



## A guide to why coal is not the way out of energy poverty

**The coal industry sees itself playing a major role in addressing energy poverty.** Carbon Tracker has produced a detailed analysis of the geography of the energy access challenge, and of the coal industry. We have then assessed the economics and practicalities of the range of energy options for improving energy access for the poor and stimulating economic development.

**Energy companies should be testing their business plan against a range of demand scenarios.** The IEA has a range of scenarios addressing the potential for renewables and energy access – these objectives need to be central to developing a sustainable energy future. Considering all of the potential scenarios – including the Energy for All and High-Renewables scenarios - is a sound risk management strategy, rather than only looking at the IEA's "New Policies" or "Current Policies" scenarios, in which neither climate change nor energy access is effectively addressed.

**Energy access is primarily a rural issue.** 84% of those without energy access live in rural areas. Our analysis focuses on sub-Saharan Africa and India which account for 48% and 24% of those without energy access respectively.

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*“The rural poor are unlikely to be the saviours of the coal industry. Importing coal is not a good solution for Africa and India, meaning solving energy access is unlikely to halt the structural decline of the seaborne market for thermal coal”*

*James Leaton, Research Director at Carbon Tracker*

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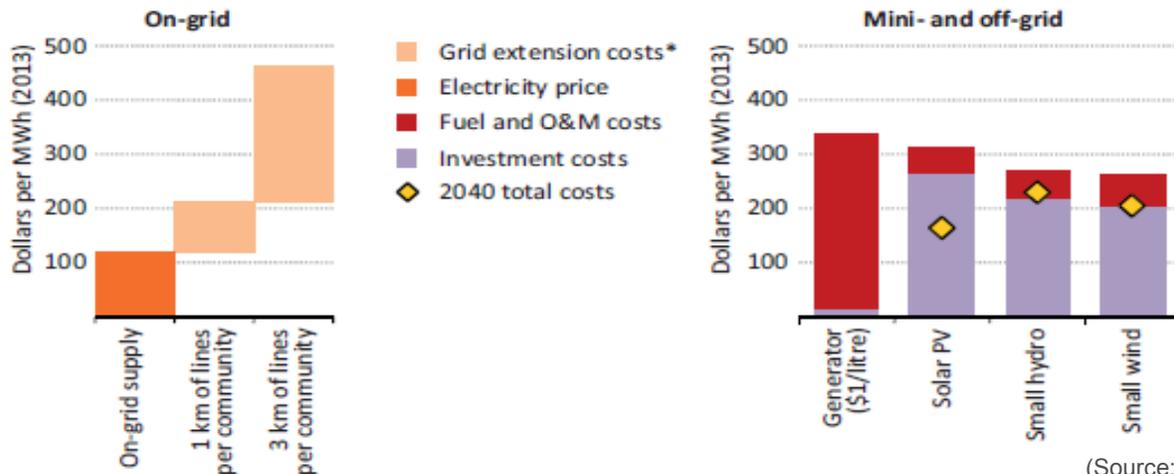
### COAL INDUSTRY VIEWS

Below are illustrations of the coal industry's position on coal and energy poverty which this paper aims to explore and debate. For more details see the 'Advanced Energy for Life' campaign.

- **"Coal is the only affordable fuel, at scale, to meet rising energy demands"** because of its low cost, energy density, ease of transport, wide availability, and integration into baseload generation capacity.
- **"Clean coal technologies provide the method to address access as well as environmental concerns"** largely through supercritical coal-fired plants and carbon capture and sequestration.
- **Coal is "essential to meet the scale of Africa's desperate need for electricity"**.

