A Global Platform for Accelerating Coal Efficiency

Concept Paper

WORLD COAL ASSOCIATION

This is a concept paper on the Platform for Accelerating Coal Efficiency (PACE).

The vision of PACE would be that for countries choosing to use coal, the most efficient power plant technology possible is deployed. The overriding objective would be to raise the global average efficiency of coal-fired power plants and so minimise CO_2 emissions which will otherwise be emitted while maintaining legitimate economic development and poverty alleviation efforts.

We welcome engagement with all stakeholders on the PACE concept. Please contact PACE@worldcoal.org with your feedback or to discuss PACE in more detail.

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The World Coal Association is a non-profit, non-governmental 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.

World Coal Association
5th Floor, Heddon House
149-151 Regent Street
London W1B 4JD, UK
www.worldcoal.org
info@worldcoal.org

twitter.com/worldcoal

www.youtube.com/worldcoal

www.facebook.com/worldcoalassociation

Key Points

- In the lead-up to COP21 in Paris there is no evidence to suggest that mitigation action arising from any climate treaty will come close to achieving emissions reductions necessary to limit atmospheric concentration of CO_2 to 450ppm.
- As developing and developed economies grow and urbanisation increases, demand is growing for affordable, reliable and secure forms of energy in order to combat energy poverty and ensure competitive economies.
- This has meant that coal remains the world's fastest growing fossil fuel. Its current contribution to global primary energy consumption (30.1%) is its highest since 1970. In Southeast Asia alone demand is expected to grow by 4.8% a year through to 2035 as the region turns to coal to fuel its growing energy needs
- There appears to be no concerted international government action to integrate the global priorities of reducing energy poverty and supporting economic competitiveness through affordable energy with global ambitions on climate change.
- Moving the current average global efficiency rate of coal-fired power plants from 33% to 40% by deploying more advanced off-the-shelf technology could cut 2 gigatonnes of CO_2 emissions now, while allowing affordable energy for economic development and poverty reduction.
- Deploying high efficiency, low emission (HELE) coal-fired power plants is a key first step along a pathway to near-zero emissions from coal with carbon capture, use and storage (CCUS).
- **There should be coordinated global action to support developing and emerging economies already choosing to use coal to do so with the lowest possible emissions profile. To that end the World Coal Association proposes a Platform for Accelerating Coal Efficiency (PACE).**

Coal and climate policy

The 21st Conference of the Parties (COP21) to the United Nations Framework Convention on Climate Change (UNFCCC) in Paris in November 2015 is scheduled to be a landmark conference where a new global agreement on climate change will be finalised.

That agreement will be aimed at limiting the average increase in global temperatures to 2°C above pre-industrial levels by limiting the atmospheric concentration of CO_2 emissions to 450ppm. At this stage there is no evidence to suggest that the mitigation actions and national contributions set to be included in that agreement will achieve that objective. Indeed, many developing and emerging economies have expressed reservations about the impact such an agreement could have on their economic development and specifically their ability to address key concerns such as eradicating poverty.

The international community must recognise that in many cases the economic and energy security priorities of the world's emerging and developing economies will be met through coal-fired electricity. Coal will also continue to play a critical role in building modern infrastructure in an urbanising world as the key raw material for steel and cement production.

An effective and sustainable climate response must integrate environmental imperatives with the legitimate aims of energy security and economic development, including poverty alleviation.

This means that there must be a role to play for cleaner coal technologies including high efficiency low emission coal-fired power generation and ultimately carbon capture, use and storage in any international agreement on climate. HELE technologies are commercially available now and, if deployed, can reduce greenhouse gas emissions from the entire power sector by around 20%. They are the low-hanging fruit in global GHG mitigation which should be given more attention.

It is imperative that these technologies are deployed as widely and as quickly as possible.

The current UNFCCC process leading towards COP21 in Paris is focussed on countries putting forward their national contributions toward achieving global climate objectives. A mechanism to support developing countries deploy HELE technologies in place of less efficient technologies must be established. This will provide a significant opportunity for developing countries to meet their energy access and development ambitions, integrated as a priority with global climate ambitions. Importantly, it would also be a first step on the pathway to the deployment of CCUS technologies in the medium-long term.

