Alliance for an Energy Efficient Economy

Mapping Demand Flexibility Service Providers for India's Green Grid

Executive Summary

India's power sector stands at a pivotal moment, tasked with the dual mandate of powering unprecedented economic growth while spearheading one of the world's most ambitious clean energy transitions. Achieving the national target of 500 GW of non-fossil fuel capacity by 2030 requires not only a massive build-out of renewable generation but also a fundamental reimagining of grid management.

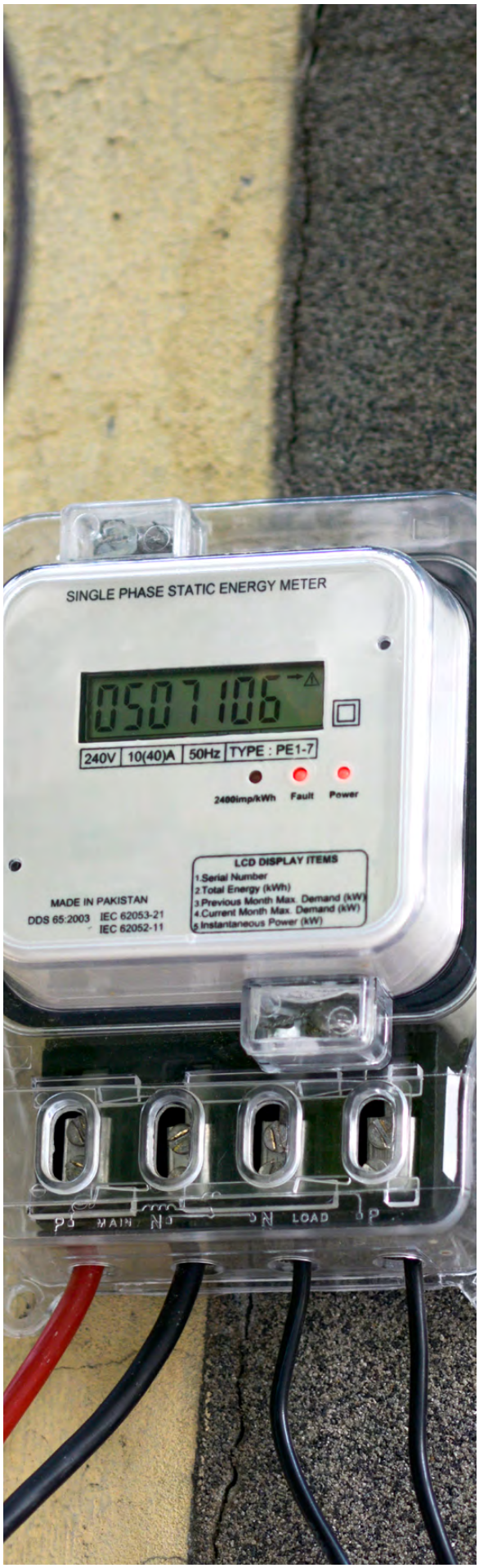
In this context, Demand Flexibility (DF) emerges as a strategic imperative –a cost-effective, scalable, and flexible resource to ensure grid stability, reliability, and affordability while supporting the clean transition. This brief argues that the demand flexibility service providers (DFS), that enable pooling of demand-side flexibility resources into a cohesive Virtual Power Plant (VPP), are the indispensable vehicle for unlocking this potential at scale.

This issue brief is a first-of-its-kind landscape analysis of India's DF service providers, identifying companies willing to offer services and partner in the development of India's DF ecosystem. The findings and analysis presented are based on survey responses from 22 companies as of the fourth quarter of 2025 and reflect a snapshot of a rapidly evolving market. While the surveyed companies represent a cross-section of the emerging ecosystem, the sample size is limited.

The key questions this brief seeks to address are:

1. **What are the current offerings of demand flexibility service providers in India?**
2. **What is the operational maturity and market readiness of these players?**
3. **What are their preferred business and revenue models for scaling the market?**
4. **What is the single greatest barrier preventing the market from scaling beyond its current state of "pilot paralysis"?**
5. **What specific interventions and support do market players identify as most critical for unlocking a commercial DF market?**

The findings reveal that the Indian DF market is nascent and pre-commercial, underlining the significant upside for service providers to enhance their competencies and build market readiness. A clear consensus has formed around a de-risked, hybrid revenue model combining fixed and performance-based payments, apparently as a direct strategic response to DISCOM's creditworthiness and high regulatory uncertainty.



