



The need for private sector participation in India's electricity distribution sector

By Gurpreet Chugh & Ashish Singla, ICF

1. Government focus and plans for investments in India's power sector

"A sustainable, viable, efficient, and competitive power sector catalyzing economic and social development..."

— Vision 2024, Ministry of Power

"Operational improvements are possible. However, structural solutions will also be needed to ensure benefits are sustained in the long run."

— Vision 2024, MoP

India's Ministry of Power (MoP) has issued a vision document (Vision 2024) which charts the way forward for India's power sector. The document points out problem areas and sets the timeline for every aspect of power generation, evacuation, and distribution. Further, the report acknowledges that distribution companies continue to reel under heavy losses and that these companies are the weakest link in the entire sector chain. The Indian government has tried to improve the sector's viability through various schemes; however, these schemes have not worked to the extent the government wanted.

The MoP has identified seven goals to further India's vision of a viable distribution business:

- Improve the financial viability and sustainability of distribution companies (DISCOMs).
- Reduce Transmission and Distribution losses to normative or better.
- Introduce competition in the retail supply business.
- Enhance end-use efficiency and promote efficient consumption.
- Empower users through new, customer-centric technologies and applications.

- Improve the reliability of the distribution network.
- Induct and scale renewable energy (RE) and demand-side management (DSM) in the distribution system.

Under the third goal, "Introduce competition in the retail supply business," the government has identified two sub-goals as part of the implementation roadmap:

- Develop a mechanism for unbundling distribution companies into wires and the supply business.
- Increase participation from private players in various facets of DISCOM operation.

Learnings for DISCOMs from COVID-19: Increased focus for private sector participation

DISCOMs were already reeling under heavy losses and unsustainable business models; COVID-19 only exacerbated the situation. The COVID-19 pandemic and subsequent lockdown squeezed the power demand by 20% to 25% for the months of March, April, and May. The worst affected demand segments, which saw significant reduction in demand, were the industrial and commercial load. Demand from household consumers, however, increased. As per current tariff designs, industrial and commercial consumers happen to be the highest paying set of consumers and account for the bulk of DISCOM earnings. Both segments have helped DISCOMs subsidize tariffs for other demand segments.

At one end, household and agricultural consumers are poorly metered; on the other end, the metering, billing, and collection process continues to be manual. Various restrictions imposed as a result of COVID-19 resulted not only in provisional billing, but also registered a significant drop in overall collection efficiency for DISCOMs. In some DISCOMs, the collection efficiency reduced by more than 60%.

Further, the skewed tariff design has resulted in lower revenue for every unit sold to the consumer. As per some industry expert reports, this could further increase the liquidity crunch by approximately INR 45,000 to 50,000 crores for already starved DISCOMs.

The COVID-19 pandemic brings very important lessons for DISCOMs in terms of the implementation of IT and internet-enabled metering, billing and collection; and the implementation of rationalized tariff structure for retail consumers.

"It will lead to better services to consumers and improvement in operational and financial efficiency in distribution."

—Finance Minister Nirmala Sitharaman

"We expect a substantial reduction in subsidy burden by bringing in private management of DISCOMs. The new management is expected to bring down the losses and turn around the DISCOMs. That will improve supplies to people, which is what the government wants."

—Bishnupada Sethi, principal secretary for energy in an eastern state

Shifting focus to increasing private sector participation (and investments) in the distribution business

DISCOMs have a number of options to enable private sector participation (and investments) in the distribution business. The Electricity Act of 2003 (EA 2003) paved the path for private entity participation in the distribution business (strengthened by Draft Electricity (Amendment) Bill 2020). EA 2003 led to the emergence of various business models for private sector participation in India's distribution sector:

- A private distribution licensee model (DL).
- A private distribution franchisee model (DF).
- A management contract model.

In recent years, the focus has shifted to DISCOM privatization and retail competition. The Indian government recently announced plans to privatize DISCOMs in Union territories. Privatization of DISCOMs in 'state territories' has been marked by significant resistance and socio-political challenges. Unlike state DISCOMs, those in Union territories are directly administered by the central government (with the exception of New Delhi).

