

The case for coal as the most secure energy fuel for emerging market economies

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5 Apr 2019

So much of the world's growth over the past 200 years has been due to the discovery and ever-increasing use of affordable energy derived from fossil fuels led by coal, followed by oil, and natural gas. This affordable and predominantly coal-fuelled energy drove industrial expansion, created millions of jobs, and generated wealth for a large portion of the global population.



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There is a great deal of discussion led by a largely pseudo-scientific approach to global warming, which has reached almost 'religion' status, and the supposed dangers of carbon dioxide gas (CO₂) released from fossil fuel combustion around the world, in particular from coal.

In 1988, the International Panel on Climate Change (IPCC) was set up to investigate and document the dangers associated with CO₂ which is released from fossil fuel combustion, such as coal. Since then, many papers and articles have been written and international meetings held to see if agreements can be made to mitigate this supposed problem for our planet - a problem not fully defined, nor even proven to any level of certainty.

In this context, coal has been set up as the general 'public enemy' Number One. Coal is an easy target; by its very nature it's black, dusty and dirty; with less powerful lobby groups and influencers than other sectors, such as oil and natural gas. These sectors are often much less visible to the public eye and easier to disguise and dismiss as threat or cause.

Targets have been set to reduce CO₂ emissions for the near future; and programmes are being introduced in developed countries on how to meet them. The goal? To shut down all coal burning power stations, followed by the source of the coal, the mines themselves.

Stress on developing continents and countries

There are still many developing countries, the rising stars of tomorrow's industrial world that rely on this affordable source of generation to power their growing industries and are now being forced to comply with western politically driven often unrealistic targets. These countries, many on the African continent, are now driven allocate a significant portion of their

fiscus on CO₂ mitigation and reduction defined and sold by them – targeting shutting down coal use in any form, while this expenditure could be put to better use and is urgently needed to develop the countries' infrastructure and large-scale industrial business that can improve these economies and add to job creation, improve the health system and reduce environmental pollution of the air, water and soil by noxious emissions and effluents.

Until a reliable, new and reasonably priced base-load source of energy is found, coal is required.

Quickly and drastically reducing the use of coal by a large percentage, as has been mandated by some developed economies and their governments, and the Paris Accord, creates a serious problem. It would have negative effects on the social welfare of so many people in the energy industry and related sectors and many millions more people's lives will be threatened because funds that could be used in infrastructure and other developmental requirements are now being deployed for CO₂ mitigation.

The Southeast Asia scenario

In 2016, the five biggest coal importers in the world were India, China, Japan, South Korea, and Taiwan. While the big five made up almost 70% or over 600-million tonnes of global imports, the Southeast Asia (SEA) market accounted for less than 8% or about 70-million tonnes of coal imports during the same period. However, according to data released by the IEA for the period between 2017 and 2018, the SEA market has doubled in size.

The region's key coal users and importers include Thailand, Malaysia, Philippines, Vietnam, and Indonesia. Even though Indonesia is the biggest coal exporter, supplying over 80% of the demand for the region, its domestic coal requirements are expected to impact the Asian demand and supply balance significantly in the coming decade by increasing its own demand.

While Vietnam already appeared on the map in 2016, Myanmar will also play a bigger role in the near future as coal production rapidly increases.

"Electricity is increasing its share in total energy consumption and coal is increasing its share in power generation", said Laszlo Varro, head of the gas, coal and power markets division for the International Energy Agency (IEA). The vast majority of the 400GW in power generation capacity to be added in SEA by 2040 will be coal-fired. That will raise coal's share of the SEA power market to 50% from roughly 32%, while natural gas declines to 26% from approximately 44%.

About 700-million people now live in SEA and the region is expanding quickly, especially in terms of energy demand and as a result electricity generation. IEA Southeast Asia predicts that population grows modestly to 760-million people by 2040 but urbanisation increases from 46% today to 60% until then. The GDP per capita will almost triple until 2040, and this is where energy demand must step in.

As a result of this soaring energy demand, environmental pressures are increasing. At the same time, the carbon foot print of SEA is only a fraction of that of Europe and the USA.

Fuel of choice

The IEA also reports similar trends and shares of total energy consumption for the African continent which, in population terms roughly approximates SEA. With these similarities in mind, the IEA predicts that 120-million people in Southeast Asia lack electricity, while over 270-million rely on wood and dung for cooking and heating, pollutants in itself. “From 2013 to 2030, the SEA region’s primary energy demand will almost double or increase by at least 80%.” The IEA notes. The “power pie” or electricity demand increases from 790TWh to 2.210TWh from 2013 to 2040.

That tripling in electricity demand will be primarily sourced from coal. Whilst renewables are expanding, their pace of growth is too slow to keep up with faster, more affordable thermal coal-fired power generation. Coal will be the fuel of choice. The material is easily available, the cheapest source of power and also the safest. All major SEA countries are constructing coal-fired power plants at a breath-taking pace. We predict that with a 40GWe energy shortage already prevalent in Southern Africa, a similar trend will emerge if the 4th Industrial Revolution (4IR) is ever to gain traction in Africa.

