



Navigating the Path to a Well-Functioning Gas Trading Hub in India

By Gurpreet Chugh and Leonard Crook, ICF

Gas trading hubs

Gas trading hubs can be either physical locations or notional hubs. Physical hubs have interconnecting pipelines and sometimes other gas transportation and storage infrastructure, which provide receipt and delivery capabilities between pipelines—allowing parties to exchange and transfer title to gas at minimal cost. This interconnectivity encourages buyers and sellers of gas to transact business at these hubs, which also have an important role in market balancing and as a central pricing point. Notional hubs have all the characteristics of a physical gas market hub but encompass market activities over a wide area rather than a single point or small area. They are always associated with well-developed transmission networks within which physical transfer costs are minimal.

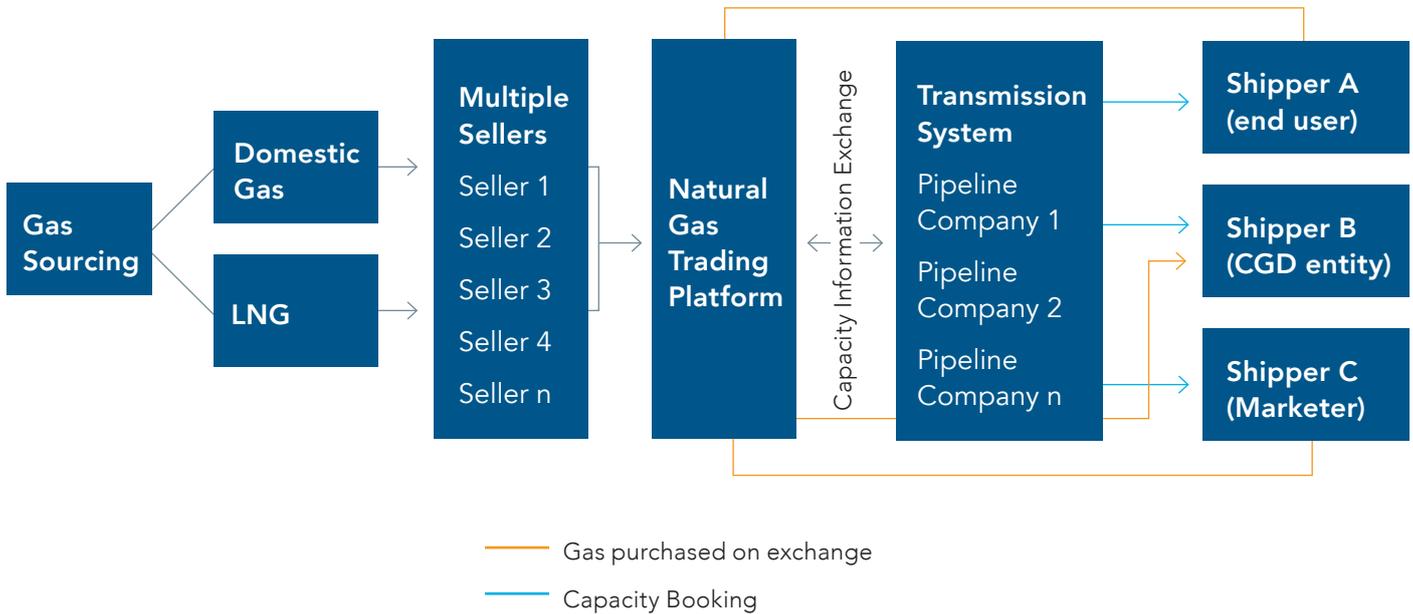
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- A policy and regulatory framework guided by the principles of transparency, independence, and integrity is needed to create the right conditions for a competitive gas hub to develop.
- Certain physical facilities must exist and technical issues be resolved to enable trading to happen at the hub with the efficiency, volume, and ease of access to drive liquidity and price discovery.
- Understanding and managing the impact on stakeholders of the new gas trading hub is key to its success and significant effort is needed to ensure their engagement, participation, and willingness to change how they operate.

Executive Summary

India is already developing a framework and regulations to initiate a national gas trading hub. Now is the time to start navigating the path to successful implementation. The history of gas market hubs shows that certain steps are needed to enable their development. The US, EU, UK, and Australia have all traveled this way before, rising to challenges en route to developing fully functional hubs. These hubs share the key characteristics of effective gas market hubs yet each one reflects the unique circumstances of its country or region. International experiences like these can give India valuable insights into what makes a gas trading hub thrive and a competitive gas market flourish for the long-term benefit of all stakeholders. This white paper explores the operational challenges ahead for India and some of the solutions, platforms, and mechanisms other countries have developed to inform India's preparations and accelerate its plans.

