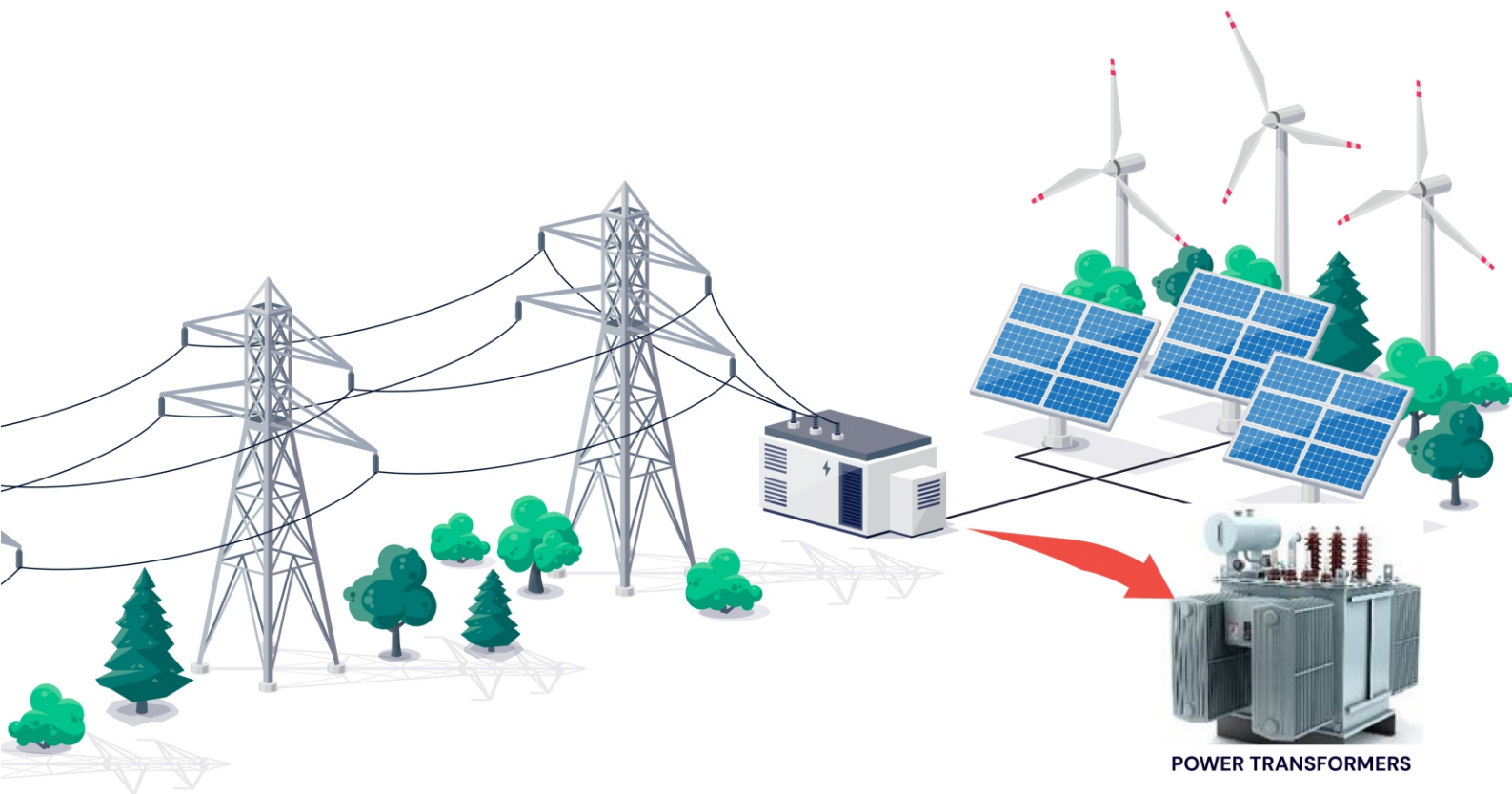


March 2024

Initiating Coverage

Transformers & Rectifiers India

Rising like a phoenix: Turnaround begins



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INITIATING COVERAGE



KEY DATA

Rating	BUY
Sector relative	Outperformer
Price (INR)	342
12 month price target (INR)	575
52 Week High/Low	397/52
Market cap (INR bn/USD bn)	48/0.6
Free float (%)	22.9
Avg. daily value traded (INR mn)	255.0

SHAREHOLDING PATTERN

	Dec-23	Sep-23	Jun-23
Promoter	69.7%	74.9%	74.9%
FII	3.5%	0.6%	0.0%
DII	0%	0%	0%
Pledge	0%	0%	0%

FINANCIALS

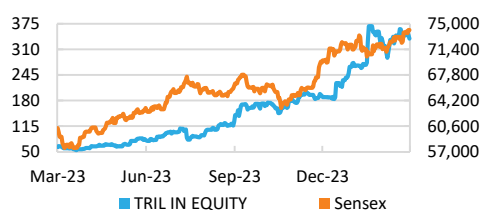
(INR mn)

Year to March	FY23A	FY24E	FY25E	FY26E
Revenue	13,809	14,392	20,558	26,930
EBITDA	1,214	1,367	2,467	3,770
Adjusted profit	407	541	1,443	2,401
Diluted EPS (INR)	3.1	4.1	10.9	18.1
EPS growth (%)	191.0	32.9	166.6	66.4
RoAE (%)	10.9	12.9	27.8	33.7
P/E (x)	111.4	83.8	31.4	18.9
EV/EBITDA (x)	39.9	35.0	19.4	12.4
Dividend yield (%)	0	0	0	0

CHANGE IN ESTIMATES

Year to March	Revised estimates		% Revision	
	FY24E	FY25E	FY24E	FY25E
Revenue	14,392	20,558	0.0%	0.0%
EBITDA	1,367	2,467	0.0%	0.0%
Adjusted profit	541	1,443	0.0%	0.0%
Diluted EPS (INR)	4.1	10.9	0.0%	0.0%

PRICE PERFORMANCE



Rising like a phoenix: Turnaround begins

India's ballooning power demand, fuelled by manufacturing push and electrification, along with green transition (500GW by 2030) has triggered a revival in T&D capex (INR2.4tn in three–four years). Much of this is HV (220kv and above) for renewable energy (RE) connectivity. This, we reckon, would require INR360bn in capex on transformers.

Transformers & Rectifiers India (TRIL) is one of the few suppliers of HV transformers in India ([Exhibit 19](#)), and poised to clock an 85%-plus EPS CAGR over FY24–27E. **We are initiating coverage at 'BUY'** with a TP of INR575 factoring in: i) 25–30% new orders growth/annum; ii) 13–15% OPMs (feeding into 85%+ EPS CAGR in our base case); and iii) 25x PE on FY27E EPS of INR26 and discounting it by 15% Ke to FY26E.

No transition without transmission

Indian policymakers' thrust on expanding the manufacturing sector (target of 25% of GDP by FY25; currently 17%) coupled with green transition demands large power capacity addition. This in turn shall spur a mega transmission capex over FY24–30E (refer to our [Power Sector thematic](#)). We note a similar revival of transmission capex globally on the back of green energy push across North America, Europe and the Middle East. The US plans to spend [USD1.2tn](#) on its infra (including transmission) while Europe plans to spend [EUR584bn](#) on grid expansion/stability over this decade.

India's transformer industry is five decades old with 300-plus players (organised + unorganised) with capacity of ~400GVA (180GVA two–three years ago). However, much of this new leg of transmission capex is for >220kv long-distance RE connectivity ([Exhibit 15](#)). This implies accelerated demand for HV transformers, wherein six–seven players operate with entry barriers. We thus find India's HV transformer demand entering a new upcycle given PGCIL's annual capex is likely to surge 300% ([Exhibit 3](#)).

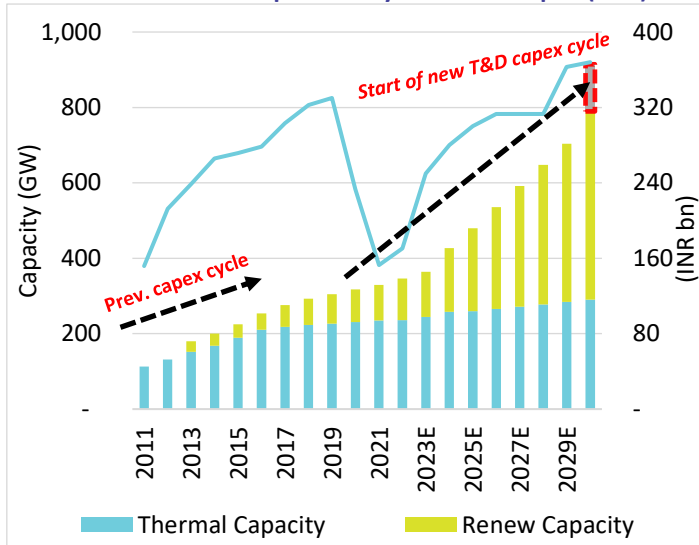
TRIL happens to be one of the few transformer manufacturers with offerings across the *spectrum* (<220kv to 1200kv), with HV forming ~70%+ of sales coupled with rectifiers, reactors, speciality transformers, etc. We estimate its potential TAM (domestic + exports) at INR390bn-plus by FY27E ([Exhibit 4](#)). TRIL's following strategic initiatives shall power its profitability and growth: i) frugal capacity expansion; ii) backward integration to eliminate potential components shortage and strengthen supply chain resilience; and iii) selective order picking for better cash conversion.

Outlook and valuation: Pure play on transformers; initiate at 'BUY'

We reckon TRIL shall clock an EPS CAGR of 85%+ over FY24–27E despite conservative assumptions of: i) 15–20% market share driving 25–30% OI growth/year; ii) slow OPM ramp-up to 15% by FY27E (18–19% in last upcycle); and iii) 25x PE (peers > 50x i.e. above +2 S.D.). **Initiate TRIL at 'BUY' with a TP of INR575 at 25x Mar-27E EPS (discounted to FY26E)**, implying upside potential of 68%. *Our bull case TP of INR702 factors in 18% OPM by FY27E with no incremental OI or higher multiple. Risks: competitive intensity, raw material supply constraints, WC management.*

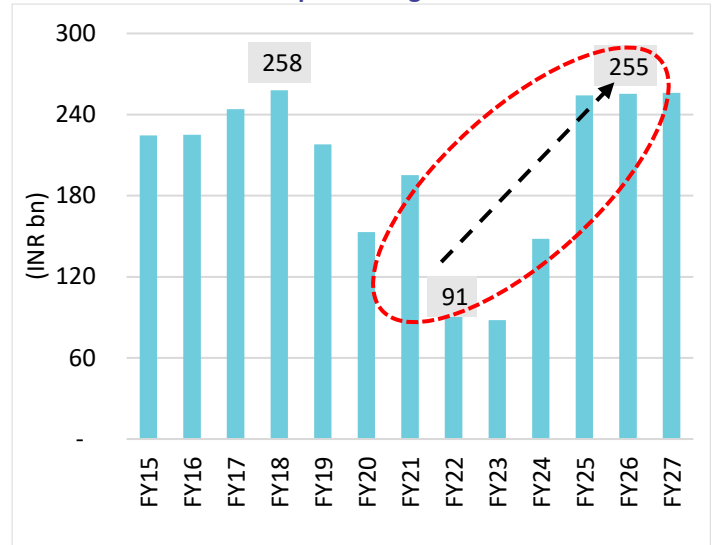
The Story in Charts

Exhibit 1: RE additions spur new cycle of T&D capex (ISTS)



