DARK MATERIALS

"And all our yesterdays have lighted fools the way to dusty death"

William Shakespeare, "Macbeth", Act 5, scene 5

Special Report on social, environmental and economic aspects of global coal dependency - with specific reference to Indonesia and India



Photo courtesy of Jatam, depicting coal operations in Kalimantan

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Abbreviations:

APAC – Asia Pacific region

BTU (Btu), or British Thermal Unit - is the approximate amount of energy needed to heat 0.454 kg of water by $1^{\circ}F$ (0.556°C). The term is widely used when assessing the heat value of specific coal deposits and products.

CV – Calorific Value. A 600 MW coal-fired power station, operating at 38% efficiency and 75% overall power availability will consume approximately 1.5 million tons a year of bituminous coal and almost three times as much lignite of brown coalⁱ

GGE – Global Greenhouse Gas Emissions

K/k – kilograms

J/j – joule: a unit of heat or kinetic energy, practically expressed as equivalent to that of "a tennis ball moving at 23 km/h (14 mph)"ⁱⁱ

JV – Joint Venture

M/m – million

MoU (MOU) - Memorandum of Understanding

pa - per annum

t - short tons

te - metric tonnes

Watt - a unit of power signifying the rate at which energy is generated and consumed

MW – a million watts

TW-terawatt (trillion watts)

Key Sources quoted:

ABARE – Australian Bureau for Agriculture and Resource Economics

BP 2010 – BP Statistical Review of World Energy 2010 (annual)

EIA – The US Energy Information Administration's "International Energy Outlook" (2010 & 2009): http://www.eia.doe.gov/oiaf/ieo/index.html

FT – Financial Times

Interfax China M&M – Interfax China Metals & Mining (weekly)

MJ – Mining Journal

MM – Mining Magazine (monthly)

WC - World Coal magazine (monthly)

(All dates given are as per day/month/year, e.g. 1/4/2010 denotes April 1st 2010)

PART ONE: the Watt, the How and the Why

Introduction

Thermal, or *steam*, coal accounts for around 70% of global output of the fossil fuel. It is burned to create steam that propels turbines. The majority of the world's electrical power currently relies on the burning of thermal coal.

The remainder of mined coal is used primarily for manufacturing steel and cement. The former - *metallurgical*, or *coking* - variety is usually of a higher quality than that used to generate electricity; and its market price reflects the fact.

The World Coal Institute is keen to proclaim the indispensability of coal in serving other needs - notably for alumina refining, paper, chemical, pharmaceutical and fertiliser production. Claims the Institute: "Thousands of different products have coal or coal by-products as components: soap, aspirins, solvents, dyes, plastics and fibres, such as rayon and nylon" [*World Coal Institute, 2010*]. However, these absorb only a small fraction of the mineral's overall output, and substitutes have long been available.

As of early 2010, contracts for metallurgical coal were set at a benchmark price of US\$200 a ton [*MJ* 12/3/2010] and predicted to rise to US\$215 by the end of this year [*Dow Jones* 27 July 2010]. Although the price may not return to its record 2008 peak of U\$300 per ton [*FT* 2/12/2009], in July some Chinese mills were apparently paying US\$295.33 per ton [*Interfax China M&M* 2/7/2010].

The spot price of steam coal currently hovers around the US\$100-US\$120 mark. It is not likely to rise in the near future: consignments traded under contracts, for delivery in October by South Africa to Europe, were being priced at below US\$ 100 [*Reuters 5/8/2010*]. In 2009, customers purchased just less than 750 mte of thermal coal from around the globe [*see: BOX 1 below*].

Since 2008, Indonesia has been the world's leading exporter of thermal coal: its estimated share of that market in 2007 was already just more than a quarter of the total (25.5%). [International Energy Agency, Coal Information, 2008].

Demand for metallurgical coal in 2009 was approximately 220 mte – less than a third of that for steam coal, although this figure may rise slightly in 2011, to 240 mte [*Dow Jones, op cit*].

After Indonesia, Australia (*see Part Three below*) is the most important supplier of exported thermal coal. Australia is also the pre-eminent metallurgical coal exporter, currently enjoying a 50%-plus share of the world market (140 mte is scheduled for Australian despatch during 2010).

Russia is a major source of coking-grade coal, although the Federation's output has fallen of late [*SteelOrbis, 21/5/2010*]. Other consignments derive from mines in the US and Canada. Collectively, Chinese, Indian and Brazilian steel mills are the main consumers of imported metallurgical coal.

From now on?

The virtual collapse of inter-bank lending (triggered by 15 years of rich men "securitising" debt without the assets to back it) cast billions of poorer people into the financial "nuclear winter" of late 2008.

Virtually all commodity prices ran into the ground - not least that of coal, the most widely-employed fuel for powering industrial "development".

As many capital-intensive infrastructure projects hit the skids across the globe, so did energy demand – not only for thermal coal but, even more so, for the type used in steel smelting and cement kilns. Demand for electricity in Japan - the world's second largest economy and importer of coal - fell precipitately in the months following the September 2008 "meltdown" [*The Federation of Electric Power Companies of Japan*, 2009].

This had only a temporary impact on coal markets. The price of seaborne steam coal might have toppled from a high of US\$200 in mid-2008 to a little over US\$60 by March 2009 ["Future of Indonesian Energy Coal and Japanese Involvement", presentation by Chairman, Japan Coal Energy Center and President, Electric Power Development Co., Ltd, Yoshihiko NAKAGAKI, 27/3/2009]. Nonetheless, by profiting from the "bearish" situation, China for the first time became a net importer of coal, primarily in order to build up its stockpiles of the metallurgical variety (see Part Two below). And thus, the bulls returned to the ring – the selling price rose.

Of late, many governments, mining companies and banks, have proclaimed a global economic revival to be underway. Some market "gurus" are not as sanguine, forewarning of a "double dip recession".

So far, in fact, there is little evidence to suggest any long-term recovery – especially in commodity prices, with the notable exceptions of gold and silver.

Australia's coking coal production increased by 73% (1.6 Mt) in the first half of 2010. Nonetheless, Xstrata plc – a world leader in the mining of both main types of coal suffered a drop in its overall production, due to the closure last year of a major South African mine [MJ 30/7/2010]. Some European, including Russian, coal pits have shut up shop altogether, while the region's coal demand, as a whole, flattened-out in 2009 [BP 2010]. Colombia predicts that its own exports to Western Europe will soon fall (*see Part Two below*). Indonesia's European exports may also follow suit - just as demand from Asia seems to be reaching new heights.

It is true that global coal trade as a whole is virtually certain to expand in the short term, as will domestic mining in some countries. Chile, for instance, is now planning to switch from its traditional reliance on hydro power to the burning of coal (See: **Part Two**, below).

On present showing it will take at least another 10 years before global dependence on coal is materially reduced. It's a "decade of grace" that the planet simply hasn't got. The longer-term (2012 - 2020) prospects of an expansion in coal output hinge on a number of, as yet, undetermined factors. Were a global political consensus soon arrived at to slash global greenhouse gas emissions (GGE) to 1990 levels (at the very minimum), the days of dependence on the black stuff will be numbered. The substitution of thermal coal for liquid natural gas and so-called "renewables" (solar, wind, wave power) *is* already happening, albeit far too sluggishly and with little noticeable immediate impact. Ministers for each of Earth's three greediest carboneating states - China, the US and India – are on record as intending to reduce reliance on coal. But (as St Augustine qualified his plea to God to make him chaste) they don't want to do so yet.

On present evidence it will take at least another 10 years for this to happen. And that is a "decade of grace" our biosphere simply hasn't got.

Statistics – and damned statistics?

The Australian government's ABARE (*see BOX 1 below*) paints a fairly rosy picture of coal's viability in the immediate future. Nonetheless, the Bureau's data should be regarded with caution – as should most other such predictions.

First, ABARE's data relates to thermal not metallurgical coal. Second, (as mentioned earlier) it takes no account of possible changes to state policies, tighter corporate governance, the advent of stricter environmental regulation, the implementation of Indigenous Peoples' specific rights and, not least, how the rules of REDD will work out in practice. (These programmes, ostensibly aimed at limiting GGE from forested regions, are particularly relevant to the future of coal mining in Kalimantan and Sumatra, Indonesia. However, REDD proposals have come under consistent attack for their current failure to guarantee community rights).ⁱⁱⁱ

Add to these limitations: possible future constraints on foreign direct investment in roads, rail and port construction – all of them essential to actually getting coal to markets. Not to mention: disruptions to mining caused by unforeseen events – whether "natural" (earthquakes, floods) or a result of human negligence (such as underground explosions, subsidence, cave-ins and the collapse of tailings or stock piles).

Any of these occurrences would severely limit coal extraction rates and mining capacity. In fact, ABARE's projections (even were they to be confirmed) do not presage a "coal rush" being about to strike across our planet. According to the Bureau, imports through 2011 will hardly amount to a tenth more than they were in 2009 (806 mte as against 737 mte). Exports will expand by a modest 60 mte (which is equivalent to last year's output from Indonesia's Kaltim Prima mines alone).

The promise that technology will avert the devastating impacts of carbon dependency must unequivocally be laid to rest

This doesn't mean that continuing to rely on coal, particularly as a source of electrical power, isn't already catapulting us into an irreversible collision with the climate. If

the science is credited, we have reached a tipping point in our exploitation of fossil fuels. At the very least we should be calling for the immediate closure of some existing mines; a ban on expansion at many others; and a moratorium on the opening of further large scale open pits.

Meanwhile, the chimerical promise held out by industry, that technology will avert the inevitable by "Capturing and Storing" carbon (CCS) – even as billions more tonnes of CO2 are spewed into the atmosphere – must unequivocally be laid to rest. [See: DTE Special on Coal and Climate Change - http://dte.gn.apc.org/85-86.pdf].