EXHIBIT 1: THE COMPONENTS OF A PHYSICAL TRADING HUB



Establishing and getting gas hubs to operate effectively can have ongoing challenges that may take governments years to resolve. Even then, markets keep evolving over time—requiring regulators to think ahead and support the development of newer products, change regulations to ensure that the gas hub remains relevant, and provide the needed services of a competitive marketplace to buyers and sellers. Many challenges come en route, which must be anticipated and dealt with effectively by the government and regulators. Some of these key challenges can be related to policy, regulatory, infrastructure, market, and, finally, the most important—human aspects. There is no silver bullet that removes all ills. Sound planning, effective stakeholder engagement, and a strong will to drive change are perhaps the most necessary skills to enable India to reap the benefits of a thriving gas hub.

Policy Challenges

Creating the required institutional structure and regulatory body to regulate the gas hub and exchange

An independent governmental regulatory body is a prerequisite for effective market development. The regulator creates the structure and policy guiding the interaction between the market and consumers. It is responsible for standardizing trading rules and contracts and also for monitoring the market to ensure compliance with these. It also has the power to enforce sanctions for abuse, a critical factor for market integrity.

The Petroleum and Natural Gas Regulator Board (PNGRB), which is an independent regulator, has the authority to regulate access to trunk pipelines and distribution infrastructure.

PNGRB is not, however, authorized to regulate the commodity itself. Whether PNGRB has the power to regulate the exchange as well is a moot point. The Securities and Exchange Board of India regulates commodity forward and futures contracts and not the daily contracts traded on gas market hubs. The first step thus may be to provide clear legislative legitimacy to an independent body like PNGRB to regulate the gas hub and a commodities/securities body to regulate the gas exchange.

In the UK and US, gas is traded over-the-counter and on multi-commodity exchanges—the Intercontinental Exchange (ICE) in both countries and the New York Mercantile Stock Exchange (NYMEX), now the Chicago Mercantile Exchange (CME), for futures and derivatives in the US. The countries' independent national securities regulator governs these exchanges—not their energy regulators, the Office of Gas and Electricity Markets (Ofgem) in the UK and the Federal Energy Regulatory Commission (FERC) in the US.

These energy regulators exercise strict oversight of the transmission pipeline networks, ensuring they operate reasonably and equitably. Indeed, because the FERC had such strong authority over the pipelines, it was able to institute policies that successfully reformed the system and created a continent-wide market for gas. Australia has a different set-up altogether— a dedicated gas exchange, the Gas Supply Hub (GSH), which is regulated by the Australian Energy Regulator (AER). Here pipeline oversight is less tight, relying on customer complaints to ensure compliance with the gas code.

Operating the entire gas pipeline system synchronously

As gas exchanges have to operate on a real-time basis, they need real-time access to information from across the pipeline network, which requires every element to work together as one single operation. This works well in countries such as the UK, where the National Grid owns all the country's pipelines. It's not so straightforward for other countries where there are multiple pipeline operators.

India has three major operators—GAIL, Gujarat State Petronet Ltd., and Brookfield (after the acquisition of East West Gas Pipeline)—managing different pipelines and charging different tariffs, plus more companies that have been awarded new pipelines to build. So, like most other countries with trading hubs, India will have to find a way to encourage and enable these operators to collaborate and harmonize the rules and processes guiding their operations. In North America, this harmonization is accomplished by requiring pipelines to execute tariffs in accordance with FERC policy for pipeline access and operations. The North American Energy Standards Board (NAESB), an industry organization, has standardized trading practices and vocabulary. In the UK and Australia, a uniform gas code also provides harmonization. The most common solution adopted in liberalized power markets is a transmission or independent system operator (TSO or ISO). This is a separate business

owned by the companies and into which their combined operations move, allowing for non-discriminatory access to be provided to the whole pipeline infrastructure.

Moving domestic gas from existing contracts and allocation policies to the hub

Bringing in a trading hub regime inevitably requires a rethink about existing allocations of gas to priority customers. Making changes to these arrangements will have some political and price ramifications. Not making any changes also has significant risks relating to the efficacy and liquidity of the hub.

India currently allocates domestic gas to some key priority sectors—residential, compressed natural gas, fertilizer, and power—and clearly has some decisions to make about how best to move forward from here into the new regime.