There have been few successful cases of DISCOM privatization in India. States can look at the implementation model of cities, including Mumbai, New Delhi, Kolkata, Noida, Ahmedabad, Surat, Gandhinagar and Dahej—and global case studies as well—to understand the implementation and operational challenges and benefits.

2. Power sector reforms around the world

For several years now, countries around the world have tried to improve the financial and operational performance of power distribution utilities to ensure a reliable power supply and to attract private sector participation. Only a few developing countries, however, have been able to successfully bring in private sector participation across the value chain.

Developed countries have gone a step further by opening up wholesale and retail markets to competition, thereby ensuring a high level of customer satisfaction. In many countries, privatization efforts failed or were partially successful because the model simply did not fit economic, political, or social realities. Also, many countries adopted reforms selectively, leading to a situation where market orientation today coexists with strong state presence (as is the case with India).

The power sector now faces new challenges, most particularly ensuring access to all while in accordance with the 2016 Paris Agreement to fight climate change. Adding to this complexity is the stupendous progress in technology and the revolution in decentralization that is turning the utilities business model on its head. These changing dynamics pose another challenge for developing countries as they redesign their wholesale and retail markets. The objective, however, remains similar: ensuring a 24/7, reliable, resilient, and sustainable supply of electricity at affordable prices.

During the 1990s, a new paradigm for power sector reform emphasized the restructuring of utilities, the creation of regulators, the participation of the private sector, and the establishment of competitive power markets. Since then, the private sector has financed a substantial expansion of generation capacity in the transmission sector. The contribution of private capital to power distribution, however, has been much more limited.

2.1 Private sector participation in distribution: learnings from global examples

In the 1990s, a number of developing countries in Latin America, Central Asia, and Eastern and Central Europe introduced widespread private sector participation (PSP) in their distribution sectors. Even among countries undertaking the privatization of power distribution utilities, however, relatively few privatized the entire distribution sector. More typically, public and private distribution utilities have coexisted within the same country, with private operators often serving capital cities or larger commercial centers.

Not all privatizations have been successful. One key reason for the failure of privatization includes incorrect operational data (for example, underestimating system losses, which led to unsustainable bids), the government's unwillingness to apply tariff regulation as laid down in the legal framework, and stakeholder opposition due to the increase in tariffs.

Success in privatization, where it has happened, has shown that the financial health and operational strength of distribution utilities is a key driver of overall power sector performance.

A financially unviable distribution utility undermines the entire payment chain, while operational weaknesses in the grid prevent power from reaching customers even when it is available. There is no better place than India to understand this context, where distribution companies have time and again proven to be the bane of the power sector. There have been multiple financial restructuring /bailout packages designed for the DISCOMs over the years, but all of these have failed to meet their objective, simply because fundamental issues have not been corrected.

Globally, there have been many examples of success over the last 25 years. A recent report published by the World Bank, titled "Rethinking Power Sector Reform in the Developing World," distilled 10 key findings from these successes and failures:

- The uptake of power sector reform in the developing world did not evolve according to the textbook model.
- Power sector reforms were more likely to gain traction if they were consistent with the country's political system and ideology, and led by champions enjoying broad stakeholder support.
- The private sector made an important contribution to expanding power generation capacity in the developing world, albeit with significant challenges along the way.

- Wholesale power markets helped improve efficiency in the minority of countries ready for it, while others found themselves stuck in transition.
- Good corporate practices, particularly with respect to human resources and financial discipline, were associated with better utility performance; these were more prevalent among privatized utilities.
- Private sector participation in power transmission and distribution delivered good outcomes in favorable settings; elsewhere, it was susceptible to reversal.
- Regulatory frameworks have been widely adopted, but implementation has often fallen far short of design, particularly when utilities remained under state ownership.
- Cost recovery has proved remarkably difficult to achieve and sustain; the limited progress made owes more to efficiency improvements than to tariff hikes.
- Starting conditions in each country heavily influenced the outcomes of power sector reform.
- Countries that adopted a variety of different institutional organization patterns achieved good sector outcomes.