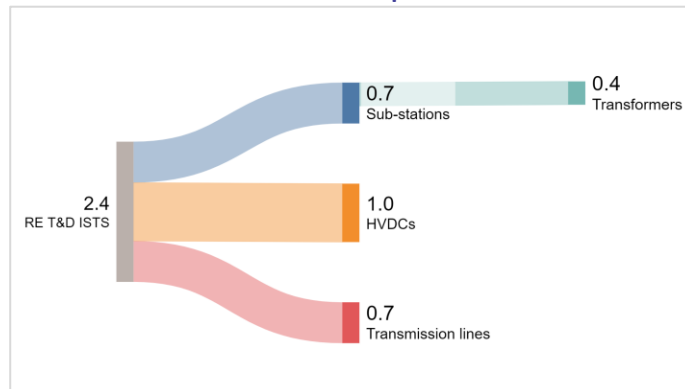
Source: CEA, PGCIL, Nuvama Research

Exhibit 2: PGCIL annual capex to surge 3x from current levels



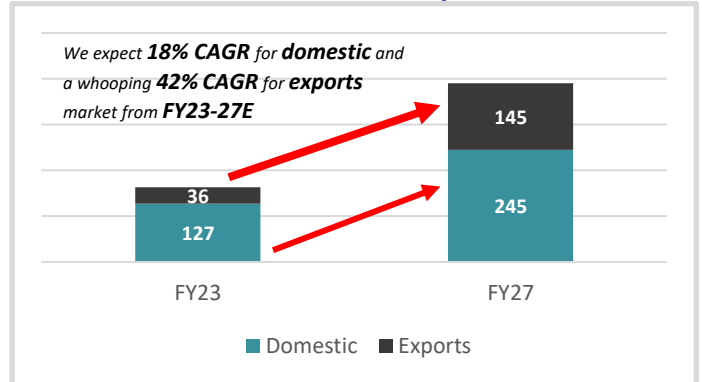
Source: PGCIL, Nuvama Research

Exhibit 3: ~15% of INR2.4tn ISTS capex is transformers' TAM



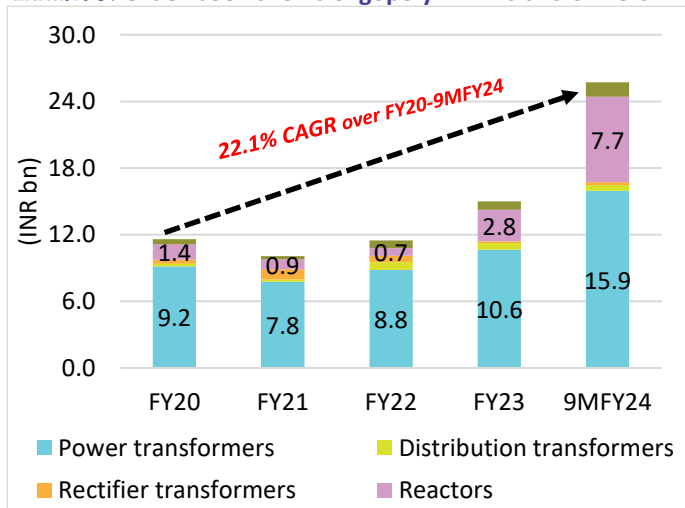
Source: CEA, Nuvama Research

Exhibit 4: 24%+ CAGR in overall TAM by FY27E to INR390bn



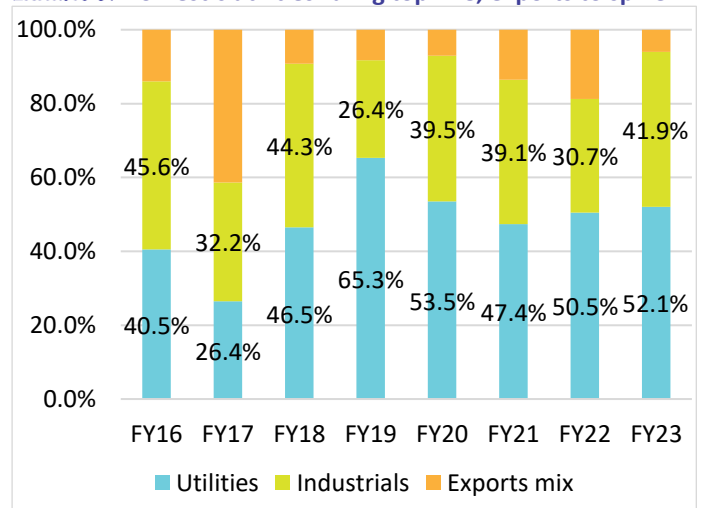
Source: IEEMA, Nuvama Research

Exhibit 5: Order book shows oligopoly in HV transformers



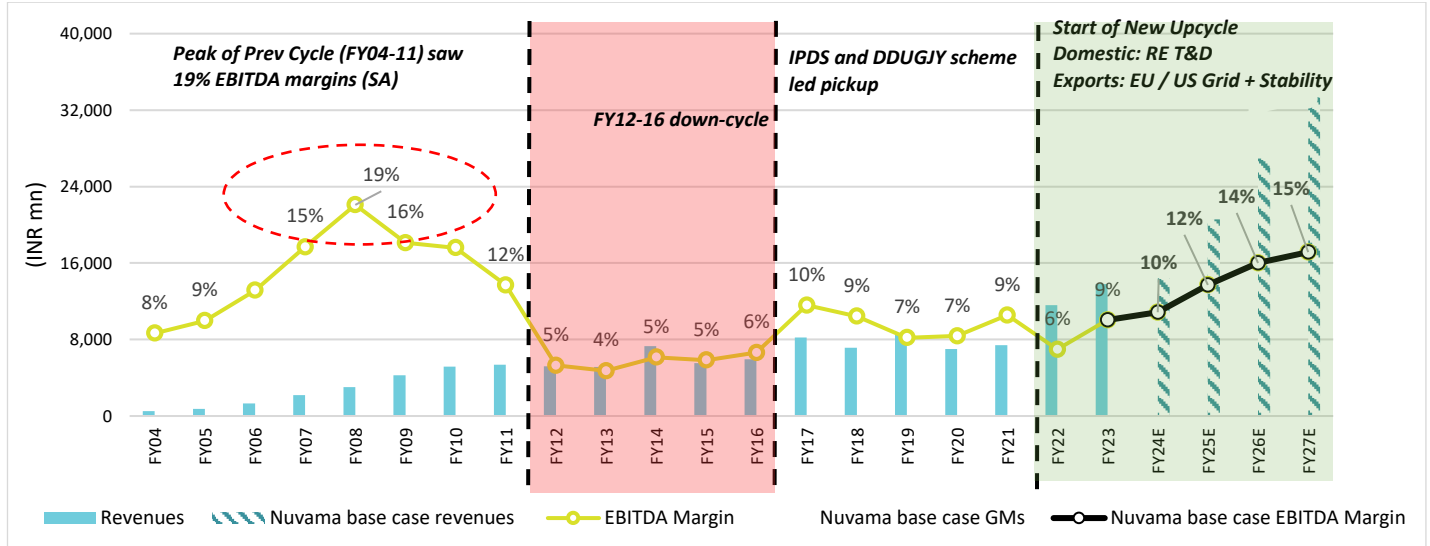
Source: Company, Nuvama Research

Exhibit 6: Domestic utilities ruling top line; exports to spike



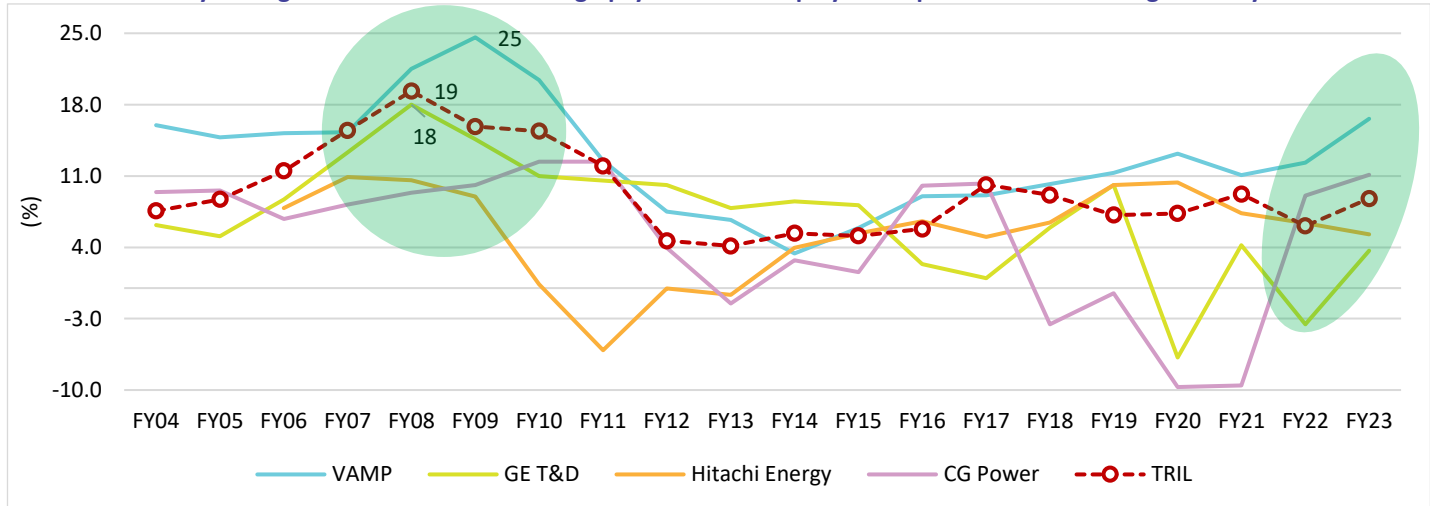
Source: Company, Nuvama Research

Exhibit 7: Goldilocks period has begun for transformer players; TRIL poised to clock OPM expansion to 14–15% by FY26/27E



Source: Bloomberg, Company, Nuvama Research

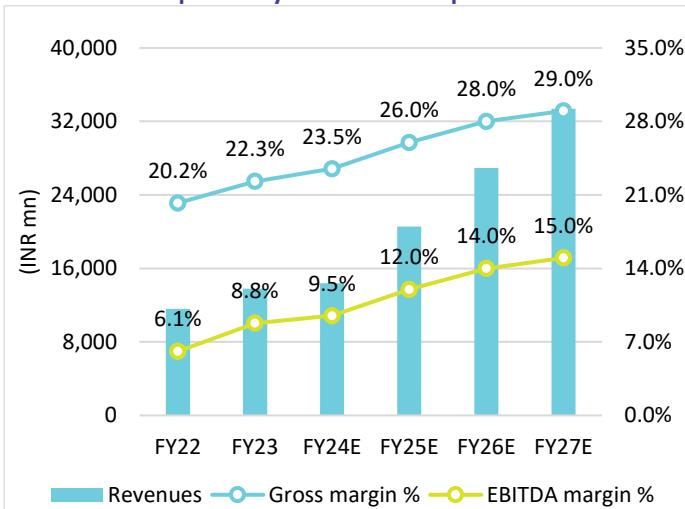
Exhibit 8: Industry average OPM close to 15% during upcycle as certain players surpassed benchmark significantly



Source: Bloomberg, Company, Nuvama Research

Note: Considering ABB Power Systems (for Hitachi Energy) till FY19 considering EBIT margins historically and CG Power's power segment EBIT margins

Exhibit 9: Multiple catalysts-led OPM expansion on the cards



Source: Company, Nuvama Research

Exhibit 10: Our base case: 85%+ EPS CAGR over FY24–27E

FY24-27E	Bear case	Base case	Bull case
Order inflows CAGR	25.0%	25.0%	25.0%
Avg. OPMs (FY24-27E)	9.9%	11.9%	12.7%
FY27E OPM	10.0%	15.0%	18.0%
EPS CAGR	57.6%	85.5%	98.3%
Price Target (INR)	353	575	702
Upside/Downside	3.1%	68.0%	105.3%

Source: Company, Nuvama Research

Note: Discounting FY27E EPS by 15% Ke and assigning 25x to arrive at our TP. CMP of 7th Mar-24

Exhibit 11: Peer comps (m-cap in INR bn)

Peer comparison	CMP	Market Cap	Rating	Revenues CAGR	Avg. EBITDA Margin	EPS CAGR	2Y fwd. PE
				FY18-23	FY18-23	FY18-23	PE (x)
CG Power	457	699	BUY	6.6%	2.0%	NA	24.1x
BHEL	257	897	BUY	-5.2%	8.5%	-11.1%	21.7x
Hitachi Energy	6,540	278	BUY	11.4%	7.3%	-26.5%	41.9x
GE T&D	971	246	REDUCE	-8.5%	2.3%	-45.7%	50.8x
TRIL	342	49	BUY	14.0%	8.0%	23.7%	18.9x
Siemens	4,682	1,663	BUY	36.8%	7.5%	16.8%	51.7x
Shilchar Technologies	4,003	31		26.2%	11.0%	49.1%	70.6x
Indo Tech Transformers	1,001	11		11.0%	2.5%	247.1%	41.4x
Alfa Transformers	105	1		-9.2%	-7.1%	179.1%	89.3x
Bharat Bijlee	5,612	32		12.8%	6.4%	6.2%	123.6x
Kirloskar Electric	117	8		5.0%	-4.3%	178.3%	29.4x
Voltamp Transformers	8,500	86		16.3%	12.5%	20.1%	46.8x
Star Delta Transformers	652	2		5.0%	5.2%	21.5%	34.0x
IMP Powers							
Toshiba (private)							
TBEA India (private)							

Some renowned players in the private space

Source: Bloomberg, Company, Nuvama Research

Note: Only power segment revenues/average EBIT margin considered for CG Power and BHEL. For Hitachi Energy, 3Y CAGR pertains to CY19–FY23. 2Y fwd. PE for Nuvama coverage universe is based on our estimates, whereas for non-rated, it is FY23 (trailing). Voltamp is largely into distribution transformers and so are Star Delta, Alfa and Kirloskar. Indo Tech is only up to 220kV. CMPs are as of 7th Mar'24. CMP is as of 7th Mar'24.

