



REDUCING EMISSIONS FROM COAL
A ROLE FOR THE WORLD BANK

Reducing emissions from coal: A role for the World Bank

Executive Summary

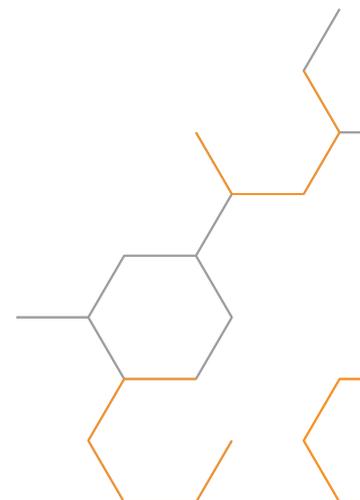
- Multiple independent forecasts show that coal will continue to play a significant role in the global energy mix for decades to come. This is particularly true in developing and emerging economies in Asia and Africa where coal is essential to enhancing energy security, supporting energy access and powering industrial development.
- 492 GW of new coal-fuelled power plant capacity is either planned or under construction today, much of it in developing and emerging economies. Given the life of these plants is at least 30 years, it is expected that many of them will be operating well into the 2050s and beyond.
- Both the Paris Agreement and 2030 Agenda for Sustainable Development are pillars of global action on energy and climate change. Approaches adopted to implement both agreements must integrate environmental imperatives with the aims of universal access to energy, energy security and social and economic development.
- As demonstrated by the Paris Agreement's Nationally Determined Contributions (NDCs), each nation will choose an energy mix that best meets its needs. For this reason, many countries have identified a continuing role for coal. These countries also identified a need for low emission technologies to help them meet integrated climate and development objectives.
- With the use of coal projected to continue to grow over the coming decades, a zero emission pathway for coal is essential if global climate objectives are to be met. This begins with high efficiency low emission (HELE) coal-fuelled power plants fitted with modern emission control technologies that are commercially available today; leading to carbon capture use and storage (CCUS) which requires greater support to accelerate its deployment.
- The transition away from subcritical technology will require international financial, technological and other kinds of support to accelerate deployment of low emission coal technology. This can be addressed by Multilateral Development Banks (MDBs), such as the World Bank, adopting a new approach to coal financing. This approach should –

1 SUPPORT THE SWITCH TO BEST AVAILABLE HELE TECHNOLOGY

The construction of the most suitable HELE coal plant with modern emission control technologies where that facilitates delivery of the commitments made by a country under their NDC under the Paris Agreement. Wherever practical, involvement of World Bank or other MDB financing in such projects should facilitate the inclusion of concepts of CCUS-readiness in plant design.

2 HELP DRIVE THE PATHWAY TO ZERO EMISSIONS FROM COAL

Engage with the relevant national government to support strategies for the development of CCUS technology as part of that country's long-term climate action plan under the Paris Agreement.



Coal will play a continuing role in delivering services and infrastructure

Coal is essential to the development of modern and sustainable societies. Across many economies it plays a major role in bringing affordable, reliable electricity to billions of people. It also plays an important part in the production of steel, cement, glass and many other energy intensive materials which are fundamental for the development of transport, energy, housing and water management infrastructure.

Utilities and power producers need to raise project capital at the lowest cost possible in order to build energy infrastructure, such as power plants and grids, and deliver electricity at affordable prices. In less developed economies, however, raising this finance can present significant challenges as local capital markets may not support the type of long-term financing required for energy infrastructure investments. A number of international financial institutions, such as MDBs, have been established to address these challenges and to promote growth in emerging economies. The World Bank Group (WBG), the most prominent of the MDBs, has played an important role in distributing risk and mobilising private finance.

Coal will continue to be a critical enabler of development and will remain as one of the fuels of choice in rapidly urbanising and industrialising economies

In 2013, however, the WBG board agreed to a new energy strategy that limits financial support for coal-fuelled power plants to 'rare and exceptional circumstances'. While MDBs have in the past only provided a relatively small contribution to overall coal-funding, MDB participation can be significant in the viability of a project that may otherwise be too risky for a commercial bank to undertake alone or where WBG participation may provide a level of comfort to other lenders. Given its influence and leadership role, some elements within the wider financial community, particularly European and US commercial banks, have adopted WBG-style policies.