These insightful findings are very insightful and must be recognized and leveraged in India's current situation so that the model now being developed is robust enough to achieve tangible results over time.

“Overall, barely a dozen developing countries were able to implement the 1990s model in its entirety. Instead, most are stuck at an intermediate stage of implementation, sometimes referred to as the ‘hybrid model’ (Eberhard and Gratwick 2008). Underlying this partial implementation has been a tendency to cherry-pick components of the 1990s model that were easier to implement, while leaving others aside. ... This à la carte approach to reform does not sit well with the original conception of the 1990s model as a coherent package of mutually supportive reform measures. It meant that countries ended up with contradictory reform combinations...”

—“Rethinking Power Sector Reform in the Developing World” by Vivien Foster and Anshul Rana (World Bank Group)

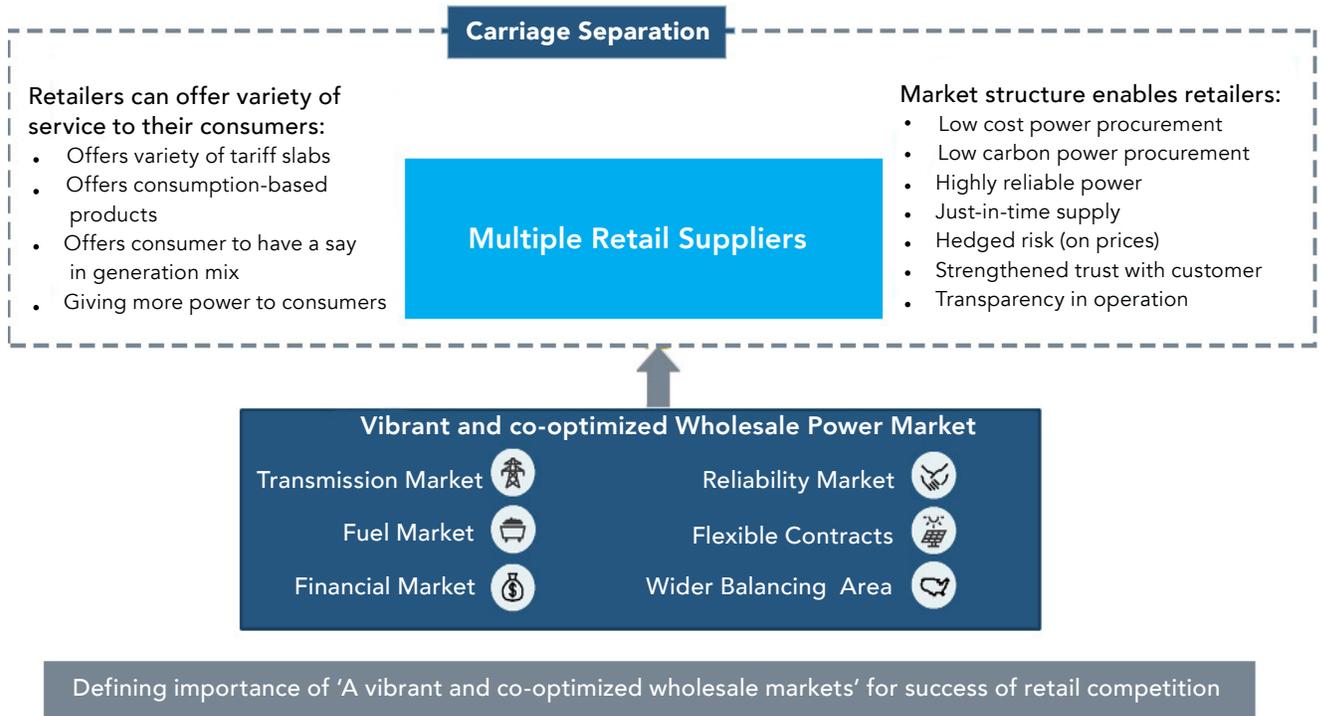
2.2 The need for vibrant power markets and resource adequacy planning

Around the time PSP started in developing countries, developed countries in Europe, Australia, and North America opened up their energy markets to retail level competition. Some countries, such as the United Kingdom, have introduced full competition in retail markets by providing a choice of supplier down to the level of household consumers and letting competition decide the retail tariffs. Countries and states, such as France and New York, have adopted a more regulated model where the majority of consumers are on default tariffs, and where the price is determined outside of retail competition.