The analysis highlights that the primary barrier to scaling is not a lack of technology or financial viability, but rather a fragmented and uncertain regulatory landscape. This is a critical finding: 41% of surveyed companies identified regulatory uncertainty as the top impediment to growth.

The path forward requires a foundational shift away from fragmented, grant-based and pilot-scale initiatives towards a clear, stable, and harmonised regulatory framework at the national level. Such a framework must provide service providers with equitable access to energy, capacity, and ancillary service markets. The policymakers, regulators, and Distribution Companies (DISCOMs) hold the key to catalysing this transition, moving it from its current state of "pilot paralysis", a situation where numerous technical demonstrations consistently struggle to transition to broad commercial deployment, to establishing it as a robust commercial market. Doing so will not only unlock billions in potential savings in grid infrastructure but also accelerate India's journey towards a secure and decarbonised energy future.

The Strategic Imperative for Demand Flexibility

India's power sector faces a dual mandate: meeting rapidly growing electricity demand while pursuing ambitious decarbonisation goals. The nation's progression towards 500 GW of non-fossil fuel capacity by 2030, primarily from variable wind and solar, presents unprecedented operational challenges and threatens grid stability[1]. Relying on expensive, carbon-intensive supply-side solutions, like fossil-fuel peaking plants and massive, capital-intensive energy storage projects, to address these challenges is economically onerous and counters India's climate and *Atmanirbhar Bharat* goals.

In contrast, Demand Flexibility offers a more elegant, efficient, participatory, and economically sound alternative. It is the capacity of demand-side energy end-use equipment and distributed energy resources to alter their consumption patterns, providing grid services that facilitate renewable integration, manage peak demand and fluctuating power prices, and assist in grid emergencies. By actively shaping load profiles, DF can provide the critical flexibility

needed to maintain grid equilibrium and defer system upgradation costs. The economic case for prioritising DF is just as compelling. A study by CEEW identified that a modest 24 GW demand shift across just 10 states could avert the need for 30 GW of new Battery Energy Storage System (BESS) capacity. This strategic deployment would yield potential savings of approximately INR 14,000 crore (USD 1.6 billion) by 2030[2]. This reframes DF not just as a technical tool, but as a high-value economic strategy that enhances the power system's overall efficiency and resilience.

Market Snapshot: Profiling India's Emerging Flexibility Providers

The findings are based on desktop research of international and domestic players (including their products and services) and a targeted survey of 22 entities. The survey respondents primarily included technology providers, software and platform developers, consulting and on-ground support providers, and energy service companies (ESCOs). The survey captured quantitative and qualitative data on service offerings, market experience, preferred business models, and perceived sectoral challenges and opportunities.

A Nascent Ecosystem

The Demand Flexibility landscape in India is currently in a pre-commercial stage, defined by a mosaic of early-stage, utility-driven and third-party supported pilots, and fragmented partnerships between utilities and technology vendors. While these initial pilots have successfully demonstrated the technical feasibility of various DF applications, very few– primarily those focused on behavioural demand response in residential customers have transitioned into large-scale programmes.

Globally, the key to scaling DF has been the emergence of the aggregators. These entities serve as crucial intermediaries, pooling numerous small, geographically dispersed energy resources, such as rooftop solar, behind-the-meter batteries, HVAC systems, electric vehicle (EV) chargers, and controllable industrial loads, into a single, coordinated portfolio.[3] This aggregated capacity can then be dispatched in real-time to deliver essential grid services, effectively operating as a Virtual Power Plant (VPP). The core functions of an aggregator are to aggregate diverse resources, orchestrate their operation through a sophisticated technology platform, and provide grid services to system operators and DISCOMs.[4] In the Indian context, an aggregator may also act as an entity that identifies and facilitates enrolment of customers into a demand-flexibility programme, without necessarily owning a dedicated technology platform or delivering direct grid services, leaving technology and service-delivery layers to be handled by other parties.

Categorising the Ecosystem Players

The emerging players in India's DF value chain can be classified into five dominant archetypes, spanning a spectrum from technology-focused software providers to asset-heavy service models:

1. **Software/Hardware Technology Provider:** These entities develop and supply the foundational technology for demand flexibility services. This includes:
    a. **Software:** The digital platforms and "soft" infrastructure, such as Energy Management Systems (EMS), Demand Response Management Systems (DRMS), advanced control algorithms, and platforms for forecasting, scheduling, and market settlement.
    b. **Hardware:** The physical "core" technology, such as smart IoT devices, sensors, control modules, and gateways that enable automated communication and control of flexible assets.
2. **Demand Aggregator/Retailer**: These entities act as market-facing intermediaries, contracting with numerous customers to pool their flexible demand. They then offer this aggregated flexibility to DISCOMs and

grid operators, often without owning the end assets themselves.