Financial Statements

Income Statement (INR mn)

Year to March	FY23A	FY24E	FY25E	FY26E
Total operating income	13,809	14,392	20,558	26,930
Gross profit	3,079	3,382	5,345	7,540
Employee costs	412	432	617	808
Other expenses	1,453	1,583	2,261	2,962
EBITDA	1,214	1,367	2,467	3,770
Depreciation	245	230	218	260
Less: Interest expense	480	494	449	360
Add: Other income	82	78	123	50
Profit before tax	571	721	1,923	3,201
Prov for tax	147	180	481	800
Less: Other adj	0	0	0	0
Reported profit	407	541	1,443	2,401
Less: Excp.item (net)	0	0	0	0
Adjusted profit	407	541	1,443	2,401
Diluted shares o/s	133	133	133	133
Adjusted diluted EPS	3.1	4.1	10.9	18.1
DPS (INR)	0	0	0	0
Tax rate (%)	25.8	25.0	25.0	25.0

Important Ratios (%)

Year to March	FY23A	FY24E	FY25E	FY26E
COGS (% of rev)	77.7	76.5	74.0	72.0
Employee cost (% of rev)	3.0	3.0	3.0	3.0
Other exp (% of rev)	10.5	11.0	11.0	11.0
EBITDA margin (%)	8.8	9.5	12.0	14.0
Net profit margin (%)	2.9	3.8	7.0	8.9
Revenue growth (% YoY)	19.2	4.2	42.8	31.0
EBITDA growth (% YoY)	71.9	12.6	80.4	52.8
Adj. profit growth (%)	191.0	32.9	166.6	66.4

Assumptions (%)

Year to March	FY23A	FY24E	FY25E	FY26E
GDP (YoY %)	6.4	5.5	6.3	6.3
Repo rate (%)	6.5	6.0	5.3	5.3
USD/INR (average)	81.0	84.0	82.0	82.0
Domestic rev gwth (%)	19	4	43	31
Exports rev gwth (%)	33	30	25	25
Gross margin (%)	22	24	26	28
EBITDA margin (%)	9	10	12	14
Tax rate (%)	26	25	25	25
Capex (INR mn)	(102.8)	(150.0)	(500.0)	(100.0)

Valuation Metrics

Year to March	FY23A	FY24E	FY25E	FY26E
Diluted P/E (x)	111.4	83.8	31.4	18.9
Price/BV (x)	11.5	10.1	7.7	5.5
EV/EBITDA (x)	39.9	35.0	19.4	12.4
Dividend yield (%)	0	0	0	0

Source: Company and Nuvama estimates

Balance Sheet (INR mn)

Year to March	FY23A	FY24E	FY25E	FY26E
Share capital	133	133	133	133
Reserves	3,800	4,341	5,783	8,184
Shareholders funds	3,933	4,474	5,916	8,317
Minority interest	77	77	77	77
Borrowings	3,295	3,295	2,697	2,098
Trade payables	3,464	3,016	4,168	5,312
Other liabs & prov	1,090	1,090	1,090	1,090
Total liabilities	11,857	11,951	13,947	16,893
Net block	1,531	1,451	1,734	1,573
Intangible assets	0	0	0	0
Capital WIP	34	34	34	34
Total fixed assets	1,565	1,485	1,767	1,607
Non current inv	0	0	0	0
Cash/cash equivalent	229	839	109	654
Sundry debtors	6,353	5,915	7,322	8,854
Loans & advances	575	575	575	575
Other assets	2,741	2,742	3,778	4,808
Total assets	11,857	11,951	13,947	16,893

Free Cash Flow (INR mn)

Year to March	FY23A	FY24E	FY25E	FY26E
Reported profit	442	541	1,443	2,401
Add: Depreciation	245	230	218	260
Interest (net of tax)	455	416	326	309
Others	160	0	0	0
Less: Changes in WC	(1,018)	(10)	(1,292)	(1,417)
Operating cash flow	284	1,177	694	1,553
Less: Capex	103	150	500	100
Free cash flow	181	1,027	194	1,453

Key Ratios

Year to March	FY23A	FY24E	FY25E	FY26E
RoE (%)	10.9	12.9	27.8	33.7
RoCE (%)	14.8	16.0	28.7	37.1
Inventory days	91	90	78	80
Receivable days	153	156	118	110
Payable days	114	107	86	89
Working cap (% sales)	37.2	35.7	31.3	29.2
Gross debt/equity (x)	0.8	0.7	0.4	0.2
Net debt/equity (x)	0.8	0.5	0.4	0.2
Interest coverage (x)	2.0	2.3	5.0	9.8

Valuation Drivers

Year to March	FY23A	FY24E	FY25E	FY26E
EPS growth (%)	191.0	32.9	166.6	66.4
RoE (%)	10.9	12.9	27.8	33.7
EBITDA growth (%)	71.9	12.6	80.4	52.8
Payout ratio (%)	0	0	0	0

Investment Rationale

- **Resurgence in T&D capex:** 24% CAGR in overall transformers TAM by FY27E to INR390bn+ led by: i) India’s mega transmission capex plan of INR2.4tn (in three–four years) for renewables connectivity; and ii) US’s and Europe’s plans to spend USD1.2tn on infra and grid and EUR584bn on grid, respectively over this decade.
- **TRIL is one of the only few players with offerings across the spectrum**—among the top six–seven of 220kv+ power transformer suppliers in the country.
- **Accelerated growth; attractive valuation:** OPM is expected to grow to 13–15% by FY26/27E from 8–10% OPM and a peak of 18–20% over the last cycle. 85%+ plus EPS CAGR over FY23–27E, translating to FY27E EPS of INR26. At 25x FY27E EPS of INR26 and discounting it by 15% Ke to FY26E, we arrive at a TP of INR575.

India plans to spend INR2.4tn on RE T&D connectivity through High Voltage (>220KV) ISTS capex

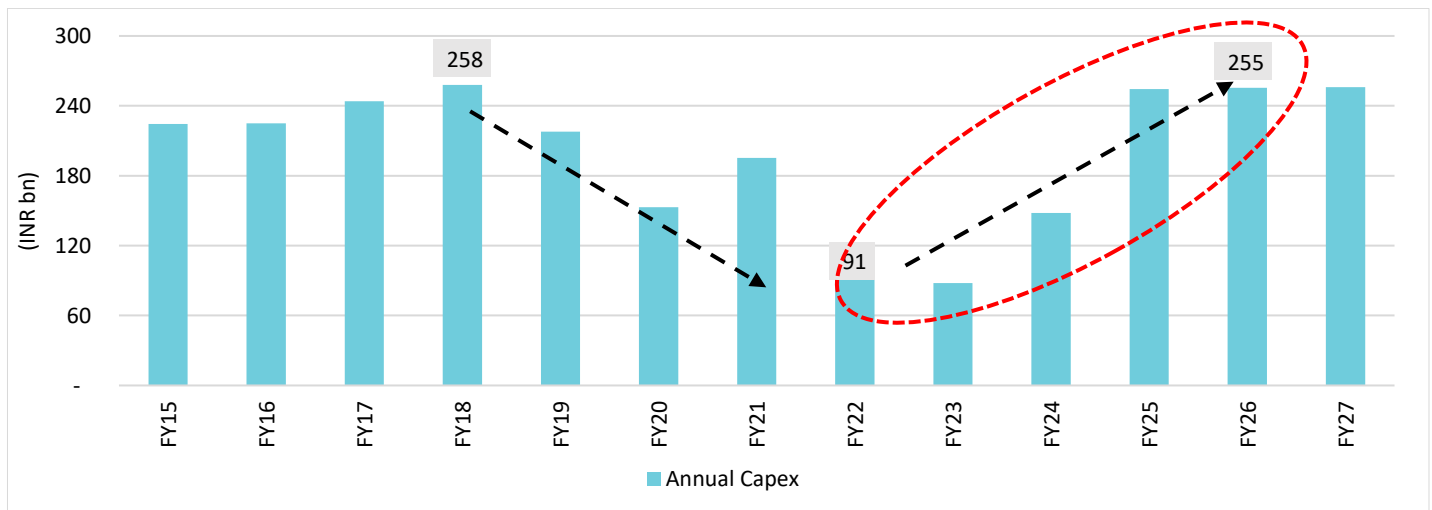
Fresh thermal capex of 55GW-plus shall only add to demand for HV power transformers

India’s power demand-supply dynamics clearly augur aggressive RE addition of 30–40GW/year and thermal addition of 10GW-plus/year to avoid base power deficits over FY28–30. Hence RE + thermal additions are more of ‘a need’ than ‘a choice’ (refer to our [power sector thematic](#)). A natural deduction of such a large-scale RE addition is the essential step-up in transmission connectivity to a similar scale—INR2.4tn as per CEA estimates. Given this backdrop, we estimate PGCIL’s capex (a proxy for India’s transmission capex) shall likely grow by almost 3x over the next two–three years ([exhibit 12](#)).

India’s transmission capex enters new leg of upcycle

Over the next three–four years, the Indian electric infrastructure grid shall require an estimated ~INR2.4tn in capex for inter-state transmission connectivity so that green energy capacity reaches the 500GW target by 2030. With concentration of the RE resources in three key regions (Gujarat, Rajasthan, Ladakh), the Government of India (GoI) has spotlighted large HV transmission corridors for connecting the RE capacity with central transmission grid ([exhibits 12-15](#)).

Exhibit 12: PGCIL’s capex to grow 2x, assuming 40% share of INR2.4tn capex



Source: PGCIL, Nuvama Research

Exhibit 13: Four HVDC projects in the pipeline

HVDC Projects	Size (MW)	Cost (INR bn)	Likely award	Comments
±800 kV Bhadla-III - Fatehpur HVDC line	6,000	150-200	FY24-25E	- 6,000MW, + 800 kV HVDC system between Bhadla-III and Fatehpur - Recommended by NCT at its 9th meeting held on 28.09.2022. - Initiating process for bidding of the scheme
±350kV Pang - Kaithal HVDC line	5,000	450-500	FY26-27E	- + 350kV, 5,000MW VSC-based HVDC link from Pang to Kaithal. - Allocated to PGCIL in January 2022, through RTM route
±800kV Barmer-II - Jabalpur HVDC line	6,000	150-200	FY25-26E	±800kV HVDC line between Barmer-II (HVDC) -Jabalpur PS(~1,100km)
±800kV Khavda - Aurangabad HVDC line	8,000	150-200	FY24-25E	Khavda – Aurangabad 8,000MW, ±800kV HVDC line
Total	25,000	900-1,100	FY24-30E	

Source: CEA, Nuvama Research

Exhibit 14: Transmission: 800kV high CAGR*

Transmission line length (ckm)	FY23*	FY30	Change (%)
+ 800 kv HVDC	9,655	15,855	64.2%
+ 500 kv HVDC	9,432	9,432	NA
+ 350 kv HVDC		1,920	NA
+ 320 kv HVDC	288	288	NA
765 kv	51,938	77,898	50.0%
400 kv	1,96,138	2,11,896	8.0%
220 kv	1,96,307	1,97,359	0.5%
Total	4,63,758	5,14,648	11.0%

Source: CEA, Nuvama Research

*400/220kV rule by ckm

Demand for transmission equipment expected to surge given ambitious infra plans by United States, Europe and the Middle East

Exhibit 15: Substations: 800/765kV high CAGR*

Sub-station capacity (MVA)	FY23*	FY30	Change (%)
+ 800 kv HVDC	18,000	38,000	111.1%
+ 500 kv HVDC	13,500	13,500	NA
+ 350 kv HVDC		5,000	NA
+ 320 kv HVDC	2,000	2,000	NA
765 kv	2,67,700	5,42,200	102.5%
400 kv	4,08,933	5,43,008	32.8%
220 kv	4,34,974	4,34,974	0.0%
Total	11,45,107	15,78,682	37.9%

Source: CEA, Nuvama Research

*400/200kV significant in MVA terms

India's growing energy needs, particularly during non-solar evening hours, has further driven the Ministry of Power (MoP) to plan for 55GW+ of fresh thermal ordering (after muted five–six years). This in turn would spur the need for more transmission capacity and, hence, transformers. As India continues to grow its manufacturing base from ~17% of GDP to 25% targeted by FY25/26E, the focus on urbanisation, electrification, digital automation, etc would all result in power demand growing by 6–7% over this decade, not to forget optionality from railways, industrial corridors, mining and green hydrogen, among others. All of the above adds to the need for more power generation plus transmission, thereby driving transformer demand.

Export demand equally strong

The global scenario mirrors India's RE transition story with all major economies—North America, Europe, Middle East, etc—targeting ambitious RE additions, which in turn entail heavy transmission infra upgrade plans. The [United States alone plans to spend USD\\$1.2tn on its infra \(including transmission\)](#) whereas [Europe is likely to spend EUR584bn for grid expansion/stability](#) over this decade.

RE transition adding to capex

Transformers are a critical infrastructure equipment that connects every power source throughout the grid. With multiple major economies pushing for renewables (which adds more fluctuating voltages to the grid), power grids are becoming more complex. This implies an urgent need for upgrading the transmission infra—not only for grid expansion, but also for stability (entailing replacement/upgrades of older transformers, other equipment, etc.).

Power transformer (HV) driving demand

The transformer market is divided into: i) power transformers – PT (high voltage, above 220KV); and ii) distribution transformers – DT (220KV and below).

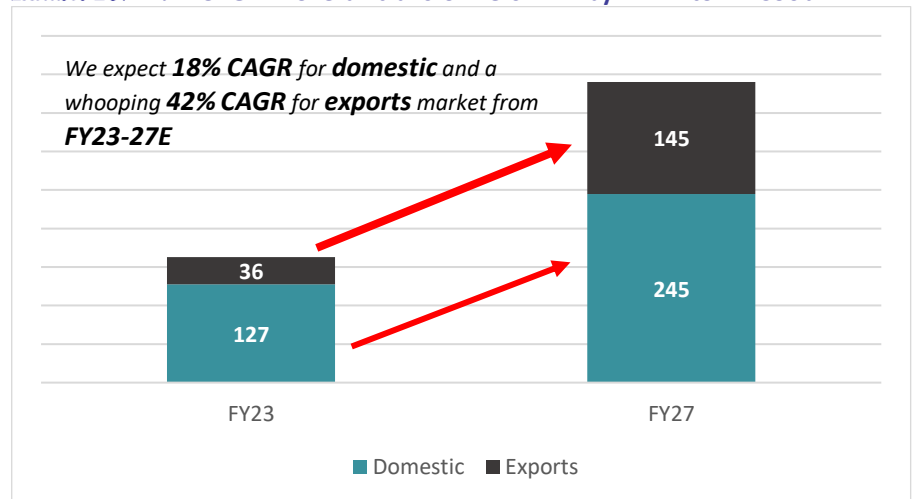
While India’s transformer industry is more than five decades old with an overall capacity of 400GVA, growing from 180GVA just two–three years ago, it is largely a crowded market, particularly in DT dotted by 300-plus players (both organised and unorganised).

In PT though, there are limited players in the high-end segment (220kv and above)—mainly Siemens, GE T&D, Hitachi Energy, TRIL, BHEL, Bharat Bijlee, CG Power, TBEA (unlisted) and Toshiba (unlisted). Hence, with growing demand for HV PT against a backdrop of the requirement of green connectivity corridors, we forecast PT would grow faster over the next few years ([Exhibit 16](#)).

