Two years later, investments made in resource-rich countries have reached a historical high with US\$24.9 billion foreign direct investments between the months of January and September 2010.<sup>64</sup> This amount is nearly double the record-breaking investments made in 2009. As South Korea comes to terms with its various degrees of vulnerability, energy diplomacy appears to have become a crucial part of South Korea’s shifting view on how it secures energy resources. It is a supply-side oriented strategy not only meant to secure and diversify the southern half of the peninsula’s energy mix, but tackle vulnerability head on, especially in the long term.

It may also reflect the concern expressed by South Korean media over China’s economic rise and the sense of fear it seems to have inspired domestically. Comments made by President Lee Myung Bak on “life-and-death com-

60 Korea National Oil Corporation, “E&P Worldwide: Korea,” 2009. Accessed November 14, 2010. [http://www.knoc.co.kr/ENG/sub03/sub03\\_1\\_1\\_4.jsp](http://www.knoc.co.kr/ENG/sub03/sub03_1_1_4.jsp).

61 U.S. Energy Information Administration, “Country Analysis Briefs,” October 2010.

62 Korea National Oil Corporation, “E&P Worldwide: Korea.”

63 Yonhap News Agency, “Gov’t considers broad restructuring of energy sector,” October 25, 2008.

64 Yonhap News Agency, “Overseas investments jumps on resource projects,” November 4, 2010.



petition” over energy resource acquisition may be an indicator of the general concern felt throughout South Korea and part of the reason why authorities appear to have been given carte blanche for securing energy resources. South Korean energy diplomacy now aims not only to secure investments in research and development worldwide thereby multiplying its energy suppliers but also to strengthen political and economic ties in countries where Chinese or even Western companies have yet to exert their full influence. It also provides resource-rich countries with economic incentives for present and future energy trade with South Korea.

As of March 2006, President Roh Moo Hyun’s visit to Nigeria marked a turning point in South Korean modern history. In fact, it was the first presidential visit to Africa in over 25 years. At the time, President Roh Moo Hyun announced the creation of the Korean Initiative for African Development (KIAD), which included a pledge to triple official development assistance to Africa from the 2005 levels of US\$39.1 million to US\$100 million by 2008. Although current President Lee Myung Bak has not reached the target set by his predecessor, he has continued to push for stronger partnerships with African countries “in a bid to strengthen energy diplomacy” and meet South Korea’s strategic energy needs.<sup>65</sup> Even though said targets were not reached, development funds made available by the KIAD are being exclusively channelled to strategic partners such as Nigeria, Algeria and Egypt.

In October 2010, President Lee Myung Bak met with Gabon’s President Ali Bongo Odimba to sign agreements on energy cooperation, bilateral economic ties as well as “cultural exchanges.”<sup>66</sup> This included a memorandum on research and development of oil and mineral deposits, as well as the establishment of a joint project for its implementation in the coming months. At the same time, the head of Korea Electric Power Company met with Niger authorities in order to secure a uranium supply deal “to fuel an expected doubling in the number of [South Korea’s] nuclear power plants by 2030.”<sup>67</sup> In exchange for Gabon and Niger’s cooperation, South Korea has offered to help build Gabon’s new airport and Niger’s first nuclear facility. As these examples demonstrate, South Korea has clearly shifted its energy diplomacy in Africa toward infrastructural investments as an incentive for energy trade. Investments on the African continent are seen as an opportunity to diversify its suppliers of natural

65 Jeong-ju Na, “Energy diplomacy bearing fruits, but not enough,” *Korea Times*, June 25, 2008.

66 Chi-dong Lee, “S. Korea, Gabon ink accords on energy, culture cooperation,” *Yonhap News Agency*, October 25, 2010.

67 Reuters Africa, “S. Korea’s KHNP seeks Niger uranium deal,” October 28, 2010.



resources away from its current natural gas and coal trade partners. South Korea thus lowers to some degree its vulnerability.