The Warsaw Communiqué

The Warsaw Communiqué was launched by the World Coal Association and the Government of Poland alongside the UNFCCC COP19 negotiations in November 2013. Recognising the critical role coal is playing in addressing global energy poverty and recognising the need to address international concerns about CO_2 emissions from coal, the Warsaw Communiqué called for increased international action on the deployment of HELE coal-fired power generation.

The sentiment was echoed at the International Energy Agency's (IEA) November 2013 ministerial meeting where the Member Countries' Statement on Climate Change declared that "where coal-fired power is used, encouraging the construction and use of highly efficient coal power plants" should be prioritised.

Coal's critical role in the global energy mix

Coal provides 40% of the world's electricity. It may soon overtake oil as the world's largest source of primary energy. According to research by the IEA, coal demand in Southeast Asia is expected to grow by 4.8% a year through to 2035 as the region turns to coal to fuel its growing energy needs. In the 2011 edition of the World Energy Outlook, the IEA predicted that more than half of the on-grid electricity needed to meet their energy for all scenario would come from coal.

Coal use is growing. Many developing countries have significant coal reserves and they want to use their own natural resources to develop their economies. This is not surprising as these countries work to bring power to the 1.3 billion people who lack access to electricity.

In developing countries coal growth is driven by the need to deliver affordable, reliable energy to populations that currently lack modern energy services. It is also driven by the significant trend towards urbanisation where coal-fired electricity helps power modern cities but is also a key ingredient in steel and cement production.

Many developing countries are building, or planning to build, new fleets of coal-fired power plants. A report by the World Resources Institute highlighted that 1199 plants (representing 1400 GW) are anticipated across 59 countries. They are doing this because for them coal is the most affordable, accessible and reliable source of power. Other sources of energy will make a significant contribution, but for many coal will be the cornerstone of their energy system.

In the longer-term, CCUS technology will be needed for all fossil fuels if global temperature increases are to be kept below 2°C. This technology is not yet available on a commercial basis and so it cannot be expected that developing countries or emerging economies should be the first movers for its deployment. CCUS provides a pathway to near-zero emissions from coal in the longer-term. The first step on that pathway is to ensure that coal-fired power generation has the lowest emissions profile in as short a time frame as possible.

In addition to its ministerial declaration, the IEA has in other reports recently pointed to the near-term benefits that deploying high efficiency, low emission coal-fired power generation can have on reducing CO_2 emissions.

Benefits from efficiency improvements

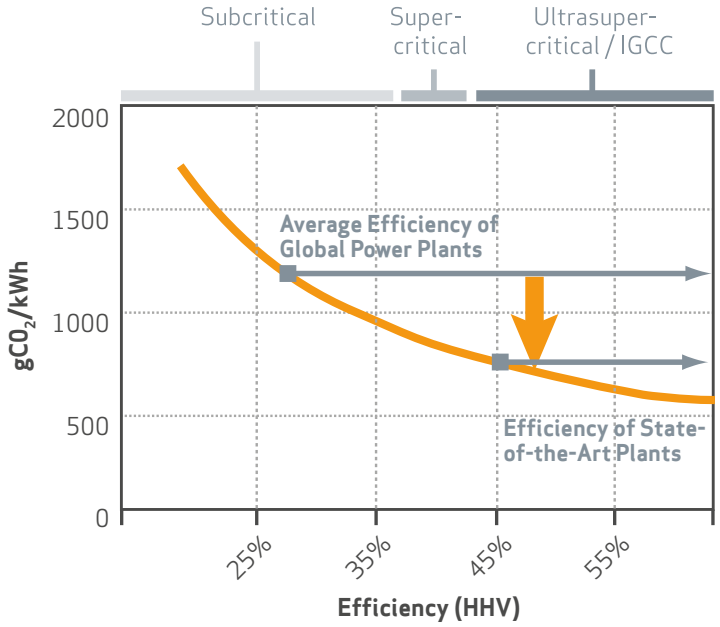
In its 2012 Energy Technology Perspectives report, the IEA highlighted the significant potential to reduce CO_2 emissions through the deployment of more efficient coal-fired power generation.

