

Since 2006, then President and now Russian Prime Minister Vladimir Putin began to openly advocate a new energy strategy that would capitalize on the increasing value of oil and gas exports to foreign markets. In order to maximize revenue to the national government from these exports, Russia has embraced, at least on paper, its desire to reorient future Russian domestic power production towards nuclear and coal fired power generation. The essential concept for the Russian treasury is that gas exports offer greater revenue net back from their export than do coal. The essential reality for Russian power and coal producers is that since the 1960s, when Russian natural gas was viewed as a bridge-fuel until coal could be burned more efficiently, Russian natural gas has been cheaper than coal to burn. This is unique in the world. Gas prices in Russia are controlled by the state. This helps ensure industrial producers use this resource rather than coal, the price of which was liberalized along with the large-scale privatization of the industry. The essential concern for environmentalists - and those who perceive a link between climate change and global security challenges both traditional in the form of inter-and-intra state conflict and new ones arising from the potential effects of global warming such as the undesirable large scale migration of human populations—is that as Russia burns more coal these problems become more precipitous.

Since 2002 the US Department of Energy has signaled that over time Russia would supplant natural gas power generation with coal in order to free up natural gas for export. This has been reiterated in Russia's Energy Strategy to 2020 and in its amended strategy to 2030. The recent global economic recession has only slowed this process with Russian gas prices scheduled to begin to creep-higher domestically after 2011. However, depending on the rate of global economic recovery this schedule may have to be pushed forward as Russia struggles to concurrently meet an increase in domestic demand for power (the majority of which is presently gas based) and its over-extended commitment to gas exports to its energy hungry European neighbors. The final essential concept here is that this power will have to be generated from something (coal or nuclear) in order to satisfy downstream demand (European) which inadvertently will spill thousands and ultimately millions of new tons of unwanted CO₂ into Russia's and Europe's own atmosphere.

So what is the role that European demand for natural gas, Europe's fuel of choice for power generation, plays in Russian thinking and in its desire to maximize these exports? After all, there would be no compelling reason to re-engineer Russia's power sector away from natural gas and towards coal if there wasn't constant and increased demand for natural gas to markets Russia could furnish. Let's be clear: Russia's piped gas market for the next ten years is Europe (not China) so forget all the Russian saber-rattling to the contrary.

Another and equally significant issue that needs to be explored is, in Europe's search to reduce

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GHG emissions due to coal fired power generation from domestic sources, whether Europeans themselves are inadvertently setting the stage for increased GHG emissions from future Russian coal fired power generation? The answers to these questions remain far from clear but the complex relationship between Russian gas exports-European gas demand-and the choice of power generating fuel Russia will use in the future is compelling.

There is More

Energy security in its narrowest national sense depends on diversification of fuels for power generating capacity. In Europe's desire to fuel switch to natural gas is it increasing its own energy insecurity by diminishing its coal and nuclear fired power generating capacity and quid pro quo increasing its import dependence on Russian natural gas? On the opposite extreme, should it diversify more deeply into coal will it displace one Russian fuel dependence, e.g. natural gas, with another?

Given Russia's pronounced inability to properly manage its own reputation in the natural gas sphere as a reliable supplier of this resource, Europe is re-evaluating its own nuclear future. While currently there are only two nuclear reactors in Europe under construction-- an EDF-led project in Flamanville, France, and an Areva-led project in Finland—renewed interest in nuclear power has been sparked across the continent. Even coal appears to be getting a second look. As an example, in Italy over the next four years Italy's reliance on coal is expected to increase to 33% from 14% in 2008. Europe-wide some fifty new coal fired plants are expected to be put into operation over the next five years a trend which contradicts its overall commitment to reducing GHG emissions at or below the benchmark 1990 level.

Russian Coal

The Russian Federation is second only to the United States in proven world coal reserves but its proven gas reserves are even larger. Having said this the fuel equivalent of coal demonstrably exceeds that of gas underscoring coal's kinetic potential for fueling Russian power and industry. Not surprisingly Russia is the world's fifth largest producer and the world's third largest exporter of coal fifty percent of which is consumed in European markets. This is hardly surprising as coal has been the fastest growing fuel in the world for the past six years driven in large part by China's expanding domestic demand for coal fired power generation and the pressing need in India to meet the projected economic and energy challenges on becoming the world's most populous nation within the next decade. In Russia, the growth rate of coal production [output] has exceeded growth rates for both oil and gas over the past several years.