<u>BOX 1</u>

EN Countries which N	MINE, CONSUMI
ures are in million tonnes	s of oil equivalent)
MINING & PRODUC	ING COUNTRIES
China	(1,552.9)
US	(539.9)
Australia	(228.0)
India	(211.5)
Indonesia	(155.3)
South Africa	(140.9)
Russian Federation	(140.7)
Poland	(56.4)
Kazakhstan	(51.8)
Colombia	(46.9)
CONSUMING COUN	<u>TRIES</u>
China	(1,537.4)
US	(498.0)
India	(245.8)
Japan	(108.8)
South Africa	(99.4)
Russian Federation	(82.9)
Germany	(71.0)
Poland	(53.9)
Australia	(50.8)
South Korea	(38.7)
Sound Rolla	(30.7)
RESERVES BY COUN	TRY
US	(238,208)
Russian Federation	(157,010)
China	(114.500)
Australia	(76,200)
India	(58.600)
Ukraine	(33.873)
Kazakhstan	(31.300)
South Africa	(30,408)
Brazil	(7059)
Poland	(7,052)
1 010110	(7,052)
e: BP 2010	
	EN Countries which I ares are in million tonness MINING & PRODUC China US Australia India Indonesia South Africa Russian Federation Poland Kazakhstan Colombia <u>CONSUMING COUN</u> China US India Japan South Africa Russian Federation Germany Poland Australia South Korea <u>RESERVES BY COUN</u> US Russian Federation China Australia India Jupan South Korea <u>RESERVES BY COUN</u> US Russian Federation China Australia India UKraine Kazakhstan South Africa Brazil Poland

		<u> </u>		
(with ABARE pr	ojections for 20	010 and 2011)		
Darian/				
<u>Kegion/</u> Country	2000	2010*	2011* (in mta)	
<u>Global</u> :	737.3	778.4	<u>805.8</u>	
Asian region	452.2	478.5	497.6	
Ianan	117.0	120.0	121.0	
China	92.1	98.3	103.0	
S Korea	80.5	82.0	83.0	
Taiwan	59.4	59.6	60.2	
Malavsia	16.1	16.4	17.1	
India	4.0	68.0	77.0	
Other Asia	33.1	34.2	36.3	
Europe	211.4	220.2	225.8	
Europe Other global	211.4 73.7	220.2 79.7	225.8 82.4	
Europe Other global <u>THERMAL COA</u> (and ABARE pro <u>Region/</u>	211.4 73.7 (L EXPORTS i jections for 201	220.2 79.7 i <u>n 2009</u> 11 and 2011)	225.8 82.4	
Europe Other global <i>THERMAL COA</i> (and ABARE pro <u>Region/</u> <u>Country</u>	211.4 73.7 A <u>L EXPORTS i</u> jections for 201 2009	220.2 79.7 (<i>n</i> 2009) (11 and 2011) 2010*	225.8 82.4 2011* (in mte)	
Europe Other global THERMAL COA (and ABARE pro Region/ Country Indonesia	211.4 73.7 <u>AL EXPORTS i</u> jections for 201 <u>2009</u> 233.5	220.2 79.7 <u><i>in</i> 2009</u> 11 and 2011) <u>2010*</u> 250.0	225.8 82.4 2011* (in mte) 254.0	
Europe Other global <u>THERMAL COA</u> (and ABARE pro <u>Region/</u> <u>Country</u> Indonesia Australia	211.4 73.7 AL EXPORTS i jections for 201 2009 233.5 139.1	220.2 79.7 in 2009 11 and 2011) 2010* 250.0 142.4	225.8 82.4 2011* (in mte) 254.0 158.0	
Europe Other global <i>THERMAL COA</i> (and ABARE pro (and ABARE pro Region/ <u>Country</u> Indonesia Australia Russia	211.4 73.7 AL EXPORTS i jections for 201 2009 233.5 139.1 91.7	220.2 79.7 in 2009 11 and 2011) 2010* 250.0 142.4 97.0	225.8 82.4 2011* (in mte) 254.0 158.0 102.8	
Europe Other global <u>THERMAL COA</u> (and ABARE pro <u>Region/</u> <u>Country</u> Indonesia Australia Russia South Africa	211.4 73.7 AL EXPORTS i jections for 201 2009 233.5 139.1 91.7 66.9	220.2 79.7 in 2009 11 and 2011) 2010* 250.0 142.4 97.0 67.0	225.8 82.4 2011* (in mte) 254.0 158.0 102.8 71.0	
Europe Other global THERMAL COA (and ABARE pro Australia Australia Russia South Africa Colombia	211.4 73.7 <u>AL EXPORTS i</u> jections for 201 <u>2009</u> 233.5 139.1 91.7 66.9 63.4	220.2 79.7 in 2009 11 and 2011) 2010* 250.0 142.4 97.0 67.0 65.0	225.8 82.4 2011* (in mte) 254.0 158.0 102.8 71.0 71.0	
Europe Other global <u>THERMAL COA</u> (and ABARE pro <u>Region/</u> <u>Country</u> Indonesia Australia Russia South Africa Colombia China	211.4 73.7 AL EXPORTS i jections for 201 233.5 139.1 91.7 66.9 63.4 21.5	220.2 79.7 in 2009 11 and 2011) 2010* 250.0 142.4 97.0 67.0 65.0 20.0	225.8 82.4 2011* (in mte) 254.0 158.0 102.8 71.0 71.0 20.0	
Europe Other global <u>THERMAL COA</u> (and ABARE pro <u>Region/</u> <u>Country</u> Indonesia Australia Russia South Africa Colombia China United States	211.4 73.7 AL EXPORTS i jections for 201 2009 233.5 139.1 91.7 66.9 63.4 21.5 19.4	220.2 79.7 in 2009 11 and 2011) 2010* 250.0 142.4 97.0 67.0 65.0 20.0 22.0	225.8 82.4 2011* (in mte) 254.0 158.0 102.8 71.0 71.0 20.0 23.0	

The Kindnesses of coal – and some consequences of mining it

Coal's rank – or quality - is calculated according to the degree that the original plant material has been transformed over time into carbon.

Usually, the older the coal, the higher its carbon content. Generally speaking, the higher that content, the cleaner the coal; and the more heat is created per unit of the raw material burned (its calorific value or CV). *Anthracite* -with the highest carbon content – gives out more heat than any other type. *Bituminous Coal* (so-called because of its bitumen content) is generally dirtier than anthracite, while *sub-bituminous* coals are dirtier still. At the bottom of this sprawling heap lies *lignite* – the dirtiest fuel of all [*see: BOX 2*].

Critical to evaluating the damages inherent in various coal bodies is knowing the proportion of sulphur within them; this may differ widely, even within specific, apparently discrete, deposits. Unless safeguarded from contact with oxygen and

water, high sulphur stockpiles and related wastes will produce sulphuric acid (SO2). This then leaches out toxic heavy metals within the ore or surrounding soils that may then prove highly dangerous to marine life. If these poisons bio-accumulate and biomagnify through the food chain, they will harm human life itself.

Sulphur fumes, emitted from power stations and unless adequately captured at the plants themselves, are also a major contributor (together with ammonium, nitrogen and carbon) to "Acid Rain" – a phenomenon that has already wreaked havoc on huge areas of forest growth.

Contrary to common perception, the higher-quality coking coal required for steel manufacture may also contain significant quantities of sulphur (2% or more).

Although traditionally burned in European steel furnaces, this type of coal is now less sought after by the region's customers. Nonetheless, steel mills in China are now said to be entering the market for this high-sulphur variety and mixing it with consignments previously destined for power stations [*Commodities Now*, 28/6/2010 – see also US, **Part Two** below]

<u>BOX 2</u>

From the dirtiest to somewhat less dirty

• *LIGNITE* (also known as Brown Coal) is inherently the most contaminated, and potentially polluting, of mined coals. Its carbon content ranges between 20% and 40%; its moisture content can amount to 70% by volume; and its ash content may rise to as high as 20%. Lignite customarily contains more sulphur than any other coal type.

This fuel is also susceptible to spontaneous combustion, creating dangers from transporting and storing it [*MM May 2010*]. Due to its soft and crumbly nature, lignite may disintegrate in stockpiles.

Strip-mined by the biggest excavators, shovels, draglines and crushers on earth (some with the capacity to scoop out 12,000 tons of the material *every hour* [WC 5/2010]), lignite is a cocktail of potential toxicity, including mercury, other heavy metals, radioactive isotypes and particulate matter. The latter are microscopic particles that, when suspended in air, that are a major trigger of Upper Respiratory Tract infections in the population at large. Particulates are attributed as a prime cause of the so-called "South Asian brown cloud" that has damaged so many of the region's forests [See: Phulbari Coal: A Parlous Project: A critique of the GCM Resources PLC Environment and Social Impact Assessment (ESIA) and Summary Environmental Impact Assessment (SEIA) for the Phulbari Coal Mine Project in Bangladesh, prepared by Nostromo Research for Bank Information Center, 12/11/2008].

All these hazardous materials should be thoroughly washed-out at the crushing or milling stage before being dried, if necessary blended, and then shipped to a power plant or other consumer.

Although located in many countries, brown coal was the staple fuel for the massive 20th century industrialisation of Europe - notably by Germany, Poland, Serbia, Bosnia, Bulgaria, Greece, Romania, Italy, Hungary, the Czech Republic, Russia and Turkey.

However, civil society movements in many of these countries have compelled the imposition of tougher air, water, and soil quality standards - thus significantly curbing Europe's lignite extraction.

Nonetheless, China, Thailand, Indonesia, and Pakistan host significant lignite deposits and are mining some of them. So is Australia's LaTrobe Valley, and a number of midwest and southern US states [*MM 5/2010, ibid*].

India's Nevyeli mine, in Tamil Nadu, is the country's largest lignite mine and one of the biggest in the world. Its reserves total around 2 billion tonnes; it employs a workforce of 22,000 people, and it extracts some 24 mte per annum. For many years, this mine has dug beneath artesian water tables, with serious consequences to water availability and quality [See: "Water in Mining Areas", R Sreedhar, Environics Trust, Delhi, undated]

• *SUB-BITUMINOUS* coals (sometimes called "black lignite") are of a higher grade than lignite, containing less moisture (between 25%-30%), less sulphur, and generally (though not always) is used for thermal power generation. Their heating potential is higher than that of lignite - ranging from 8,300 to 11,500 BTU/lb (19,306 – to- 26,749 kJ/kg). But, like lignite, these coals are susceptible to spontaneous combustion if not packed densely enough to exclude air flows.

In Indonesia, sub-bituminous coals are produced by KPC at its Pinang and Bengalon mines, both for domestic and foreign consumption [*WC* 5/2009] and are in demand mainly because of their low (0.2%) sulphur content [*WC*, *ibid*].

PT Adaro also extracts sub-bituminous coals from its Titupan mines for their medium heat and "ultra low" sulphur, ash, and NOx (nitrogen oxides) content. Again, these are used within Indonesia itself and also despatched to overseas customers [*Adaro at a Glance: www.adaro.com*].

Similarly, Banpu's Torong mine supplies lower-heat, sub-bituminous, products, allegedly with a very low sulphur content, destined for an onshore power station and to foreign markets [*WC 5/2009, op cit*]

• *BITUMINOUS COAL* is soft, dense, and black, with a moisture content less than 20 %, used for generating electricity, making into coke, and in space heating (essentially, the blowing of warm air into buildings).

The heat potential of this product ranges between 6.8 and 9 kW/kG, and it has a lower sulphur and ash content than the sub-bituminous variety. However, coking coal supplied by Indonesia to Japan does have a significant ash content of 8% [Asia Energy, 4/4/2010].

Bituminous coals are mined in Indonesia at PT Arutmin's Satui and Senakin mines in South Kalimantan [*information from PT Arutmin – see also: Thiess, Part Three*]

below]. KPC earmarks this higher grade of coal solely for export, from its Pinang and Bengalon mines [*WC 5/2009, op cit*].

Banpu's Bontang and Trubaindo mines in Indonesia also deliver mid-to-high heat bituminous steam coals exclusively for export.