According to IEEMA, domestic transformers’ market size in FY23 stood tall at INR127bn, which we expect to expand at ~5%/year going forward, while exports were INR36bn. Given, INR2.4tn ISTS on the domestic front, we expect the market to increase at an 18% CAGR over FY23–27E to INR245bn (*higher growth rate for PT than DT*). Meanwhile, the ambitious capex plans in the US and Europe would inflate the exports TAM to INR145bn, expanding at a CAGR of ~42% over FY23–27E.

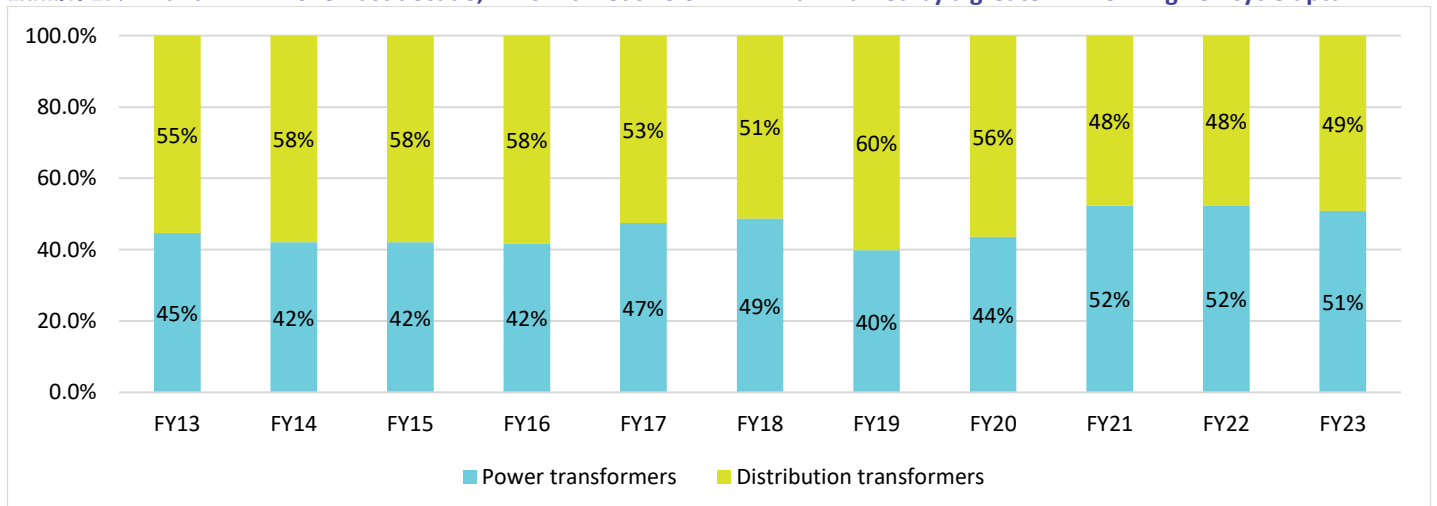
We expect the overall transformers market’s TAM to expand at a CAGR of 24% to INR390bn+ by FY27E with power transformers’ growth surpassing that of distribution transformers’

Exhibit 16: 24%+ CAGR in overall transformers TAM by FY27E to INR390bn



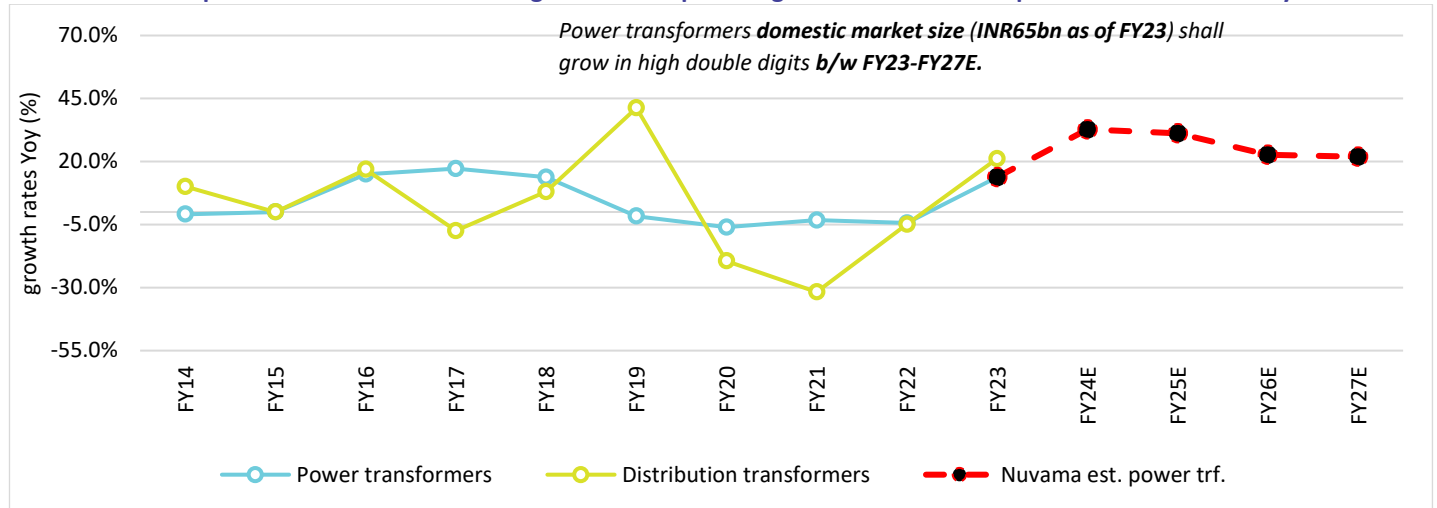
Source: IEEMA, Nuvama Research

Exhibit 17: PT and DT mix over last decade; FY23 market size of INR127bn marked by a greater mix of PT given cycle upturn



Source: IEEMA, Nuvama Research

Exhibit 18: We expect PT domestic market size growth to surpass DT given INR2.4tn ISTS capex over next four–five years



Source: IEEMA, Nuvama Research

Exhibit 19: Big players undertook capacity expansion plans in last cycle, which seems to be repeating

Equities	Transformers				Reactors		Capacity (MVA)		
	132kv	220kv	400kv	765kv	400kv	765kv	FY08	Current	Planned
CG Power	Yes	Yes	Yes	Since FY09. Earlier through JV with Toshiba	Yes	In JV with ZTR (FY10)	23,000	34,900	44,900
BHEL	Yes	Yes	Yes	Since FY12	Yes	Since FY12	20,500	45,000	NA
Hitachi Energy	Since FY07	Since FY07	Since FY07	Since FY09. Earlier through ABB parent	Since FY09	Yes	10,000	20,000	NA
GE T&D	x	x	Yes	Yes	Yes	Yes	15,000	25,000	NA
TRIL	Since FY07	Since FY07	Since FY07	Since FY12	Yes	ToT with Fuji Electrical since 2014	7,200	37,200	47,000
Siemens	Since FY09	Since FY09	Since FY09	Since FY09	Yes	Yes	15,000	15,000	30,000
Shilchar Technologies	Yes	Yes	x	x	x	x	NA	4,000	7,500
Indo Tech Transformers	Since FY08	Since FY08	Since FY08	x	x	x	7,000	7,000	NA
Alfa Transformers	Yes	x	x	x	x	x	NA	NA	NA
Bharat Bijlee	Yes	Yes	x	x	x	x	8,000	15,000	NA
Kirloskar Electric	Yes	Yes	x	x	x	x	NA	NA	NA
Voltamp Transformers	Yes	Yes	x	x	x	x	9,000	14,000	18,000
EMCO	Since FY07	Since FY07	Since FY07	x	x	x	10,000	20,000	NA
IMP Powers	Yes	Yes	x	x	x	x	NA	NA	NA
Toshiba (private)	Yes	Yes	Yes	Yes	Yes	Yes	NA	NA	NA
TBEA India (private)	Yes	Yes	Yes	Yes	Yes	Yes	0	15,000	NA
Star Delta Transformers	Yes	x	x	x	x	x	NA	NA	NA

Source: Nuvama Research

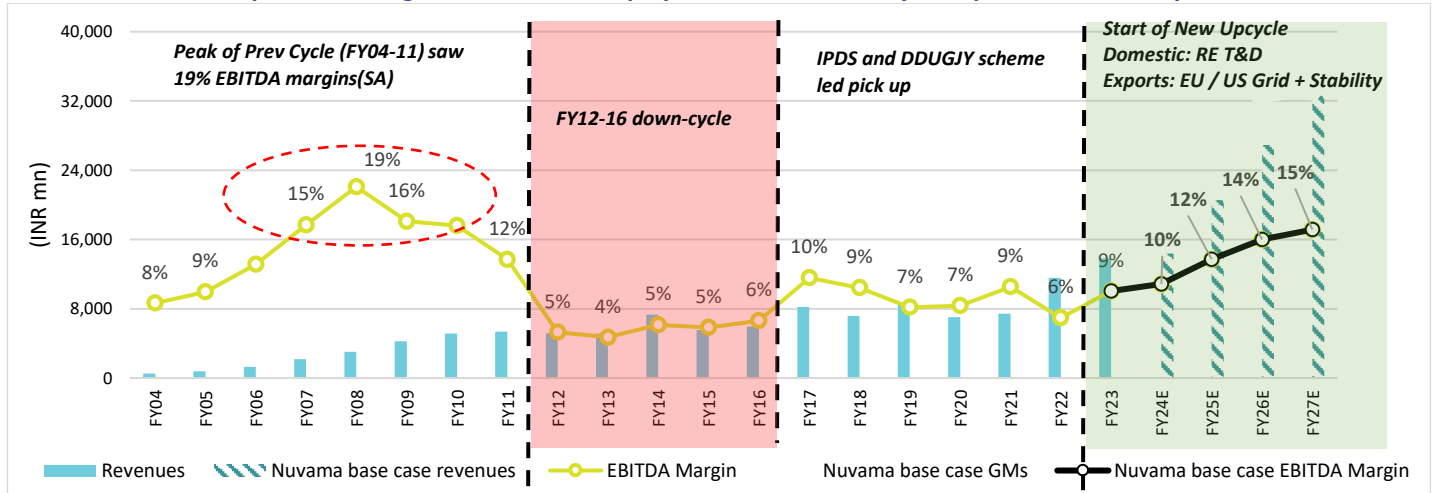
Why TRIL; what is in it?

While most HV power transformer (PT) names are already ‘discovered’—given they are trading at 40–50x FY26E earnings—we find TRIL (trading at 18.9x on FY26E) to be a strong recovery play given:

- i) it is among the top six PT suppliers to PGCIL, enjoying a 15–20% domestic market share;
- ii) its offerings span the LV, MV and HV spectrum of transformers;
- iii) margin recovery is underway: 10% in Q3FY24 versus 9.6% last year, which, in our view, can ramp up to 13–15% (versus TRIL’s last upcycle’s peak of 18–20%); and
- iv) North American and European transformer manufacturers are fully booked until FY26/27E, therefore export demand for Indian PT/DT manufacturers is already spiking (visible in order intake at Siemens, GE T&D, Shilchar, etc).

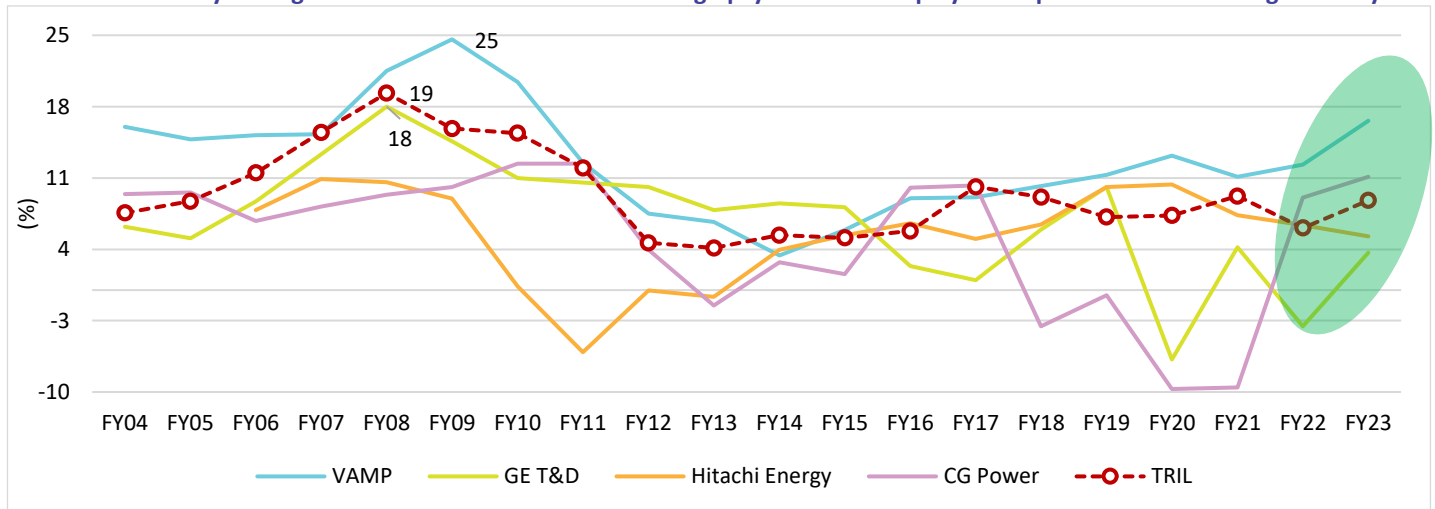
Moreover, we demonstrate TRIL is charged up to outgrow the transformer industry CAGR of 24%-plus over FY23–27E ([Exhibit 16](#)) on the back of its current order book of INR25bn-plus (1.9x FY23 sales), ongoing capacity expansion plans and backward integration. Macro tailwinds suggest accelerating order inflow growth and operating leverage might well lift TRIL’s EBITDA margins to 13–15% by FY26E/27E from 8–10% currently (peak of 18–20% in the last cycle). This translates to an EPS CAGR of 85%-plus over FY23–27E.