Coal’s share of electricity generation is expected to increase from about one third today to reach 50% by 2040. This means that the SEA will pull up the global average for coal use and significantly contribute to coal continuing to be the power source for the developing world. Again, renewables, including hydro will also grow but the staggering increased power demand cannot be met economically without the use of easily available, low-cost and safe coal.

Renewable energy sources

New energy technologies are being funded and developed to counter the reliance on coal and coal-fired power stations. Solar panels, geothermal wells, wind farms and tidal turbines are being installed to produce electricity. While these solutions are often portrayed as reliant green energy, geothermal and tidal turbines are only considered transient and cannot yet be used for base-load service which is driven mainly by coal; a key factor for a stable power to a city, town or industrial centre.

Solar produces no power at night and windmills only work when there is sufficient wind, while shutting down when the wind speed is too high. Thus, storage and re-distribution of extra power has become the key challenge. Only an advanced storage solution that can be applied on a global scale and is affordable, will allow for large-scale economic use of solar and wind power. Coal-fuelled power is steady, still relatively cheap and runs continuously 24 hours a day. Therefore, there might not be a way around coal fuels for many decades to come.

Key forces affecting climate

The question we need to ask is, are we sure that this costly and drastic move away from coal just to reduce CO₂ is urgently needed? What are the key forces that affect the Earth’s climate? Do higher CO₂ levels not benefit plant growth and therefore are beneficial to our environment?

To answer this question, let us have a look at the Earth’s climate history over the past 400,000 years and the role of CO₂. This contrasts with the typical 150-year time span depicted in global media and which is a major misdirect to garner public support.

The fallacies of a carbon tax

To more rapidly reduce the use of fossil fuels, coal in particular; a \$40/ton carbon tax was proposed and given serious consideration in Washington and similarly in other developed nations. This would affect mainly the use of coal and natural gas, oil, which make up 80% of the energy used in those countries.

Based on the data available, this could be a big mistake which would force energy companies to close down otherwise productive coal-fired power plants too early and increase the cost of power beyond what is economically viable.

Carbon capture and storage (CCS) has also been proposed to remove CO₂ from coal power plant exhaust, transport it by pipeline and inject and store it in state approved deep underground sites. It is estimated that CCS could double the base cost of electricity production from coal and other fossil fuels. This would be highly prohibitive, and the costs were to fall first on the public who depend on stable energy sources and as explained above, it serves no useful purpose for controlling climate change.

Another key point about CO₂ is that all plant life thrives in high CO₂ environments and farmers routinely pump CO₂ into greenhouses to 1.500 ppm CO₂, which greatly increases growth rate. It is the key nutrient for all plant life and when it drops below 150 ppm, very few plants and animals can survive. Plants also handle drought conditions better as CO₂ rises as they expire less water in the process of absorbing CO₂, their principal food source. If CO₂ in the air were to double, their water needs would drop by 50%. This will be an enormous boon for agriculture everywhere especially in arid regions around the world and would support feeding our growing population.

The CO₂ content in the air in our homes is also much higher than outside and is safe to breathe. CO₂ is not a pollutant but a vital basic building block of all life on Earth, on land and in the oceans.

Conclusion

- Reviewing the available data makes clear that no significant global warming from re-radiated solar energy can be created by an increase in CO₂ above current levels for which coal gets most of the blame.
- CO₂ is beneficial for our environment and is not a pollutant. It benefits plant life by increasing biomass and thus improves the basis for all human life on Earth. So, producing and burning coal using state of the art technology can still be a sustainable development solution.
- The present warm period has lasted over 8,000 years longer than any of the three prior ones, giving the oceans a much longer time to warm up and release more CO₂ into the atmosphere, which would also contribute to the current level of 400ppm. This means that coal does not carry all the blame as is stated by socio-environmentalist groups and politicians.
- According to IEA climatologists and oceanographers tripling the present value of CO₂ to 1,200 ppm will not result in ocean acidification, as has been proposed by the socio-environmental political movement (most notably Al Gore), and the pH would be about 7,8 which is still a satisfactory alkaline level in which ocean life can flourish – as it did over most of geological history when CO₂ levels were several times higher than those today and when no coal was being mined or burned.

Proposed future energy development plan

Of course, coal and fossil fuel sources have a limited useful time span and technological advancement will ensure that we will no longer rely on coal, possibly latest by 2200, 180 years away. We need to develop a well-planned economic, environmental and social introduction of viable and affordable new energy sources. We need to gradually change our social infrastructures and improve the lives of people and futures of whole towns, cities and regions in every country around the world. And the reason for this is not the CO₂ that coal used as a fuel emits, but because there will be more efficient and fewer polluting ways of producing energy developed in the next two centuries.

It is recognised that there are real issues related to coal and other fossil fuels that need to be addressed such as groundwater contamination and smog from release of smoke particles, and corrosive gases containing sulphur, as well as safer storage of fly ash from coal combustion. That's where our resources should be spent, and our ingenuity used to improve existing conditions.

The billions of dollars to be spent or better wasted on CO₂ mitigation could – if employed elsewhere - truly make a difference to provide cheap clean coal technology driven energy sources of base load magnitude and thus improve the health of our planet and our populations economic development.

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