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Global Scenario of Coal Market – A Road Map Edge

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Abstract

Coal is the basic raw material which is considered to be the backbone of modern power industry. Though several other sources of energy were identified with the progress of civilization, coal has remained to be the main stay of thermal energy, catering to over 60% of world's industrial energy requirement. In the International energy outlook 2016 reference, coal remains the second –largest energy source worldwide-behind petroleum and other liquids-until 2030.From 2030 through 2040,it is the third largest energy source, behind both liquid fuels and natural gas. World coal production in the Reference case increases from 9 billion tons in 2012 to 10 billion tons in 2040, with much of the growth occurring in India, China, and Australia. Their combined share of total world coal production increases in the IEO2016 Reference case from 60% in 2012 to 64% in 2040, but the share of the world's leading coal producer, China, decreases from 48% in 2012 to 44% in 2040. World coal production varies significantly from region to region in the Reference case, with sustained strong growth in India, slowing growth and a gradual decline after 2025 in China, and little change in the United States and OECD Europe.In global scenario in coal market shows the demand supply, laws and regulation, consumption of coal in oversees after the globalization with technological advancement.

International coal trade consists of two separate markets—one for steam coal (also referred to as thermal coal) and one for coking coal. Steam coal is used primarily for electricity generation and in industrial applications for the production of steam and direct heat. In the IEO2016 Reference case, international steam coal trade declines from 1,031 MMst in 2013 to 896 MMst in 2020, then increases to 960 MMst in 2040. Coking coal is used to produce coal coke, which in turn is used as a fuel and as a reducing agent for iron ore smelting in blast furnaces. World coking coal trade increases in the Reference case from 344 MMst in 2013 to 393 MMst in 2040. India, whose steel industry relies almost exclusively on imports of coking coal because of a lack of domestic reserves of coking coal, accounts for much of the growth, with its imports increasing from 43 MMst in 2013 to approximately 120 MMst in 2040.

Keywords: Global, Scenario, Source, Coal, Demand, Consumption, Regulation.

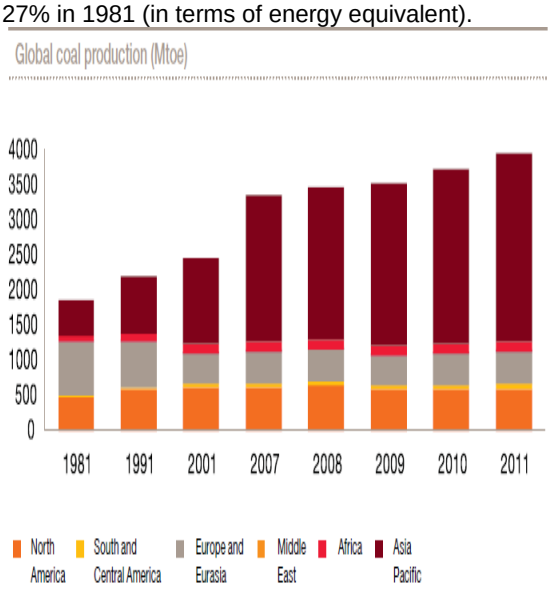
Introduction

The coal markets have been observed as a complex market globally, having high influence on price formation. While anticipating future price trajectories for any commodity can be a difficult exercise, given the complexities and global market influences one finds in coal, attempting to forecast prices and volatilities can be particularly harrowing. Nevertheless, it is incumbent upon market participants to continually update their market outlook and forward price curves for the various coal products in order to properly manage market risks and exposures.

Short term influences, such as weather driven demand or production/transportation upsets can create fairly significant price movements that may last days or even weeks; however, these price movements are simply "part of the game." Most traders are versed in reacting to these short term changes and can manage their positions around them without significant financial consequences. It is the longer term that will ultimately delineate between those traders and companies that find success in continuously evolving their strategies and portfolios to meet a rapidly changing market; versus those that did not have the foresight to anticipate how structural changes that are occurring globally and are transforming the market, might impact their businesses.