Exhibit 20: Goldilocks period has begun for transformer players; TRIL’s OPM likely to expand to 14–15% by FY26E/27E



Source: Bloomberg, Company, Nuvama Research

Exhibit 21: Industry average OPM has been close to 15% during upcycle as certain players surpassed benchmark significantly



Source: Bloomberg, Company, Nuvama Research

Note: Considering ABB Power Systems (for Hitachi Energy) till FY19 and CG Power’s power segment EBIT margins

Backward integration

TRIL has been focusing on expanding its transformer fabrication capabilities, which can be a potential bottleneck in the future. To be precise, rising demand and limited supply could necessitate making advance payments (by major transformer players) to suppliers. TRIL is evaluating strategic partnerships, expanding in-house capacity for a key input viz., CRGO in order to make its supply chain resilient. Additionally, demand for repair services etc., which is a new area of high-margin revenues for TRIL, is growing.

Outlook and valuation

We are initiating with a **'BUY/SO'** on TRIL, valuing the stock at 25x FY27E EPS of INR26 and discounting it to FY26E (15% Ke), which yields a TP of INR575 in our base case. Our bull case TP of INR702 factors in 18% margins by FY27E with no incremental growth in order inflows or higher multiple vis-a-vis the base case.

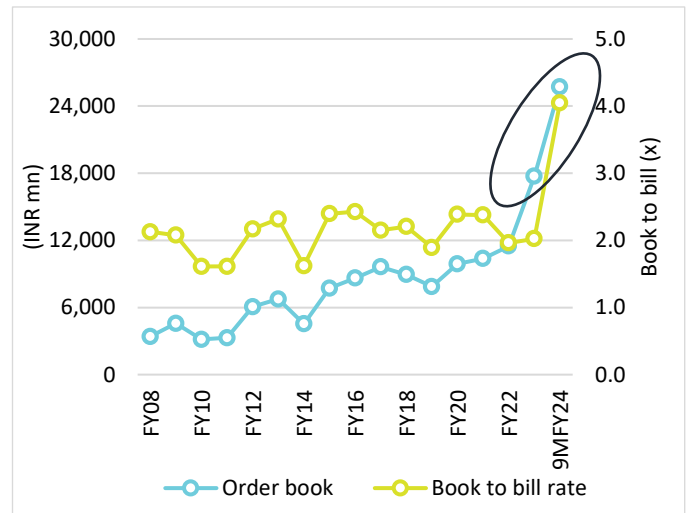
Key risks: competitive intensity, execution challenges, raw material supply constraints and working capital management.

Exhibit 22: 85%+ EPS CAGR (FY24–27E) in base case

FY24-27E	Bear case	Base case	Bull case
Order inflows CAGR	25.0%	25.0%	25.0%
Avg. OPMs (FY24-27E)	9.9%	11.9%	12.7%
FY27E OPM	10.0%	15.0%	18.0%
EPS CAGR	57.6%	85.5%	98.3%
Price Target (INR)	353	575	702
Upside/Downside	3.1%	68.0%	105.3%

Source: Company, Nuvama Research. Note: CMP is as of 7th Mar'24.

Exhibit 23: Book-to-bill up on buoyant order intake over 18M



Source: Company, Nuvama Research

Exhibit 24: Peer comparison table (m-cap in INR bn)

Peer comparison	CMP	Market Cap	Rating	Revenues CAGR	Avg. EBITDA Margin	EPS CAGR	2Y fwd. PE
				FY18-23	FY18-23	FY18-23	PE (x)
CG Power	457	699	BUY	6.6%	2.0%	NA	24.1x
BHEL	257	897	BUY	-5.2%	8.5%	-11.1%	21.7x
Hitachi Energy	6,540	278	BUY	11.4%	7.3%	-26.5%	41.9x
GE T&D	971	246	REDUCE	-8.5%	2.3%	-45.7%	50.8x
TRIL	342	49	BUY	14.0%	8.0%	23.7%	18.9x
Siemens	4,682	1,663	BUY	36.8%	7.5%	16.8%	51.7x
Shilchar Technologies	4,003	31		26.2%	11.0%	49.1%	70.6x
Indo Tech Transformers	1,001	11		11.0%	2.5%	247.1%	41.4x
Alfa Transformers	105	1		-9.2%	-7.1%	179.1%	89.3x
Bharat Bijlee	5,612	32		12.8%	6.4%	6.2%	123.6x
Kirloskar Electric	117	8		5.0%	-4.3%	178.3%	29.4x
Voltamp Transformers	8,500	86		16.3%	12.5%	20.1%	46.8x
Star Delta Transformers	652	2		5.0%	5.2%	21.5%	34.0x
IMP Powers							
Toshiba (private)							
TBEA India (private)							

Some renowned players in the private space

Source: Bloomberg, Company, Nuvama Research

Note: Only power segment revenues/average EBIT margin considered for CG Power and BHEL. For Hitachi Energy, 3Y CAGR pertains to CY19–FY23. 2Y fwd. PE for Nuvama coverage universe is based on our estimates; for non-rated, it is FY23 (trailing). Voltamp is largely engaged in distribution transformers, and so are Star Delta, Alfa and Kirloskar. Indo Tech deals in PT only up-to 220kV. CMP is as of 7th Mar-24.

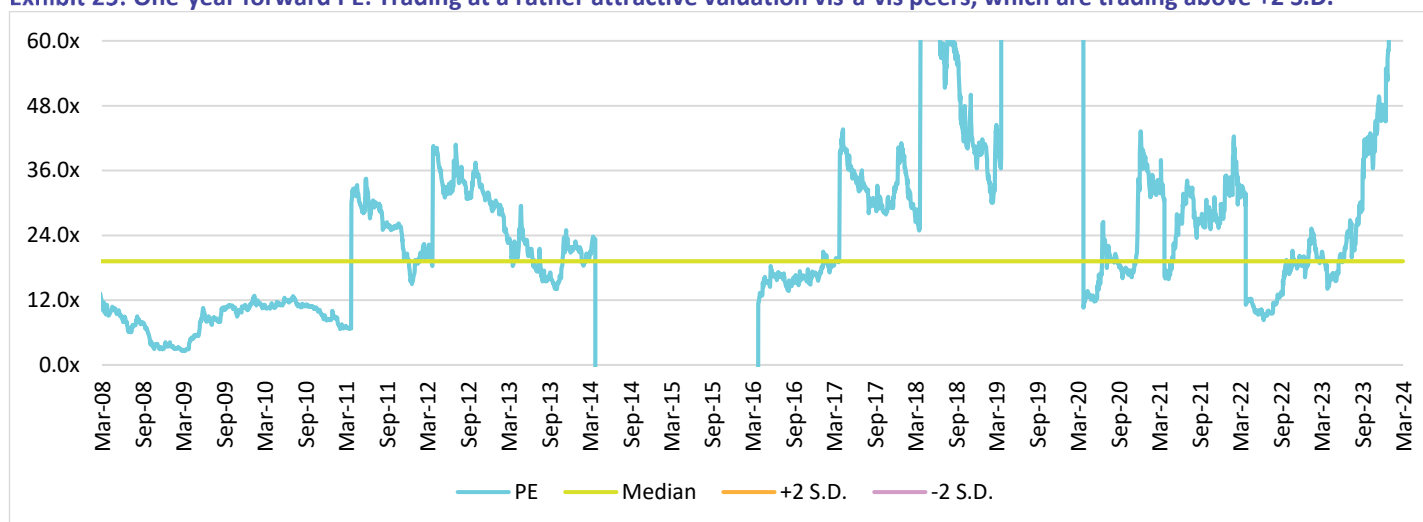
Valuation

Multiple positive catalysts

- Initiating coverage on Transformers & Rectifiers India at 'BUY' with a TP of INR575.
- TAM for TRIL likely to log a healthy 24%-plus CAGR over the next four years (to INR390bn) driven by power generation, transmission, distribution, railways, etc.
- Potential for higher growth beyond sector average on the back of capacity expansion initiatives, exports, product offerings for new-age segments, etc.

We are initiating coverage on TRIL with a **'BUY/SO'**, valuing the stock at 25x FY27E EPS of INR26 and discounting it to FY26E (15% Ke), which yields a TP of INR575 in our base case. *Our bull case TP of INR702 factors in 18% OPM by FY27E with no incremental growth in order inflows or higher multiple vis-a-vis the base case.*

Exhibit 25: One-year forward PE: Trading at a rather attractive valuation vis-à-vis peers, which are trading above +2 S.D.



Source: Bloomberg, Nuvama Research

On market cap-to-order book, TRIL happens to be in a sweet spot too versus peers, trading much cheaper and thereby providing a comfort on the valuation.

Exhibit 26: Valuation comfort adds to our investment case

Equities	Order book (INR bn)	Market Cap (INR bn)	Market Cap/OB
TRIL	26	49	1.9x
Siemens	471	1663	3.5x
Hitachi Energy	76	278	3.7x
GE T&D	59	246	4.2x
CG Power	36	210	5.9x
Shilchar Technologies	4	31	8.7x
Voltamp Transformers	9	86	9.8x
Indo Tech Transformers	NA	11	NA
Alfa Transformers	NA	1	NA
Bharat Bijlee	NA		NA

Source: Company, Nuvama Research

Note: For CG Power/BHEL, only power segment order book is considered, which is 30/70% of its revenue mix (adjusted for market cap accordingly).

Financial Outlook

- Double-digit growth in fresh orders led by bunching up of domestic RE integration projects and exports.
- Rising share of exports/services (5% exports currently versus potential 20–25% mix by F25/26E) coupled with healthy operating leverage to drive OPM/profitability.

Double-digit growth in new orders led by bunching up of domestic RE integration projects and exports would help TRIL sustain double-digit revenue growth. In our view, a rising share of exports/services coupled with healthy operating leverage shall drive overall OPM expansion.

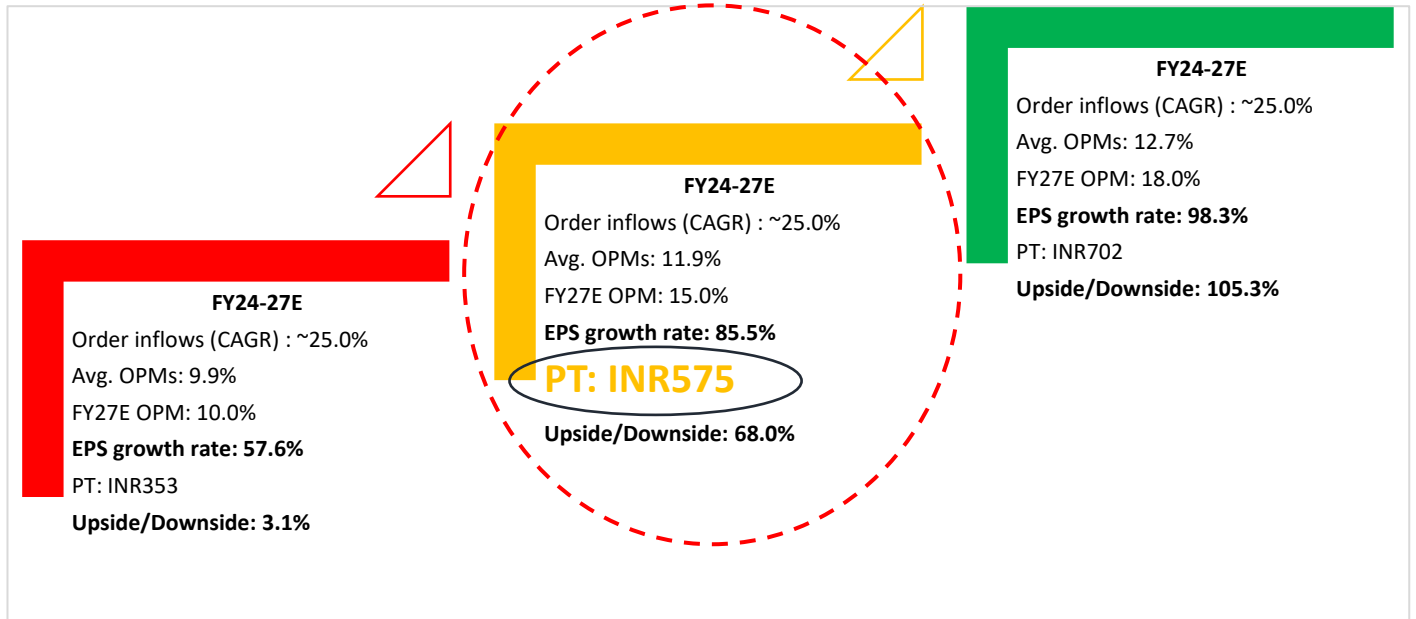
While cash translation in the near term shall normalise (assuming sharp improvements given limited industry players, better pricing power and negotiating/bidding new orders at better GMs), we expect TRIL to improve its cash flows significantly over coming years.