In November 2010, Samsung, Daewoo and Hyundai business executives visited Zimbabwe with the intention of investing “in energy and resources.”<sup>68</sup> Talks included reconstruction projects for Zimbabwe. During this visit, an agreement was signed between the Korean business executives and the Prime Minister Morgan Tsvangirai, but was declared null and void only days later by Zimbabwean President Robert Mugabe. The latter claimed the Prime Minister did not have the authority to conclude the agreement and that first a bilateral trade agreement between both nations would have to be struck. Despite this, South Korea will likely move ahead with investments in Zimbabwe due to little competition from Western countries that wish to avoid “backing regimes considered despotic.”<sup>69</sup> Although China has made the fastest growing foreign direct investments in Zimbabwe since 2000, Chinese President Hu Jintao warned the country earlier this year that loans made to the regime would have to be repaid.<sup>70</sup> As relations sour with China, South Korea’s window of opportunity widens, but with President Robert Mugabe’s political party known as “an ally of poor Communist-run North Korea,” partisan politics may hinder future energy trade relations with this country.<sup>71</sup> Although it may involve certain risks, South Korean trade relations with countries where instability reigns offer an alternative to energy suppliers in countries or regions where competition is more intense. Gains in this area may translate into further diversification of sources of imports.

Since 2008, South Korean officials have visited Central Asian and Caucasian countries, such as Uzbekistan, Kazakhstan, Turkmenistan and Azerbaijan, with the explicit intention of strengthening economic ties. The same year, Korea’s major oil developers accompanied South Korean Prime Minister, Han Seung Soo, to Azerbaijan where Korea National Oil struck a deal with the state-owned oil firms to develop oil fields. The two countries intend to invest about US\$1 million to conduct a joint exploration of the Caucasus area, which are said to have large reserves of gold, silver, lead and other metals. In Turkmenistan, South Korea has undertaken similar investments in oil fields. A South Korean consortium led by Korea Gas Corporation also signed a joint venture deal with Uzbekistan’s state-run gas company to develop a large-scale natural gas field.

68 Yonhap News Agency, “S. Korean vice minister meets Zimbabwe’s PM,” November 2, 2010.

69 AfrikNews, “China Warns Zimbabwe: we are not friends!,” February 22, 2010.

70 Ibid.

71 AfrikNews, “South Korean investments agreements ‘null and void’,” November 5, 2010.

The gas field is estimated to have more than four trillion cubic feet of proved reserves, equivalent to nearly four years worth of natural gas for South Korea.<sup>72</sup> This project will include the construction of a chemical plant as well. Much like in Africa, South Korea has secured development rights to energy resources in Central Asia by linking projects to industrial infrastructure building. In fact, these efforts mark the first attempt made by South Korea to provide infrastructural investments as part of its energy diplomacy strategies in Central Asia.<sup>73</sup> It illustrates a readiness to move ahead with energy investments in this part of Asia despite failed attempts at regional cooperation. To secure these energy resources at a reasonable price might, nevertheless, require China's operation, especially more cost-effective on-land transportation methods.

As for the Middle East, energy diplomacy strategies are far more complex. South Korea's GS Engineering & Construction Corporation has previously invested US\$1.2 billion to build a gas project in Iran. However, due to the Iranian nuclear program and mounting pressure from the United States and the United Nations Secretary General, South Korea cancelled this deal over the summer of 2010 and began sanctioning the country. This has become a sensitive area for South Korea as non-proliferation efforts pushes for sanctions not only against Iran but also against North Korea. While international sanctions against the latter may be in South Korea's political interest, to limit business with Iran could undermine South Korea's "long-term opportunities in the petrochemical, construction and plant export industries amid China's growing influence."<sup>74</sup> China, on the other hand, has made it clear that it does not support these measures and continues to invest heavily in Iran despite international sanctions.<sup>75</sup> With South Korea's trade with Iran reaching US\$10 billion in 2009 and supplying one tenth of the country's oil in the last year, South Korean politicians will have to pay the economic price for coordinated international counter-proliferation efforts.