Globally, coal resources have been estimated at over 861 billion tonne. While India accounts for 286 billion tonne of coal resources (as on

31 March 2011), other countries with major chunk of resources are USA, China, Australia, Indonesia, South Africa and Mozambique. Coal meets around 30.3% of the global primary energy needs and generates 42% of the world's electricity. In 2011, coal was one of the fastest growing forms of energy after renewable sources and its share in the global primary energy consumption increased to 30.3%-highest since 1969. Coal production in the Asia Pacific region has grown tremendously and accounts for over 67% of the total production globally (2011) as compared to about 27% in 1981 (in terms of energy equivalent).



Source: BP's Statistical Review of World Energy, June 2012

Last year, around 6.1 billion tonne of hard coal and 1 billion tonne of brown coal were used worldwide. Since 2000, the global consumption of coal has grown faster than any other fuel. Currently, the five largest coal users are China, USA, India, Russia and Germany. They account for 77% of the total global use. India has the fifth largest coal reserves in the world. Of the total reserves, nearly 88% are non-coking coal reserves, while tertiary coals reserves account for a meager 0.5 % and the balance is coking coal. The Indian coal is characterised by its high ash content (45%) and low sulphur content. The power sector is the largest consumer of coal followed by the iron and steel and cement segments.

Objective of the study

1. To aware people global scenario of coal market throughout overseas.
2. To through the light on coal production, consumption of global market.

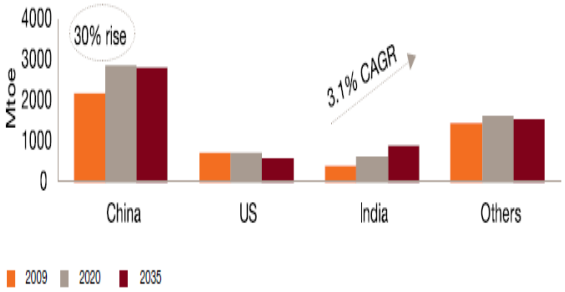
Global Energy Supply Balance at a Glance

The coal market is primarily focused on demand for steam coal for power generation and secondarily on coking coal used in steel production. Demand for these commodities and their derivative products is in turn directly influenced by the evolution in the global economic landscape; an evolution that has, in the last 20 years, seen a nearly continuous reshaping in order to meet demand from the emerging economies in the Asia-Pacific region. Indeed, the story of coal demand and prices now and in the foreseeable future is inextricably tied to what happens in Asia, and in particular, China.

The Asia region, led primarily by China, has seen an explosive growth in demand, with an increase of almost 300% during the period from 1990 to 2010, and now consumes over 63% of the total global production of coal. In the global market, China, India and Indonesia are expected to account for nearly 80% of the total incremental growth in demand for coal. As per projections, by 2035, China will remain the world's largest consumer of coal, followed by India, US and Indonesia.

Coal-based thermal power projects will be the main drivers of demand in China and India. The projected coal fired generation capacity in Asia will rise to 1,464,000 MW in 2020 up from 918,000 MW this year, while for India it will rise from 95,000 MW to 294,000 MW over the next 11 years (a 300% increase).

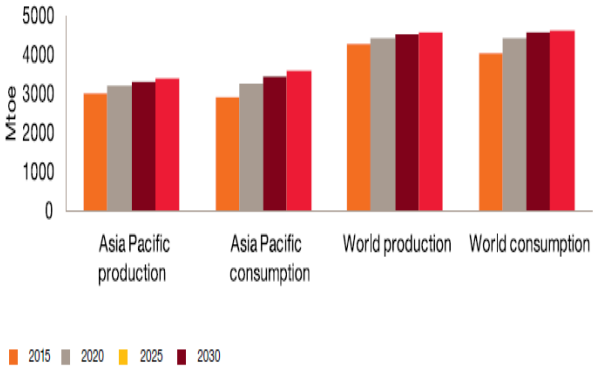
Primary Coal Demand



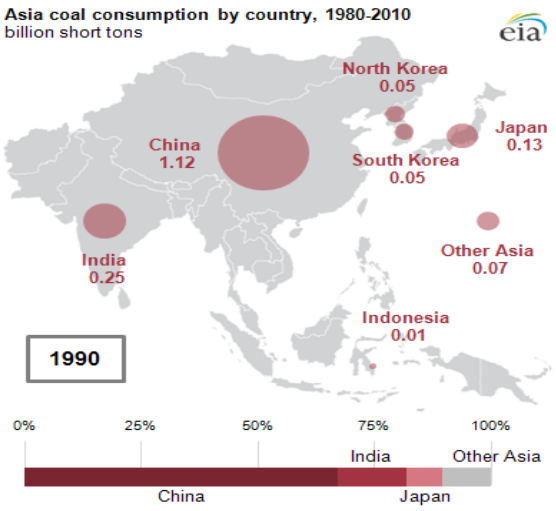
**As per the new policies scenario*
Source: IEA, WEO 2011