The introduction of such measures appears at odds with the role coal-fuelled power is expected to play in many developing and emerging countries. In 2018, according to analysis from third party sources, there was 492 GW of coal capacity under construction or in development globally, complementing the 2 TW in operation¹.

Coal will continue to be a critical enabler of development and will remain as one of the fuels of choice in rapidly urbanising and industrialising economies. Recognising this role, MDBs, led by the WBG, should adopt a pragmatic and ambitious approach to financing for coal. Such an approach would help accelerate the deployment of low emission coal technologies and address environmental challenges.

The pathway to zero emissions from coal

Through its ability to raise capital and support complex projects, the WBG is well-positioned to drive the pathway to zero emissions from coal.

Much of the world's current coal fleet uses subcritical technologies with efficiencies of around 33% with a CO₂ intensity of up to 1340 kg CO₂/MWh. More recently, however, a transition has begun to deploy more efficient HELE designs in coal-fuelled power generation. These modern HELE plants have CO₂ intensity as low as 740 kg CO₂/MWh with units reaching an efficiency of 45% (with technological developments expected to achieve further reductions). Deployment of these technologies can be accelerated with the right financial and policy frameworks in place. Increasing the efficiency of coal-fuelled power plants by each percentage point reduces CO₂ emissions by between 2-3%². Given the significant reduction in emissions, key international organisations, such as the International Energy Agency (IEA), have encouraged the deployment of low emission coal generation systems³.

While the environmental benefits of HELE are well understood, restrictive financing may lead developers to choose lower efficiency and poorer emission rates due to higher upfront construction and material costs.

Analysis indicates that the initial capital costs of a subcritical coal plant may be a third less than the more advanced HELE options⁴. Yet the overall costs over the life of the plant can be lower for HELE technologies due to significantly lower fuel consumption per unit of electricity produced. Financiers can have a significant degree of leverage in the technology and equipment that developers adopt on new projects.

For coal-fuelled electricity production, the release of pollutants, such as oxides of sulphur and nitrogen and particulate and trace elements, such as mercury, can be

greatly reduced through the application of low emissions technologies. For instance, deploying fabric filters and electrostatic precipitators can reduce particulate matter emissions by as much as 99.95%. This technology is becoming standard in coal plants in more advanced coal markets, including China and Japan, and should be actively encouraged in other coal-using countries.

CCUS: INDISPENSABLE TO MEETING CLIMATE TARGETS

Improved access to capital would provide incentives to coal generators to invest the higher initial capital outlay of HELE technology and contribute to further decoupling of emissions from economic growth. The benefits of improved emission rates would be significant. Investment by the WBG encouraging developers to adhere to best available technology would therefore lead to improved economic and environmental outcomes than otherwise may have been the case.

However, the zero emission pathway for coal – as with all fossil fuels – has to include CCUS in order to meet our climate goals. Given that many countries will continue to rely on fossil fuels for energy generation, CCUS is recognised as indispensable for the world to meet climate targets⁵. CCUS technologies capture the CO₂ emissions produced when fossil fuels are used in electricity production and industrial applications, with potential for near-zero-emissions. CCUS processes are technologically proven with 21 large-scale integrated projects in operation or under construction⁶. Development and deployment of CCUS technologies would be accelerated through financial and policy support from banks and governments. With such financial and policy support, CCUS can be expected to emulate the virtuous cost reduction and deployment circle experienced by wind and solar.

Development and deployment of CCUS technologies would be accelerated through financial and policy support from banks and government



Developing and emerging economies need support for low emissions coal technology

Twenty-four countries (largely developing and emerging economies) representing over half of global emissions have identified a continuing role for coal in their Nationally Determined Contributions (NDCs) under the Paris Agreement. To integrate environmental imperatives with the aims of universal access to energy, energy security and social and economic development, they pledged to deploy HELE coal-fuelled technology.

Ten NDCs also identified a role for near-zero CO₂ emissions through CCUS. CCUS will be required not only for coal, but also natural gas and industrial sources to ensure global temperature increases are kept well below 2°C. There are also sound economic reasons for promoting CCUS deployment, with analysis indicating that without widespread deployment the cost of achieving the 2°C goal could rise by a median estimate of 138%⁷ – an equivalent cost of around -3% of cumulative global GDP for the rest of the century⁸.

Capacity building, technology transfer, and financing were identified in the NDCs as vital to accelerate deployment of all low emission coal technologies. With the necessary WBG support the transition away from subcritical and toward zero emissions from coal could be accelerated.

