



I genuinely believe that coal gasification is a bridge between today's realities and tomorrow's future

Dev Energy stands at the forefront of innovation, dedicated to enhancing efficiency and productivity in India's steel, ceramics, and non-ferrous industries. With a robust portfolio of over 200 systems operating successfully, the company has established itself over the past 24 years in the field of coal gasification, pioneering many of the nation's first projects focused on coal gas generation.

In an exclusive interview, Varun Jindal, CEO of Dev Energy, shares his journey in revolutionising coal gasification technology in India. Conducted by Santosh Mahanti, Editor of Iron & Steel Review magazine, the discussion explores the objectives behind establishing Dev Energy, a company committed to optimising energy solutions across various industries. He talks about the innovative two-stage gasification technology developed by the company, highlighting its significant impact on cost efficiency in the steel and ceramics sectors. The interview also emphasises Dev Energy's mission to transition industries towards cleaner and more economical fuel alternatives, providing insight into the future of coal gasification in India and its potential to reshape the industrial landscape.



Varun Jindal, CEO, Dev Energy

What inspired you to start Dev Energy?

Every great idea starts from a seed, and in my case, that was the problem that no one seemed to be solving at that time – the process of using cheap coal to replace expensive fuels. India is abundant in coal; however, no major industry was using it in 2003 as a fuel. That's why I searched for the best coal gasification technologies in the world and found the same being used in China extensively. It felt like a smarter, cleaner, and more economical way to use our domestic coal resources. It was about making the best use of what we already have – coal – while providing no-compromise technological solutions to the industry.

Dev Energy was built around that idea. I wished for us to become a complete solution provider, helping industries transition to

efficacy, efficiency and cost competitiveness and replacing the expensive imported fuels and draining us of precious foreign exchange.

What is coal gasification, and what's the value proposition for the user?

Coal gasification is a technology that converts coal into a clean, versatile fuel called coal gas, which can be used as fuel to heat furnaces of steel mills, ceramic tile plants and any other industry that needs heat. The complete coal gasification and gas purification process through our plant is able to harness the energy in coal in the form of gas and segregate the harmful tars, phenols and ash. The driver for me has been to create a strategic shift for my customers by being cost-competitive. I genuinely believe that coal gasification is a bridge between today's realities and tomorrow's future. It's about securing energy independence and creating jobs, all while being commercially viable.

How is Dev Energy's gasification technology offering different?

Dev Energy's gasification technology deals with the gasification process in two stages, with volatiles in coal being converted to gas in the upstage reactor and the carbon in coal converted to gas in the downstage reactor in the presence of steam and air. The reaction is at very high temperatures, making it the most efficient conversion in the industry. The two-stage technology provides an immense advantage in gas cleaning and purification. The proprietary 8-stage cooling and cleaning process cools and cleans the gas of dust, tar, phenols, moisture, sulphur and other harmful particles. The process is accompanied by a proprietary reuse process of phenolic water, making the complete system Zero Liquid Discharge and compliant with the NGT norms for coal gasification in India.

What industries are you targeting for coal gasification?

Our focus has always been on industries where heat is a big part of the operating cost, and directly switching to coal firing isn't practically possible. Therefore, the primary target has been the steel industry, with reheating furnaces and pellet plants being major consumers of heat. These furnaces were operating on furnace oil and stood to save 50% of their fuel cost by shifting to coal gasification. Next, the ceramic industry was in focus with wall tiles, floor tiles and tableware being made by natural gas or

LPG, providing an opportunity to shift to clean and cheaper coal gas. In the last 23 years, we have successfully commissioned more than 200 plants, and 85% of them are in the above-mentioned industries. Many other applications remain untapped, such as chemicals like TiO₂, non-ferrous melting shops, and alumina calciners, which are still using very expensive fuels.

Which projects have been your hallmark of success?