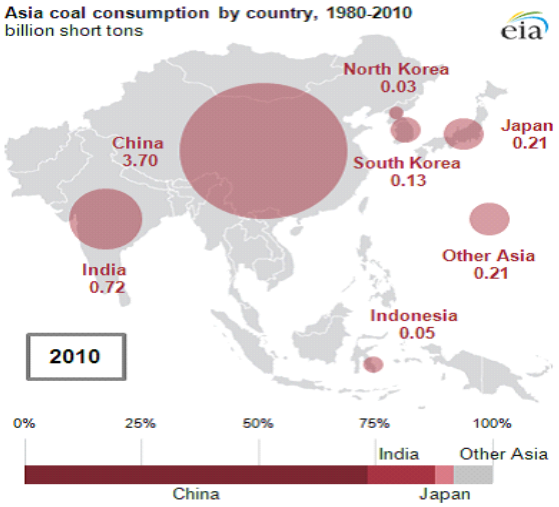
Asia Pacific is expected to account for 70.8% of the global coal production and 71.3% of the global consumption in 2015 with China and India being two largest consumers. The demand and supply gap is expected to widen in 2030 as Asia Pacific is expected to produce 73.8% of the global coal production but consume 77.7% of the total consumption.The negative coal balance will have significant impact on coal prices.

Coal Production and Consumption Statistics



Source: BP Energy Outlook 2030, January 2012





On the other hand, the economies of Europe and the former Soviet countries have been moving away from coal as a primary fuel source, relying more and more on natural gas and renewable for generation, leading to fairly significant declines in coal demand in those regions.

This reshaping of the global supply & demand balance has had fundamental impacts on prices and trade flow patterns for coal. As noted in the recently released IEA report on global coal, the emergence of China as the primary coal market places that country in the role as the single largest influencer of global prices. Any change in China's consumption brought about by internal market changes or by government mandate will have significant impacts on coal markets around the globe. IEA notes, "…considers that China's domestic coal market is more than three times the global coal trade: Only 15% of global coal demand is met through international trade, yet more than half of global coal demand during the outlook period is projected to come from China." This consumption to import ratio is in effect a multiplier, exacerbating the impact that changes in that country's demand profile will cause.

One important dynamic is that China's domestic production costs continue to increase. The increase in demand has meant that domestic producers have to mine more difficult locations and at greater depths, increasing costs. The IEA reports that the average coal production cost of state-owned enterprises in Shanxi province increased threefold from $16 per tonne in 2000 to $56 per tonne in 2009. This continuing increase in domestic prices means that Chinese coal consumers will be more likely to buy from abroad.

Coal, like oil, is a globally traded commodity, with a complex supply chain supporting movements of physical product via train, ship, barge and truck. The intercontinental seaborne trade sees coal moving from the primary exporting regions in Australia, Indonesia, Russia, South Africa and the U.S. to the primary importing region, Asia (also known as the Pacific market region), with smaller amounts shipped into Europe (also known as the Atlantic market), primarily Germany, Spain and the UK.

Australia is the world's largest coal exporter. It exported over 298Mt of hard coal in 2010, out of its total production of 353Mt. Though international coking coal trade is limited, Australia is also the leading supplier of that product, accounting for 57% of world exports. The USA and Canada are significant exporters and Indonesia is emerging as an important supplier.

In all, global coal trade in 2010 was more than 1 billion tons, though this represents only slightly more than 15% of the total consumption of coal, as most coal is consumed within the country in which it is produced. Nevertheless, these traded volumes represent a huge market in terms of value and a logistical network of global shipping and transportation - the costs of which are reflected in the delivered prices for the commodity.