Conscious of the need to upgrade ("clean") brown, sub-bituminous and bituminous Indonesia coals, the Japanese government has embarked on a technical joint venture with Indonesian authorities, designed to "achieve high efficiency and environmental friendliness" (sic) ["*Future of Indonesian Energy Coal and Japanese Involvement*", 27/3/2009, op cit]. Partners in this venture include PT Bumi, PT Arutmin on the Indonesian side, and Kobe Steel and JCOAL from Japan. Although this venture is recent, it is already claimed to demonstrate that "Indonesian coal should not be feared" (sic) [*Future of Indonesian Energy Coal, ibid*]

• *ANTHRACITE* (*aka* Hard Coal) is black, lustrous and hard. Low in sulphur, high in carbon (between 86-98%), with a moisture content generally lower than 15%, it possesses the highest heat value of the four main coal varieties (9kW/kg) of coal. Employed mainly for power generation, but also in smelting steel, anthracite's share of the world market is minor, compared to that of the other three main coal varieties.

Indonesia – leading the export pack

The six principal thermal coal-exporting countries are Indonesia, Australia, Russia, South Africa, Colombia and – until last year - China [*WC 5/2009*].

But they are not the most important producers of all types of coal.

Here, China streaks ahead of its rivals, followed - considerably behind - by the US, Australia, India, Indonesia, South Africa and Russia [*BP 2010, op cit*].

Indonesia and Colombia surrender far more in domestic value by foreign exploitation of their coals than any other major coal-endowed economy

Significantly, Indonesia doesn't feature among the top ten coal consuming states. The country's domestic consumption of coal in 2009 (at 30. 5 mte oil equivalent) was barely greater than that of the United Kingdom (just 29.7 mte) [*BP 2010, ibid*].

The failure to employ this indigenous fuel to serve domestic power and industry, and instead provide it to other states, is even more marked in the case of Colombia. The Latin American state consumed only 3.1 mte last year, while the country's mined output was 15 times as great (nearly 47 mte) [*BP 2010 ibid*].

Thus, Indonesia and Colombia are surrendering far more of the domestic value of their coals to foreign benefit than any other major coal-endowed economy.

In stark contrast Japan and South Korea (which together mined less than 2 mte of coal in 2009) currently feature as the 4^{th} and 10^{th} most coal consumptive states in the world [*BP 2010 ibid*].

Indonesia is disposing of its "family silver" at a rate and to a degree unrivalled anywhere else.

Moreover, by the end of last year, the amount of Indonesia's coal-in-the-ground stood at a mere 4,328 mt. The country's chief competitors for coal export contracts (Australia, Russia, South Africa and Colombia) host sufficient coal to sustain their sales for years to come. In contrast, Indonesia currently ranks just 19^{th} in terms of its reserves and resources – a mere 0.5% of the global total [*BP 2010 ibid*].

It should be borne in mind that figures for proven coal reserves and inferred resources may be revised upwards, following an expansion in exploration. At present, however – and put bluntly - Indonesia is disposing of its "family silver" at a rate, and to a degree, unrivalled by any other administration on our planet.

Behind the figures - some stark realities

Statistics often appear flat and become tedious to digest. Nonetheless, they can tell important tales. Knowing the amount of heat (BTU) contained within the raw material shows how much of it will have to be extracted to deliver a given branded "product". Calculating moisture content enables even a "non-expert" to roughly estimate the amount of treatment required to turn a wet coal into a drier one.

Similarly, if the ore is high in sulphur and other potentially hazardous materials, we may make at least a thumb-nail indication of likely full "life cycle" environmental and health impacts, should the toxic contents not be completely eliminated.

Even if these heavily-contaminated coals are "washed" (and this is not to ignore the toll in water usage required for that to be effective) there remain the challenges of disposing permanently of the acidic wastes left behind.

A recent (May 2010) investigation of the vast open-cast operations Kaltim Prima Coal (KPC) in East Kalimantan was carried out by this author and Indonesian colleagues. It produced evidence that, at only one or two sites, had high-sulphur coal been covered with "impermeable" sheets to protect them from heavy rainfall, and separated from contact with adjacent water bodies.

Indeed, the team identified several instances of a direct leaching of toxic spoils into lagoons within the concession areas. In one case (KPC's only operational mine that is open to public viewing) run-off was piped into a pond which, although ostensibly treated with lime to reduce its high acidity, was then being siphoned directly into a river used by local villagers.

Once we can tell how the coal is being extracted, and the "strip ratio" (the degree of overburden, in the form of rock, soil and vegetation, that must be removed to access the ore body) we may determine a mine's likely impacts on human habitation; the capacity of local people to continue growing crops, rearing rear livestock, breeding fish, gathering other foodstuffs, or of their sustaining a variety of other livelihoods.

All mining imposes a "footprint" that encompasses not only the mine's own infrastructure, but much else besides: transport routes, sea or river ports, facilities for

workers, units for sewage disposal, and generation of the power needed for the extraction operation itself. Habitually, all of these constructions will affect the availability and use of endemic natural resources over a far larger area than was projected in the initial mine construction plan. In fact, they may sequester and profoundly damage up to thirty times more territory than the mine itself [See: Phulbari Coal: A Parlous Project. 12/11/2008, op cit].

Underground extraction usurps far less land than a strip, or open-cast, mine. However, due to the ever-present risk of a release of potentially highly-explosive methane, workers' lives are continually placed in danger [*see: China, Part Two below*].

Open-pit mining (employed in Indonesia and the commonest practice throughout the world, with the marked exception of China) may be less hazardous to workforces; even so, injuries still occur from blasting and use of unsafe equipment. Nonetheless, methane will also be released to the open air, thus increasing the contribution of this very potent greenhouse gas to global warming.

In theory, underground mining is more likely to reach into sub-surface aquifers and pollute them, or severely reduce their volume and availability. However, the deeper an open coal pit, the greater the likelihood that it, too, will contaminate underlying water tables [*See: Phulbari Coal: A Parlous Project: 12/11/2008, ibid*]. India's Neyveli lignite mines have been impacting underground – as well as surface – water bodies for several decades; there is little sign that this situation will improve in the near future [*see BOX 2, above*].

The vast overground workings of Kaltim Prima Coal at the company's Sangatta and Bengalon concessions in East Kalimantan, each stretch for more a kilometre across. They plunge from crest to bottom almost the same distance, creating a moonscape that, if all the plans of KPC's mines and men become fulfilled, will cut a 30 mile wide swathe, advancing 100 km north of Sangatta town [*Information from Jatam, Samarinda, 14/5/2010*].

According to one of Indonesia's leading environmental and human rights activists, Chalid Muhammad, the Kaltim Prima mines are sacrificing 12,000 hectares each year – an invasion that is fated to be enormously compounded unless present advances by Bumi Resources and Tata of India (the leading investors in KPC) are halted [*Chalid Muhammad, interview with author, Samarinda, East Kalimantan, May 2010*].

When it comes to rehabilitating a closed-down underground mine, much of the waste can be (and is) deposited down the empty shafts. But this cannot happen if the coal has been scooped from hills and valleys, leaving behind degraded surface rivers and streams. Left behind will be series of horizontal plateaus (known as "benches") which vertically descend at slopes, usually too steep to ensure long-term ground stability, and bereft of the nutrients vital for adequate plant regeneration.

Even were this not the case, the extraction process will already have robbed the soil of most of its essential biota and precluded access to fresh water - in some cases over many years. A closed mine-site may appear to be afforested, clothed in green, and made pleasing to the eyes - a veritable family picnic site. This in no way compensates for the reality that, while the mine was operating, it will have robbed the land and land

users of much of the sustainability on which they earlier depended. The subtraction of this "natural capital" from a given biosphere reserve – sometimes over many years is rarely accounted for.

Sangatta town has already been blighted, perhaps terminally, by its over-dependence on the extraction of what, when all is said and done, are essentially irreplaceable resources. At least one community's farmland has been rendered useless as a result of flooding, allegedly triggered by KPC's denudation of upstream forestry. The company's main tailings (waste disposal) dam within the city limits, to which coal washings are assigned, is reportedly in a parlous state, and prone to seepage.^{iv}

Finally, we should not be misled into believing that, because one type of coal may be less riddled with contaminants than another, the end product is necessarily more acceptable. PT Adaro boasts that its branded "Envirocoal" is ultra-low in sulphur (0.1%), contains a maximum 2% of ash and less than 1% of nitrogen (NOx).

Nonetheless, Adaro's raw coal is sub-bituminous, with a low-to-moderate calorific value (CV). Hence, proportionately more of it must be stripped out than deposits which have a higher heat content, in order to produce the same amount of energy. Adaro suggests that "in countries such as Japan, with limited ash disposal areas" its Envirocoal may be "blended with higher ash coal [to] reduce the on-costs (sic) associated with ash disposal." [*PT Adaro website, accessed 29/7/2010*].

(Why does a company, proud to proclaim that its product possesses "unique environmental properties", urge customers to mix it with coal that is significantly higher in a major contaminant? Presumably, only in order to increase its own export market share).

Perhaps more important is to realise that bituminous coals, extracted by PT Arutmin and KPC for export to Japanese steel foundries, are reportedly considerably higher (8%) in ash than Adaro's. Such a proportion is far from negligible.

Arsenic, cadmium, lead, selenium, and other toxic metals contained within coal ash, can cause cancers and inflict irreversible neurological damage on humans as well as poison fish and wildlife for many kilometres downstream [*Environmental News* Service, 24/2/2010].

This is indeed "Deadly coal"!"

Following the trails

Campaigners have discovered from bitter experience that, more often than not, it is impossible to determine which consignments of dug-up coal end up in a particular plant. Electricity utilities may claim they themselves can't access this information. And it is true that coals are frequently mixed - at the mine site, port, or other points, before delivery to the customer. Nonetheless the buyer will always know – indeed *has* to verify – the quality of its purchases.

Most exported coal, conveyed from the mine by river or road, is then loaded onto seagoing vessels which are owned by national, regional or international trading companies - such as Glencore. In a recent (May 2010) tour of the Bengkulu coal terminal in Sumatra, the author and his Indonesian colleagues identified a consignment of blended coal, being loaded onto a barge destined "for South Asian markets". No further information was provided by the security official at the port.^{vi} However, as already noted, coal exported from East Kalimantan with the label "Envirocoal" (affixed by PT Adaro) should serve to identify the specific source. Surely it is the bounden duty of power utilities (and other coal end-users) not only to guarantee the quality of what they buy, but also identify where it has come from? Without such due diligence, any undertaking to assess the "product chain" impacts of the material isn't worth the paper it is written on.

Lighting the way to dusty death?

Under a "no change scenario" China and India will account for an 85% increase in coal use by 2035, with the rest of the world consuming little more than it did in 2010.

In May this year, the EIA said that, "assuming no [global] energy policy changes" (a critical qualification), coal will continue to fuel the largest share of global electricity output in 2035, generating 206 quadrillion Btu. Between them, China and India would account for 95% of the total net increase, with the remainder of the world consuming little more than it did in 2010 [*EIA 2010*].

This 206 quadrillion figure strikingly matches EIA predictions of the increase in energy-related CO2 emissions during the same period, unless major steps are taken to bring them down [*Howard Gruenspecht, CSIS, in EIA: International Energy Outlook 2010, 25/5/2010*].