On the other hand, South Korean energy diplomacy in the Middle East hasn't stopped there. With its sanctions against Iran, South Korea has sought investments in Iraqi oil fields as an alternative. In October 2010, the South Korean overseas development firm, UI Energy Corporation, acquired shares of oilfields in the Miran, Tawke and Duhok regions of the Iraqi-ruled Kurdistan. Here, South

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72 Na, "Energy diplomacy."

73 Ibid.

74 Doo-hyong Hwang, "Iran sanctions could be biggest challenge for South Korea in future: scholar," *Yonhap News Agency*, August 5, 2010.

75 Ibid.

Korea also faces Chinese competition, which is “expanding [its] foothold beyond Iraq’s oil reserves [...] to areas such as construction, government services and even tourism.”<sup>76</sup> Nevertheless, Western companies, particularly from the United States, are holding back investments and have left room for South Korea and others to enter the market. Recently, South Korea has even begun building “a multimillion-dollar steel mill in the south and a power plant.”<sup>77</sup> Energy trade relations appear favorable with Iraq and will likely expand over the short-term, especially in light of recent sanctions against Iran. Despite this, investments made in this region neither diversify the type of energy imports nor expand the suppliers of these resources, and may heighten South Korea’s vulnerability.

At present, South Korea continues to strengthen diplomatic and economic ties by providing a growing number of incentives to sustain energy trade in the Middle East and beyond. With its record numbers of investments overseas, South Korea spreads out risk and clings to the idea that strong political and economic ties favour its access to affordable supplies of energy. It is also one way of increasing the number of energy suppliers it relies on and reducing transport risks, especially when drawing from energy resources over continental Asia.

## Conclusion

An overview of South Korea’s current energy situation has shown how weak resource endowment has led to near-total dependency on energy imports. A study of South Korea’s sources of energy imports have nuanced what initially appeared to be a gloomy energy situation, but energy vulnerability is reason for concern due to limited oil and natural gas suppliers, as well as geographical positioning and reliance on sea transport. Failed attempts at regional energy cooperation have reinforced this sentiment. On the other hand, supply-side oriented strategies have been an answer to the current energy situation and have given way to homemade solutions. Building nuclear facilities has been one way of diversifying South Korea’s energy mix and reducing energy dependency vis-à-vis the exterior. On the other hand, supply-side oriented strategies have led to the implementation of large-scale renewable energy projects. South Korea “going green” readily aligns with its vision for energy diversification, which also serves to gain a comparative advantage in an energy sector other than nuclear power.

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76 Leila Fadel and Ernesto Londoño, “Risk tolerant China investing heavily in Iraq as U.S. companies hold back,” *The Washington Post*, July 2, 2010.

77 *Ibid.*

Concerns for energy security has translated into an unprecedented wave of energy policy reforms and overseas investments. Political discourse on the race to secure fossil fuels has steered public opinion, which has been fueled by the emphasis placed on energy as a strategic good for economic growth, particularly in light of China's accelerated development. This explains to some degree why South Koreans have sought investments in countries where China exerts a lower degree of influence, despite weak human rights records and volatility. In any case, energy diplomacy and economic incentives, such as infrastructural investments, are designed to boost South Korea's political and economic position in vulnerable, yet resource-rich countries. They are ultimately aimed at securing an affordable supply of energy resources over the long-term.

South Korea benefits from the second-mover advantage following the course China has set in new and emerging energy markets across the globe. And while China's surging energy demands have stirred up fears over energy security in South Korea, China's geographical proximity, political weight and economic rise is likely to play in South Korea's favour over the long term. With China's own interest lying in a safe and secure energy mix, it may undertake the necessary steps to secure energy resources, foster cooperation or condemn acts destabilizing the flow of resources in the region. Although energy vulnerability remains a cause for concern, South Korea could significantly benefit from the intersection of its energy interests with China's rising demand for oil, as well as its growing market for renewable energy technologies.

**PEAR**