Exhibit 27: Financial snapshot

Particulars	FY19	FY20	FY21	FY22	FY23	FY24E	FY25E	FY26E	FY27E
Order inflows	7,261	8,861	7,738	12,358	16,457	21,394	26,743	33,428	41,786
YoY growth		22.0%	-12.7%	59.7%	33.2%	30.0%	25.0%	25.0%	25.0%
Order book	7,870	9,901	10,370	11,480	17,730	25,151	31,935	39,218	48,602
YoY growth		25.8%	4.7%	10.7%	54.4%	41.9%	27.0%	22.8%	23.9%
Book to bill rate	1.9x	2.4x	2.4x	2.0x	2.0x	2.8x	2.6x	2.5x	2.5x
Revenues	8,554	7,010	7,421	11,583	13,809	14,392	20,558	26,930	33,373
YoY growth		-18.1%	5.9%	56.1%	19.2%	4.2%	42.8%	31.0%	23.9%
EBITDA	613	514	685	706	1,214	1,367	2,467	3,770	5,006
EBITDA Margin	7.2%	7.3%	9.2%	6.1%	8.8%	9.5%	12.0%	14.0%	15.0%
PAT	45	4	71	140	407	541	1,443	2,401	3,454
PAT Margin	0.5%	0.1%	1.0%	1.2%	2.9%	3.8%	7.0%	8.9%	10.3%
EPS	0.3	0.0	0.5	1.1	3.1	4.1	10.9	18.1	26.0
YoY growth		-91.2%	1665.0%	98.2%	191.0%	32.9%	166.6%	66.4%	43.9%

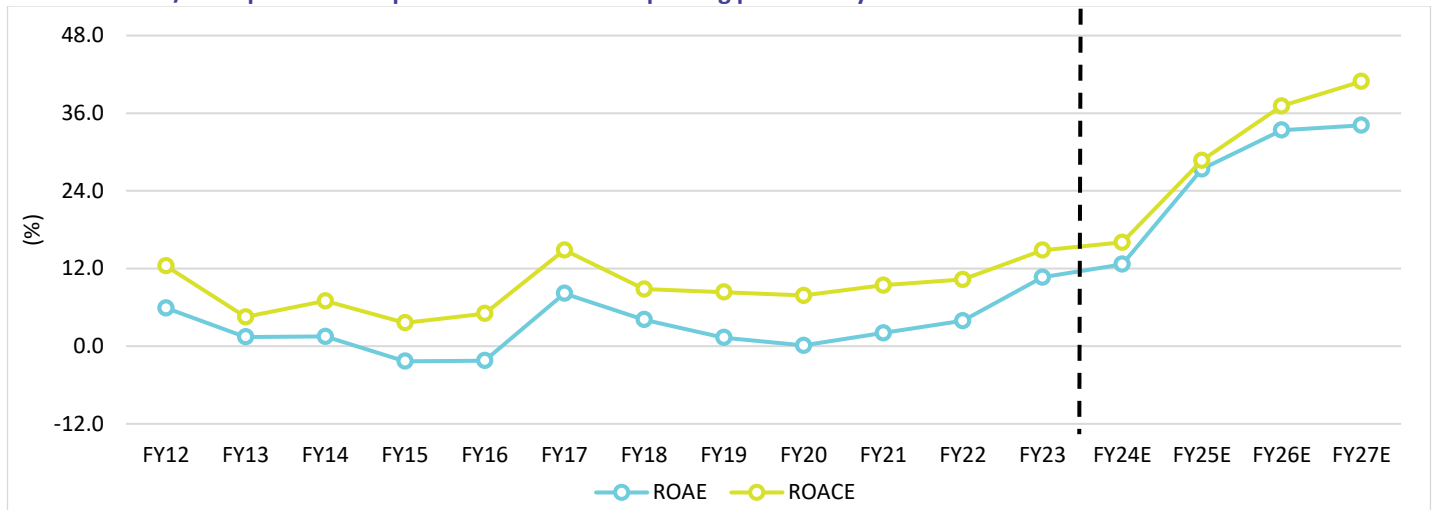
Source: Company, Nuvama Research

Exhibit 28: Scenario analysis: 85%-plus EPS CAGR over FY24–27E in our base case



Source: Company, Nuvama Research

Exhibit 29: RoE/RoCE profiles to expand on the back of improving profitability



Source: Company, Nuvama Research

Key Risks

Business concentration

TRIL's business has a significant 50%-plus exposure to central power transmission utilities, which leaves its growth dependent on capex in the sector. While transmission capex has now started to pick up after a muted period of five–seven years led by RE integration, a deferment thereof would shrink our TAM and revenue growth assumptions.

Industrial/private capex

TRIL's exposure to industrial capex is 15–20%, which is non-utility. While the best of private capex is yet to come given upside to capacity expansion across a more broad-based set of industries (both conventional and new age), any major slowdown shall affect TRIL's order pipeline.

Factors driving EBITDA margin guidance

Management is targeting an EBITDA margin of 14–16% over the next few years. This, in our view, is largely a function of macro tailwinds being in favour, better pricing power given limited players and operating leverage. TRIL's execution and working capital management could be some of the key catalysts to this end, in our view.

Supply chain and backward integration

Supply chain constraints arising from adverse situations may cause difficulties in procurement of raw material components, namely CRGO, steel and copper. TRIL is working aggressively on backward integration as well as to enter into long-term contracts with key raw materials' suppliers.

Company Background

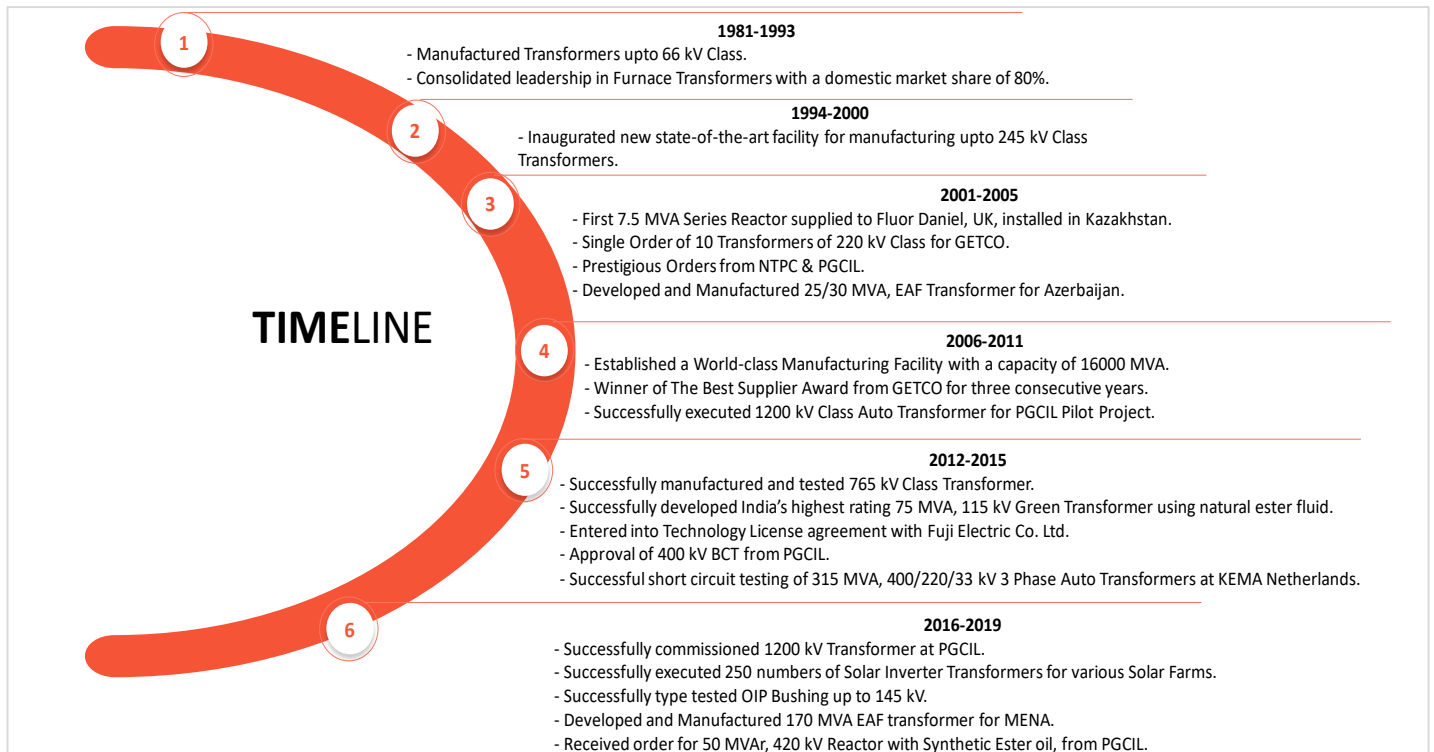
Transformers & Rectifiers India (TRIL) is among India’s largest domestic transformer manufacturers with aggregate installed capacity of 37,200MVA across its units: Odhav (1,200MVA), Changodar (12,000MVA) and Moraiya (24,000MVA) in Gujarat. This capacity can be increased to 42,000MVA with repeat design order without any additional capex, as throughput time is 20% less in repeat orders as they presently have quite some repeat design orders.

TRIL has a presence in a wide range of transformers: Power transformers (up to 1,200kV), distribution transformers (160kVA and above), furnace transformers (105kA and above), rectifier transformers (up to 160kA DC), and shunt reactors (up to 765kV), which find application in the power transmission & distribution sector and other industrial sectors.

TRIL is the only Indian company with the capability to manufacture all type of transformers such as distribution transformers, high-voltage transformers, special duty transformers, furnace transformers, reactors, renewable and green energy transformers. In fact, very few companies in the world offer such a wide range of transformers. TRIL manufactures transformers up to 500MVA and 1200kV.

The company has a technological tie-up with Zaporozhtransformator (ZTR), Ukraine for manufacture of 765kV transformers, Fuji Electrical Company Limited, Japan for step-up transformers of 420kV and shunt reactors of 420kV and 765kV, and Jianguo Jingke Smart Electric Company Limited, China for the supply of switchgears and switch panels.

Exhibit 30: Transformers & Rectifiers India’s history so far...



Source: Company, Nuvama Research

Over the years, TRIL has graduated from being an LV/MV rectifier/transformer manufacturer to a company offering transformers across the LV-MV-HV and UHV range up to 765KV. As with rest of the industry, TRIL has seen a huge drop in operating margins as the last cycle of transmission capex ended in FY14–15. However, now with RE-led transmission connectivity capex making a comeback, we expect the TAM for HV and UHV transformers to balloon given waiting periods have already doubled.

Being one of the seven UHV transformers manufacturers in India, TRIL, we believe, shall maintain its market share of 15–20% in the domestic annual INR70bn-plus transformer ordering TAM. Moreover, pricing power may also improve given shortages.

In fact, its peers in HV segment too (Siemens, Hitachi Energy, GE T&D, Bharat Bijlee, BHEL, CG Power) are all seeing massive order pipeline and shooting for higher margin guidance. Hitachi and GE T&D have lower margins, but guiding for double-digit by end-FY25E.

TRIL seems to be in a similar position of recovering margins to 14–17% over coming years, not to mention potential additional kickers from new export orders.

Exhibit 31: Product offerings' snapshot

Classification of transformers	Range	Types
Power Transformer	Upto 1200 kV class	Generator transformer, Unit Auxiliary transformers, Step up & Step down transformers, Interconnecting Auto transformers, Dual Voltage Primary or Secondary Three winding transformers
Shunt Reactor	Upto 765 kV class	Reactors upto 765 kV class
Distribution Transformers	160 kVA and above	Earthing transformers, Three winding transformers, Step up & Step down transformers, Dual voltage Primary or Secondary
Furnace Transformers	220MVA/101KA	Arc Furnace, Induction Furnace, Laddle Arc Furnace and Submerged Arc Furnace transformers
Rectifier Transformers	100 KA DC	For DC power sources for Melt and Chemical Industries

Source: Company, Nuvama Research

TRIL caters to a wide spectrum of transformer users in various industries such as petrochemicals, oil refining, cement, paper & pulp, pharmaceuticals, automobiles, steel, power, railways, mining, renewables and green hydrogen. Power utilities and power transmission companies are TRIL's key customers.

Exhibit 32: Capacity by location

Location	Capacity (MVA)	Capability
Odhav (two units)	1,200	up to 66kv
Changodar	12,000	up to 245kv
Moraiya	24,000	up to 765kv/500MVA

Source: Company, Nuvama Research

Exhibit 33: Key subsidiaries and JVs

Subsidiary	Stake	Business area
Transpares Limited	51%	Pressed steel radiators
Transweld Mechanical Engineering Works Limited	100%	Manufacturing of transformer tanks and core channels
TARIL Infrastructure Limited	100%	Transformer erection and commissioning
Savas Engineering Company Private Limited	100%	Vacuum drying of transformers
TARIL Switchgear Private Limited*	100%	Switchgear items (BCT, outdoor CTs, OIP Bushings, compact sub-station, LV/MV Panels, GIS/HGIS etc.)

Source: Company, Nuvama Research

Note: TARIL Switchgear Private Limited is a JV with a 60% holding

In coming years, the need to move power from massive renewable energy projects would be the key factor driving growth of the transmission industry.

India is on track to achieve 500GW power target from renewable sources by 2030, Installed capacity for Renewable Power is 167.75 GW, and projects to the tune of 111.35GW have already been awarded or are in the execution stage.

India's renewable energy sector is expected to boom with a likely investment of USD15bn, as the government plans to focus on electric vehicles, green hydrogen, manufacturing of solar equipment, etc.

During FY23, India added 14,625 circuit kilometres and 75,902MVA of new transformation capacity.

In order to transmit power from areas with high amounts of renewable energy to the rest of the country, the power transmission sector will need even more capacity.

The government's push to go green in the automotive industry shall unleash tremendous demand for electrical power for charging stations. It would result in increased demand for distribution transformers, generator transformers and transmission equipment.