Coal and Power Generation

Coal fired generation accounts for more than 40% of the world's power. While many companies have sought to limit their dependence on coal for power, (particularly in Europe and increasingly so in the US) many countries continue to rely on coal as their primary source for power generation, including South Africa (93% coal fired generation), Poland (92%), PR China (79%), Australia (77%), India (69%), Israel (63%), Czech Rep (60%), Greece (52%), USA (49%), and Germany (46%). In aggregate, coal is the single largest source of power generation around the globe, and despite some regional initiatives to reduce the burning of coal for power, virtually all economic forecasts project that increasing demand for power will lead to increased demand for coal on a global basis.

In December of 2011, the International Energy Association (IEA) released their *Medium-Term Coal Market Report 2011* in which the organization notes that they anticipate coal usage to grow by 600,000 tonnes per day over the next 5 years. This level of growth, primarily driven by demand from China, India and other developing or non-OECD economies, will clearly impact global prices and will almost certainly reshape much of the global distribution network as more coal is exported to the Asia/ Pacific region. The IEA also noted they

anticipate the increased demand will require poorer deposits to be exploited, increasing production costs with subsequent impacts on prices. Additionally, they state their belief that while coal has traditionally been considered a cheap and secure energy resource, as demand increases and supplies tighten, this perception could change in the coming years. In fact, they are projecting that with the reshaping of the global distribution network there may be increased supply bottlenecks that could cause coal prices "to more than triple."

Regulatory Impacts on Global Supply

Coal's status as a major source of CO2 and other pollutants had put it squarely in the sights of politicians and regulators around the globe. In the US, the Environmental Protection Agency (EPA) is aggressively drafting new rules and increasing their regulatory oversight of both the mining and consumption of coal for power generation.

In April 2010, the EPA issued new regulatory guidelines covering the surface coal mining operations in the Appalachia region. These new guidelines laid out the EPA's newly aggressive approach to the review of new mining permits, and in particular, those that involve the so called "mountaintop removal" method of mining in which large volumes of materials are removed from hills and mountains. The displaced materials are then used as fill in the valleys between the peaks, effectively reshaping the terrain and redirecting the flow of streams and other waterways in the valleys. The new guidelines are clearly aimed at limiting, or eliminating entirely, such mining practices under the auspices of reducing groundwater contamination from dissolved solids which might migrate from the fill materials into downstream aquatic systems.

In a practical application of this regulatory approach by the EPA, in January of 2011, the agency effectively rescinded a previously approved permit for a US based coal company's new mountaintop mining operation and indicated the permits would be reissued only if the firm were able to redesign and resubmit their mining plans in order to eliminate or significantly mitigate any environmental impacts. Having determined that they could not produce a plan that would meet the new EPA requirements and still be economically feasible, the mining company shuttered their plans for opening the new mine. The EPA's aggressive interpretation of the Clean Water Act (CWA) provisions, specifically Sections 402 (which covers the issuance of National Pollution Discharge Elimination System permits) and 404 (relating to the issuance of permits for the discharge of fill material into US waterways), does not necessarily preclude the opening of any new mines that utilize valley filling as an operational component, and in fact they have approved such operations as recently as 2010. However, it is clear that the agency has been acting to limit the opening of new mines and in the process the EPA has been increasingly under fire and charged with being overly aggressive in the application of their authority. In fact, in October of 2011, the EPA was cited by a federal judge as having overstepped their authority when they revoked mining permits in Appalachia that had been issued by the US Army Corps of Engineers. In a lawsuit filed by the National Mining Association, the judge indicated that the EPA was not authorized by Congress to interfere in the Corps of Engineers permitting process and could not continue with such "enforcement" activities. Though this ruling has been a victory for the mining industry in the Appalachia and Ohio Valley regions, the EPA is appealing the ruling and is continuing in its efforts to find avenues to block or limit the opening of new mines in the region.

Outside of US, regulatory intervention has impacted existing and planned coal mines in a few countries, though the overall impact of those actions is not believed to be significant on a global basis. That being said, there will be regional impacts that will result in changing supply needs for individual countries. For example, in India in 2010, the country's Environmental Ministry declared many of that country's prime prospective coalfields will be off limits as future production sources. The Ministry has refused new mining permits in those regions due to the perceived environmental sensitivity of the land that overlay the prospective mines. Coal India, the nation's largest coal producer, estimates the action will result in loss of up to 110 million tons by 2015, doubling their current shortfall that must be met via imports.