3. **Energy Auditor and M&V Specialist:** These specialists and consultants focus on assessing the potential for DF and performing the crucial Measurement and Verification (M&V) of energy savings and demand reduction achieved.
4. **Asset-Backed Service Provider:** These companies own, finance, or lease the flexible assets themselves (e.g., C&I battery storage, EV charging infrastructure) and aggregate their flexibility for grid services.

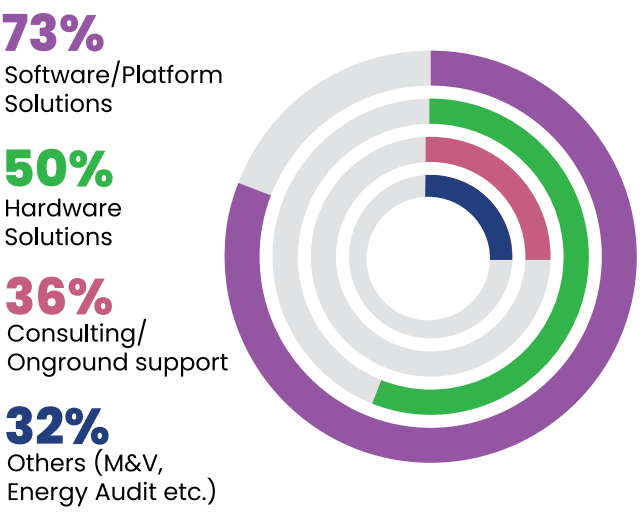
A demand flexibility service provider may focus on one or more of the aforementioned service models to deliver demand flexibility.

Analysis of Findings: Mapping Representative Players and Positioning

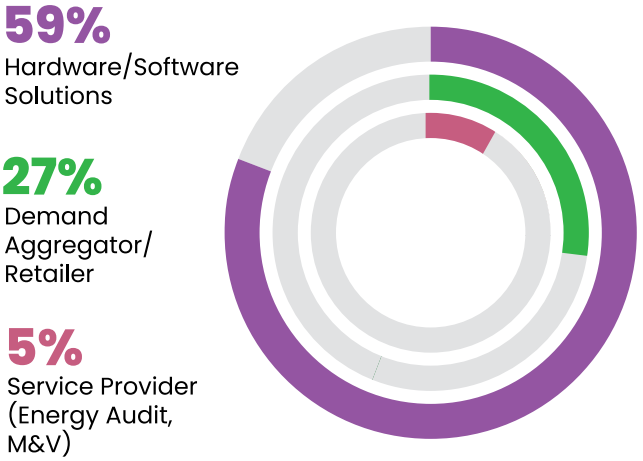
A targeted online survey of 22 companies (Annexure 1) provides a clear snapshot of the current market's composition, capabilities, and strategic priorities. The data reveals a market that is still finding its footing, with distinct patterns in service offerings, experience levels, and business model preferences. The survey of India's emerging players highlights several key characteristics:

- **Focus on Components, Not Solutions:** The current market offerings of potential DF service providers are heavily concentrated at the component level. A commanding 73% of respondents provide software and analytics, 50% offer hardware services, and 36% entities offer Consulting/On-Ground Support. Truly integrated, end-to-end solutions that combine software, hardware, and M&V are "rare." This focus is also mirrored in their future plans, with the majority of entities (59%) indicating an interest in providing hardware/ software solutions. 27% of the respondents acknowledged the need for aggregation and aim to provide demand aggregation/ retailing service.