The government has identified ten potential states that could be the key enablers in manufacturing green hydrogen in the country. These states are Karnataka, Odisha, Gujarat, Rajasthan, Maharashtra, Tamil Nadu, Andhra Pradesh, Kerala, Madhya Pradesh and West Bengal, and we believe they are likely to have green hydrogen or ammonia manufacturing zones or clusters, helping India kick-start its National Green Hydrogen Mission.

Taking the lead in India's big leap towards green hydrogen manufacturing, the Gujarat cabinet has cleared 1.99 lakh hectares for green hydrogen projects (source: MNRE Annual Report 2022–23, Ministry of Power).

As on 31st Dec-23, TRIL has an order book position of INR25.7bn. The table below indicates the division of TRIL's order book between its business segments.

Exhibit 34: Order book as on 31st Dec-23

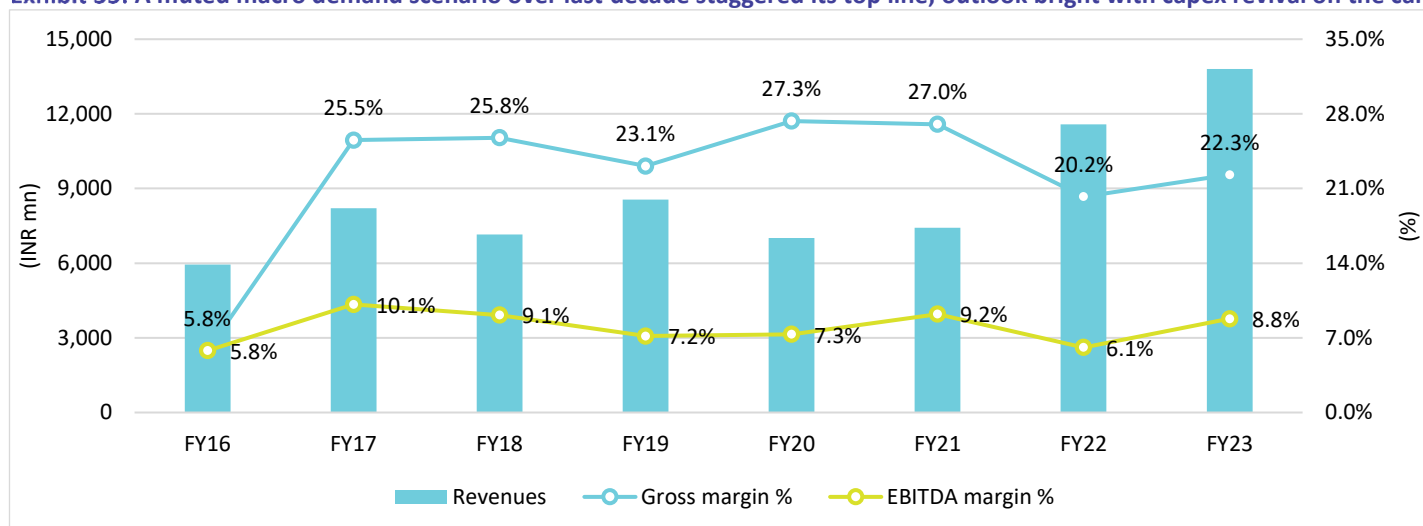
Customer breakdown	Order book (INR bn)	% mix
Central utilities	11.6	45%
State utilities	3.6	14%
Industrials	6.7	26%
Renewables	2.1	8%
Exports	1.5	6%
Total	25.7	100%

Source: Company, Nuvama Research

Raw material accounts for 70–75% of the selling price of a transformer. The key raw materials needed to manufacture transformers are copper conductors, CRGO and transformer oil. Copper is sourced locally (from Hindalco, Mahindra, etc) while CRGO steel is sourced locally as well as imported from South Korea, Italy and Japan.

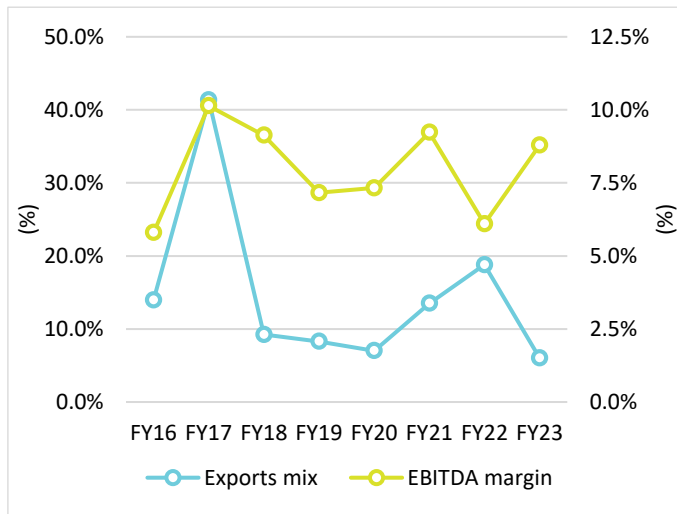
TRIL does not enter into any long-term contracts with its suppliers. Once received, copper rods are sent for job work to be converted into the requisite size of conductors. Both CRGO and copper are highly price-sensitive, but TRIL has the ability to pass-through escalations, if any.

Exhibit 35: A muted macro demand scenario over last decade staggered its top line; outlook bright with capex revival on the cards



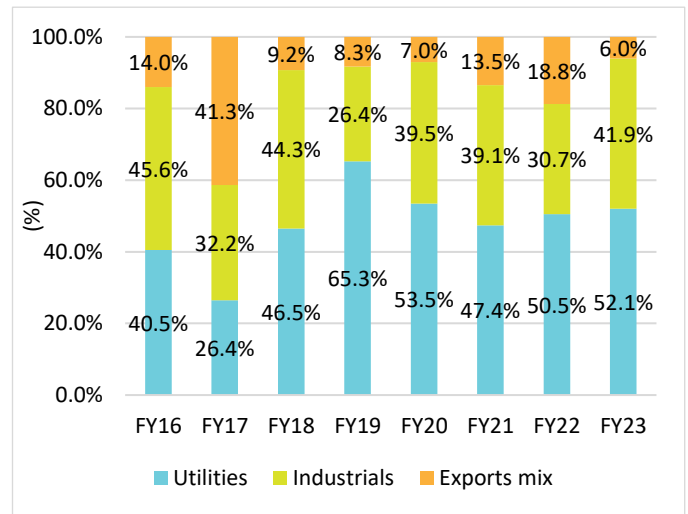
Source: Company, Nuvama Research

Exhibit 36: Exports generate greater OPM than domestic



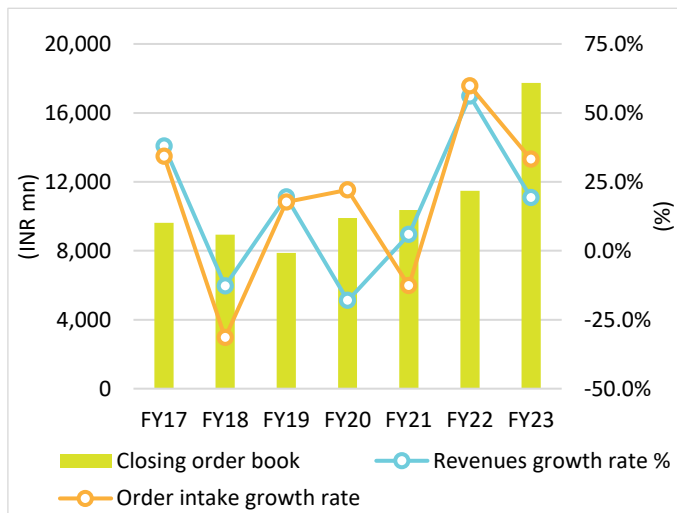
Source: Company, Nuvama Research

Exhibit 37: Utilities make up a large chunk of revenue mix



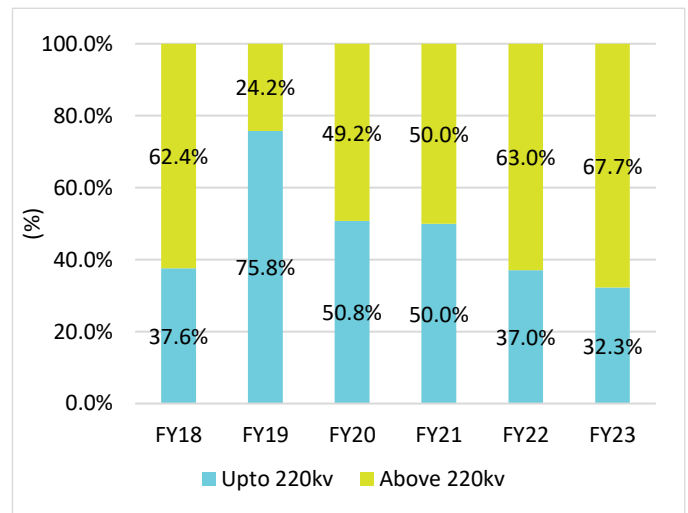
Source: Company, Nuvama Research

Exhibit 38: Execution versus fresh inflows



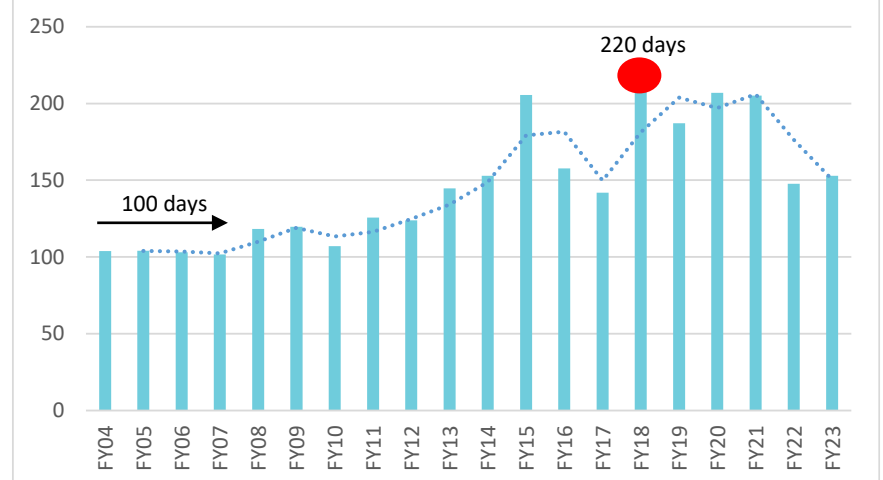
Source: Company, Nuvama Research

Exhibit 39: Sales volume mix (MVA)



Source: Company, Nuvama Research

Exhibit 40: Receivable days: 100 during upcycle; 220 in worst-case scenario



Source: Company, Nuvama Research

Management Profile

Mr Jitendra Mamtora, Chairman & Whole-Time Director

Mr Mamtora is a Bachelor of Electrical Engineering. After working as an engineer in eastern India, he moved to Gujarat and set out on an entrepreneurial journey. Driven by his strong intent to design and manufacture quality transformers, TRIL has gained a pan-India footprint. Mr Mamtora has 40-plus years of experience in dealing with power utilities across India. He is an Executive Council Member of IEEMA, and has been nominated as the Chairman of IEEMA since 2007. Mr Mamtora is also a member of the CII and FICCI.

Mr Satyen Mamtora, Managing Director

Mr Mamtora holds a Diploma in Electrical Engineering from Uxbridge College of Engineering, London. He has more than 20 years of association with TRIL, and currently spearheads the production and marketing division. Mr Mamtora has played a key role in consolidating the organisation's presence in the power utilities segment across the country. He has also played an active role in strategising and putting in place a global marketing plan, which has successfully ensured TRIL's presence in the African, Asian and South American geographies. Mr Mamtora is a lifetime member of IEEMA.

Mr Chanchal S S Rajora, Chief Financial Officer & Advisor to BoD

Mr Rajora is a Chartered Accountant (CA) with nearly two and a half decades of experience in Corporate Finance, Fund Raising, Financial Planning, M&A, Credit & Risk Management, BD, PR, etc. His business relationship skills, decision-making ability, international exposure, knowledge of Infra, capital goods, power industry and financial markets shall be instrumental in carving out the growth story at TRIL.

Industry Overview

Indian transformer market is poised for a significant growth as CEA plans for investments in developing and strengthening of new/existing grid in order to create a better and more efficient power infrastructure. Several favourable trends would drive growth including (a) expanding RE distributed energy, (b) Modernization and grid stability initiatives etc.

Energy demand from industrial sector avenues: Pharma, railways, green hydrogen, EV, chemical, textiles, engineering units, etc as urbanisation and electrification are helping pave the way for higher power generation, transmission capacity and, hence, demand for transformer players. India's green energy corridor is a favourable policy by the Government of India, which is driving growth for Indian transformers industry. A few earlier schemes introduced are Saubhagya Electricity Scheme, Integrated Power Development Scheme and Deen Dayal Upadhyaya Gram Jyoti Yojana, etc.

According to media reports, the global transformer market is expected to be valued at USD109.5bn by 2032 with a CAGR of 7.2%. Key drivers thereof: rising energy demand leading to installation of smart grids, modification of existing ageing transformers and expansion of RE projects. Several government programs aimed at installing technologically superior power transformers, modernising existing power grids to improve energy efficiency and minimising losses are expected to boost TAM for the power transformer industry.

