



# THE USE OF COAL-DERIVED WASTES AS A SOURCE OF ENERGY

Many governments around the world are under growing pressure to minimise environmental impacts associated with the use of coal, particularly for power generation. A raft of technologies, mostly applied post-combustion, are capable of greatly reducing power plant emissions. However, there are also opportunities to reduce coal's impact at the beginning of the supply-use chain. For example, the use of more selective mining systems can minimise the amount of unwanted mineral matter recovered with the coal. Downstream, coal quality can be improved further through the use of advanced washing techniques, capable of segregating a growing proportion of mineral waste from the coal and reducing the amount lost. However, all coal mining and washing operations generate wastes that are often deposited in large above-ground heaps or in settling ponds – most coal-producing countries have accumulated significant amounts. Some deposits are a legacy of earlier mining and processing, with many thousands scattered throughout the world's mining regions. Often, material rejected from current operations continues to be added. Both dumps and ponds occupy considerable areas of land, making it unavailable for productive use.

Alongside visual blight, waste storage also has environmental consequences that can range from acidic run-off and localised water pollution, to spontaneous combustion. The need to deal with such deposits and to rehabilitate landscapes has increased in many coal-producing countries. This process has been driven largely by public health and safety issues, the increased awareness of mining's environmental consequences, and the importance of environmental preservation. As some wastes can form viable sources of fuel, they have a commercial value; hence, financial issues may also come into play.

In a number of developed and developing nations, concerted remedial initiatives have only been instigated relatively recently. Driven largely by the introduction of new environmental policies, national agencies have been created and tasked with the monitoring and remediation of landscapes damaged by coal production – this can include impacts on air, water and land. On a global scale, guidelines on mine closure, treatment of waste dumps, and landscape restoration have been produced by organisations such as the World Bank and the United Nations Development Programme. Nationally, policy and guidelines have been introduced by countries such as the USA and Canada. Some apply only to operating or planned mines, although others address directly abandoned sites and waste dumps. Some legislation and policies consider the treatment of waste materials in general, whereas others focus specifically on the coal and mining sector. For example, the European Union requires member states to maintain an inventory of closed or abandoned waste facilities that have the potential to create negative environmental impacts or are a threat to human health. Many national initiatives now also encompass such measures. Alongside the introduction of legislation and environmental policy, increasingly, practical experience accrued from working with abandoned mine sites and dumps has fed back into recommendations for policy makers. As well as addressing the historical consequences of coal production, many organisations are also identifying and considering possible future problems.

Globally, despite some successes, much still needs to be done, as even after the cessation of active coal mining and production, environmental problems resulting from abandoned sites and waste dumps can persist, and the land occupied remains unavailable for alternative, more productive use. There are strong

economic and environmental incentives for the greater utilisation of both current and historical coal-derived wastes. However, although there have been significant technological advances, there is no quick or easy way to remedy the large-scale impacts of coal production.

Despite the fact that finances and resources available are often limited, for remedial actions to be effective, it is important that these initiatives are adequately funded and maintained for the long term and that cost-effective ways to utilise coal wastes for energy production and other applications are increasingly deployed.



**The 600 MW Virginia City Hybrid Energy Center, USA, where two CFBC units fire waste coal and biomass (photograph courtesy of Dominion Energy)**

The IEA Clean Coal Centre is a technology collaboration programme of the International Energy Agency (IEA). The objective of the IEA Clean Coal Centre is to provide definitive and impartial information on how coal can continue to be part of a sustainable energy mix worldwide.

Each executive summary is based on a detailed study which is available separately from [www.iea-coal.org](http://www.iea-coal.org). This is a summary of the report: The use of coal-derived wastes as a source of energy by Dr Stephen Mills, CCC/288, ISBN 978-92-9029-611-9, 79 pp, July 2018.