PART TWO: The Where and the Who

Here is a summary of coal output, operating coal mines, and related exploration and "development" projects in a number of countries. The states selected currently play a critical role in the global coal trade, or are likely to do so in the near-future. Several of these countries currently buy coal mined in Indonesia.

AUSTRALIA

Australia is the world's biggest overseas supplier of Metallurgical Coal [*MJ* 4/6/2010] and the second highest source of Steam coal [*ABARE, summarised by Reuters,* 22/6/2010]. Between 2008 and 2009, 45% of the country's total coal exports went to Japan, with South Korea taking 16% and China, Taiwan and India settling for under 10% each [*WC Asia Special 2010*].

According to Australia's Economics Bureau (ABARE) thermal coal exports will grow, at a pace of 2.4%, to 142.4 million tonnes in 2010 – then rise by 11% the following year to 158 million tonnes. New mines will come on-stream and ports will be expanded [*ABARE op cit*].

The world's biggest privately-owned coal miner, Peabody Energy of the US has been aggressively acquiring Australian coal deposits, fixing to export 12-15 mt per annum of metallurgical coal and 16 –to-17 mt per annum of thermal coal from these mines by 2014 [*WC 2/2010*].

China Investment Corporation (*see: China Part Two below*) also has a JV agreement with the junior Australian miner, Metro Coal, whose Columboola project is said to host resources of 2.5 billion- 3.5 billion tons. Asia's leading commodities trader, Noble Group (*see Part Three below*) recently acquired two major Australian coal mines. Noble also owns PT Sangha Coal in Indonesia.

Vale of Brazil – the world's biggest iron ore miner, a coal mine at Integra in New South Wales, which produced just over a quarter of a million tonnes of thermal coal, and 65,000 te of the metallurgical variety during the second quarter of 2010 [*SNL*, 3/8/2010]

The Indian industrial conglomerate, Adani Enterprises Ltd (not to be confused with Anil Ambani who owns Reliance Power – *see below*), is reportedly the largest single importer of Australia's thermal coal. In August this year the company agreed to buy Linc Energy's coal assets in Queensland for Au\$3 billion (US\$2.7 billion) [*FT 3/8/2010 - see also India Part Two below*].

<u>CHILE</u>

Until now, Chile – the world's most important copper producer – satisfied its energy requirements by using hydropower and natural gas, with almost all (94%) of its relatively small thermal coal needs being met by Colombia, Indonesia, Australia and the US [*Business News Americas*, 6/7/2010].

However, in July 2010, the Minera Isla Reisco company announced that its new Mina Invierno coal venture, in the country's Southern Region X11, would replace "close to 30% of imports" [*Business News Americas, ibid*; *see also Mercopress* 8/4/2009].

Despite some continuing community opposition, the mine is expected to be approved by the end of this year. It is one of three coal concessions on the eponymous island that were privatised in 2008. Along with ones at Rio Eduardo and Elena, they are said to host more than a billion tonnes of reserves [*Business News Americas, ibid*].

The most important of these deposits lies in the Bío-Bío region, which hosts almost half Chile's remaining forests. Coal reserves (estimated at 1,302 million tons in 2010) are now considered adequate to supply Chile's energy requirements for 100 years. A number of petroleum-fired electric generators have also recently been converted to coal. [*Encyclopaedia of the Nations: Chile Energy and Power, July 2010, Energy and power*]. Minera Isla Riesco is a joint venture between Chilean fuel distributor and forest company conglomerate Copec and the shipping company Ultramar.

<u>CHINA</u>

The Peoples Republic of China officially had 14,423 coal mines, with a combined annual (sic) production capacity of 3.6 billion tons, as at the end of 2009 [*Interfax China M&M 16/7/2010*]. Its reserves at present are calculated to be 114.5 billion t [*BP 2010*].

One recent prediction is that the country's coal production capacity will rise to between 3.8 billion and 4 billion tons by 2015 [*Li Jinpin of Shenhua Coal Trading Co Ltd, cited in Interfax China M&M, ibid*].

Nonetheless, demand during the next five years may not exceed 3.55 - 3.7 mt, with Western Xinjiang, Nigzia and Inner Mongolia bearing the largest surpluses. Indisputably the world's leader in extracting and consuming thermal coal, China imported 125 mt of it in 2009 [*Interfax China M&M, ibid*], marking the first calendar year in which it ceased being a net exporter.

Between January and May 2010 Chinese firms bought just under 70 mt (68.98mt) of foreign coal [*Interfax China M&M*, *ibid*]. In June, the regime announced a freeze on all prices for coal sales within the country, apparently to "curb inflation" [*Oilprice 28/6/210*]. On the face of it, this should stimulate imports even further. However, according to a recent analysis by Bloomberg, imports are now likely to decline, rather than increase - slowing to only 9.9 mt a month during the second half of 2010 [*China Knowledge, 6/10/2010*]. This appears to somewhat contradict a spokesperson for the China National Coal Association (CNCA) who, just a month earlier, predicted imports were likely to exceed 100 mt by the year end. He added, however, that they will " probably not surpass last year's mark of 125 million" [*Interfax China M&M opcit*].

The discrepancy suggests (as pointed out earlier) that bare statistics cannot be trusted on their own. Perhaps this is more so in China than in other countries where energy forecasts appear to be less volatile. But it also reflects different strategies between Chinese end-users on how much coal to hold in reserve, balanced between current spot, and likely future, market prices.

CNCA's Dong Yueyin has attributed the "jump in coal import volume last year... largely... to growing coking coal imports". Steel mills and construction material manufacturers (cement *et al*) consumed a total of 501 mt, compared with the 865 mt despatched to power plants [*Interfax China M&M 28/6/2010*] – a significant proportion of the whole. And, in August 2010, China's coal ministry upped its estimate of the shortfall in requirements for these industries by almost 60% - from 51 mt to 83.33 mt by 2012 [*Business Standard, Mumbai 9/8/2010*].

For some years, a discernible mis-match has prevailed between the regime's good intentions and the reality of operations on (or under) the ground. While the Beijing leadership attempts to scourge the minerals sector of highly inefficient and dangerous practices, it continues trying to boost domestic coal output. Not only do many of these practices bring numerous workers to an untimely death or permanent disablement each year. China's overwhelming reliance on coal-fired power generation also severely comprises its avowed intention to slash the country's overall GGE by 20% before 2011, and 40% within the following 9 years.

True, the regime claims to have significantly reduced the frequency of pit disasters in recent times; and virtually all the coal-rich provinces have closed down illegal or ill-managed pits. (Around 1,000 of these were officially shut last year [*New York Times 21/11/2009*]. Heilongjiang province closed down 272 small mines in 2008 and 2009 [*Interfax China M&M 25/6/2010*]). However, according to the State Administration of Work Safety, the first quarter of this year actually "experienced a spike in coal-mining fatalities" [*MJ 21/5/2010*], averaging seven deaths *every day* [*MJ 23/7/2010*]. Just as this paper was being completed in August 2010 a blast in Shanxi province claimed 17 lives and leaving another 104 workers severely injured [*MJ 6/8/2010*].

It is the very large, state-owned, mines which have been responsible for some of the worst such disasters in recent years. Notwithstanding this, on 1 July 2010, the China Coal Industry Development Research Center announced the construction of 20 new domestic coal mines by 2015, each with a capacity of 10-40 mt per annum. Some even bigger ventures (at 50 mt per annum-plus output) would, it said, account for around 65% of the country's total coal output by that point.

China's "dark materials" from abroad

Between 2000 and 2007 Indonesian coal deliveries to China increased by 157% [*EIA* 2009].

Lined up for, or already receiving, coal consignments from overseas are the companies Wisco, Yanzhou and Shenhua Group. As the country's largest coal producer, Shenhua plans to deliver some 640 mt per annum by 2015 - 15 mt per annum of which will derive from the company's overseas assets in Indonesia and Australia [Interfax China M&M ibid] (*see also Part Three below*).

In late 2007, three electricity companies in Guangdong Province (Guangdong Yudean Group, Shenzhen Energy Corp and Huneng Power International) signed a contract

with PT Adaro Indonesia to import a total 32.5 million tons of coal until 2012. The agreement was described by the province's economic and trade commission as "the largest coal import deal Guangdong … has signed with a foreign company" [*CoalTrans, November-December 2007*].

In August 2010, China's sovereign wealth fund, China Investment Corporation (CIC) announced that, in order to "secure more resources in Southeast Asia and benefit from increasing trade in the region" it would "plough" US\$2 billion into coal, electricity and port projects in Indonesia. No time limit was given for fulfilling these objectives, but CIC said it was interested specifically in three Indonesian state firms: the coal miner PT Tambang Batubara Bukit Asam; the state electricity company, PLN; and port operator, Pelindo [*Reuters 3/8/2010 – see also Indonesia below*].

<u>COLOMBIA</u>

This South American state is the world's fifth most important coal exporter after Indonesia and Australia, ranking just behind Russia and South Africa [*Reuters* 17/6/2010]. Colombia exported 72 million tonnes in 2009, accounting for approximately 10% of all global exports of thermal coal [*WC* 6/2010].

The majority of this is scooped from the El Cerrejon mines in La Guajira province, operated by BHP Billiton, Anglo American plc and Xstrata plc.

The three partners have exported 32 million tonnes so far this year [*Reuters* 23/6/2010; *Dow Jones* 25/6/2010] from the most extensive open-pit workings in Latin America, comprising five zones, varying between 60cm and 4 m in thickness, Excavating these reserves results in the deposition of veritable mountains of "bank" (exposed) material - at the rate of 250,000,000 cubic metres every year [*WC* 2/2010, *op cit*].

Next in size to El Cerrejon comes US private miner, Drummond Coal. Exports from the company's Pribenow and new El Descano mines (currently standing at 20 mt per annum [MJ 23/7/2010]) are expected to rise to 25 million tonnes by the close of this year [MJ ibid].

The third most important Colombian coal producer is Glencore, the world's largest metals and minerals trader. Glencore itself owns 35% of the equity in Xstrata plc and now operates the two Prodeco mines in the country's northeast, following a buy-out from the UK company in March 2010. Vale of Brazil (*see: Australia above*) operates a thermal coal mine in Colombia's Cesar department, purchased in 2009 and which produced just under 1Mte in the second quarter of this year [*SNL 3/8/2010*].

Colombia's coal mineworkers run heavy risks – almost on a par with those prevailing in China. In June 2010, an underground explosion killed 73 people who were labouring 58,524 feet underground in the north-western town of Amaga. This was the worst such disaster since 1977. A flood at the same mine claimed five lives in November 2008. Then, in early August this year, four workers died and 12 were injured when a platform undergoing repair collapsed at El Cerrejon [*EFE 7/8/2010*]. Most of Colombia's coal output is shipped to Europe, the US and other states in Latin America, with a steadily growing market in Chile (though that may soon change - *see above*), Mexico, Brazil and Argentina .The coal goes not only into electricity generation but also cement manufacture. However, in June this year, El Cerrejon said it would focus more on making shipments to Asia, particularly China, since demand from Europe had been slumping. Between January and May 2010 the company exported around 5 million tonnes to the APAC region [*Reuters -23/6/2010, ibid*].

