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## **Briefing paper: Coal, not cheap, not clean**

Coal is the dirtiest, most carbon intensive of all fossil fuels, emitting 29 percent more carbon per unit of energy than oil and 80 percent more than gas, it is one of the leading contributors to climate change.

Burning coal also releases massive amounts of substances such as mercury and arsenic that are toxic to human health and create acutely detrimental effects on developing economies. Despite all the negative impacts of coal-based power generation, however, nothing has been done by the Philippine government to account for the external costs of coal fired power plants much less stop the expansion of coal in the country.<sup>i</sup>

According to the External Cost study<sup>ii</sup> conducted by the European Commission (EC) in 2003 on different types of power generation, coal-fired power plants registered the highest external cost. In comparison, renewable energy sources such as wind power exhibited the lowest external cost.

Also known as externalities, external costs arise when the social or economic activities of, say, a power station, have an impact on a set of people and when that impact is not fully accounted, or compensated for, by the power plant. Thus, a power station that generates sulfur dioxide or mercury emissions, causing damage to human health, imposes an external cost. Environmental costs are thus “externalized” because, although they are real costs to members of society, the owner of the power station is not taking them into account when making decisions related to his economic activities.

The EC study considered climate change impacts, human mortality (i.e. reduction in life expectancy, cancers), human morbidity (i.e. respiratory hospital admissions, restricted activity days, congestive heart failure), its impacts on building materials (i.e. aging of galvanized steel, paint), crops (i.e. changes in yields caused by nitrogen oxide, sulfur dioxide, trioxide and acid deposition), amenity<sup>iii</sup> losses due to noise or spoliation of aesthetics, and the impacts of acid and nitrogen deposition on ecosystems.

When coal companies refer to coal as a 'cheap' source of energy, they do not tell us that coal is cheap only because Filipino taxpayers - and communities hosting coal plants - end up shouldering the massive costs and impacts created by burning coal for energy.

### **Coal and climate change**

Climate change refers to a change in the planet’s climate system which is attributed directly or indirectly to human activity. Climate change alters the composition of the global atmosphere and which, in addition to natural climate variability, is observed over comparable time periods.<sup>iv</sup>

Disruption in the climate system is manifesting itself around the world through more frequent floods, droughts and heat waves whose severity are expected to increase in the coming years. Seven of ten disasters are now climate change-related. More than 20 million people were displaced by sudden climate-related disasters in 2008 alone. By 2050, an estimated 200 million could be displaced as a result of climate impacts.<sup>v</sup>

There is no lack of evidence that human-induced climate change is underway. For communities hosting coal-fired power plants, the consequences of climate change means doubling the grave local impacts that coal has on their lives.

### **Toxic coal plant pollution**

In several studies, Greenpeace tested ash samples taken from the coal plants around the Philippines<sup>vi</sup> – in Toledo, Cebu and Sual, Pangasinan; in Masinloc, Zambales and Calaca Batangas and in Mauban, Quezon. All revealed the insidious presence of the same heavy metals: mercury - a deadly neurotoxin, arsenic - a known carcinogen, as well as the hazardous substances lead and chromium.

### **Coal and mercury poisoning**

Coal plants are identified as the largest source of mercury emissions<sup>vii</sup>. There is no existing technology that can capture or eliminate mercury emissions from coal plants.

Mercury is a substance so toxic that all it takes is 0.002 pounds of mercury accumulated over a year to contaminate a 10 ha lake to the point where fish caught are deemed unfit for human consumption<sup>viii</sup>. A typical 100-MW coal plant emits an estimated 25 pounds of mercury a year<sup>x</sup>.

Mercury is an extremely toxic metal that has no biochemical or nutritional function. Most of the toxic effects of the substance that can result from exposure are on the central nervous system<sup>x</sup>.

Mercury is capable of causing severe brain damage in developing fetuses and mild tremors, mental disorders, motor and emotional disturbances, even death, in exposed adults. The exposure to mercury depends on its forms, with mercury vapour and methyl mercury being the most likely forms since they are nearly completely absorbed into the body.

Once mercury enters water – either directly or through deposition from the air - biological processes transform it into methyl mercury, a more toxic form of mercury that bioaccumulates in fish and other animals that eat fish - such as humans. When a substance bioaccumulates, its concentration increases as it moves through the food chain.<sup>xi</sup>

### Methyl mercury and extreme risks to children

According to recent studies undertaken by the US National Academy of Sciences (US-NAS), "there is strong evidence for the foetal neurotoxicity of methyl mercury, even at low concentrations of exposure." Exposure to methyl mercury emitted by coal-fired facilities "causes lifelong loss of intelligence in hundreds of thousands of babies born each year<sup>xii</sup>."