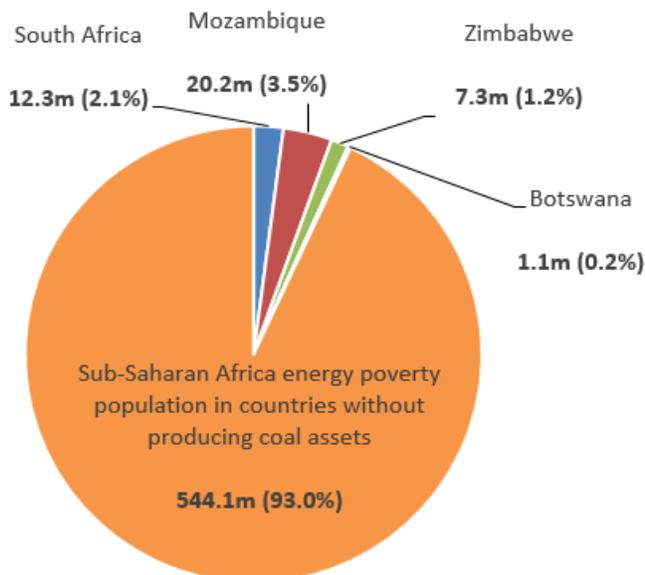
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**Grid costs are prohibitive for coal in rural areas.** When the cost of introducing grid infrastructure is included in cost comparison, off-grid or mini-grid renewables are cheaper than a new grid and coal power station. The IEA see 59% of energy access being supplied by mini-grids or off-grid to deliver universal access by 2030; the majority of grid connections relate to urban areas due to additional costs for each kilometre of grid extension.



(Source: IEA)

**Coal is not distributed well to serve Africa's energy poor.** Only 7% of the people in sub-Saharan African countries who lack access to energy live in countries with producing coal assets. The coal production is concentrated in the very south of the continent and transport links are poor. This suggests that many African countries with energy access issues are unlikely to follow the coal-based industrialisation seen historically in other parts of the world.



Source: IEA, RMG data, CTI analysis

**Developing renewables prevents locking developing countries into expensive coal imports.**

Renewables provide a flexible solution that both compliment and increasingly compete with diesel generators on cost. As energy storage technology improves, capacity can be added, increasing the proportion of solar power in hybrid PV/diesel systems.

**Increasing coal use does not guarantee energy access.**

Industry often cites the IEA's New Policy Scenario as evidence that coal demand will increase. Even this reference scenario only sees coal demand increase by 23% globally through 2030 and with coal losing market share. However this scenario only reduces overall energy poverty by a quarter, and in fact sees an increase in the number of people without access to energy in Sub-Saharan Africa.

**Providing universal energy access does not significantly increase coal demand.** The extra coal demand in the IEA Energy for All scenario is equivalent to 1.8% of global coal use, and could be offset by India and sub-Saharan Africa reducing electricity distribution losses by a third. The IEA High Renewables scenario shows how these regions can provide more than 80% of their energy from renewables in 2050 with less than 5% coming from coal, (down from 68% in India and 38% for Africa in 2011). If energy efficiency improvements also outpace projections this will further erode demand requirements. For these reasons it is clear that providing "energy" does not automatically mean more demand for coal.

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*“As the costs of photovoltaics reduce and battery technology improves, this can provide a growing share of hybrid solar/diesel generator solutions which suit local small enterprises as well as rural settings and include more local manufacturing content over time.”*

*Mark Fulton, CTI advisor*

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**Renewables are improving lives now.** Even in places that currently lack a centralized grid, low-cost off-grid interventions are enabling households with initial access to the “energy ladder” at a fraction of the cost of grid extension, providing immediate benefits. This may only provide a few hours of light or mobile phone charging initially, which does not register as full energy access, but contributes to education and livelihoods.

**Financial innovation and telecoms tie-ins make renewables available.** ‘Tower power’ links mini-grids to mobile phone towers, bringing efficiencies for local communities. Pay-as-you-go solar and solar leasing arrangements overcome initial capital outlay challenges. Off-grid and mini-grid solar is combining with other technologies and alternative financing models to accelerate roll-out and reduce cost of delivery.

**Renewables are beating all predictions on cost and scale of deployment.** Deployment of both solar and wind has repeatedly beaten the forecasts of energy commentators since 2000. A recent survey of 55 emerging economies found that annual renewable investment doubled between 2007 - 2013. This suggests it is sensible to consider such a scenario going forward where expectations are again exceeded. It is important to continually test assumptions on the fundamentals of demand, costs and price, as technological innovation and economic growth forecasts are difficult to

**Renewables are competing on cost in urban market too.** The coal sector sees urbanization as its route to providing energy to the poor. Grids are more prevalent in cities, but they can supply electricity from a range of energy sources. In South Africa \$90/MWh is the revised LCOE cost of the most recent example of the new Eskom Medupi coal plant in South Africa, with its sister Kusile plant rumored to be even more expensive. This level of cost is in the same range as renewables recently commissioned by Eskom - \$75/MWh for wind and \$100/MWh for solar. In India recent renewables projects are similar in cost to generating electricity from imported coal.