The UK-listed London Mining Company in March announced a tie-up with Australia's Ilawarra Coke Company (ICC) whose assets in the Socha area, south of Bogota, include coking coal concessions, a low volatile coking coal mine development project (Invercoal) and a coke oven project. Production is targeted production at 250,000 tpa of coking coal within the next two years [*LMC Company website, March 2010*].

In April 2010, the head of another UK company, Anglo Coal, announced it was "seeking to exploit thermal coal opportunities in Indonesia, Australia and Colombia" [*Reuters 12/4/2010; see also Part Three below*].

<u>INDIA</u>

The world's second most-populated country was, until recently, believed to contain the world's fourth largest reserves of coal, currently being mined from 565 official pits (although there are numerous "illegal" operations). The vast majority of these mines are owned and managed by a single state entity, Coal India Ltd (CIL) which, by volume, is the biggest coal mining corporation in the world [*PTI 24/2/2010*].

However TERI (The Energy and Resources Institute, Delhi) estimates that the country has "only 45 years" left of exploitable domestic coal – standing in stark contrast to an earlier estimate of 200 years [*WC Asia Special 2010*]

In 2009 India imported 45 mt of thermal coal, a significant proportion of which originated in Indonesia. By June 2010, 31 of the country's 81 power plants were at "critical" supply levels; almost half of them running at less than four days' forward supply [*Oilprice, 29/6/2010*]. In August this year, an analyst with the accountancy firm, KPMG, estimated that the country would need to import "up to 150 million tons of coal by 2015 [*UP, 3/8/2010*].

According to some observers, a key reason for this switch to reliance on imports is the government's reluctance to raise the domestic price of coal (thus constraining capital investment in mines and coal transportation). In March 2010 the authorities also levied a "clean energy" tax on India's own coal production - thus squeezing home company profits further [*Oilprice ibid*].

India generates 70% or more of its electricity by burning coal. (Hydro and "renewables" account for nearly 24% and nuclear power 4% [*WC Asia Special 2010, op cit*]). There's no doubt that, given the current coalition government's predictions (and predilections), considerably more of the raw material will be required from overseas during the next 2-3 years. India's population is expected to increase to 1.4 billion souls over the coming decade [*WC ibid*], while its expanding middle class is

demanding "higher standards of living" which cannot be fulfilled without a major increase in electricity output.

However, there are different projections of how this will translate into actual coal demand. India's Ministry of Power anticipates a 120 mt per annum shortfall by the close of 2010, and says that imports must be increased by 50 mt from next year (2011). Raising the stakes somewhat higher, a recent study by Citigroup estimates that India must purchase 140 mt per annum of both steam and coking coal from foreign suppliers by 2014 - 50 mt of which must arrive before next year. The Indian Planning Commission sets a lower, but remarkably precise, target of 81.03 mt being required from imports during 2011 itself [*WC ibid*].

At the same time, CIL – perhaps over-optimistically – says it will almost double its total supplies (of both coking and non-coking coal), from 689 million tonnes in 2011/2012 to more than 1,015 mt per annum by 2016 in order to satisfy demand [*WC ibid*].

However, CIL isn't relying solely on domestic investment in order to make the leap. It plans to forge new deals with a mix of domestic and foreign companies. The latter include BHP Billiton, Rio Tinto and Vale of Brazil; and - perhaps above all - Vedanta Resources plc. Though regarded principally as a metals producer, this London-listed company has embarked on a US\$10 billion expansion of Indian coal mining to feed its mounting output of zinc, lead and silver, and to power its expanding Jharsuguda aluminium smelter in Orissa. (According to *World Coal* the company recently commissioned new haul trucks to carry 230 tons in a single load – threatening a dusty hell for villagers living along the way [*WC ibid*]).

However, all these ambitious enterprises face resistance from Indian communities, human rights and environmental groups, and climate change activists, at virtually every step of their way. It is therefore little wonder that CIL and other Indian coal companies have lately been casting their nets wide and deep over foreign lands.

The Coal Ministry in early 2010 announced it was "encouraging" CIL to acquire or develop coal mining operations in Mozambique, Australia, Indonesia, South Africa and the US [*WC 2/2010*].

The state company is also negotiating with Peabody Energy for stakes in four Australian mines, aimed at producing12 mt per annum by 2012 [*WC Asia Special 2010, ibid*].

In August 2010, Adani Enterprises Ltd announced the "largest single investment by an Indian company in Australia" [*MJ 6/8/2010*] when it bought Linc Energy's Queensland coal licences which reportedly embrace a resource of 7,800 mt (sic), capable of eventually producing 60 mt per annum [*MJ ibid; see also FT 3/8/2010*].

Tata Power (*see Part Three below*) has already got its dark tentacles deep into East Kalimantan and Mozambique.

Other major Indian companies hungry for Indonesian coal include GMR, Lanco, NTPC PTC, Reliance and cement producer Binani (*see Part Three below*).

Indian steel producers are also actively seeking acquisitions and investment opportunities in overseas metallurgical coal projects "to ensure supply security as well as guard against price volatility" [*WC op cit*], while Essar Steel already operates Indonesia's largest flat steel plant [*see Part Three below*].

SAIL (The Steel Authority of India), the country's most significant producer of steel and iron ore for domestic use, has been in talks with firms in Australia, Aotearoa/New Zealand, Mozambique and Indonesia to the same end [*WC ibid*].

And the huge private company, JSW (Jindal Steel), has also been foraging for metallurgical coal in South Africa and Australia [*WC ibid*].

<u>INDONESIA</u>

Sixty percent of Indonesia's total electricity demand is met by burning coal. The state electricity company PT PLN (*see Churchill Part Three below*) predicts that demand will increase from 272 TWh an hour in 2009, to 325 TWh by 2018 [*WC Asia Special 2010*].

Nonetheless, as should already have been made clear, the overwhelming proportion of the country's inherent black stuff goes overseas. Unless government policies radically change (and not just those of Indonesia itself) this will be the case for years to come. The Indonesian part of the island of Borneo (known as Kalimantan and comprising 73% of the world's third largest island) is the country's chief provider of all main types of coal, with Sumatra an important secondary source.

Although there are many smaller companies involved at the "sharp end" of the supply chain [*see for example: DTE number 84, March 2010*], six major companies currently exploit Kalimantan's resources, led by Kaltim Prima Coal (KPC), PT Arutmin and PT Adaro (the first two controlled by Bumi Resources in close partnership with Tata of India).

All these firms primarily deliver bituminous steam coal, with KPC also mining a significant amount of the metallurgical variety. The fourth largest Indonesian coal company, PT Kideco Jaya Agung, relies on lower-quality "borderline" bituminous and sub-bituminous ores: in 2008 these were exported exclusively to South Korea [*WC 5/2009*].

While Indonesia does not quite yet enjoy (or suffer) the status of premier target for multinational coal-seekers, it is not far behind its main competitor, Australia. But here, politicians and the electorate continue tussling with the problem of raising more taxes from the industry, without alienating it altogether [see: http://www.minesandcommunities.org/article.php?a=10228].

In contrast – and despite a growing movement to impose stricter regulations on contract processing – Indonesia may open its doors even wider to foreign firms. If and when, the current, often confusing, overlaps between different types (and dates) of contract are resolved, companies will still have to consign a certain proportion of coal output to home users (the so-called Domestic Market Obligation, or DMO) [*WC*

4/2010]. Earlier laws, specifying that foreign stakes in Indonesian companies must be sold to administrations functioning at different levels, will likely remain in place. Nonetheless – as evidenced by the resent upsurge of investment in Indonesian operations – overseas companies do not appear to be too fazed by this.

This is not to say that the miners will have an entirely smooth ride through Indonesia's forests.

Practical problems remain in shifting coal to markets. Often the deposits are deep in hills and woodland, some of them a long distance from navigable rivers and without adequate road or rail links. (One such scheme, to lay a coal rail track in Central Kalimantan and originally costed at US\$1.5 billion, was set back earlier this year when "hidden costs" were revealed to be an additional U\$700 million [*Jakarta Post*, 25/5/2010]).

Nonetheless, deals continue to be made to build new infrastructure; parlous as the increased congestion of waterways and widening of roads will likely be for many who depend on fishing or cultivation along these routes.

A startling example of the degree to which investors are willing to underwrite new coal-based projects is an agreement reached between the UAE companies, MEC and RAK (*see Part Three below*) and the provincial governments of East Kalimantan and South Sumatra.

Several Indian companies have also calculated that initial capital costs of providing new export facilities will be outweighed by the relative ease with which they'll finally get their share of coal. East Kalimantan is only a short 2,300 nautical miles away from India's east coast; South Sumatra is even closer [*WC Asia Special 2010 op cit*].

Closest of all is the Philippines, which imported 6.38 million tons of coal from its Indonesian neighbour in 2009. This comprised 58% of the Philippines' total imports – most of which went to thermal power plants but with a significant one third (2.26 mt) being used in cement kilns [*Business Mirror*, 19/6/2010].

What *is* worrying prospective investors in Indonesian coal is that, following the Norwegian government's recent US\$1`billion grant to Indonesia on condition that it preserve remaining forests, some projects mooted for Kalimantan and Sumatra will (as it were) run onto the rocks [*Jakarta Globe*, 4/8/2010].

Whether this will actually happen is open to some broad and searching questioning about the country's climate policies - clearly a discourse that should not be confined to Indonesia alone.

[For further details of the social, environmental and economic impacts of Indonesian coal mining, see Part One above, and DTE Special 'Deadly Coal' at http://dte.gn.apc.org/85-86.pdf.]

JAPAN

The leading Asian industrial power is among the greediest of coal consuming countries on earth. Since it has almost no resources of its own, 60% of its requirements, for both steam and metallurgical coal, are met by Australia, with Indonesia supplying around another 20% of both varieties [*Asia Energy* 4/4/2010].

<u>MONGOLIA</u>

This Central Asian state – large in area but sparse in population – might, within just a few years, be churning out more lumps of coal *per citizen capita* than any other country.

In March 2010 Shenhua Energy of China was in the running to secure the Tavan Tolgoi coal deposit – 300 metres in depth and with a potential to deliver 30 mt per annum over 30 years [*WC Asia Special 2010*].

In July 2010, Peabody Energy of the US announced a joint venture agreement with another Chinese company, Winsway Coking Coal, to mine Mongolian metallurgical coal [*Reuters 2 July 2010*].

A similar coal deposit, located in Khushuut, western Mongolia, and owned by the Mongolia Energy Corp, aims to supply 8 mt per annum of metallurgical coal when at full tilt [*WC Asia Special, op cit*].

Canada's South Global Energy Resources – injected with a US\$ 5.5 billion investment by the China Sovereign Wealth Fund, expects to be extracting 4 mt per annum from the Ovoot Tolgoi coal mine by the end of this year [*WC ibid*].

Vale of Brazil has said it too is "pursuing greenfield coal opportunities" in Mongolia, as well as Colombia, Australia and Mozambique [*SLN 3/8/2010*].