Whatever the regulation model, one common factor found in countries that have implemented retail competition is a functioning wholesale electricity market necessary to facilitate the buying and selling of electricity for all retail customers. For instance, in the United States, all states that have restructured their electricity markets to provide full retail competition are part of either an ISO or an RTO. In addition to markets for energy, there are markets for capacity, ancillary services, transmission congestion management, and other financial mechanisms that allow for efficient market outcomes and risk management.

This is a profound statement distilled from 25 years of learning and clearly establishes that the entire power sector value chain— particularly wholesale and retail—must work together to enable successful reforms. The figure below describes the link between the wholesale and retail markets.

FIGURE: INTERACTION BETWEEN WHOLESALE MARKETS AND RETAIL MARKETS



Source: ICF

Aside from managing daily operations, any distribution company must plan for future needs and estimate the resources it needs to meet consumer demand.

A resource adequacy program typically has two goals:

- Provide sufficient resources to DISCOMs to ensure the safe, reliable operation of the grid at the most affordable/optimal rate.
- Provide appropriate incentives for existing capacity and the construction of future capacity/resource needs.

All ISOs/RTOs in the United States are mandated to conduct resource adequacy exercises on a periodic basis. For example, the California Public Utilities Commission (CPUC) adopted a resource adequacy (RA) policy framework (PU Code Section 380) in 2004 to ensure the reliability of electric service in California. The CPUC established RA obligations applicable to all Load Serving Entities (LSEs) within the CPUC's jurisdiction, including investor-owned utilities (IOUs), energy service providers (ESPs), and community choice aggregators (CCAs).

The CPUC's RA program contains three distinct requirements: system RA requirements (effective June 1, 2006), local RA requirements (effective January 1, 2007), and flexible RA requirements (effective January 1, 2015). As a part of overall RA requirements, there are two types of filings: annual filings (filed on or around October 31) and monthly filings (filed 45 calendar days prior to the compliance month).

In India, as part of Multi-Year-Tariff (MYT) filings, DISCOMs are required to estimate their energy requirements (in MUs), and capacity requirements (in MW to meet peak demand). Unfortunately, very few states have finalized MYT regulations to date, and there are major differences in the provisions of each of them. Most of MYT regulations specify a control period of less than four years, which is insufficient for the market to meet capacity requirements. In any resource adequacy discussion, the need for assessment of local ancillary services has not been prioritized.

A recent report by the Standing Technical Committee of the Forum of Regulators on Intra-State Reserves and Ancillary Services for Balancing (SANTULAN) highlighted needs for assessing intra-state ancillary demand and incentivizing appropriate capacity. Challenges in the current resource adequacy framework indicate a need to re-examine the framework being deployed at the state-level.

3. Introducing retail competition and leveraging private sector participation to enhance DISCOM performance in India

India's power distribution sector continues to be dominated by state-owned DISCOMs. The very nature of the sector (e.g., the essential nature of services they provide, the massive capital investment they require, etc.) suggests the need for natural monopolies.

Before 1996, these utilities were vertically integrated and were very inefficient in their overall operations. In the early 1990s, the rapid increase in power demand, coupled with India's economic reform agenda, led to the de-licensing of the power sector's generation segment and the unbundling of state electricity boards (SEBs) to improve operational efficiencies and introduce competition in generation, transmission, and distribution. Amid apprehensions of sweeping changes, SEBs gradually joined the bandwagon and unbundled into GENCOs, TRANSCO, and DISCOMs. Subsequently, with the implementation of the Electricity Regulatory Commission Act of 1998, other elements of the ecosystem developed, and the state regulatory commission was tasked with protecting consumer interest by regulating retail power prices.