I feel that luck is an opportunity that meets preparation; therefore, I have been very lucky. The strength of a technology enterprise is measured by how many times it has been a first mover. We have the distinction of being the first in India to have successfully commissioned coal gasification for Ceramic Tableware at the biggest brand Clay Craft, Ceramic Tiles at the famous brand Kajaria Tiles, 240 tph Steel Reheating Furnace at Jindal Steel & Power, 14 USER Coal Gasification Plant at Tata Steel (Tayo Rolls), Straight Grate Pellet Plant at Minera Steel & Power, Grate Kiln Pellet Plant at Ankit Metal & Power, Stainless Steel Slab Reheating Furnace at Rimjhim Stainless and many more. We have been able to successfully envision and execute these projects with our deep understanding of process, design, engineering and implementation.

How do you envision the future of coal gasification in India?

I feel the coal gasification in India is in both arenas – Fuel and Syngas.

In fuel usage, the Indian industry has understood the reality of coal being cheaper than other alternative fuels, and if they choose the right technology, the adaption of coal with no resultant harm to the environment will be possible. The latest technologies, like Air-fed Circulation Fluidised Bed (CFB), will enter India as they can use coal fines and have zero tar and phenol footprint.

In Syngas, coal is the base raw material, which can be converted to expensive raw materials like hydrogen and ammonia to produce valuable chemicals like methanol, DME, synthetic natural gas and fertilisers. The Syngas can be used as a direct reductant in the DRI-making process, removing the need for imported coking coal.

We at Dev Energy are part of this journey, offering CFB-based technological solutions that make sense for both arenas, helping India's transition into a future without dependence on imports.

What is Circulating Fluidised Bed (CFB) technology?

Circulating Fluidised Bed (CFB) coal gasification technology uses the process of conversion of coal fines into carbonised gas by creating a cloud of coal fines and oxygen under high pressure and temperature. The operations are just below the Ash Fusion temperatures of coal, and thus, ash is not melted. The process is made efficient through multiple loops of circulation of coal till the carbon is fully converted. The process is best suited for gasification of light bituminous and sub-bituminous coal as they are softer and with high reactivity. The plants are simpler than other competing technologies.

How does it address the challenge of using high-ash Indian coal?

The Indian coal is mostly available with high ash content, and thus, the future technology must be able to perform on it. Our CFB technology has the inherent advantage of operating range of pressure and temperature which allow the carbon conversion without the problems of agglomeration. The optimum pressure and temperature suitable for the Indian coal allow the CFB gasifiers to use coals with up to 30% ash content on an ADB basis. The same has been tested and proven in many lab-scale and commercial plants.

What is the challenge for coal gasification to be successful in India?

If we as a nation want coal gasification to take off in India, I think a few realistic and practical policy changes are required. You must understand that projects like these need heavy upfront investment, and long-term policy clarity gives businesses and investors the confidence to plan big. The first key step is to ensure that the coal is available at the right price and with long-term supply assurance for consistent quality and quantity. Secondly, we need to make all project approvals, including environmental clearances, smoother without cutting corners on safety or environmental checks but by simplifying the process and cutting down unnecessary delays. The steel industry will benefit hugely from these two steps as the Syngas to DRI process is a proven technology waiting to be implemented in the right ecosystem. The third step for other products would be to build a proper market around products made from Syngas like methanol, DME, SNG, ammonia, and hydrogen. If we have a clear pricing framework or

guaranteed offtake model in place, industries would be far more willing to invest in gasification projects.

How do you see the National Coal Gasification Mission influencing your roadmap?

The National Coal Gasification Mission is a very timely intervention by the Government of India. It's encouraging to see the government actively supporting cleaner, more efficient ways of using our domestic coal resources. For us at Dev Energy, it feels like the larger ecosystem is finally catching up with a vision we've been working towards for years. This mission isn't just about policy, but it's about creating real opportunities on the ground. The senior officials are open to any discussion or feedback in framing and execution of the policy. The structure of Viability Gap Funding is intelligently designed to enable public sector and private sector participation. I believe that 15% VGF on the total Capex should excite many players to jump on the coal gasification bandwagon. It gives us, as Dev Energy, the confidence that we're building the future in the right direction and the support to think even bigger.

How do you think the adoption of coal gasification happened in the steel industry in India?

I believe that the lowest hanging fruit in the Syngas arena is the use of Syngas as a reductant in the DRI-making process. The large public sector or private steel players should get together and set up the smallest viable commercial-scale project of 0.8 MTPA with assured coal as part of the National Coal Gasification Mission. The capital cost of the project can be optimised by first spending on study and detailed engineering of the process and equipment with the aim to convert 75-80% into make in India. The indigenisation of the technology should be a prime objective with a target to multiple deployments on success.