WBG ENERGY POLICY REFORM HAS LED TO UNINTENDED CONSEQUENCES

Despite the environmental and clean air benefits of HELE technologies, analysis indicates that just over a third of capacity being added (183 GW) will use the most efficient plant designs. Close to 13% of global capacity under construction or planned will use subcritical technologies. The technology for over 94 GW of coal capacity additions is unknown or yet to be announced, suggesting significant opportunity to influence the type of technology that developers select⁹. With a wider range of financing options, developers would be more inclined to select the best available technology, resulting in lower CO₂ emissions and increased scope for CCUS installation.

Supporting this view, the decision by the European Bank for Reconstruction and Development – which takes its policy direction from the WBG – to withdraw support from the Stanari power plant in Bosnia may have led developers to compromise the original design plans for HELE plant to a subcritical plant. The decision away from HELE technology led the project to be almost 10 per cent less efficient than originally intended with consequences for the plants emission profile.

The technology for over 94 GW of coal capacity additions is unknown or yet to be announced, suggesting significant opportunity to influence the type of technology that developers select

There is little indication to suggest that coal demand has been adversely impacted by changes to WBG policy. On the contrary, there is growing evidence that the WBG position may be creating perverse incentives leading to less efficient coal technologies to be deployed. This has significant implications, including risking the objectives of the Paris Agreement.

MDBs could play an important role in encouraging the transition to low emission coal by promoting efficiency, transparency and adherence to internationally accepted standards in HELE plant design. However, since MDBs have adopted policies that preclude coal, a void has been created that has been filled by alternative funding partners. These partners do not consistently apply the same stringent efficiency standards and environmental protections that MDBs, such as the WBG, have historically championed.

CCUS will be required for coal, natural gas and industrial sources to ensure global temperature increases are kept well below

2°C



Addressing the challenge – a new World Bank financing strategy for coal

Alongside its role in promoting sustainable economic growth and poverty reduction, the WBG has an important part to play in climate change mitigation. However, the retreat by the WBG from financing coal has led to an increasing sense that the global climate agenda is being prioritised over the legitimate development aims of poorer countries. Reform of the current energy policy would ensure support is made available for the full suite of technologies that countries have identified as important to both their climate mitigation strategies through the NDCs and necessary for their economic development.

Moves by the WBG to chart a transition away from coal have not led to a reduction in the use of coal globally or dramatically changed planned coal plants. Instead, alternative funding is being sourced and used to build much-needed power stations with less focus on environmental control technology.

The WCA calls on the WBG to end its policy of only supporting coal in “exceptional circumstances” and to develop an activist policy that supports a pathway toward cleaner electricity production from coal in the developing economies where it will continue to play an essential role.

A new approach to financing for coal should have two elements

1

SUPPORT THE SWITCH TO BEST AVAILABLE HELE TECHNOLOGY

For many developing economies coal will be an essential part of their future energy strategy. 24 countries have included a shift towards low emissions coal technologies in their NDCs under the Paris Agreement. This principally relates to the deployment of HELE coal-fuelled generation in place of subcritical technology, but also includes other low emissions technologies to address air quality concerns.

In many cases the countries have identified a need for international support to facilitate the drive away from subcritical technology toward HELE and other low emission coal technologies. This is where the World Bank has a role to play. If the Bank’s current strategy prioritises climate action then supporting developing countries to implement their Paris Agreement commitments should be

a priority, regardless of the technology.

World Bank involvement in a coal project could provide capital support to compensate for the higher initial capital costs of a HELE plant and facilitate technology transfer and capacity building in those countries where experience in higher efficiency plants has not yet fully developed.

This would mean that the World Bank would participate in the financing of a coal plant where HELE coal technology is included in a country’s NDC submitted under the Paris Agreement and where World Bank involvement can support an active technology choice of HELE or best available technology in place of planned subcritical coal plants.

A new approach to financing for coal should have two elements

2 HELP DRIVE THE PATHWAY TO ZERO EMISSIONS FROM COAL

Given that any HELE plant supported by the World Bank in the scenario outlined above is likely to be operating into the 2050s and beyond, the Bank should also support a long-term strategy for CCUS.

The Paris Agreement calls on all countries to develop a long-term, mid-century strategy for reducing greenhouse gas emissions. For those countries who have coal fleets likely to be operating beyond the 2050s, such a strategy will clearly need to incorporate action on CCUS. In financing a HELE plant today, the World Bank should also engage with the national government of the relevant country about including CCUS technology in the long-term strategy and support a pathway to achieve that, such as through the Long-Term National Climate Plan.