Analysis and modeling can bring clarity about the implications of moving all or some of the allocated gas to the hub and the role of subsidies in different scenarios. Looking to the US and UK, in particular, can usefully highlight alternative approaches. When the UK, for example, transitioned to a trading hub, prices didn't change for the end customer in the new competitive regime as supplies were domestic and sufficient. The US faced more of a challenge as transition occurred during a period of low oil prices and excess gas supply. This meant that when third parties entered the market, prices fell for a time, creating problems for organizations with long-term contracts tied to higher price terms. India's challenge is the opposite—because India is supply short, any move to market will make domestic gas prices immediately become equal to import parity. However, India has had a very successful experiment with direct benefit transfer (DBT) to consumers who really need financial support. This may also be an effective solution to help absorb some of the price shock after removing the allocation of domestic gas to priority sectors.

EXHIBIT 2: OPTIONS FOR DEALING WITH ALLOCATED DOMESTIC GAS IN A TRADING HUB REGIME

Scenario 1

Only new finds of domestic gas traded on hub. Allocation stays as it is today

Scenario 2

Domestic gas allocated to power sector moves to the hub

Scenario 3

Domestic gas allocated to power & fertilizer sector moves to the hub

Scenario 4

All allocated gas moves to hub

Regulatory Challenges

Ensuring third party access to pipeline capacity in practice

Opening up the natural gas infrastructure—including pipelines, regasification activities and storage—equally to third parties is a vital enabler of market liberalization and thriving gas trading hubs. By attracting many more participants into the market and accelerating competition, third-party access (TPA) benefits the whole industry over the long term through more efficient pricing and a wider choice of contracts. Initially, of course, there will be pain points for some incumbent players. However, over the longer term, customer benefit lies in enabling transparent infrastructure access even for very short periods of time. Making TPA happen thus requires clear rules and a strong independent regulator empowered to take action against their infringement.

In a country like India with multiple pipeline operators, it will be crucial to develop robust TPA rules. The FERC in the US set the bar high with its pioneering Order 636 which mandated shippers to release capacity through pipelines instead of directly transferring capacity between shippers and also allowed any third party to obtain the capacity. Rules covered in the European Commission's Uniform Network Code (UNC) regulation served a similar purpose. In China, whose trading hub is still in development, TPA is currently reserved for just a few stakeholders, but the government is gearing up to introduce stronger rules.

Making daily pipeline capacity data available

All customers wanting to trade on the exchange, whether they're at the gas trading hub or far away from it, need to know available pipeline capacity, tariffs, and prices on a daily basis. This means operators need to submit their data daily and price reporting entities (PREs) need to aggregate sales and report average prices and volumes daily. Regulators, meanwhile, must ensure market participants can be certain that capacity and prices reported are reliable, and that the latter reflect the true value of pipeline capacity available at any given point in time for a particular location.

The various capacity trading platform models developed around the world to provide these details accurately and reliably can give India a good picture of its options. In Europe, for example, there is one single capacity trading platform, while the US has multiple platforms, known as electronic bulletin boards (EBB), which are seen as the centerpiece of capacity trading arrangements. These follow guidelines developed by the FERC whose emphasis is on transparency, the key enabler of competitive markets and market liquidity. All proposed transfers of capacity must be reported on the EBB so that others in the market have the opportunity to match or beat the proposed transaction prices.

Making sure the pipeline tariff structure is fair for everyone

The core underlying purpose of all actions and regulations relating to the creation of a competitive gas market is to cultivate an equitable environment to ensure wide participation. When it comes to pipeline tariffs, it is reasonable that costs reflect the distance gas has to travel to reach the customer. The flip side of this approach is that due to such distance-based tariffs, gas markets usually develop nearer to the source and hinterland has to pay more for the gas transmission cost. In deciding the exact charging structure, however, care needs to be taken to factor in the size of the country and to embed the principle of fairness.

In the US, most pipelines are linear systems that charge tolls based on distance (straight distance or zones). This is because of the vast size of the country and the distances between producing and consuming markets—it is simply more expensive to ship gas 2000km than 100km. In addition, some pipeline transmission systems resemble the entry/exit model. These charge so-called ‘postage stamp’ rates, where all customers pay the same toll to use the pipeline. Such systems resemble networks with multiple entry and exit points—and also tend to be adopted in smaller countries like the UK and parts of the EU. The entry/exit model provides greater flexibility and accessibility for network users and also opens the door to secondary trading in pipeline transfer capacity—another key component of an effective exchange function. The differences arise due to the difficulty of differentiating tolls that recover a pipeline’s costs without undue discrimination. A basic principle in the US, India, and even China is that pipelines should recover their cost of doing business, including a reasonable rate of return, without discrimination among similarly-situated customers.