Current Market Offering

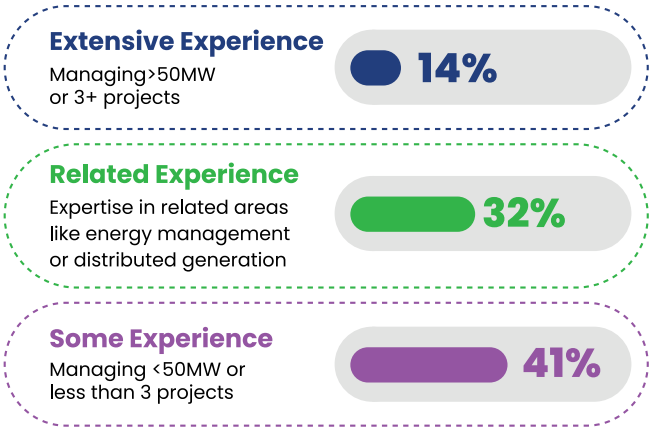


Intended Primary DF Service Offerings

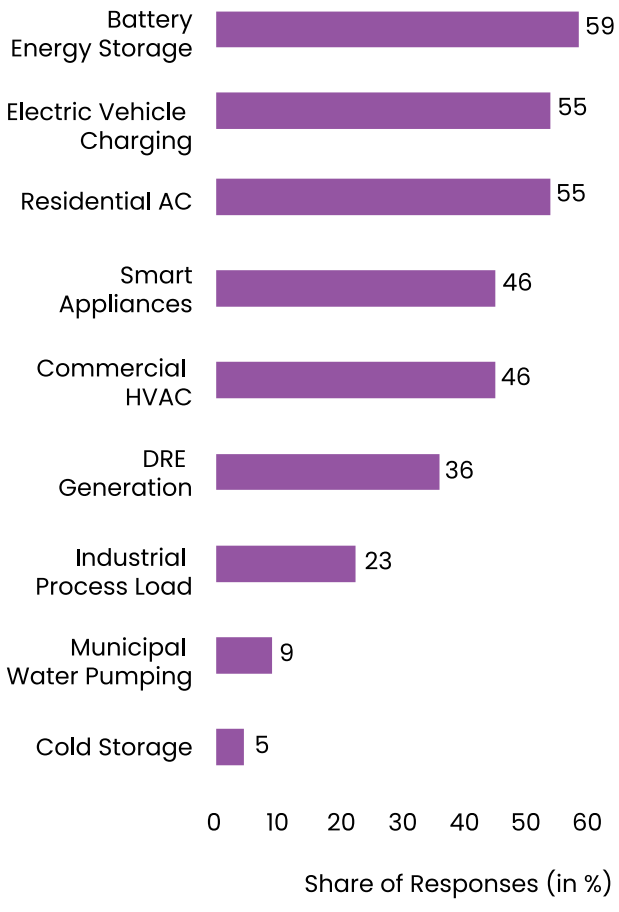


Note: Since respondents could select multiple options ("select all that apply") on the 'current market offering' by the entities, the percentages for each service are calculated against the total number of survey responses.

- **Experience Gap:** The operational maturity and market readiness of DF service providers remain in their early stages, primarily due to a pronounced experience deficit. Only 14% of respondents report "Extensive Experience" (managing >50 MW or 3+ projects), while 32% report "Related Experience" in fields such as energy management, but lack direct DF or VPP dispatch experience. The majority (41%) have "Some Experience" (managing <50 MW or less than 3 pilots).

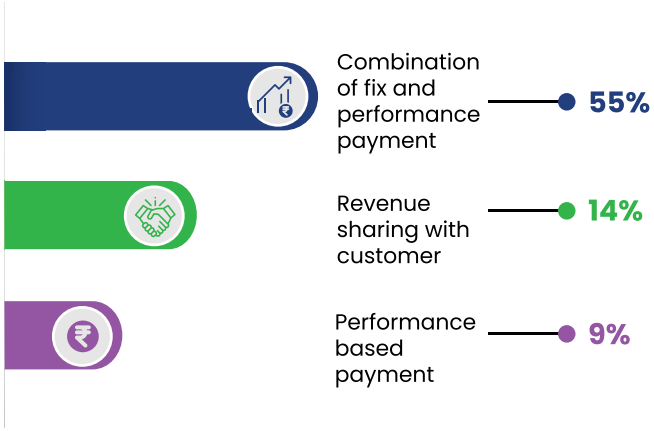


- **Preferred Asset Portfolio:** The focus is squarely on modern, controllable distributed energy resources (DERs). Battery Energy Storage System (BESS) (59%), Residential AC (55%), and Electric Vehicle (EV) charging (55%) are the top targets, followed by Smart Appliances (46%), Commercial HVAC (46%), and Distributed Renewable Energy (36%).