While the impact of the Great Recession has negatively impacted energy and power industries around the globe, Russia's oil and gas complex has taken a comparatively larger hit than has its

coal sector. Today, nearly 80% of Russian coal is produced by independents. While demand for Russian coking coal fell 17% in Q1 2009 due to a fall in global demand for steel, Russian gas output measured in June has fallen some 34% year on year. Russia's oil industry has been in a stupor since June of 2008 despite an exceptional up-tick measured during Q2 2009.

In short, Russia's coal industry—despite significant internal problems related to technological deficiencies, transport problems and production inefficiencies—is generally poised to rebound in response to either new domestic or global demand. In July, the shares of Russian coal producers soared with the announcement by Prime Minister Putin of a proposed new tax regime for coal. The overarching reality is that Russian coal will be exploited. The question remains by whom and at what environmental cost.

This brings the issue back to the global security framework as impacted by environmental factors such as global warming. A multitude of institutions ranging from the US National Security Council and US Department of Defense to the United Kingdom Defence Academy's Concept and Doctrine Centre are readily examining the links between the effects of climate change on traditional security challenges such as inter-and-intra state conflict catalyzed by global warming. In short, some argue that GHG emissions are not only a threat to the world's environment but a potential threat to global stability and security. This doesn't even begin to take into account the geopolitical impact of Russia's over-extended commitment to natural gas exports when its domestic production isn't even scheduled to increase until 2012. As Europe's energy import dependency continues to grow (for oil by the way from Russia as well as for natural gas) Russia is shopping the world for new gas finds particularly in its own backyard: Turkmenistan. Russia's need for export-gas to satisfy European import-gas demand catalyzes a whole array of foreign policy challenges undesirable to European interests including Russian bullying over its comparatively-weak but gas-rich southern neighbor. There is a reason the Nabucco pipeline remains a paper-tiger. This is a pipeline that could conceivably be filled with Turkmen gas that presently has one outlet: north to Russia. (There is one current exception to this which is the Korpheje-Kurt Kui pipeline from Turkmenistan to Iran. This pipeline however has never reached its capacity leveling out at 6.5 bcm/year at its height.)

Russian Gas

Europe is increasingly dependent on both Russian gas and oil. Statistics alone demonstrate this dependency. What are less obvious are problems inherent in Russia's gas industry posited against Europe's increasing demand profile for this resource. Roughly 80% of Russian gas comes from Western Siberia's giant and super-giant fields that are in steady decline. Since the early 1970s new discoveries have also been declining intensifying the importance on these maturing Siberian fields. Therefore for a variety of reasons ranging from depletion rates from Russia's aging super-giant gas fields, lack of investment in existent infrastructure and in new gas-field development to steadily increasing demand for power from gas domestically there are

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real concerns as to whether Russia can deliver contracted gas to its downstream customers. This should be a cause for concern for gas import dependent Europeans. In an ugly twist of fate, some argue that global warming is good for the future of Russia's gas industry as the melting of Arctic ice will liberate heretofore areas inaccessible to gas exploitation due to inhospitable climate conditions. On the other hand these same experts choose not to ponder on the fact that melting permafrost could also cause major infrastructure problems to the pipelines. Significant liberalization of Russia's concentrated gas industry has not occurred leaving one to wonder if and when Russia will begin to expand domestic coal fired power capacity.

Russian Coal Fired Power

The impact of the Great Recession on energy and power should be viewed against the long term trend of increasing global capacity and demand for electricity. Despite the projected decline in demand for new power in 2009, the first such decline since World War II, it is a timing issue as to when power demand will rebound and with it coal fired power. The significant issue is whether it would be more advantageous, from an environmental-security perspective within the framework of Russia's coal paradigm, that the majority of new coal capacity is driven by comparatively more regulated OECD countries or whether it will revert back to Russia. Russia's environmental record is not exemplary in this regard. In 2006 energy as a sector was already the largest contributor to Russian GHG emissions. While coal accounts for only 28% of Russian electricity production, due to the age and technology of Russia's overall power generating fleet coal (and energy) remains a major net contributor to Russian GHG emissions. In fact 84% of all Russian GHG emissions come from power generation and transportation combined.