Enabling regulated, open access to LNG terminals

Liquefied natural gas (LNG) terminals have not traditionally been open to third-party users or subject to regulation. As significant components of gas infrastructure alongside pipelines, this may pose a problem for market liberalization when the regasification capacity is limited and held only by a few. Energy suppliers or traders wanting to make use of terminals to supply into the short-term market—which serves the market well by keeping prices low—simply can’t. Usually, the only organizations that can do this are the terminal operators themselves—not a situation that encourages competition.

India has already taken a step towards opening up its LNG terminals through negotiated pricing for third parties, but there will soon be a need for greater strides. There’s no getting away from the fact that change is likely to be contentious among terminal operators. In China, which has so far only issued ‘guidance’ on the issue rather than mandatory regulations, there has been some reluctance on the part of operators to grant terminal access to potential competitors.

Overall, and over time, the global picture seems to show that initial concerns are assuaged by the impetus open access brings to investment and to the increasingly significant role of this supply source.

Almost all UK and European LNG terminals are now open access with their own regulations and tariffs. Country-specific customization of rules is a common route to resolve local issues. In the UK, for example, terminals under construction can be exempt from third party access if the regulator deems the market need for new facilities to outweigh the benefits of TPA. In the US, LNG import terminals operate under the FERC's 'Hackberry Decision' of 2003, which exempted them from open access rules and regulated tariffs. This was in recognition of the financing realities of the world LNG market at that time—sellers needed assured access to markets at negotiated prices to underpin the train of investments in liquefaction, shipping, and regasification. So terminals were allowed to contract their capacity to affiliates and others where those contract commitments supported the project. That said, sellers of LNG into the US would nevertheless have to sell regasified LNG into a market rife with gas-on-gas competition. There were no guarantees, as importers discovered when shale gas flooded the market.

Infrastructure Challenges

Creating adequate pipeline capacity across the country

It goes without saying that significant gas trading will only happen if the available pipeline networks are able to transport physical gas where it's needed, when it's needed. It is also true to say that attempting to address network capacity issues by investing in new pipelines is a particularly difficult undertaking during hub development. For this is the moment when the companies that might in the past have built or funded new pipelines are facing business model or supply changes that are forcing them to reconsider priorities or the risks they are prepared to take.

Creative thinking is clearly needed by countries like India, where having sufficient infrastructure has become an unavoidable necessity to meet wider objectives. India is already experimenting with different models, such as direct government payment to developers (Urja—Ganga pipeline). Assessing solutions adopted by other countries can also contribute to decision-making. Among these are the entry-exit model used in Europe, which Japan also plans to implement, where network tariffs recovered from existing pipelines are used to finance new ones. Or there's the 'open season' concept favored in the US, where individual pipelines do their own market research and pipeline planning and stage public 'open seasons' where they invite potential shippers to express their interest in contracting for new capacity. This culminates in shippers signing firm commitments, at which point the pipeline can go to the FERC for approval. Sometimes several pipelines will vie for the same market, but only one will win the support of enough shippers to financially justify going forward. The UK employs a similar concept known as a capacity auction.

Overall, India will need to figure out the right combination of the pipeline tariff mechanism, financing model, business model, and ownership structure for new pipelines to be built and a national gas grid to become a reality.

Identifying the optimum physical location of the new trading hub

While there are two possible types of hub, one notional and one physical, it would appear to make the most sense for India to consider a physical hub, located in an area with more advanced infrastructure. The attributes needed at the chosen physical point are multiple supply sources able to feed into that point, sufficient and surplus pipeline capacity, and gas storage facilities nearby for short term load balancing. In other countries where there is a well-developed network of crisscrossing pipelines, a single company operating the entire network, and an entry-and-exit tariff regime, the entire network can be considered a notional hub and a discrete physical hub need not be defined.

The US has many hubs, of which the most important for the purpose of price discovery is Henry Hub in Louisiana—a physical location. In the UK, however, where the National Grid owns the whole pipeline network, the National Balancing Point is a notional hub. A number of notional hubs have developed across Europe too as free movement of gas across the continent has been encouraged, adding to the mostly physical hubs originally established in individual countries.