<u>MOZAMBIQUE</u>

Ncondezi Coal Co Ltd – which plans to list on the London Stock Exchange at an initial value of US\$60 million – has a 10 million tepa open-pit concession, and is planning a rail link (at Beira) mainly to supply coking coal [WC 2/2010]. A recent scoping study indicated that 10mt per annum of would become available from this deposit [MJ 29/5/2010].

Riversdale Mining and Tata Steel of India (owning 35% of the Australian company [*MJ* 17/7/2010]) have identified just over 9 billion tons of inferred and indicated reserves with potential metallurgical (1.7 mt) and secondary thermal potential [*MJ* 4/6/2010] at their Benga mine in Tete, Zambeze province. The partners aim to produce 20-30 Mt per annum by 2013 [*MJ* 16/7/2010;*MJ* 21/5/2010;*MJ* 4/6/2010; Interfax China M&M 26/7/2010].

In May 2010, Riversdale announced that it was in "discussions" with steel mills in Asia, Europe, and South America to produce high energy thermal coal "suitable for both the Indian and African markets" [*WC 6/2010*]. Approval has already been given for a company mine-mouth power plant [*WC 2/2010*].

In June 2010 the Chinese iron and steel group, WISCO, signed a non-binding agreement with Riversdale to gain a 40% stake in its Zambeze operations, with the right to buy equivalent amount of coking coal [*Interfax China M&M 26/7/2010 op cit*].

Brazil's Vale – the world's premier miner and merchandiser of iron ore - operates a coking coal mine in Tete province called Moatize [*MM* 4/2009] for which Consolidated Minerals, Global Coke and Bacon Hill Resources recently brokered a supply off-take agreement [*Energy Business Review* 19/7/2010].

Meanwhile, Jindal Steel of India is reportedly also looking for coal concessions in this east African state [*http://www.minesandcommunities.org/article.php?a=10201*].

<u>RUSSIA</u>

The Russian Federation's 300 mt coal output in 2009 (although marking a drop of 8.7% on the previous year) rendered it the world's third biggest exporter of the fossil fuel. Last year an estimated 18.1% of production was exported to APAC, fulfilling just 5% of the region's coal demand [*WC 3/2010*]). This was outstripped by the 71.3%, said to have been sold to Europe [*WC 2/2010*].

Evraz (a steel company part-owned by the London-based oligarch Roman Abramovich) produces 31% of all the country's metallurgical coal [*WC 2/2010*, ibid] from southern Siberia's Kuzbass basin – one of the largest resources of its kind anywhere in the world [*Daily Telegraph 30/6/2010*].

In May 2010, the worst mining disaster in Russia's recent history occurred at the Raspadskaya mine in Kuzbass, killing 90 workers in two explosions [*Daily Telegraph 30/6/2010 ibid*]. Until then, the operation had been meeting 10% of the country's coking coal demand from estimated reserves of 328 mt and supplying it to Evraz-owned steel mills in Siberia and the Urals, as well as to coke-chemical plants in Ukraine [*WC 5/2010*].

SOUTH AFRICA

The former apartheid state relies on coal-fired power plants for the generation of almost all its energy [*WC Asia Special 2010*]. More than 48.8 mt of coal was exported in 2009; of which just under 12 mt went to India, 9.9 mt to the Netherlands and a third of the remainder to Spain [*WC 2/2010*].

In early 2010, the government announced its intention to markedly increase coal exports – to 61 mt – during the present year, mainly to meet Asian demand, while also cutting back on supplies to Europe by nearly four fifths [*WC 2/2010 ibid; see also Reuters 12/4/2010*].

Anglo Coal (*see also Part Three below*) is a subsidiary of the UK conglomerate Anglo American plc. In April 2010 the company said it expected to export around 16 million tonnes of its South African coal by the end of this year (out of a total production of 55 million tonnes) [*Reuters 12/4/2010*]. It also intends to significantly

boost thermal coal sales to around 120 mt per annum within the next decade [*WC* 5/2010]. Much of this would be supplied from mines outside the "Sunshine State".

Moreover, the Group's CEO, Norman Mbazima stated in May that Anglo was "considering" acquiring mines with a capacity of 3 mt per annum or more, in Colombia, Indonesia and Australia [*WC ibid*].

US & CANADA

The world's most energy-hungry country is also its second biggest consumer of coal, at around 1 billion tons a year. Ten per cent of US electricity (and around 2% of that used globally) is said to be generated by Peabody Energy, the world's leading privately- owned miner of the dark material [*WC 6/2010*]. Peabody's coal output alone dwarfs that of some other entire countries. Its 2009 sales of 244 mt recouped \$6 billion in revenues. Other US producers include Consol, Arch Coal, Kennecott (wholly-owned by Rio Tinto of the UK), Alpha Natural Resources, Massey Energy, Patriot Coal, Cameco of Canada, and Walter Energy.

Internal US coal consumption last year dipped almost 10%, from 1/1y billion t in 2008 to 1.17 billion t [*WC 6/2010*]. A number of states have legislated to curtail dependence on the fuel [*see: http://www.minesandcommunities.org/article.php?a=10096]*; and the practice of "mountaintop destruction", practiced in Appalachia, is facing – to say the least – an uncertain future [*see: http://www.minesandcommunities.org/article.php?a=10071*].

The US share of the global export market in steam coal is relatively small, compared to some other countries, including Indonesia. And, according one scenario, its existing contribution proportion may well reduce further - to as little as 4% of the country's total coal output [*EIA 2009 ibid*].

North of the great divide, Canada's own coal mining is hampered by difficulties of access and the depth of deposits (330m or more). Only two underground mines remain operational [*WC 5/2010*]. Nonetheless it is the largest single customer for imported US coal [*EIA 2009*], followed by Brazil.

The US enjoys plentiful supplies of coking coal, 50 mte of which have reportedly been exported so far this year [*Commodities Now 28/6/2010*].

Chinese coking coal imports from the US and Canada (which hardly existed a year ago) rose by 4,800% during January-May 2010; even so they amounted to only 2.7 mte [*Commodities Now ibid*].

US coal deposits – totalling almost one trillion tons of reserves and resources [WC 5/2010] are potentially worth trillions of dollars. But much of it is alarmingly high in ash which contains sulphur, arsenic, cadmium, lead, selenium and mercury [see: http://www.minesandcommunities.org/article.php?a=994; and WC 5/2010]. An August 2009 study identified dangerous levels of mercury in every sample of fish collected from 300 of the country's streams and rivers. According to its authors, the most significant source of this most toxic of heavy metals was coal-fired power plants [http://www.minesandcommunities.org/article.php?a=9634].

PART THREE: A way with Indonesia

Notes on foreign companies that have their hands (or eyes) on Indonesia's coal

<u>Anglo Coal</u> is a subsidiary of UK-listed Anglo American plc and based in South Africa. In April 2010 the company announced it was "seeking to exploit thermal coal opportunities in Indonesia, Australia and Colombia [*Reuters 12/4/2010; see also Part Two above*].

Banpu Public Company Ltd is Thailand's third biggest coal producer and Indonesia's fourth most important miner of the black stuff. The company owns five mines, containing reserves of around 300 mt, in South and East Kalimantan – Jorong, Indominco Bontang, Kitadin-Emblamut and Trubaindo. It has three mines in China and last May purchased a 14.9% stake in Australia's Centennial Coal Ltd. [*Coal Trans 7/5/2010*].

<u>BHP Billiton</u> is a dual-listed corporation registered in Australia and the UK and is the world's richest mining company. It is now planning to advance its Maruwai coal project in Central Kalimantan (seven concessions covering 350,000 hectares) along with PT Adaro Energy. Production is targeted to begin in 2014, rising to a fairly modest output of 5 mt per annum of thermal and coking coal during the following five years [*For further detail see: DTE Special 'Deadly Coal'*].

Binani Cement, a subsidiary of India's Binani Industries, in 2009 announced it would be "looking" at acquiring coal blocks in Indonesia in order to meet its energy requirements for cement kilns. Binani has cement plants in India, Dubai and China, and is planning to commission another one in Mauritius [*Mergers and Acquisitions in India 19/3/2009*].

<u>China Investment Corp (CIC)</u>, the state's sovereign wealth fund, has allocated US\$1.9 billion to acquire Indonesian mines, in partnership with PT Bumi Resources [*WC Asia Special 2010*]. In August 2010 CIC announced that, in order to "secure more resources in Southeast Asia and benefit from increasing trade in the region" it would "plough" US\$2 billion into coal, electricity and port projects in Indonesia; it was interested specifically in three Indonesian state firms: the coal miner, PT Tambang Batubara Bukit Asama; the state electricity company, PLN; and port operator Pelindo [*Reuters 3/8/2010 – see also Indonesia Part Two above*].

<u>Churchill Mining Plc</u>, registered on the London Stock Exchange, signed an MOU this year with a subsidiary of PT Perusahaan Listrik Negara (PLN), Indonesia's state electricity utility [*WC Asia Special 2010*]. This envisages the UK company supplying PLN-Batubara (PLN's coal subsidiary) with 4 mt per annum from its East Kutai Coal Project (EKCP) in addition to 20 mt per annum already intended for delivery elsewhere.

The East Kalimantan pit is said to possess probable reserves of 956 million tons, and a resource of nearly two and a half billion tonnes [*WC Asia Special ibid*]. Churchill is also partnered in a coal-bed methane trial project at Sendara in East Kalimantan, along with Indonesia's powerful Ridlatama Group which owns nearly thirty mining

rights (kuasa pertambangan or KPs) in East Kutai, Pasir and West Kutai blocks – all in East Kalimantan [*Ridlatama website, accessed 29/6/2010*].

<u>CIL (Coal India Ltd)</u> has short-listed 24 foreign firms as potential partners in sourcing overseas coal, of which a quarter (6) are from Indonesia [*WC 4/2010; see also Part Two above*].

Essar Steel is a leading Indian producer of iron and steel products. It already ranks as Indonesia's largest private sector flat steel products company, enjoying a 35% share of the domestic market share, thanks to its plant in West Java. After a major expansion drive, the plant's capacity was recently lifted to 400,000 tpa [*Essar corporate website*, 22/7/2010].

Last year, PT Essar Indonesia was awarded second runner-up of the "Warta Ekonomie-Company Award 2009 for Business Improvement through IT Innovation" in the basic industry category. [*Essar website*, 2/11/2009].

Essar combined its power interests – including coal – into an initial public offering (IPO) on the London Stock Exchange in June this year – thus now making it a UK-registered company.

Three months earlier, Essar announced that it had agreed to buy the Aries coal mines in Indonesia to secure supplies for its power plants, for an estimated US\$ 200 million [*Business Standard 25/3/2010*]. The mines are located in East Kalimantan's Kutai region. Said to host 100 million tonnes of thermal coal, production "may start within a year" [*Bloomberg 25/3/2010*].

<u>GMR Energy</u> is part of the Bangalore-based Indian infrastructure company, GMR Group. In 2009 it acquired a 100% stake in PT Barasentosa Lestari (PT BSL), an Indonesian greenfield coal mining company which holds two coal blocks in South Sumatra. [*Business Standard 26/2/2009*; *see also GMR website*]. PT BSL is estimated to have reserves sufficient to sustain "mining life" for around 25 years – with a "significant area which is yet to be explored" [*GMR website ibid*].