The WBG should prioritise HELE projects that are most suitable for CCUS retrofit. While it is technically feasible that almost any coal unit can be retrofitted with CCUS (depending on space), WBG support should be based on the concept of 'CCUS readiness' which extends further and includes commercial opportunity and storage access considerations. Guidelines developed by the European Union could provide a potential definition for the WBG –

'CCS-ready' means that an installation has demonstrated that suitable storage sites are available, that transport facilities are technically and economically feasible and that it is technically and economically feasible to retrofit for CO₂ capture.'

While many emerging economies may not have completed research on subsurface CO₂ storage opportunities to meet the European Union definition of 'CCUS readiness,' WBG financing could be used to accelerate such research around any plant it finances. Engaging with project developers and national governments to promote opportunities for CCUS deployment would ensure that the benefits of the technology are likely to come sooner and more widely.

Such an engagement should:

- Consider how elements of CCUS readiness could be incorporated into plant design
- Identify how storage mapping, CO₂ pipelines, hubs and clusters and other strategies would accelerate the deployment of CCUS in the country and how the WBG could assist
- Provide support for ensuring effective policy and regulatory frameworks are in place to facilitate CCUS project development
- Support linkages with international CCUS technology developers



Moving toward an all-inclusive low emission framework

Coal will play a role in the global energy mix well into the second half of the century. Much of this capacity will be in today's developing and emerging economies because it is essential to their economic development. If those economies are not supported in ensuring their coal fleets use the best technologies available today, with support for future deployment of CCUS, then international climate and development objectives will not be met.

Policies adopted by several development banks to end financing for coal have not resulted in a shift away from coal. Indeed, such policies can be shown to have unforeseen consequences and lead to less efficient plants with higher emissions profiles. Instead, the WBG should adopt an energy policy that reflects the essential role that coal is forecast to continue to play. Policy reform should prioritise support for countries to implement their international commitments to deploy low emission technologies and help drive the path to zero emissions from coal.

The WBG has demonstrated real leadership in promoting the use of some carbon mitigation technologies. However, opportunities exist for further action by promoting the deployment of other low-carbon technologies. With necessary reform, the WBG could support countries to meet their climate pledges by ensuring that the transition away from subcritical technologies continues. Moreover, by influencing the scale and pace of low-emission coal deployment, the WBG would ensure that the benefits of the transition are felt sooner and more widely.

Ensuring their coal fleets use the best technologies available today, with support for future deployment of CCUS

1: WCA analysis taken from third party sources including Platts, World Electric Power Plants Database

2: International Energy Agency (2014) *Emissions Reduction through Upgrade of Coal-Fired Power Plants: Learning from Chinese Experience*, Paris: OECD/IEA. p.11

3: International Energy Agency (2012) *Technology Roadmap High-Efficiency, Low-Emissions Coal-Fired Power Generation*, Paris: OECD/IEA.

4: World Coal Association and ASEAN Centre for Energy (2017) *ASEAN's Energy Equation*, London

5: See IPCC (Intergovernmental Panel on Climate Change) (2014), *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, [Edenhofer, O., R. P.Bichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA & IEA (International Energy Agency) (2017) *Energy Technology Perspectives 2017: Catalysing Energy Technology Transformations*, OECD/IEA, Paris, <http://www.iea.org/etp/>

6: Global CCS Institute (2017) *Global Status of CCS 2017*, Melbourne

7: Intergovernmental Panel on Climate Change (2014) *Climate Change 2014: Synthesis Report*, p.25

8: Volker Krey et. al, *Getting from here to there - energy technology transformation pathways in the EMF27 scenarios*, December 2013

9: WCA analysis taken from third party sources including Platts, World Electric Power Plants Database

10: Baruya, P. (2017) *International Finance for Coal-Fired Power Plants*, London: IEA Clean Coal Centre. p.55

World Coal Association

The World Coal Association is a global industry association formed of major international coal producers and stakeholders. The WCA works to demonstrate and gain acceptance for the fundamental role coal plays in achieving a sustainable and lower carbon energy future. Membership is open to companies and not-for-profit organisations with a stake in the future of coal from anywhere in the world, with member companies represented at Chief Executive or Chairman level.

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