The challenge for India is to assess which area would make the best location. Through a process of careful analysis of the existing capacities and utilization of the pipeline network, gas quality issues, liquefied petroleum gas extraction locations, pipeline ownership, ease of access by suppliers from various entry points, and connectivity to major regional pipelines, the choice should become clearer. Such a review would also reveal the need—and the best location—for multiple local hubs given the country's vast geographical area.

Market Challenges

Changing existing contracts to enable a competitive market

Historically, gas supply contracts between buyers and sellers 'bundled' together the sale of gas and transmission services. Market reform requires contracts to be 'unbundled' to enable competition and allow anyone who wants to book pipeline capacity to do so. This new type of contract, which sees gas delivered at the seller's output and the buyer contracting separately for the pipeline transmission to its destination, is now being used in every country where a trading hub has been successfully implemented.

As the natural gas trading and transportation business is combined in India, there will be a need for operating companies to find acceptable ways of separating their commodity sales function from their transportation and other logistics services. The subsequent implementation of unbundling will then require the development of a UNC, a legal and contractual framework for the supply and transport of gas, which also has to be acceptable to transmission business stakeholders. This can be a long drawn out process where existing contracts have to be split into two and re-negotiated as supply and transportation contracts.

Initially, at least, the US faced similar challenges to India in that its industry was made up of monopolies and its regulations were based on traditional monopoly laws and policies. When government reforms required these monopolies to change how they operate, there was deep resistance. The FERC, as an independent authority supportive of the government's plans, proved to be the key to unlocking progress.

Ending take-or-pay and end-use restrictions in commodity contracts

'Bundled' natural gas contracts, where the end user buys both gas and pipeline delivery services from a single provider, have typically contained clauses restricting where the buyer takes delivery and what they can do with their purchase. Most common are take-or-pay clauses which stipulate that the buyer must either pay the price and take away gas according to pre-agreed quantities or pay the price regardless of whether they actually purchase the gas. Such clauses often also prohibit re-delivery of gas, thus preventing the buyer from reselling gas to others in different markets.

The new rules of the game ushered in by liberalized gas markets substantially change the context in which these contracts operate. Pipeline capacity contracts remain long-term by necessity: pipelines must be assured of cost recovery for their long-lived assets. Buyers of pipeline capacity are required to pay pipeline charges for the term of the contract. They can manage this risk, however, by reselling capacity in the secondary market when they are not using it. Such secondary trading of pipeline capacity can typically happen for both long term as well as short term release. In addition, there are rules such as "use it or lose it" (UIOLI) that regulators enforce to remove any hoarding of pipeline capacity by shippers. Gas supply contracts have, meanwhile, become much shorter, ranging from daily or monthly to annually or multi-year. Buyers can resell their contracted gas if they have no need for it or see a market opportunity.

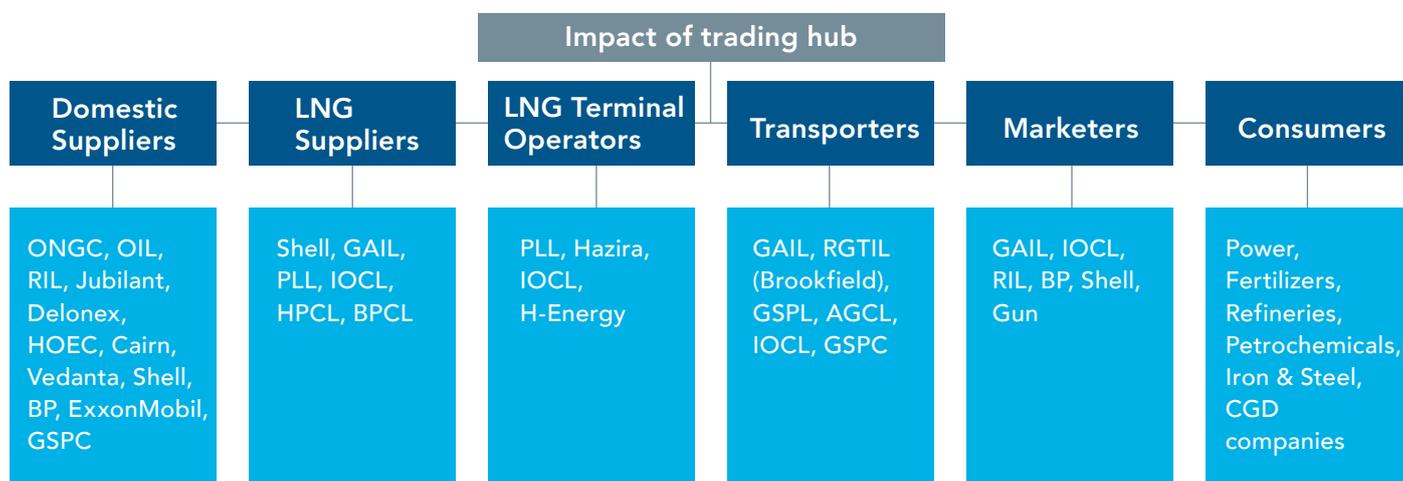
The key requirement for any gas market liberalization and subsequent hub development is this ‘unbundling’—breaking the linkage between gas pipeline transportation contracts and gas sales contracts. In the UK, British Gas was broken up into two companies for dealing with these separate aspects of the business. In the US, pipelines spun off their market operations into affiliated yet separate companies, which in turn seeded the development of a large industry of gas marketers—a process that has occurred in Europe too.