In Europe, the EU regulators have been pushing their member countries to reduce coal production as part of their overall scheme to reduce greenhouse gas (GHG) emissions. In particular, the German government, with pressure from Belgium, has mandated a phasing out of financial support for the country’s coal mining concerns. Though the legislation has been amended since its initial passage, as it currently stands many German mines, particularly those in the Saarland and Ruhr regions, will be shuttered by 2018. For many countries, coal exports are a significant source of hard currency. Despite the global movement to limit GHG, coal production and the opening of new mines has generally not affected these countries plans for development of their coal reserves. In fact, for many countries, including South Africa, Indonesia, Russia, and several countries in South America, the only issue that has limited their development of existing and new coal reserves has been infrastructure constraints, and most commonly the lack of sufficient rail capacity to move coal from interior mines to export facilities. Nevertheless, given the importance that coal exports hold in the balance of trade for these countries, new investments in transportation infrastructure are being made in order to facilitate increased exports.

Regulatory Impacts on Market Demand

In U.S the Environmental Protection Agency (EPA) has also brought its rulemaking and enforcement powers to the consumption side of the market in their approach to limiting pollutants from coal fired power generation facilities. In a December 2011 pronouncement, the EPA decreed that all coal fired generation facilities must meet new regulatory mandates for pollution reduction by 2016. With full implementation of the rule at that time, the new

regulations will cut mercury emissions by 90%, acid gas emissions by 88% and sulfur dioxide by 41%.

Under the new regulations, many power plant operators will face the choice of having to install expensive pollution controls, re-engineer the facilities to burn natural gas, or shutter the plant. In all, the cost of meeting these new requirements is estimated to be in the range of $10 billion a year. Some industry estimates say that up to 600 plants may be impacted by the ruling, with as much as 12% of the nation's coal fired generation capacity at risk of having to be shut down. Other estimates place the impact at more than 30 facilities certain to shut down and up to an additional 35 at risk for closing.

Beyond the regulation of pollutants such as mercury, the EPA is also signaling their plans to begin regulating the emissions of CO2 from coal fired plants. In January of 2012, the EPA released their survey of greenhouse gas emissions from US power plants. In the report, the agency indicated that these plants produced 72% of the total GHG emissions reported to the EPA in 2010. The list identified 20 plants, either entirely coal fired or partially coal fired, in 15 states as the top emitters. This report is the first step in the Obama administration's plan to regulate the release of GHG's through existing regulatory authorizations and new rulemaking. Such new rules have yet to be released as of this writing; however, it is expected that much like the new rules covering mercury and other pollutants, the new regulations will place a significant burden on coal fired facilities and will result in the determination that many are unprofitable to run. While it is difficult to quantify the entirety of the impacts these emerging regulatory changes will have on the price and availability of coal in the US, they will certainly have an impact, affecting not only the price of coal but also the price of power – costs which will certainly be felt throughout the nation's economy.

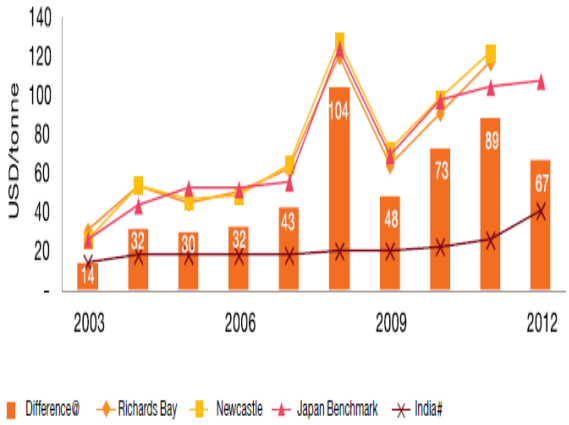
Globally, regulation of coal fired power generation facilities has been a spotty affair. In Europe, the cap and trade GHG schemes, along with national mandates to reduce pollutants associated with coal fired power production, have resulted in the retirement of few coal fired facilities. Potentially more impactful than GHG regulation is the continent's focus on reducing pollutants such as sulphur and nitrogen oxides (SOx and NOx). Under the newly negotiated, but as of yet un-ratified, Industrial Emissions Directive (IED), plants that cannot economically meet new strict emissions standards must be closed by the end of 2023. Given that the new rules will phase in limits beginning in 2016 and provide for member country specific options for the timing of implementation of pollution controls until 2020, the ultimate impact on coal demand and power generation is unclear. However, the EU's efforts to reduce pollutants and limit GHG emissions are no doubt reflected in the IEA's estimate that European coal demand will decline by more than 50% between now and 2035.