The average efficiency of coal-fired power plants around the world today is 33%. This is well below the state-of-the-art rate of 45% and even 'off-the-shelf' rates of around 40%. Increasing the efficiency of coal-fired power plants by 1% reduces CO_2 emissions by between 2-3%. Moving the current average global efficiency rate of coal-fired power plants from 33% to 40% by deploying more advanced technology could cut 2 gigatonnes of CO_2 emissions.

This is the equivalent of –

- India's annual CO_2 emissions
- running the European Union's Emissions Trading Scheme for 53 years at its current rate, or
- running the Kyoto Protocol three times over.

Reducing emissions through efficiency improvements



Source: IEA"Focus on Clean Coal" (2006)
Note: 1% increase in efficiency = 2-3% decrease in emissions

Emission reductions by policies / actions, bn tonnes CO_2 equivalent

Policy / Action	Cumulative emissions	Period	Annual emissions*
Montreal protocol	135.0bn	1989-2013	5.6bn
Hydropower worldwide	2.8bn	2010	2.8bn
Nuclear power worldwide	2.2bn	2010	2.2bn
Increase average global efficiency of coal-fired power plants to 40%			2bn
China one-child policy	1.3bn	2005	1.3bn
Other renewables worldwide	600m	2010	600m
US vehicle emissions & fuel economy standards†	6.0bn	2012-2025	460m
Brazil forest preservation	3.2bn	2005-2013	400m
India land-use change	177m	2007	177m
Clean Development Mechanism	1.5bn	2004-2014	150m
US building & appliances codes	3.0bn	2008-2030	136m
China SOE efficiency targets	1.9bn	2005-2020	126m
Collapse of USSR	709m	1992-1998	118m
Global Environment Facility	2.3bn	1991-2014	100m
EU energy efficiency	230m	2008-2012	58m
US vehicle emissions & fuel economy standards‡	270m	2014-2018	54m
EU renewables	117m	2008-2012	29m
US building codes (2013)	230m	2014-2030	10m
US appliances (2013)	158m	2014-2030	10m
Clean technology fund	1.7bn	project lifetime	na
EU vehicle emission standards	140m	2020	na

* Annual emissions are cumulative emissions divided by the relevant period.
The estimate for the current emissions avoided under the Montreal protocol is eight billion tonnes of CO_2e.
The annual figure for the collapse of the USSR refers to the years 1992-1998. †Cars and light trucks ‡Heavy trucks

Sources: The Economist 2014 and International Energy Agency 2013

Analysis of the impact various policies or events have had on global CO_2 emissions demonstrates the potential significance of supporting efficiency improvements in the global coal fleet. If a global initiative was in place to increase the average efficiency of the global coal fleet to the level of off-the-shelf technology, its 2 gigatonnes of savings would place it fourth on this list of 20 activities. It would be more than three times as effective in reducing CO_2 emissions than the global deployment of all non-hydro renewable energies combined.

In addition to significant benefits from reduced CO_2 emissions, these modern high efficiency plants have significantly reduced emissions of nitrogen oxides (NOx), sulphur dioxide (SO_2) and particulate matter (PM). Beyond the climate benefits of reduced CO_2 emissions, reduction in these pollutants is of additional importance at the local and regional level to address air quality and related health concerns.

In the 2012 Energy Technology Perspectives report the IEA proposed a range of technology and policy actions for CO_2 reduction in coal-fired power plants, amongst them were –

- pursue technology development for plants with efficiencies in excess of 45%
- reduce generation from less efficient subcritical plants and/or significantly increase their efficiency
- promote the deployment of ultra-supercritical technology for new installation and repowering.

Similar technology and policy recommendations were made in the 2013 World Energy Outlook, in particular focussing on the role of coal in Southeast Asia. In the 'Efficient ASEAN Scenario' the IEA looks to an improvement in the average efficiency of coal plants in the region from 34% to 39% as the share of coal in the electricity mix increases from 31% to 50%. If global ambitions to reduce CO_2 emissions are to be achieved, then it is essential that the most advanced technologies possible are deployed.