Subsequently, EA2003 was formulated to address the changing needs of the power market. This act provided much-needed support for initiating the development of competitive markets in India. It also laid the foundation for introducing competition in the retail supply of electricity.

In the spirit of encouraging competition in all segments of the power sector, central and state governments initiated various reforms, such as the competitive procurement of power, competition in power transmission, and competition in distribution (such as open access for consumers above 1 MW of load).

Although competitive procurement and privatization in generation and transmission have grown significantly, competition and private investment in power distribution remain very limited to date.

3.1 Issues inhibiting competition in India's distribution sector

EA2003 laid the foundation for introducing competition at the consumer end through open access and parallel licensees. While open access has allowed large consumers to procure power directly, parallel licensees do not have economic rationale and thus have not been implemented.

Open access and related issues

- Open access has not taken off very successfully, despite states having put in place regulations for open access for consumers above 1 MW of load. Open access operationalization has its own share of problems:
- A lack of depth in the wholesale power markets.
- A lack of clarity on charges applicable to open access consumers.
- A lack of clarity on the distribution between fixed and variable charges in retail tariffs.
- A lack of clarity on recovering past liabilities, such as regulatory assets and pension trust funding.
- A lack of regulatory consistency in determining wheeling charges and cross-subsidy surcharges.
- A fear of DISCOMs losing high-paying, cross-subsidizing consumers.
- A lack of adequate transparency regarding the availability of transmission and distribution infrastructures.
- A fear of DISCOM non-cooperation and repercussions if open access participants move away from DISCOM supply.

Parallel licensees/sub-licensing and related issues

The concept of parallel licensees has been marred with many issues. The Draft Electricity (Amendment) Bill 2020 has given a new form to parallel licensees in the form of sub-licensing. Parallel licensees required new distribution licensees in an area to distribute power through their own distribution network within the same area (as the incumbent distribution licensee). This would potentially result in network duplication and metering infrastructure to serve the same set of consumers. Such duplication of is not economic, and also is difficult to implement due to right of way issues.

The sub-licensee introduced in Draft Electricity (Amendment) Bill 2020 is a mix of distribution franchisee and parallel licensee. Both concepts (distribution franchisee and parallel licensee) had their own set of limitations; the sub-licensee has been structured to address some of those. This concept needs to be tested in India to see if it may result in a new set of issues.

3.2 Re-structuring India's distribution sector: the way forward

India's power market structure gives significant control to state governments to decide the level of retail competition and private sector participation in the distribution sector. This can be seen when comparing the privatization efforts of Delhi and Odisha, and the introduction of distribution franchisees by many other states. Each state has restructured the models (or adopted a part of the model) to suit its desires and specific needs.

One key discussion that has gained momentum is around content and carriage separation, akin to separating distribution and retail functions and bringing competition in retail supply. The proposed framework for this involves separating an existing distribution company into two independent businesses:

- A content business, which would involve the service side of the business, including purchasing electricity from generators, selling electricity to consumers, managing customer services and billing, and collecting consumer charges.
- A carriage business, which would involve the technical side of the business, including network operations, and network planning and development.

Under the proposed structure, carriage business, by its nature, would remain a monopoly. However, the entity operating the carriage business would be independent and provide open and non-discriminatory third-party access to the content business to service consumers.

Further, it will provide for multiple retail supply companies in an area of supply. The proposed multiple retail supply companies are expected to compete with each other for supplying electricity to consumers in a given distribution supply region.

A 2015 study done by the Forum of Regulators proposed a plan to roll out competition in the retail sale of electricity in India. The structure proposes to introduce four different companies to be involved: distribution businesses (network operations, network planning, market operations), retail supply businesses, intermediary companies, and metering companies.

This is not different from the existing regulatory structure in India for City Gas Distribution, where 'City Gas Distribution regulation' allows for separate distribution and supply companies. Supply companies must have open access to the distribution company's network by paying regulated tariffs for using the network to supply gas to consumers. The regulation allows for exclusive marketing rights to the distribution company for a certain number of years, after which it must provide open network access to competing suppliers.