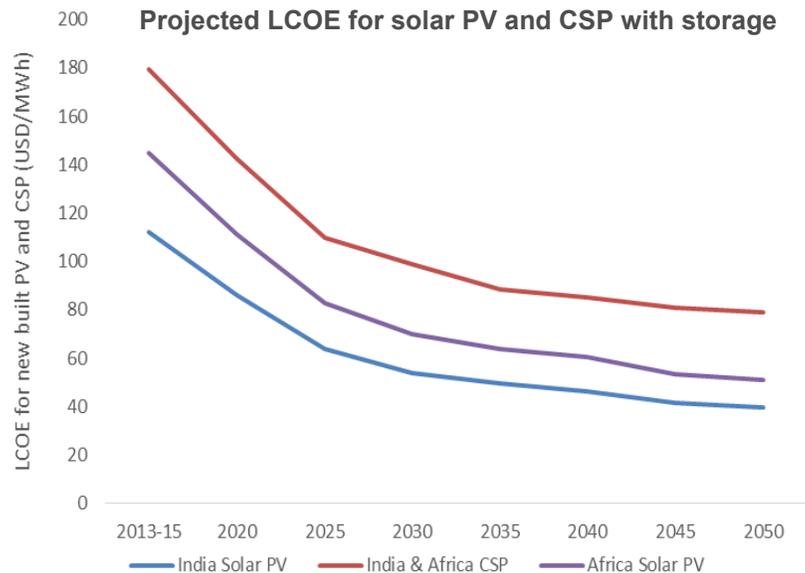
**Urbanization is not a panacea for energy access.** In large cities such as Nairobi or Mumbai there are large populations living in shanty towns without proper infrastructure, such as grid connections to electricity. Whilst urbanization is undoubtedly a trend, there is no guarantee that migration of the poor to cities will see them improve their access to energy. Alongside urbanization, rural populations in developing countries are also set to grow, meaning the problem cannot just be solved by expecting those without energy access to move to grid-connected housing in the cities.

**Energy access provides economic development opportunities.** Smaller enterprises are often the best funded and most in need of reliable energy sources. The electricity grids of Africa and India suffer from significant reliability issues. Disruptions due to unreliable grid-based electricity – and the high cost of on-site diesel only generation – create significant economic opportunities for distributed clean energy technologies, including batteries. Diesel generators are typically replaced every few years, providing greater opportunity for substitution and higher shares for solar in hybrid systems. We expect there will be increasing opportunities for local manufacture and for developing countries to participate in the development of clean energy industries, providing jobs and revenues based on clean energy.

**Reduced fuel costs offset upfront costs of renewables.** Our estimates suggest that when spread over the lifetime of the asset, there is little difference in overall cost once fuel cost savings for the poor are taken into account. Indeed as costs come down further, renewables will become the cheaper option. Climate finance is needed to provide the initial capital, and there is signs that financial institutions are gearing more towards smaller scale renewables requirements in terms of both policy and financial products available. Reducing the cost of capital for renewables improves the economics considerably.

**Renewable investments can also be broken down into more manageable chunks of capital.** The \$1billion plus cost of a 1GW sub-critical coal power plant exceeds the spending power of many African nations. The payback periods for renewables continues to fall, making them increasingly attractive to businesses looking to secure their own energy supply. For examples in East Africa, we estimate the simple payback of solar PV systems to be 6 years compared to grid electricity, and 4 years compared against diesel.

**Coal has negative environmental and social impacts.** There is a fundamental contradiction in promoting unmitigated coal as the solution which will improve development outcomes, given firstly the negative impacts on respiratory health and secondly that exacerbating climate change will impact the poor the most. Carbon Capture and Storage (CCS) has not yet developed to a commercial scale, and would only increase the costs of coal generation. Current cost comparisons do not typically include this extra cost. Internalizing the costs of preventing impacts on health, water and climate change through emissions limits, resource constraints or technological requirements will only increase the costs of continuing coal use.



(Source: BNEF and World Energy Council)

*“Energy may echo telecoms where mobile networks have provided communications links without a wired telecom network and infrastructure being required – this is what we are seeing in the global energy markets in the developing world, all around the globe,”*

Anthony Hobley, CEO of Carbon Tracker.

## Contact Us

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