In 2008, GMR acquired 50% of InterGen NV, a global energy producer which operates 12 power plants with a total generation capacity of 8,088 MW located in the UK, the Netherlands, Mexico, the Philippines and Australia.

Although GMR then failed to refinance its debt for the acquisition, in July 2010 the company claimed that Axis Bank and ICICI, along with the Bank of Baroda, Bank of India, Indian Bank, Indian Overseas Bank and Syndicate Bank, had now provided necessary funding [*Reuters 30/7/2010*].

InterGen's other fifty percent owner is the Ontario Teachers' Pension Plan [*www.intergen.com*]. GMR describes its acquisition as being " in line with the Group's strategy to own coal assets to scale up its energy business and secure the fuel supply" thus "help[ing] to circumvent the volatility of fuel prices for...its imported coal based coastal power plants in the west and east coast of India." [*InterGen website ibid*].

Despite its strong Indian-focus GMR's key position within InterGen suggests that it might well sourcing fuel from its Indonesian coal mines for InterGen's plants in the Philippines, if not those in Australia, the UK, the Netherlands and Mexico.

<u>Kangaroo Resources</u>, located in Australia, has raised AU\$ 30 million to purchase and develop a number of "coal options" in East Kalimantan with a target of gaining 2 mt per annum this year, "ramping up" to 10 mt per annum by 2013 [*WC Asia Special 2010*].

<u>Lanco</u> (Lanco Infratech) is a major Indian "powerhouse" which has recently been seeking opportunities to import coal from abroad in order to establish power projects in coastal regions. At present it is constructing just one such plant – at Udupi in Karnataka - due to be completed by the end of 2011 [*Euclid Infotech Pvt Ltd release*, *1/6/2010*].

Lanco generated 1,349 mw during its last financial year, but if the planned output of plants under construction is combined with their current capacity the company reckons it can produce 9,300mw a year [*Euclid release ibid*]. To gain fuel for the future, the company has been evaluating coal properties with sizeable reserves in Indonesia, Australia and South Africa.

<u>Leighton Group</u> of Australia claims to be the world's largest contract miner for both coal and iron ore [*ATI Magazine 26/2/2008*]. It wholly-owns Thiess Indonesia, which operates PT Arutmin's mines in South Kalimantan (*see Thiess below*).

<u>MEC</u> is the United Arab Emirates' AE-based Middle East Coal company (MEC). In late 2009 it announced plans to start operating coal mines in East Kalimantan province during 2010, with an initial production of a modest 2 million tonnes destined for India, later mounting to very substantial 32 mte per annum by 2015 [*Reuters* 8/12/2009].

MEC would be joining RAK Minerals (part of the UAE state investment fund) and Rak Metals Investments (RMMI), along with UAE-based mining company Trimex, to exploit MEC's "greenfield" coal concession in East Kalimantan. This vast deposit reportedly hosts resources of no fewer than 2 billion tonnes of "low-sulphur/low-ash" thermal coal [*Reuters ibid;see also RAK below*]. Although the exact location of this concession is not known, in April 2010 World Coal magazine reported that MEC and RAK had opened talks with PT Bhakti Energi Persada to sell 32 mt per annum of coal from their joint operations by 2013 [*WC 4/2010*].

In March last year RMMI also secured a license to construct a 130 km rail link to take MEC coal from its Muara Wahau mine to Bengalon port – with the intention of "commissioning the first cargo train by early 2012" as part of a Middle Eastern-Indonesian integrated energy project valued at US\$5.2 billion [WC 4/2010].

The firm claimed that it has already acquired "about 80 percent of the land needed for the project" which it costed at \$1 billion [*Reuters op cit*]. *Gulf News*, at the same time, claimed that "MEC...was able to purchase and clear the land for the entire 130 km corridor within a few months" [*Gulf News 16/12/2009*]. The newspaper said that

India's IL&FS Group was providing financing to MEC for the project [*Gulf News ibid*].

MEC has also been "in talks" to buy equity stakes in Indian power plants in exchange for a long-term coal supply deal [*Reuters op cit*] which presumably could include substantial consignments from Indonesia.

<u>Noble Group</u>, headquartered in Hong Kong, is Asia's largest commodities trading firm, spanning ownership of land; the growing of foodstuffs (it exports Indonesian cocoa); the mining and processing of metals and minerals, and the transporting and selling of these on global markets.

In 2009 59% of the group's revenue (US\$ 18 billion) derived from "energy" – including coke and coal. Although its largest mines are situated in Australia, Noble owns PT Sangha Coal Indonesia (with share capital worth Rp 18,240,000,000 last year) [*Noble Group website accessed 29/7/2010*]. Sangha's Morris2 mine in East Kalimantan exports coal to Eastern Europe, China and Japan.

<u>North American Coal Corporation</u>, headquartered in Texas and a subsidiary of NACCO Industries, is one of the USA's largest miner and sellers of lignite, primarily as fuel for power generation [*MM 5/2010*]. It operates six such mines in North Dakota, Louisiana, Mississippi, and Texas, as well as providing dragline mining services for independently owned lime quarries in Florida [*see: www.nacoal.com*].

The company is partnered with Reliance Power (see below) to provide technical services for that Indian corporation's "development" of the Aries mines in South Sumatra.

<u>NTPC</u> is an Indian state-owned utility (formerly the National Thermal Power Corporation) which, in mid July 2010, announced plans to import 5-10 million tonnes of coal from Indonesia, and a like amount from Australia, between now and 2017.

At present the utility's' joint venture plans seem most advanced with Australian companies. However NTPC says it has "identified mines in Indonesia and Mozambique" and is "in talks on these coal assets" [*Energy Business News* 15/7/2010]. It is also believed to be in discussions with the South African government for the US\$1 billion acquisition of a mine [Noble website, ibid].

In June this year the NTPC's so-called "Navy Training Plan Conference" appointed three merchant bankers to carry out a due-diligence study on the acquisition of Indonesian coal mines [*Euclid Infotech Pvt Ltd release*, 1/6/2010].

<u>Peabody Energy</u> of the US is the world's most important private coal mining company. In late 2009 it opened an office in Jakarta "to expand business development and coal sourcing opportunities to serve the fast-growing Pacific Market". The operations would be led by a Mr Reynard Hanoppo, "directly from his role as managing sales for PT Kideco Jaya Agung [CoalTrans 1/6/2010].

POSCO is South Korea's leading steel-maker which, in August 2010, said it was "looking to buy Indonesian coal and iron ore mines" – no further detail was provided [*Reuters 4/8/2010*].

<u>PTC India</u> is "the leading provider of power trading solutions in India" through a government-initiated Public-Private Partnership. Its financial services subsidiary (PFS) has an 11.3% foreign partnership with Australia's Macquarie Bank.

PTC has identified Indonesian and Australian sources of coal as "top" of its wish list, with a coffer of 3 billion rupees to throw in that direction [WC 4/2010].

RAK: from coal to aluminium through Indonesia and India

In February 2008 the Dubai government's Ras Al Khaimah Investment Authority, together with RAK Minerals and Metals Investments (RIMMI) signed an MoU with the provincial government of South Sumatra that "covers the entire mining-to-export chain of the coal industry" [*Gulf News* 19/2/2008].

On paper this looks to become one of the most ambitious undertakings of its kind anywhere. The MoU includes: building an industrial park for metals refining, smelting and metal-based fabrication industries, bio-technology parks, palm, rubber and other agro-based industries, captive power plants and supporting infrastructure.

In addition, the government of South Sumatra will "provide sufficient land and fasttrack the approval and licensing process to build new port, industrial parks and power plant, along with residences and leisure facilities". It would also "assist RMMI in getting licences and off take agreements for natural resources like coal and metallic ores, to support the raw material requirements of local industries and the planned power plant" [*Gulf News op cit*].

According to Madhu Koneru, RIMM's managing director:

"With the planned world class industrial city at Tanjung Api-Api, Sumatra will be able to support and attract investments in the minerals/ore dependent heavy industries, palm, rubber and other agribusinesses and bio-technology industries.

"The MoU with resource-rich Sumatra - where we plan to develop a suitable freight corridor and port infrastructure - will allow us to develop cost effective and efficient export route of thermal coal and other natural resources to Asian and Middle Eastern markets."

A year after this announcement, RAK and MEC (*see above*) concluded yet another agreement - with the provincial government of East Kalimantan - under which they would invest US\$ 1 billion in the construction of a railway corridor to link MEC's Muara Wahau coal mine in East Kalimantan with Bengalon port. This would comprise part of a massive "integrated energy project" worth US\$ 2.5 billion [*WC* 4/2010].

Critical to this hubristic venture is the participation of India's largest aluminium company, state-owned Nalco, which, according to a MEC spokesperson, has agreed to

co-fund the East Kalimantan enterprise in return for the right to build a smelter to refine alumina imported from India itself [*Reuters 9/3/2010*].

This is far from the only major venture on which RAK has embarked in Indonesia. [*For details of MEC's Sumatra play see above*].

<u>Ramky Infrastructure Ltd</u> is based in Andhra Pradesh, India. In January 2010 it announced that it was "looking at some coal mines in Indonesia" – without specifying which [*Business Standard 1/1/2010*].

The company claims to place a "strategic emphasis on environmental projects (sic)" and to be "planning to expand into the waste management space (sic) in West Asia and Southeast Asia" [*Business Standard ibid*]. Fourteen percent of Ramky's equity is held by Infrastructure Leasing and Financial Services (IL&FS) (*see also MEC above*); the World Bank's IFC; and Sabre-Abraaj Capital (a joint venture between the Indian private equity firm, Sabre Capital, and Dubai's biggest Private Equity outfit).

<u>Reliance Power</u> is controlled Anil Ambani – India's fifth richest individual, whose personal wealth increased during the past year to well over a billion pounds sterling [*Businessworld 26/7/2010*]. It is part of the huge Anil Dhirubhai Ambani Group. In June this year, Reliance signed a share-sale agreement with Indonesia's mining and industrial Sugico Group to acquire three coal mines in a transaction valued at US1.6 billion and involve "a series of production-linked milestone payments" [*Bloomberg 10/7/2010*]. This means that the company's wholly-owned subsidiary, Reliance Coal Resources, will make an upfront payment of US\$106 million to acquire the mines, but pay off the balance only if and when the mines achieve certain targets.

Commenting on the deal, K Leo, chairman of Sugico, called it a "win-win' for both sides. The partnership with Reliance will improve the valuation of other assets in the region".

The three mines are in South Sumatra province and were previously owned by PT Sriwijaya Bintangtiga Energi and PT Brayan Bintangtiga Energi, subsidiaries of the Sugico Group. Their output is earmarked for Reliance's proposed Krishnapatnam Power Project in Andhra Pradesh.

