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Introduction to Global Coal Markets

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Introduction to Global Coal Markets

Chair of Energy Economics and Public Sector Management, Dresden University of Technology (TUD)

Supply security issues in the coal market have been subject to very little analysis in the last decades, despite the increased importance of coal as a primary energy source. In fact, amid concerns about global warming and CO₂ emission reductions, coal is currently experiencing a “Renaissance” due to its relative low price and tensions on other primary energy markets (oil, natural gas, cf. other SECURE work packages). Power production based on steam coal input¹ has received increasing attention lately due to the advent of “clean-coal” technologies. These technologies, which aim at significantly reducing the greenhouse gas emissions, may considerably extend the viability of coal-based electricity generation despite the present climate change concerns. Technological advances like carbon sequestration and storage will be necessary if the dirtiest fossil fuel in traditional combustion (compared to oil and natural gas) is to be used in a medium- and long-term future (MIT, 2007). As we will further investigate in deliverable 5.3.3, it seems to be critical for the European security of coal supplies to rapidly bring these technologies into the market.

Next to the internal risk of coal use in a carbon-constrained environment, the security of external coal supplies needs to be analyzed. Globally, the use of coal has considerably increased in the last years, mainly due to the high energy demand growth in China and India (see IEA, 2007). Approximately 15% of the produced hard coal is internationally traded (the rest being used domestically), from 2000 to 2005 the amount of yearly traded coal increased from 210 Mio. t to 755 Mio. tons.

Historically, one can discern two geographical markets: the Pacific market with imports from Australia, Indonesia and China (to a lesser extent also from South Africa, USA, Canada) to Asia (Japan, South Korea, Taiwan, ...); and the Atlantic market with imports from South Africa and Colombia (to a lesser extent also from the USA, Canada, Poland, Russia, Australia, Venezuela) to Europe and North America. Recent research of international coal markets has pointed out that the traditional separation of the Pacific and the Atlantic market has faded (Ellerman, 1995; Warell, 2006; Li, 2008). However, the spatial aspect of the market plays a considerable role with transport costs being an important factor in determining the trade relations.

¹ Hard coal must be distinguished into steam (thermal) and coking (metallurgical) coal, depending on its calorific content and other chemical properties. Steam coal, that is almost exclusively used for electricity production, can be considered a homogeneous good.

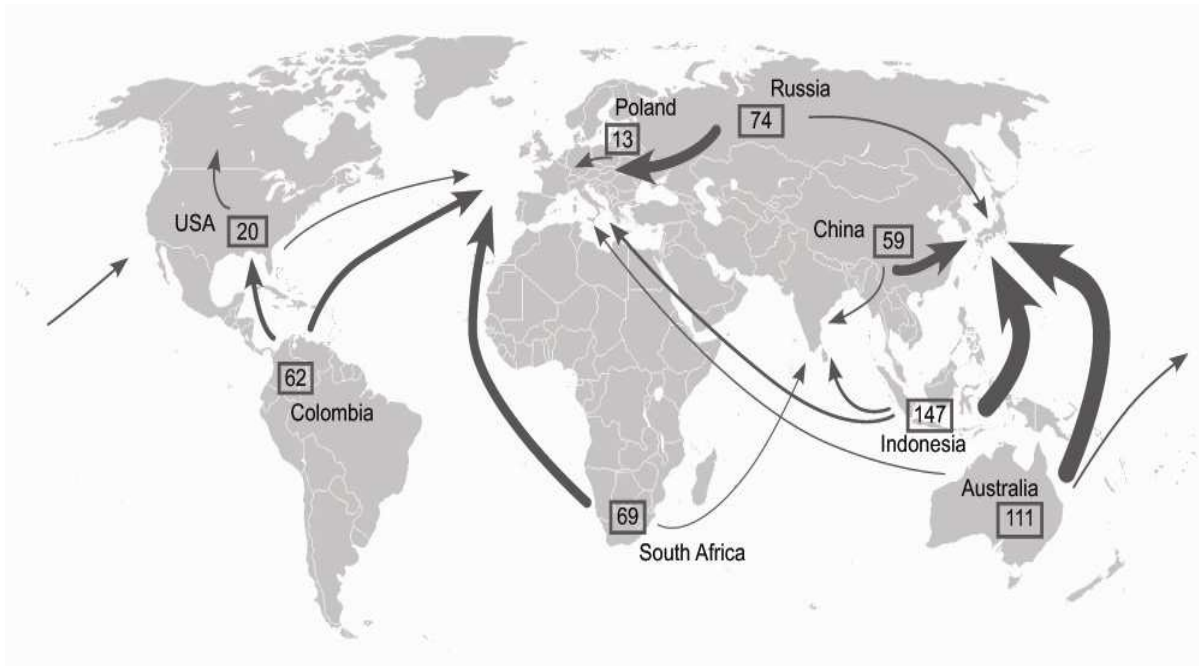


Figure 1: Trade flows in the seaborne steam coal between major exporters and importers, 2007

Source: IEA (2008)

Most large coal consumers satisfy a significant share of their demand on the world market, often because domestic reserves have declined but left behind a certain industry structure “locked in” with coal use (e.g., in Germany, the UK). For these consumers imported steam coal became more attractive than exploiting their own high cost reserves. The world coal markets in the last decades have provided a relatively cheap supply which also attracted new consumers like China and more recently India.

	Imports dependency rate	Share of steam coal in electricity production
Germany	69.2%	20.6%
Italy	99.5%	14.4%
Spain	71.0%	23.5%
UK	63.4%	33.7%
USA	1.8%	47.9%
Japan	99.5%	24.5%
South Korea	95.4%	35.1%
Taiwan	100.0%	52.8%
China	11.0%	78.4%

Table 1: Import dependency rates of major steam coal consuming countries

Source: IEA (2007)

Table 1 reports the import share of total consumption for the major consumers of steam coal. Several European countries rely for about 70% of their steam coal consumption on imports, for some resource-poor Asian countries (Japan, Taiwan, South Korea) this rate goes up to 100%. Table 1 also shows the contribution of imported steam coal to the total electricity generation. In the European countries this share ranges from 15% to 20% and in Asia, is even higher ranging from 20% to more than 50% for Taiwan. China's share is lower but given the very important amount of coal used the imported steam coal is a very substantial amount in absolute terms. Given the importance of the international market for steam coal, we would like to better understand its supply structure.

Virtually all major exporters can be considered as “safe” countries in geopolitical terms and, unlike in the oil and gas markets, no sudden supply disruption on political grounds can reasonably be expected. Major exporters are Australia, South Africa, Indonesia, USA, Russia, China and Colombia. Short term supply disruptions may occur due to natural disasters like storms and floods or social tensions leading to strikes. However, efficient supply management with stockkeeping and supply diversification can reduce the short-term risk of disruption for the importers.

Hence, after a first look at the supply structure, we see that there is little risk for the security of supplies from the export market, especially in the medium to long term. The sub-tasks on import diversification (deliverable 5.3.2.1) and on a structured numerical model of the global coal trade will give further insight into the external risk of coal supplies.

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