What Russia plans on doing is to add some new 47.2 gigawatts of electricity from coal and nuclear by 2020 which would conservatively increase its CO2 emissions over 10% from 2003 levels. This is at a time when most nations are drilling back on capping emissions to their 1990 levels. In June 2009 Russian President Dmitry Medvedev said Russia would reduce its carbon dioxide emissions 10%-15% from 1990 levels by 2020. Important to understand is that due to Russia's painful period of economic transition which saw industrial activity decline over the 1990s, Russia's current emissions today are far below its 1990 levels. This lead Kim Carstensen of the World Wildlife Fund to state in response to the June 2009 Medvedev announcement that, "What Russia has announced means that it does not have to do anything about climate change between now and 2020. That's worse than anyone else." Even the most optimistic proponents of new Russian coal capacity should keep in mind that in China--which has the financial capacity to introduce new cleaner coal technologies-- only about 60% of the new plants being built are using newer technology that is highly efficient, but more expensive.

What to Do

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If Europeans are really concerned about Russian GHG emissions, both present and future, from coal fired power an enlivened discussion needs to take place with Russia on the net-back advantages of economy wide measures to increase Russian energy efficiency. According to a 2004 International Finance Corporation report Russia's current energy inefficiency is equal to the annual primary energy consumption of France. Russia's energy intensity is more than twice that of the United States, 3.1 times that of European Union, and higher than any of the 10 largest energy consuming countries in the world (Russia ranks third in the world in terms of energy consumption). To put this in some perspective, according to the IEA in 2004, Russia consumed nearly 0.6 kWh per \$GDP compared for example to 0.2 kWh/\$GDP in the UK for a per capita GDP of \$10,000 compared to the UK's \$30,000 per capita GDP. This means that Russia and the UK both consumed around 6000 kWh per capita of electricity but in the Russian case this produced one third of the GDP/capita achieved in the UK.

One thing going for the efficiency argument (and indirectly for enhancing global energy security by obviating an augmentation in new Russian coal fired power generating capacity) is the fact that it is comparatively much cheaper than instituting efficiency measures in Russia's power sector itself. Again according to the IFC, efficiency measures in the power sector itself are 31%, which is equivalent to 44.4 million tons of oil equivalent/year (mtoe). The focus in the energy sector is on savings in the natural gas sector through the introduction of combined cycle gas turbine technologies but this comes at a cost of some \$10.6 billion dollars a year or over \$1 trillion over the 10 years estimated to institute these measures. If these measures were carried out across the entire energy sector these savings would result in a savings of some 89 million tons of coal per annum. In 2007 Russia produced 240 million Mt on hard and lignite coal. Such savings would be the equivalent of nearly 37% of all 2007 coal produced for steam purposes a significant percentage by any measure.

In contrast, the same IFC report indicates that (potential) energy savings in the residential building sector is 49% which is 53.4 mtoe per year. It is estimated that 84% of these steps are considered economically viable with 46% of these steps considered financially viable. The focus here is on efficiency steps in space heating and water heating in residential and commercial buildings. The overall investment is estimated at \$50 billion with a return on investment over 2.8 years versus more than 13 years in the energy sector.

The real challenge, aside from the financing of these efficiency measures which has lagged even in the best of economic times, is designing how collaboration would work. Europeans have had marked success in this as evidenced by collaboration between Member States at the European Union level on significant policy issues including environmental ones.

Secondly, if the overall policy objective is GHG emissions mitigation versus overall energy savings (this is not to suggest that these objectives are incompatible) then careful consideration should be given to steps which maximize the emissions objective versus overall reductions in energy intensity or other consumption parameters.

Finally, the entire issue of Russian coal and the probability of Russian coal fired power expansion, would benefit from a much more global analysis of the potential implications of this roll-out across geopolitical, environmental, and the global security and stability landscapes. Russia will use its coal either through burning it or through export. How, when, and in what quantity it uses this resource is a reality that needs to be acknowledged and confronted. Europeans themselves need to examine the real policy implications of their dependence on Russian natural gas beyond the environmental benefits derived its burning. Turning a blind-eye to the geopolitical implications of where and how Russia gets its export gas to Europe is unconscionable.

There is no proprietary ownership over environmental issues: there is room for both the policy hawks focused on the hard security landscape and the environmental left focused on the science of climate change. Together, real traction can be generated in confronting and cooperating with Russia on addressing its own energy challenges and in doing so avoiding the negative and cascading effects from doing nothing.

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