4. Issues and roadmap implementation: Initial conjectures

A number of key issues may come in the way of carriage and content separation:

- **Existing long-term PPAs.** All DISCOMs in India have signed long-term power purchase agreements (PPAs). To introduce retail competition, these PPAs would need to be allocated ultimately to the new retailers. This can be a tricky situation, but it is not unprecedented. Lessons can be drawn from other jurisdictions and other commodities (like gas), where monopolies have been asked to reduce their market control by auctioning long-term supply contracts to the highest bidder. Consequently, PPA allocations through a transparent and equitable mechanism include the possibility to auction these PPAs to new retailers. Another challenge would be to understand the legal implications of PPA assignments since these are bilateral contracts negotiated under Indian law. It would be important to get the generators to buy into the scheme to ensure a smooth change.
- **Past liabilities and revenue streams.** It would be necessary to design a transparent, balanced mechanism to allocate past liabilities. Different options would need to be evaluated, including the possibility of state governments to assume a certain percentage of the liabilities and to clean up the balance sheets of public sector DISCOMs before new retailers are invited to buy the right to sell electricity. On the revenue side, the challenge of cross-subsidy between different consumers will need to be understood, and a mechanism would need to be found so that cherry-picking of consumers does not happen by new retailers until the time the tariff structure is fully rationalized to reflect the cost of service.
- **Tariff setting mechanism for retailers.** A number of different mechanisms exist for tariff setting by retailers in markets where there is retail competition. There are models where the tariff is fully competitive and set by the retailers. There are also models where default tariffs are set outside of competition for consumers who do not desire to switch suppliers. In addition, special consideration is given to vulnerable consumers.

- **Commercial losses.** It is important to understand which entity is best placed to handle commercial losses. For instance, before-meter losses may be best handled by the distribution (carriage) company. However, there must be adequate incentives in place for the distribution company to reduce these losses. International regimes have found mechanisms in tariff settings that encourage efficiency improvement and provide higher returns to operators that improve their network operations.
- **Metering services.** Metering is one of the key activities affecting the commercial side of the electricity supply business. The metering service can be broken down into key activities, such as meter reading, meter replacement and maintenance, metering asset ownership, operations and calibration, data management, and Know-Your-Customer (KYC) Meter. For example, if metering responsibility is assigned to a retail supplier, it allows the retailer to understand a consumer's demand pattern, offer them customized supply products, and accordingly buy a suitable generation portfolio. A lack of consumer data may restrict new entrants or may pose as a barrier to entry. On the other hand, freely available consumer data may also pose a higher security threat for a consumer. Consequently, there is a need to critically examine the pros and cons of assigning responsibilities of different metering related activities between retail supplier, wire business, and a neutral third party.
- **Selecting retailers.** One of the most important parameters in judging the success of the retail competition is the number of retailers in the market. A recent report by the Council of European Energy Regulators (CEER) lists the number of active retailers of electricity in various European countries. For instance, in Italy, there are around 490 electricity suppliers with 54 active nationwide. In Germany, there are more than 1,250 electricity suppliers with 64 active nationwide. Thus, the entry barriers for new retailers to enter the market need to be low to enable competition—the benefits of which would go to consumers. The retailers, however, should have the required strength and experience to qualify as retailers. Another key concern in India would be to design the retail market in a fashion that does not lead to cherry-picking by new retailers. Due to the prevalence of cross-subsidies between consumer categories in India, this is an important issue to keep in mind. One option to reduce this tendency could be to have low entry barriers for new retailers and make a defined set of consumers as “contestable consumers” in initial phases. Subsequently, retail competition could be opened to all categories of consumers as cross-subsidization reduces. Another approach could be to develop customer portfolios and invite bids from retailers for them.