What are the biggest leadership lessons you've learned while building Dev Energy?

Building Dev Energy has been a constant learning experience of my life. I realised early on that leadership is not about having all the answers, but it is about listening, asking the right questions, and trusting your team. The toughest part of being a leader for me has been to let go of control. In the beginning, I was and wanted to be part of every decision, every detail. But as we grew, I realised that the best thing I, as a leader, can do is to build a

strong team, give them a clear direction, and then step back and let them run with it. In the last 23 years, I also learnt that it is okay to fail. Not everything I tried worked; some ideas flopped, some deals didn't happen. But those moments taught me much more than the easy wins ever did. Now, if there is one thing I truly believe — it is that people follow values, not positions. Being honest, staying grounded, and genuinely caring about your people and your purpose makes all the difference. That's what I try to remind myself of every.

What are the key timeless values you think are the cornerstone of Dev Energy?

I have driven Dev Energy by a set of core values that guide all our decisions and actions. These serve as the mile markers on the highway of success for us.

Honesty is being transparent and open in all work practices. All stakeholders, suppliers, employees or our customers are bound to each other by trust. This results in empowerment at all ends.

Excellence is a way of doing things. We do our best to upgrade our skills and knowledge.

Innovation is constantly pushing for better ways to serve. We are always thinking out of the box of unique solutions to solve challenges. This proactive approach puts us ahead of all others.

Reliability is to embrace ownership of tasks assigned to us. We strive in our goal to create a product that meets customers' expectations 100%.

What advice would you give to young entrepreneurs interested in clean tech innovation?

My advice to anyone entering or navigating this arena would be to not give up on how tough or slow it feels at times working in this industry. There are no overnight success stories. It takes time, it takes patience, and sometimes it feels like there is no light at the end of the tunnel. But if you stick with it, the impact you'll create will be something you can truly be proud of. Also, be very clear about why you're doing it. Clean tech sounds exciting, but it comes with its own set of challenges. You need to be passionate about solving real problems, not just chasing trends. And don't wait for the perfect idea or perfect time. Start small, ask lots of questions, and spend time in the field. Most good ideas come from paying attention to problems no one else is looking at. Lastly, find

people who share your values and believe in the future you're working towards. It makes the journey a whole lot easier and a lot more meaningful.

How has Dev Energy extended its footprint into related areas?

In the last 23 years, I have been interacting with many technology companies all over the world, and our clients keep asking for our help in solving various challenges. We have, in the process, developed and deployed technologies in the following fields.

Scrap Processing

Deteriorating steel scrap quality necessitated the preparation of scrap for melting through scrap processing machines for better efficiencies in melting furnaces. Processed steel scrap is denser and cleaner for faster charging in the furnaces. Dev Energy has developed expertise to provide innovative turnkey solutions for efficient scrap segregation, processing and feeding. The scrap is processed using three broad methods, namely Shearing, Baling and Shredding. The machine selection depends on the type of raw steel scrap, its density, size, cleanliness level, size of the furnace, power density of the furnace, etc. There are various types and sizes of machines available to process scrap from 01 to 100 t/hr.

Fumes Extraction System

The present devices can only absorb up to ~60% of emissions and cannot fulfil government standards. Because they are intended for exceptionally high working pressure, their operating costs are quite expensive. Dev Energy developed and deployed a Dog House-based fumes extraction system for induction furnaces, collecting more than 95% of the fumes, and total power usage is ~10 kwh/t. Scrap Pusher compliments the Dog House system to help SMS furnaces achieve the required melting rate. Scrap Charging Trolley, which is remotely controlled, helps feed the scrap to furnaces without the need for the Dog House to be moved.

Reheating Furnaces

The heating cost of steel is a major component in the making of rolled steel. Efficient reheating furnaces are the need for the hour. Dev Energy has partnered to provide efficient walking beam furnaces with regenerative burner technology. The furnaces can be designed on any fuel such as coal gas, blast furnace gas, natural gas or mixed gas. ■



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