Importantly, *Bloomberg* makes a "back of the envelope" calculation that the coal will be "almost 35% cheaper than other imported coal" and, with a calorific value of 4,000,000 calories and an ash content of "just 3-5%", it will present "a major advantage" to the Indian company [*Bloomberg ibid*].

The mines are expected to enter production over the coming three years, and Reliance's technical partner will be the North American Coal Corporation (*see above*).

In addition, the Anil Dhirubhai Ambani Group is to "help in the development of a dedicated custom-built railway line to transport coal from the mines to a proposed port in Jambi in the Sumatra province" which is expected to be capable of handling large "capsize" vessels (180,000 mt) [*Bloomberg ibid*].

<u>Rognar Holding B.V</u>, based in the Netherlands and Japan's Sojitz Corp. (*see below*) respectively hold 39% and 10% of the equity in PT Berau Coal which operates the Binunan Lati and Sambarata coal mines in East Kalimantan, from which Rognar obtains both thermal and smaller amounts of metallurgical grade coal [*Rognar website* 29/7/2010].

<u>Sahin Jain</u> is a Madhya Pradesh-based energy coal trading company in India which claims to have "associated partners" that include the Indonesian companies PT Kaltim Prima, PT Adaro, and PT Bumi, as well as Rio Tinto, Glencore, Noble Energy (*see above*) and Austral Coal.

The company supplies thermal coal to Tata and GMR; metallurgical coal to steel plants (including ones operated by Essar Steel; and fuel to Indian cement plants, using a fleet of its own vessels. (It is likely that its role with Tata and GMR, given their own deep involvement in mining Indonesian coal, is limited to transporting the two companies' output).

Sahin Jaim does not divulge just how much coal is sourced from Indonesia. However, an email received on 26 July 2010 by the author (clearly being confused as a coal trader himself!) and purporting to come from Navkaar Coal Corp Pvt Ltd, an associate company of Sahin Jain, announced: "We Are One Of bigest (sic) Trading Group in India. Here we want to say that we want indonesian coal in Bulk base from Genuin (sic) Miner so will you help us to find out that." *Indeed!*

<u>Samtan Co.</u> is part of the South Korean industrial conglomerate, Samchully. It imports both thermal and metallurgical coal from Indonesia – the latter going towards its steel production.

Along with Jakarta-based Indika Energy (which advertises itself as Indonesia's "leading energy integrated energy company [*www.indikaenergy.com*]) Samtan controls PT Kideco Jaya Agung, which delivered some 25 mt of coal in 2009 and expects to deliver 29 mt by the end of 2010 [*The Indonesian 29/6/2010*].

Kideco's workforce has suffered several mine fatalities so far this year: two in January, a further two in May, and one in June. Kideco has also year signed a 10-year strategic mining cooperation agreement with PT Pamapersada Nusantara, Indonesia's biggest mining contractor, The agreement is intended to enable removal of 90 million cubic metres of overburden per year and lead to a doubling of the 2009 production volume [*The Indonesian ibid*].

<u>Shenhua Group</u> (parent of Hong Kong-listed China Shenhua Energy) is China's leading miner of coal and (after India's CIL) the world's second biggest state-owned enterprise in the field (*see also Part Two above*).

In July 2010 the company said it expected to raise domestic "raw output" by 9.8% mte to 360 mte by the end of the year, and to boost its production capacity to 640 mte per annum by 2015 [*Reuters 8/7/2010*]. At the same time Shenua announced a start to construction of a 300 MW power plant in South Sumatra, due for completion in 2011 and to be fed by a 1.5 mte per annum coal mine [*Bloomberg 13/7/2010*].

This marks the first time that a Chinese company has invested directly in Indonesia's own electrical energy production.

<u>Sojitz Corp</u> is a large Japanese trading house, formed in 2002 by the amalgamation of Nissho Iwai and Nichemen. It owns 10% of PT Berau Coal (*see also Rognar Holding BV*).

<u>Straits Asia Resources</u>, a Singapore listed company, includes Australia's Straits Resources among its shareholders. The Jembayan mine in East Kalimantan and thee Sebuku mine in South Kalimantan are operated by its subsidiary PT Bahari Cakrawala Sebuku. The Sebuku operation was blockaded by local people in December 2003. They accused the company of causing severe pollution

[http://www.minesandcommunities.org/article.php?a=1844].

<u>*Tata* (Tata Sons)</u> is India's most globally-spread company, its largest private-sector electrical utility and by far the country's most zealous seeker of coal resources outside the country's borders.

In March 2007, Tata Power concluded a US\$1.1 billion agreement with PT Bumi Resources to acquire 30% stakes in PT Kaltim Prima Coal and in PT Arutmin along with a Bumi-owned coal trading company. The purchase was made through an offshore Special Purpose Vehicle (SPV) and Bumi was to receive a further US\$US\$200 million when working capital "and other adjustments" were made. Tata said at that the time that it would "cap" its supplies from Indonesia at 50% of its future domestic needs, since it didn't "want to get more than 50% of requirements from one country" Tata would also be "viewing other opportunities" in Australia and South Africa. [*Businessline 1/4/2007*].

Initially the Indian giant would purchase 10 mte per annum, specifically to fuel its Mundra Ultra Mega power and other plants in Maharashtra, including those for cement [*Mergers and Acquisitions in India 19/3/2009*].

In March 2010 Tata announced that a major step-up in its Indonesian coal mining capacity from the current 60 mt per annum to 75 mt per annum by the middle of the coming fiscal year [WC 4/2010].

Tata Steel has also identified just over 9 million of inferred and indicated coal reserves, with potential metallurgical (1.7 mt), and secondary thermal potential [*MJ* 4/6/2010; see also Mozambique **Part Two** above].

<u>Thiess</u> - a wholly-owned subsidiary of *Leighton Holdings* (*see above*) - is a leading Australian mine engineering and construction enterprise.

In 2000 it secured one of its largest-ever contracts, with PT Arutmin, to operate the Senakin and Satui Mines in South Kalimantan. As of 31 December 2009 the contract was valued at Aus\$3.7 billion. Thiess Indonesia has been responsible (and will be until the end of the mining "life") for "the complete operation of the mines, including all coal mining, mine planning, stripping and waste disposal, coal crushing and washing, coal transportation and loading, environmental rehabilitation and quality control work".

[http://www.leighton.com.au/about_us/projects/senakin_and_satui_coal_mines.html]

<u>Vinacomin</u> is Vietnam's largest coal producer which, in 2009, announced plans to begin importing coal from Indonesia [*EIA 2009*]

End-note: what about the poor and the workers?

Coal has no place in a future where life is valued far higher than it has been to date.

The purpose of this paper has been to *warn*. It does not pretend to offer any resolution - political or otherwise - to two critical dilemmas arising from our current massive dependency on coal.

First, it is clear that millions of people will gain release from endemic poverty only if, as well as gaining adequate food security, they also significantly increase their access to electricity. How to do this, however, without compounding the current rise in global greenhouse gas emissions to the point of planetary "no return"?

Second, under a "no-coal scenario" is it feasible to provide viable employment for the many people employed in mining, transporting and selling coal; or who depend on it to support their businesses?

Here are some possible responses:

- Coal supplies are not inexhaustible. (Already one Institute in India has slashed its previous estimate of the country's coal reserves by almost a fifth [*see India Part Two above*]). The building of an even greater reliance on this fossil fuel into long-term state "development plans" may prove to be the height of economic folly.
- At every link in the chain, from mine to final product, the extraction and burning of coal can, and does, cause crippling ill health and disease. The costs of preventing, treating, and compensating for, these disorders runs to billions of dollars most of which are borne by the public sector.
- There is no fail-safe way of mining coal: one that avoids damaging soil and air, consuming or polluting egregious amounts of fresh water, and sequestering significant areas of agriculturally productive land.
- The task of tackling the consequences of putting more carbon into Earth's atmosphere is one that has yet to be seriously embarked upon. So-called "carbon offsetting" is seriously flawed, and does not address the reality that already too much CO2 is being emitted. The technological fixes aimed at "capturing and storing carbon" (CCS) are largely untried and untested. At the very least we should halt any expansion of coal output until the advocates of CCS have unequivocally proved their case.

Everyone able to read this document owes a debt of gratitude to the serried ranks of men, children and women who for hundreds of years have hewn and carried the preeminent substance used to power industrialisation.

Historically, coal mineworkers were the driving force behind the winning of trade union rights in several countries (including the US, Russia and the UK). Should all coal mining cease within the next few years, hundreds of thousands of them would be thrown out of work.

Nonetheless:

- There's virtually no likelihood that this will happen yet whatever "post carbon" energy protocols are agreed during Climate Change negotiations; even if the outcomes of this lumbering process unexpectedly proved as radical as they ought to be.
- Realistically what we should be calling for is a severe reduction in carbon dependency, rather than an immediate ban on all fossil fuels' usage. It is reasonable to plan for a lowering in coal consumption to around 20% of current levels over the next ten years.
- Having this "breathing space" would afford sufficient opportunity for the necessary "just transition" in training workers out of mining coal and into other occupations; not least those vital to creating so-called "sustainable energy" options for societies as a whole.
- The rate, and security, of employment in extractive industry (and coal mining is no exception) has, in any case, markedly decreased during the past 20 years. Companies have resorted to non-union and sub-contracted labour and replaced workers by machines especially in open-cast mining which now dominates coal extraction in many countries.
- Where coal is dug from beneath the surface mine workers are more susceptible than those in any other industrial sector to fatal accident, serious injury, or occupational disease (pneumoconiosis, emphysema, black lung *et al*). Far from diminishing, workplace accidents appear to be on the increase in a significant number of countries (e.g. China, Kazakhstan and Colombia).

To conclude:

Coal may bring some benefits to a large number of people in the present. It is equally likely to inflict permanent damage on many others, not to mention significantly continuing to deplete the planet's "natural capital".

It has no place in a future where all life is valued far higher than we have done to date.

Footnotes

ⁱ Data from GWC Coal Handbook & IEA Clean Coal Centre (2007)

ⁱⁱ See: Ristinen, Robert A., and Jack J. Kraushaar: Energy and the Environment. 2nd ed. Hoboken, NJ: John Wiley & Sons, Inc., 2006

ⁱⁱⁱ See, for example, analyses by Forest Peoples Programme on their webpage (http://www.forestpeoples.org/templates/latest_news.shtml) and, on Indonesia specifically, see the online newsletter by Down to Earth Newsletter - http://dte.gn.apc.org/news.htm.

^{iv} Our team was unable to visit the main KPC tailings' deposition area. However, a company employee, recently responsible for overseeing the dam's operational standards, told us that a number of basic precautionary measures were not being taken.

^v For a lucid, comprehensive, assessment of the health impacts of "cradle to grave" global coal use, see: http://www.psr.org/resources/coals-assault-on-human-health.html

^{vi} At least some of this coal is probably barged down-river to Bengkulu from an Indian-owned mine in hills further to the north. Our team also interviewed small bands of people at the river mouth who recover small lumps of this dirty coal from beneath the water (sea coal as it is called), then bundle it up for sale to local consumers. Almost certainly the coal consisted mainly of "rejects", washed out at the mine and which should have been safely disposed-of at the site itself.