- **Meeting universal service obligations.** This will be an important question for new retailers and must be defined clearly in the policy before retailers are invited to compete. The level of service retailers must maintain to all households should be defined in regulation. For instance, global utilities are expected to treat vulnerable consumers with special packages. Regulators, too, design targeted policies to protect such customers. These policies generally focus on preventing disconnections, reducing payment burdens, and increasing home efficiency. The first step is to define a vulnerable consumer and identify the minimum service levels to be accorded to them. Targeted protection is most commonly extended to low-income customers via government-sponsored benefits programs. There are different types of support packages available to vulnerable consumers, such as payment support, bill smoothing, EE training, and prepayment meters.

The solution to these issues could be drawn from international precedents and customized for India.

About the Authors



Gurpreet Chugh is the Managing Director at ICF in the New Delhi office and has 18 years of in-depth practical understanding of finance related issues in areas of fundraising, valuation, economic feasibility, financial modeling, etc. across geographies in the global energy sector. He has direct experience of working in India, UK, West Africa and Russia. In his professional career as a consultant, he has led consulting engagements for international energy majors and provided advisory services across oil & gas, coal, power and renewable sectors. He has advised the Government of India on key policy initiatives in the coal sector and advised power sector developers on power and renewables. Mr. Chugh has supported Ministry of Coal in developing Coal Auction Policy for Schedule 2 and 3 mines.

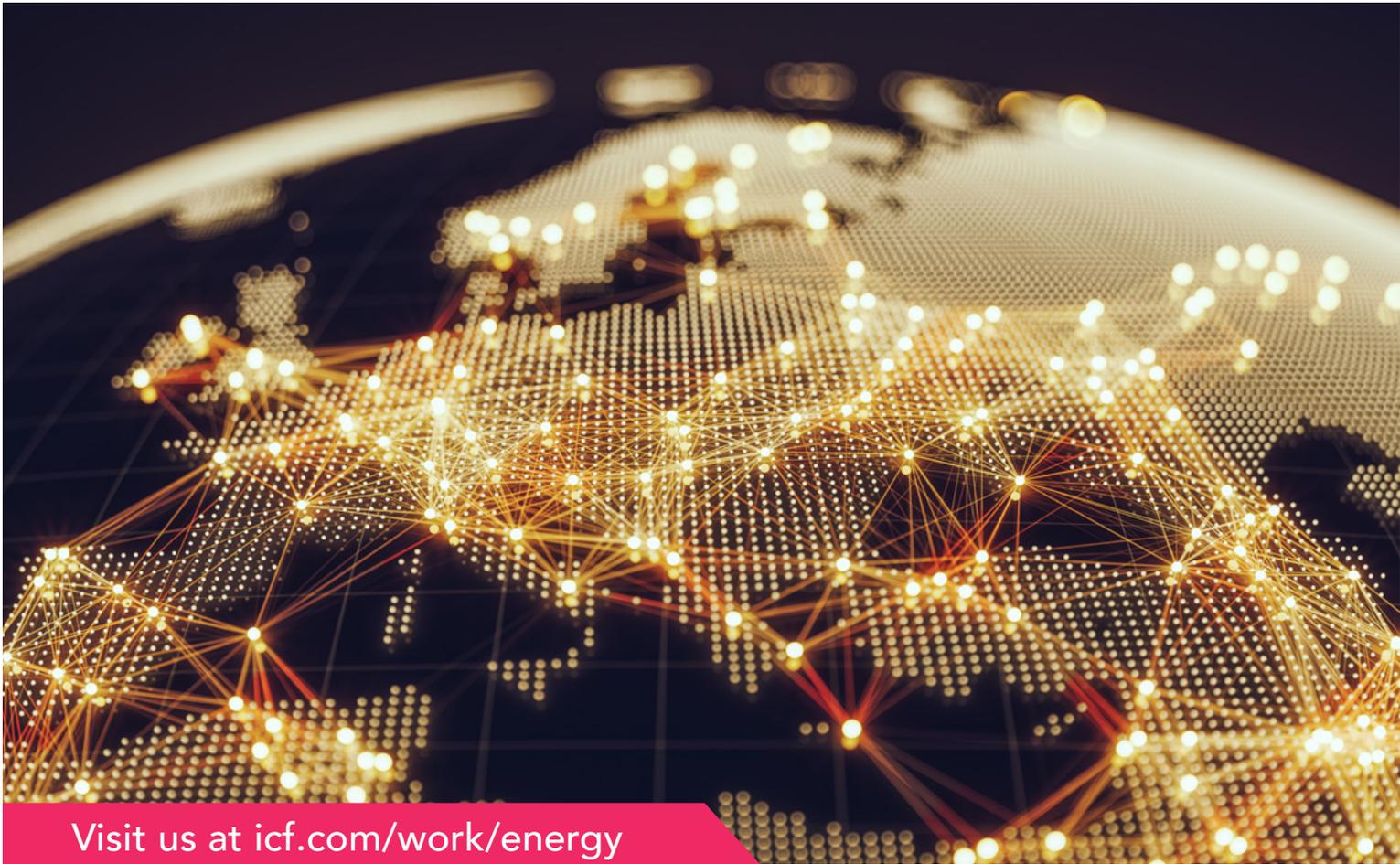
Gurpreet has advised global energy majors on LNG market studies, financial modeling, M&A advisory, UK and continental gas market studies, European utilities on liberalization, Indian companies on renewables strategies, multilateral organizations on demonstrating viability of solar power in rural healthcare sector, assisting State Nodal Agencies (SNAs) in capacity building for RE projects, supporting MNRE and SECI in solar park and transmission infrastructure development, feasibility assessment for LNG technologies in transportation, competitive economics of different types of fuels used in various modes of transportation. Gurpreet has completed his B. Tech. from NSIT, MBA from MDI Gurgaon. Gurpreet is a CFA charter holder.