Human Factor Challenges

Ensuring that stakeholders can accept and adapt to market change

A key success factor in gas trading hub development is how well its impact on all the stakeholders involved is understood and managed. Their engagement, participation, and willingness to accommodate change underpin the effectiveness of every aspect of hub design and development. Being alive to the concerns, as well as the opportunities, that can come up for suppliers, transporters, traders, and consumers in the new regime will go a long way to reducing resistance and being able to gain ground.

EXHIBIT 3: KEY STAKEHOLDERS OF INDIA'S GAS TRADING HUB



Formal analysis of how each stakeholder group is likely to be affected by the different regulations, structures, contracts, and ways of working is a useful first step in rising to this challenge. Strong, targeted communications throughout the transformation process can then help all players understand the need for change and its long-term benefits as well as the preparations they need to make to participate in the new hub. And there’s significant value in finding out how other markets have dealt with the human side of bringing a hub into existence. communications throughout the transformation process can then help all players understand the need for change and its long-term benefits as well as the preparations they need to make to participate in the new hub. And there’s significant value in finding out how other markets have dealt with the human side of bringing a hub into existence.

In the early days of market liberalization in the EU, for example, TSOs sometimes resisted co-operating with capacity trading, having little motivation to provide capacity transfer services and little desire to see new entrants in the market. Over time, though, old competitive habits were shaken off, new legislation provided a nudge in the required direction, and the desire to develop new services grew. This is reflected in the US experience too, where pipeline operators saw opportunities to establish a host of discreet service offerings to attract and satisfy the needs of different customers and third-party providers emerged with offerings such as storage.

While there might have been bumps in the road for the US on its gradual, steady journey from government supervision to deregulation, it has managed to develop a smooth operating market—one of the most successful markets in US history, in fact. And it achieved this, as has every country with a fully functioning hub, by appreciating and responding skillfully to the challenges outlined in this paper. Now it's India's turn to get started and rise to these challenges in its own unique way.

About the Authors

Gurpreet Chugh is managing director of ICF India. He has 18 years of experience in the global energy sector and demonstrated capabilities in program management, energy planning and modeling, strategic business planning, and policy advocacy. He has been deeply involved in the natural gas sector around the world, working in the areas of strategy, operations, consulting, and mergers and acquisitions. As a consultant, Gurpreet has supported investors, developers, lenders, government, and donors in understanding and navigating the complexities of Indian gas and LNG markets. He is an advocate of open and competitive markets and believes that natural gas has the potential to take a significant share in the energy mix of India in times to come.

Mr. Chugh has a bachelor of engineering in instrumentation and control from the Netaji Subhas Institute of Technology and a postgraduate degree in management (finance) from the Management Development Institute in Gurgaon.

Leonard Crook is an expert consultant with ICF's natural gas practice. He joined ICF in 1984 following a career with the US Federal Energy Regulatory Commission (FERC). At ICF, he specializes in natural gas market structure and operations, pipeline transportation issues, distribution costs, supply planning, LNG strategies, and climate change issues related to natural gas systems. He has extensive experience of working with government and private industry clients and has authored numerous reports and presentations on all aspects of the natural gas industry. This work has included directing the conceptual design for a national gas pipeline grid for the government of India, advising regional governments in Canada on strategic gas supply issues, and helping design gas markets for Australia and Singapore.

Mr. Crook has a bachelor of arts in economics and history and a master's in American history from the University of Memphis.





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For more information, contact:

Gurpreet Chugh

Gurpreet.Chugh@icf.com

Leonard Crook

Leonard.Crook@icf.com

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 [linkedin.com/company/icf-international](https://www.linkedin.com/company/icf-international)

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