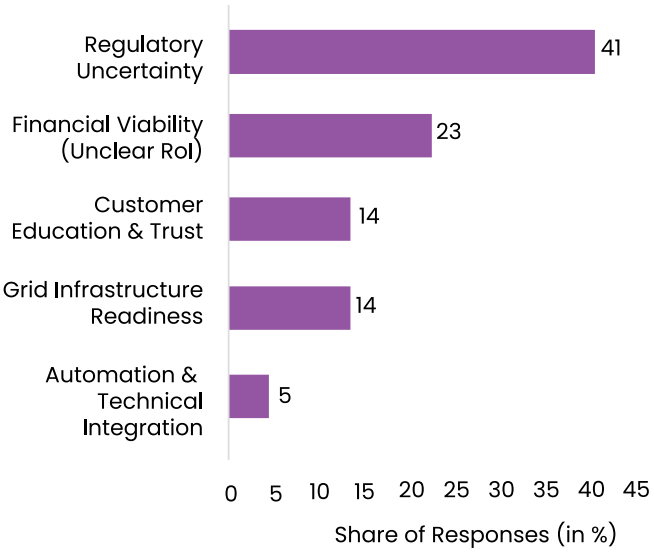
Note: Since respondents could select multiple options ("select all that apply"), the percentages for each service are calculated against the total number of survey responses.

- **Risk-Averse Revenue Model:** An overwhelming 55% of respondents favour a hybrid revenue model, combining fixed and performance-based payments as preferred business and revenue models. This preference is a direct strategic response to perceived high risks, driven by both the low levels of dispatch experience and the high external risk posed by an unpredictable regulatory environment. This dominant preference suggests aggregators are aiming for a balanced model that provides both financial stability through a guaranteed fixed or capacity fee, and an incentivised upside linked to the successful dispatch and reliability of the service.



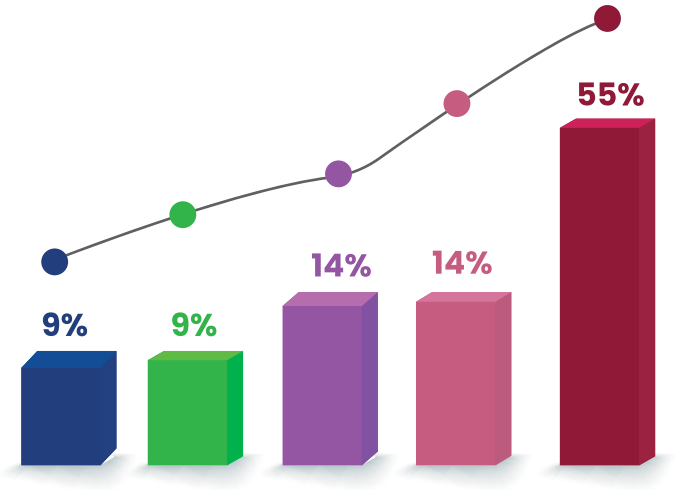
The Core Bottleneck: From 'Pilot Paralysis' to Regulatory Uncertainty

The analysis shows that the primary barrier to scaling DF in India is not a lack of technology or financial viability. Instead, the market is stuck in a state of "pilot paralysis," a situation where numerous technical demonstrations struggle to transition to broad commercial deployment. A striking 41% of respondents identified Regulatory Uncertainty as the single most significant impediment to growth. This concern far outweighs financial viability and unclear return on investment, which are cited as barriers by only 23% of companies.



When asked what support is most needed to unlock the market, the response was unequivocal. A commanding 55% respondents identified a "clear and stable policy and regulatory framework" from DISCOMs and regulators as the most critical requirement. This was followed by the need for a "streamlined onboarding and payment process" and "Technical Collaboration" (14% each).

- **Data Access:** Stramlined access to customer historical data(with consent) and grid information
- **Joint Marketing & Customer Outreach:** Co-branded intiatives to build customer trust
- **Technical Collaboration:** Clear interconnection standards and API intergration support
- **Streamlined Onboarding & Payment:** Efficient processes for registering assets and timely payment
- **Clear, Stable Policy and Regulatory Framework**



The table below provides a consolidated profile of the emerging Indian DFS ecosystem based on the survey findings.