Ashish Singla has 13 years of experience: 8 years in energy sector (covering SAARC countries) and 5 years in Power markets covering North America, and Caribbean countries. He has led numerous assignments related to Coal, Gas, power (generation, Transmission and distribution), RE sector in India (and SAARC Countries). He has experience of working with different types of stakeholders including private (from buy side as well as sell side) sector, public sector and donor agencies.

Ashish's experience includes Power Market Analysis & Outlook, Asset Valuation & Due Diligence, Coal Market analysis, Gas Market analysis, Renewable market analysis, and New market products (Battery storage). He has thorough understanding of structure and the workings of Indian sub-continent and North American power markets. In his professional career, as a consultant, Ashish supports planners, PE firms, investors, MNCs, developers on various power and fuel markets due diligence studies across the value chain.

Ashish is a B.Tech from Indian Institute of Technology, Roorkee (2007, Production and Industrial Engineering).



Visit us at [icf.com/work/energy](https://www.icf.com/work/energy)

For more information, contact:

Gurpreet Chugh
gurpreet.chugh@icf.com

Ashish Singla
ashish.singla@icf.com

-  twitter.com/ICF
-  [linkedin.com/company/icf-international](https://www.linkedin.com/company/icf-international)
-  [facebook.com/ThisIsICF](https://www.facebook.com/ThisIsICF)

About ICF

ICF (NASDAQ:ICFI) is a global consulting services company with over 7,000 full- and part-time employees, but we are not your typical consultants. At ICF, business analysts and policy specialists work together with digital strategists, data scientists and creatives. We combine unmatched industry expertise with cutting-edge engagement capabilities to help organizations solve their most complex challenges. Since 1969, public and private sector clients have worked with ICF to navigate change and shape the future. Learn more at [icf.com](https://www.icf.com).

Any views or opinions expressed in this white paper are solely those of the author(s) and do not necessarily represent those of ICF. This white paper is provided for informational purposes only and the contents are subject to change without notice. No contractual obligations are formed directly or indirectly by this document. ICF MAKES NO WARRANTIES, EXPRESS, IMPLIED, OR STATUTORY, AS TO THE INFORMATION IN THIS DOCUMENT.

No part of this document may be reproduced or transmitted in any form, or by any means (electronic, mechanical, or otherwise), for any purpose without prior written permission.

ICF and ICF INTERNATIONAL are registered trademarks of ICF and/or its affiliates. Other names may be trademarks of their respective owners.