Based on the US-NAS study, the resulting loss of intelligence "causes diminished economic productivity that persists over the entire lifetime of these children. This lost productivity is a major cost of methyl mercury toxicity<sup>xiii</sup>."

### **Fallacy of cheap coal**

There is no such thing as clean coal. Neither is there anything such as cheap coal. While coal fired power plants are often referred to as one of the cheapest sources of electricity, the external cost of coal is indisputably one of the highest among the different types of power generation in the world.

Before any further development of coal fired power plants in the country is undertaken, the external cost of existing coal-fired power plants should be quantified. Incorporating external costs is an indispensable way of achieving genuine sustainable development because it corrects the severe imbalance in the power sector that is right now stacked against allegedly more expensive renewable energy technologies.

Coal is a finite resource and we are hostage to its world market prices. On the other hand if we use renewable energy technologies, the fuel is free. Increasing demand of RE technologies as an answer to energy security, is pushing down the cost of renewable energy. The US department of Energy the

average building and operating costs for the different power technologies, the figures for January 2010 show that RE sources are already broadly competitive<sup>xiv</sup>. In the meantime, the price of fossil fuels is climbing.

The 'cheapness' of coal is a myth. So is the supposed 'expensiveness' of new, renewable energy. It is time to make the switch to clean power.

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<sup>i</sup> External Costs, Research Results on Socio-Environmental Damages Due to Electricity and Transport, European Commission.

See: <http://www.externe.info/externpr.pdf>

<sup>ii</sup> External Costs: Research results on socio-environmental damages due to electricity and transport, Luxembourg: Office for Official Publications of the European Communities, 2003.

<sup>iii</sup> Amenity is defined as an enhancement to a piece of property that is not essential to the property's use, but may increase the property's value. Examples include a swimming pool, tennis courts, scenic view, access to a body of water, etc.

[www.secured-loan.co.uk/glossary-loans.html](http://www.secured-loan.co.uk/glossary-loans.html)

<sup>iv</sup> [http://unfccc.int/press/fact\\_sheets/items/4987.php](http://unfccc.int/press/fact_sheets/items/4987.php)

<sup>v</sup> Stern, N. (Ed.) (2006). *The Economics of Climate Change: The Stern Review*, Cambridge University Press, Cambridge

<sup>vi</sup> Greenpeace first exposed the risks faced by the country and local communities due to toxic releases from coal-fired power plants in May 2001 based on ash samples taken from the waste stream of the 600-MW coal plant operated by the National Power Corporation (NPC) in Calaca, Batangas. In 2002, Greenpeace released another report demonstrating the unabated emission of hazardous substances coming from other coal-fired power plants operating in Sual, Pangasinan (1200-MW; Mirant), Mauban, Quezon (40-MW; QPL) and Masinloc, Zambales (600-MW; Napocor). Each of the tests registered the insidious presence of mercury, arsenic, chromium and lead. Most recently, in May 2004, Greenpeace published a report revealing the same set of toxic materials present in Mirant's 100-MW coal plant in Toledo City, Cebu and Salcon's 100-MW coal plant operating in Naga City, Cebu. For more information, go to the reports section of [www.greenpeace.org.ph](http://www.greenpeace.org.ph).

<sup>vii</sup> U.S. EPA, Office of Water, "Air Pollution and Water Quality: Atmospheric Deposition Initiative: Where is the Air Pollution Coming From?" Available online at <http://www.epa.gov/owow/wtr1/oceans/airdep/air5html>. (U.S. EPA, Mercury Report to Congress, 1997, Vol. 1).

<sup>viii</sup> National Wildlife Federation, "Clean the Rain, Clean the Lakes: Mercury in Rain is Polluting the Great Lakes," p. 4, September 1999.

<sup>ix</sup> National Wildlife Federation, "Clean the Rain, Clean the Lakes: Mercury in Rain is Polluting the Great Lakes," p. 4, September 1999.

<sup>x</sup> <http://www.epa.gov/mercury/effects.htm>

<sup>xi</sup> *Toxicological Effects of Methylmercury*, National Academy Press, Washington, DC, 2000.

<sup>xii</sup> *Ibid.*

<sup>xiii</sup> *Ibid.*

<sup>xiv</sup> <http://zamboangatimes.ph/articles-submitted/40-business/364-mining-industry-to-raise-power-demand-in-mindanao-by-1000mw.html>