Characteristic	Key Findings	Implication
Primary Service Offering	Software & Analytics (73%), Hardware (50%)	Focus on components, not integrated solutions.
Direct DF Experience	Extensive (14%), Some (41%), Related (32%)	Experience and capability gap.
Preferred Asset Portfolio	BESS (59%), EV Charging (55%), Residential AC (55%)	Focus on modern and flexible loads.
Preferred Revenue Model	Hybrid (Fixed + Performance) (55%), Revenue sharing with customers (14%)	High risk aversion due to market immaturity.
Top Market Barrier	Regulatory Uncertainty (41%), Financial Viability (Unclear RoI) (23%)	Regulatory uncertainty is the primary bottleneck, not financial viability.
Top Support Required	Clear & Stable mandate from DISCOMs and regulators (55%)	Market seeks clear rules, ensuring DF is treated as a reliable alternative to supply-side investment.

Recommendations for Market Development

The survey findings reveal a profound message: The emerging DF industry has confidence in its underlying commercial case. According to the projection from Central Electricity Authority (CEA), India's electricity demand is projected to at least double by 2040 as the nation electrifies its transport, heating and industry to decarbonise the economy. At the same time, an increasing share of country's electricity will come from variable renewable sources such as wind and solar. To integrate these cheaper, homegrown sources of electricity and manage this transformation, India needs to develop a highly flexible grid that can modulate clean electricity supply and demand in time and location, across hours, days, and seasons.

Industry players are primarily seeking a clear, predictable, and equitable playing field. Certain specific signals that can unpack the customer-driven flexibility transition will require:

- **Formal Legitimacy:**
  - » DF must become a core component of national and state energy planning. Mandating its inclusion in long-term plans, like the National Electricity Plan and state Resource Adequacy (RA) assessments is essential. This move formally establishes DF as a reliable alternative to investing in new supply-side infrastructure.
  - » Amend existing DSM regulations to include demand response and demand flexibility. The regulations must set clear targets and provide a fair compensation and incentives structure that encourages DISCOMs to roll out scalable programmes.
  - » Develop a standardised Measurement and Verification (M&V) protocol to ensure consistent and credible reporting of energy and demand savings across DISCOMs.
  - » Establish a single, formal legal definition for an 'aggregator' at the national level. This will provide regulatory certainty and clarify their role in the energy market.
- **Market Access & Compensation:** Unlocking long-term revenue certainty by granting aggregators non-discriminatory access to bid into energy, capacity, and ancillary service markets.
- **Enhanced Transparency:** Standardise contracts for DF services and define technical protocols for market integration with clear rules of engagement, particularly in market operations, settlement processes, and data sharing protocols between DISCOMs and aggregators.

The recent formal recognition of the aggregator's role by regulators like the Maharashtra Electricity Regulatory Commission (MERC), the Assam Electricity Regulatory Commission (AERC), and the Karnataka Electricity Regulatory Commission (KERC) is a positive and necessary first step, but it must be followed by detailed work on market design and rule-making. The policymakers, regulators and DISCOMs hold the key.

This inaugural report provides a first-of-its-kind snapshot of a nascent yet rapidly evolving market. The Alliance for an Energy Efficient Economy (AEEE) envisions this report evolving into an ongoing tracker of the demand-flexibility service-provider ecosystem in India. AEEE invites all stakeholders—aggregators, service providers, utilities, and investors—to engage with this tracker, share updates, and help AEEE monitor and update this landscape. The tracker will provide clear and consistent market signals to policymakers, regulators, DISCOMs, and investors, helping build the confidence needed for demand flexibility to become a commercially viable resource.

References

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Annexure 1: Survey respondents and their classification by operational scale (Startup, National, Multinational)

Startup	National	Multinational
Limelight IT Research PVT LTD	REConnect Energy Solutions Limited	Siemens
Trillectric Gridmend Private Limited	BSES Rajdhani Power Limited	Oracle Utilities
Voltreum India Pvt Ltd	BSES Yamuna Power Limited	Schneider Electric
Flock Energy	Noida Power Company Limited	SEW.AI (Smart Energy Water)
Kazam EV Tech Private Limited	Sixth Energy Technologies Pvt Ltd	Uplight
GreenTree Global	SRIT	Bidgely Inc.
TekUncorked AI IoT Pvt Ltd	Tata Power-DDL	
Smart Joules	MP Ensystems Advisory Pvt Ltd	

Disclaimer: The insights contained herein should be considered indicative of current market sentiment and trends. Every attempt has been made to ensure the correctness of the data. However, AEEE does not guarantee the accuracy of the data or accept responsibility for the consequences of the use of such data. They are intended to inform stakeholders and stimulate discussion. This tracker will be updated annually to reflect new data and market developments.

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