Platform for Accelerating Coal Efficiency

Accelerating deployment of HELE plants calls for a new approach. In order to give effect to the Warsaw Communiqué and to more effectively integrate global ambitions on climate and development, the World Coal Association proposes the concept of a Platform for Accelerating Coal Efficiency (PACE).

The vision of PACE would be that for countries choosing to use coal, the most efficient power plant technology possible is deployed. The overriding objective would be to raise the global average efficiency of coal-fired power plants and so minimise CO_2 emissions which will otherwise be emitted while maintaining legitimate economic development and poverty alleviation efforts.

PACE would be an international public/private partnership. In addition to governments and corporations it would also partner with other non-state actors, such as non-government organisations, think tanks and research institutes, who can contribute knowledge and support in achieving PACE's vision and objectives. It would work at both local and international levels.

Internationally, PACE would work to drive a supportive environment for increasing deployment of HELE technologies. At the national level, PACE would facilitate linkages between governments, technology providers and financiers to smooth the pathway toward deployment of HELE technologies.

PACE at the international level

At the international level, PACE will work to drive a supportive environment for increasing deployment of HELE technologies. The main challenge areas identified at the national level also have synergies at the international level. PACE will convene specialist working groups to address these challenges.

PACE can help address policy challenges through international action in developing guidance and tools to support policy making at the national level. It may also be able to contribute to international policy development challenges relating to the deployment of HELE coal. These will also support addressing the financing risks faced by the coal-energy sector as a result of some multilateral development banks and private finance institutions limiting financing for coal projects.

Following establishment, the initial steps of PACE would be to –

1. Define a model for best available technology and practice in HELE coal-fired power generation, including identifying potential high impact research priorities.
2. Identify and begin to address specific policy challenges to the implementation of HELE plants.
3. Drawing on 1 and 2 above, and in conjunction with the IEA, establish a global target for improving average coal plant efficiency.
4. Identify potential client countries that are a particular priority to work with, e.g. those where coal is a major part of the national energy strategy and involvement from PACE would support HELE deployment.

An overview model of PACE's activities and inputs is provided in Attachment 1.

Establishing PACE

The World Coal Association is seeking the support of international partners to progress the PACE concept.

- **National governments** – both sponsoring PACE through financial contributions to support the work programme and those anticipated to be client countries (countries could be both sponsors and clients).
- **Private sector** – companies along the coal value chain that can provide financial contributions, be involved in work on technological development and invest in HELE deployment in developing countries.
- **International and non-government organisations** – particularly those who can advise on policy development, environmental and regional issues, and which may make in-kind or financial contributions.
- **Implementing partners** – consultants or other institutions who can provide technical advice and support on high level issues, but more specifically would be responsible for working with client governments.

Engaging with PACE

The World Coal Association would welcome the opportunity to engage with you and your organisation or government on the PACE concept. We are asking for your feedback on the concept, how it should be implemented and how you could work with us to make it a reality.

Please send your comments to us at PACE@worldcoal.org

Attachment 1

Overview model for PACE

Advancing technological development through coordinating research efforts using a technology centre model and identifying and leveraging financial support.

Technology

Global Action

Define a model for best available technology and practice in high efficiency, low emission coal-fired power generation.

Implement the recommendations and actions of the IEA's 2012 Technology Roadmap for High-Efficiency, Low-Emissions Coal-Fired Power Generation with a view to maximising achievement of the milestones contained in that report.

Promote knowledge and technology transfer to support development and deployment of more advanced technologies in developing countries.

National Action

Develop roadmaps and regulatory frameworks with governments to facilitate the deployment of high efficiency, low emission coal-fired power plants in preference to less efficient technologies with higher emissions.

Support the upgrading of existing coal-fired power plants to improved technologies to reduce emissions.

Support actions that promote better resource efficiency for coal (such as reuse rather than disposal of coal ash and increased efficiency along the coal value chain, including through improved coal handling, drying and washing)

Finance

Identifying and working with funding partners to ensure cost is no barrier to deployment of the most efficient technologies, including work with financial institutions (eg, development banks) and carbon market mechanisms (eg, the CDM).

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