Outside of Europe, and for many of the emerging economies around the globe, coal is a native resource that can be exploited to meet those countries' growing needs for power. Utilizing coal enables them to provide a reliable energy source that can support their growing populations and increase economic development, while simultaneously limiting their dependence on, and exposure to, the global energy markets.

Price of Coal: A Global Market Perspective

Like in every other commodity, the price of domestic coal is determined by the level of supply and demand. However, the response of overall demand and supply to price variations is slow due to the structure of the coal industry as well as the nature of the user industries. The two government-owned companies of India, namely Coal India Ltd and Singareni Collieries Company Ltd, working in different geographies, see their role as one of fulfilling the production targets fixed by the government and take up plans and projects to meet the targets, with very little surplus to serve any unanticipated or sudden increase in demand. Domestically, coal prices in comparison to international prices are as follows:

Coal Price Movement in Global Market



@ Difference between arithmetic average (of Richards Bay, Newcastle and Japan Benchmark (JFY) and Indian coal prices in USD; # Indian coal prices are for D grade ROM coal , which is the one of the best grade coals available for Indian pithead power generating companies, with GCV range: 5200 to 5500 kcal/kg.

Conversion Rate 1 USD = 50 INR. Source: AME and Coal India Limited

Though prices outside of the Asian markets have moderated considerably from the highs of 2008, a number of competing factors are at play, the outcome of which is most certainly going to be higher prices. The question is, how much higher? Though the IEA reports a possible tripling of prices over the next 5 years, that forecast is based upon a large number of variables whose outcomes are less than certain. There is little doubt however that if China's economic growth results in continued ramping up of coal demand in line with current trends, and India's growth in demand cannot be at least partially offset through the opening of new production due to environmental regulation.

The continuing global economic recovery results in significantly increased demand for both

electricity and steel, and then we will see continuing and significant upward pressure in prices. But local market dynamics will persist. On the downward side, in 2011 and 2012 the plentiful and cheap supply of natural gas and the mild winter have made coal less attractive in North American markets and created downward price pressure. Thermal coal prices have fallen steadily in the past 10 months and are expected to remain flat or slightly higher this year.

One thing is certain- price volatility will remain a key feature of coal markets and companies will need expertise and technology to help manage it. Clearly the global outlook for coal is a complex mixture of competing signals. While regulators and governments in North America and Europe are intent on reducing consumption of coal due to the perceived environmental impacts, demand for additional power generation capacity from the developing countries will more than offset any reductions in the OECD countries in the medium term.

Conclusion

In the backdrop of increasing coal demand and reliance on coal for power generation, collective effort of the government, power producers, coal miners and service providers are necessary to ensure modern and sufficient infrastructure. Further, to reduce reliance on imported coal and boost the domestic supply, development and expansion of coal mines in the country is necessary. To ensure timely and smooth development of coal mines and for meeting coal demand, following steps should be taken:

1. Establishing a single window clearance process for coal mines.
2. Support in land acquisition and R&R related issues to ensure timely and smooth completion. Offering projects with secured clearances will boost timely development as well as increase the industry participation.
3. Currently, commercial sale of coal is allowed for government companies only. To meet the growing coal demand, it is prudent to consider commercial sales of coal by Private Developers though suitable framework may need to be developed for coal pricing, balance profits to private developers etc.
4. Measures to be imposed to improve productivity of the coal mines and improve recovery from the coal mines.
5. The government may consider creating funds to support overseas acquisition to supplement domestic resources. This is required since mining is a capital intensive industry. Further, mining projects often require investment in supporting infrastructure which is more capital intensive than mining.
6. Steps need to be taken to promote research and exploration activities and modern underground mass production technologies which will also help in dealing with land acquisition related issues as land requirements for UG mining will be lesser.
7. Indian Railways, port authority and the industry need to work in close collaboration to plan development of infrastructural facilities as per requirements.

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