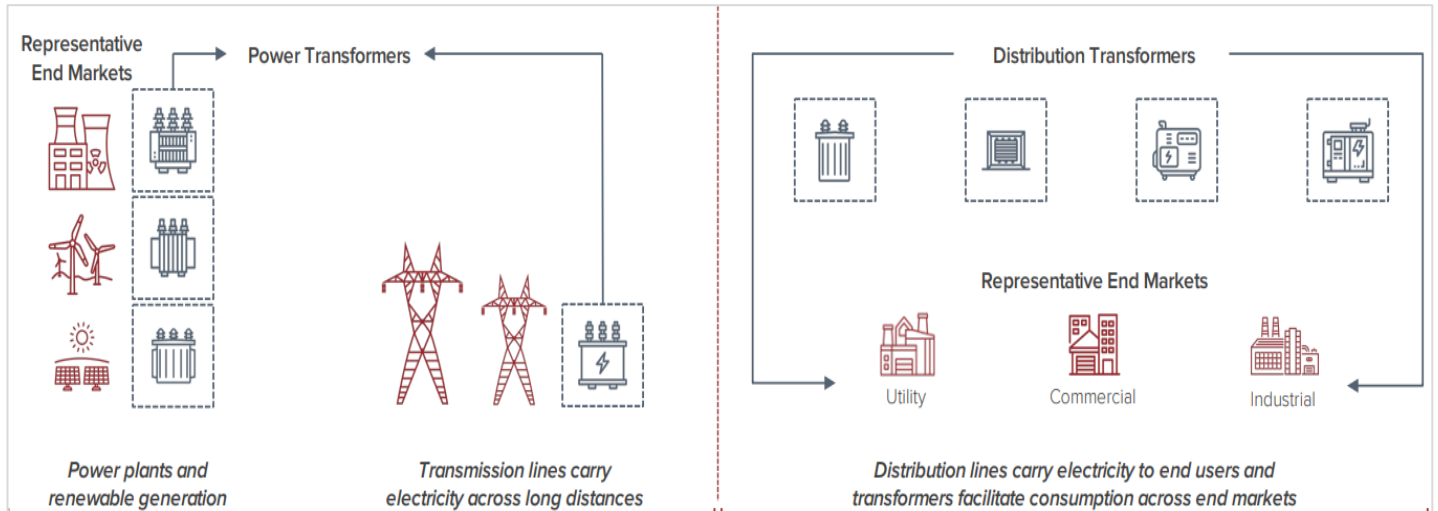
With India at risk of power deficit by FY28, unless annual RE additions accelerate to 40GW, there is an urgent need to ramp up the transmission capex for connecting areas with upcoming solar projects. The CEA has already identified INR2.4tn of capex ([CEA link](#)) in this area while tendering for TBCB transmission project began in Jan–Mar'23. This can potentially double **PGCIL's annual capex by FY27 (at 40% market share)**.

Out of India's INR2.4tn T&D capex (as per CEA), roughly **15% would be transformers** in our view, and it shall be incurred over the next three–four years. On the exports front, North America and Europe are facing an unprecedented transformers demand due to RE push, grid enhancement/renewal capex, etc. They are looking out to Indian firms given European/American local players' are fully booked and quoting 2026–27 as delivery time. **Hence, we estimate transformers TAM to rise at a 24% CAGR over FY23–27E to INR390bn—opening gateways for Indian manufacturers.**

Electrical transformers transfer electric power from one circuit to another through changing voltage levels with no change in frequency and serve to improve the safety and efficiency of power systems by raising and lowering voltage levels to facilitate the movement of electricity across the grid.

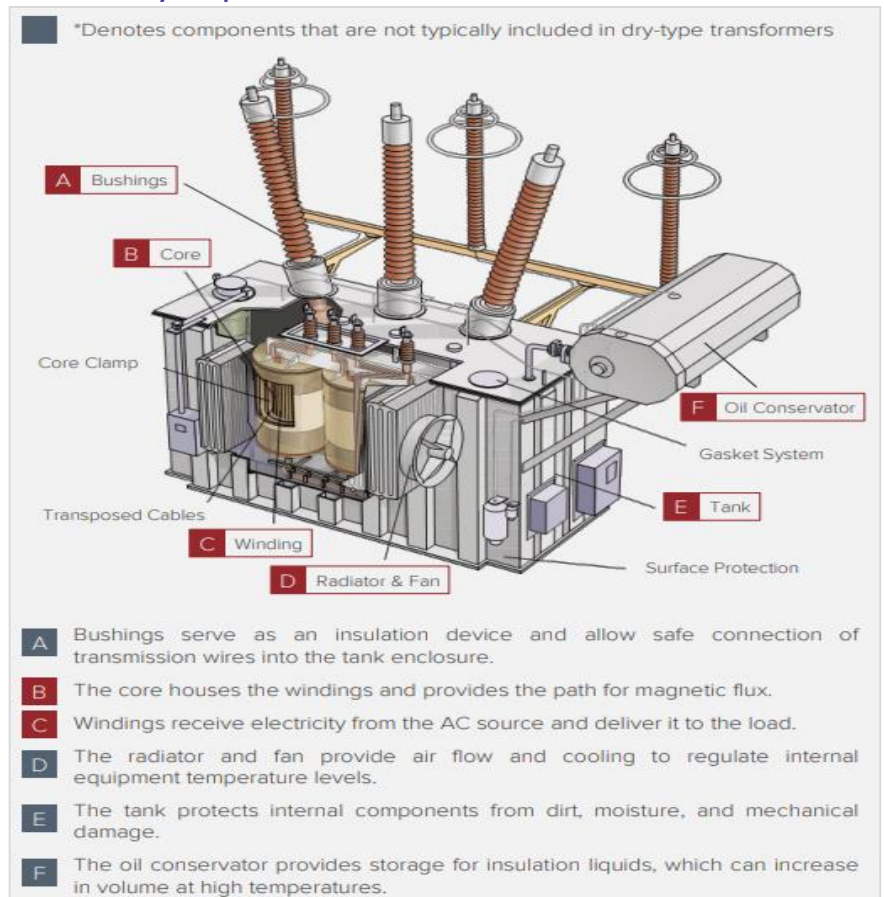
- **Power transformers** are used to step up and step down power output from generation through transmission. Voltage ranges from ~69kV to 1,000kV.
- **Distribution transformers** consists of further stepping down power outputs to the final electrical power usage by customers across a variety of end markets. Voltage ranges from ~120V to 69kV.

Exhibit 41: Power supply overview



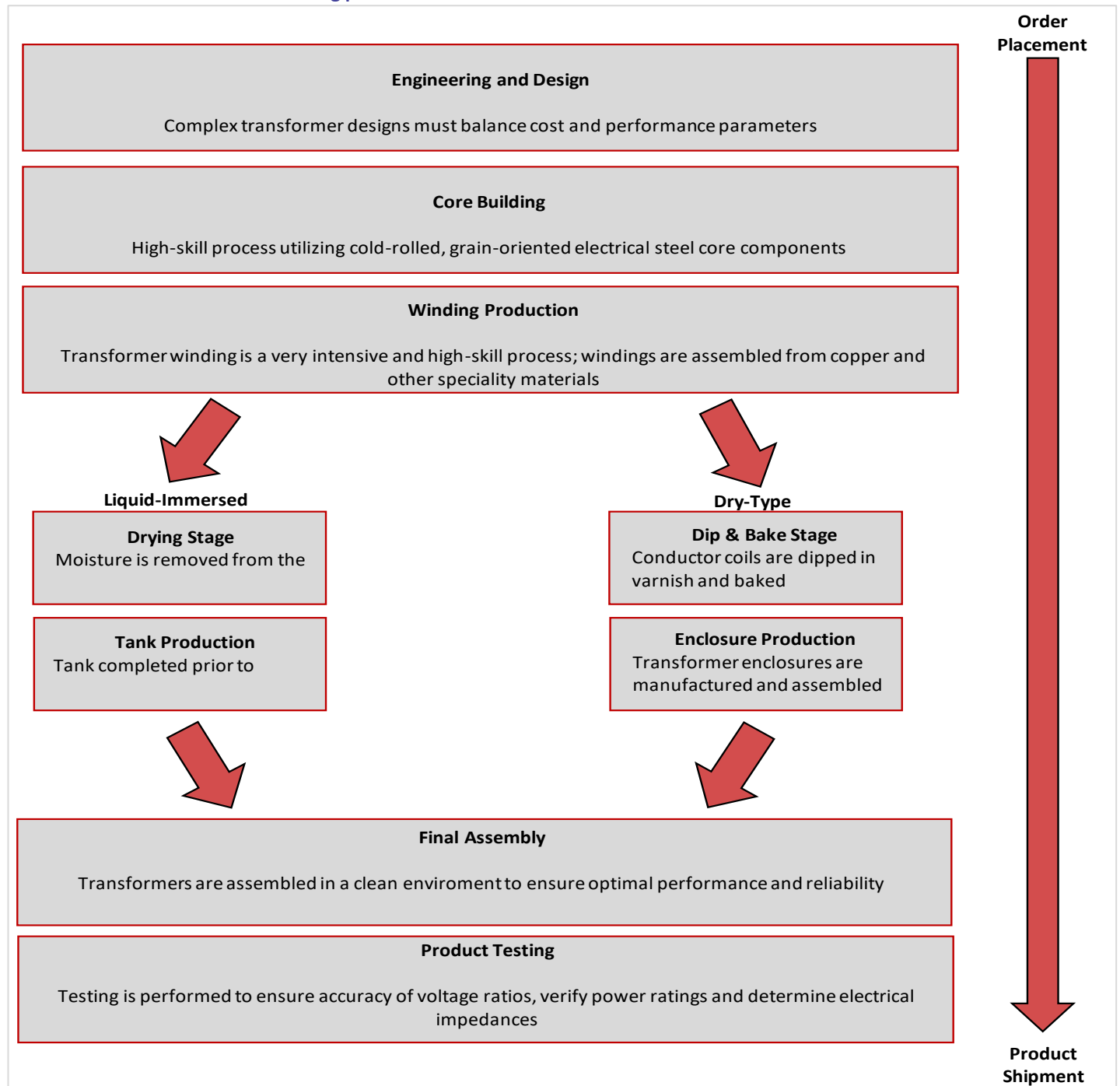
Source: Harris Williams, Nuvama Research

Exhibit 42: Key components of a transformer



Source: Harris Williams, Nuvama Research

Exhibit 43: Transformer manufacturing process overview



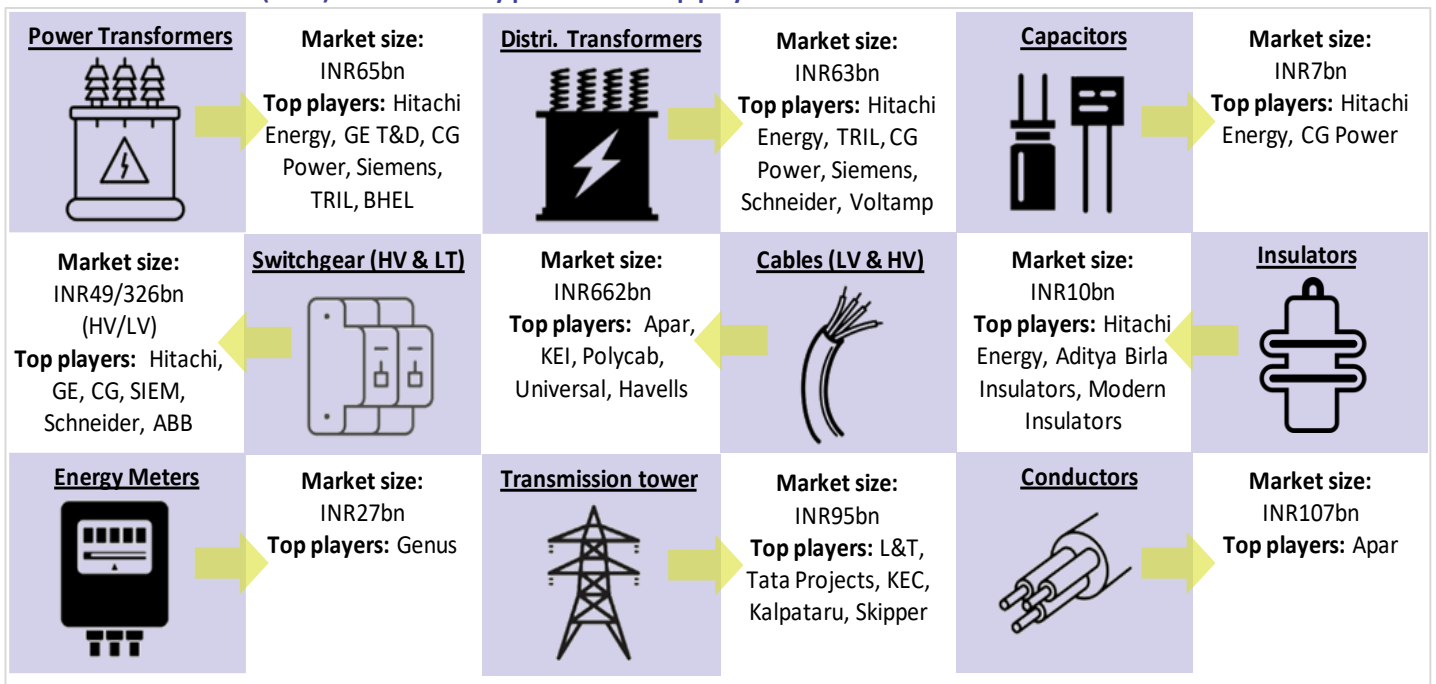
Source: Nuvama Research

Exhibit 44: Key dynamics of transformer industry

	Sub 33kv	33kv-220kv	220kv-765kv
Type	Distribution transformer	Power transformer	Power transformer
Clients	Discoms, small to medium industries	Discoms, transcos, large industries	State transcos, PGCIL, generating companies
Competitive intensity	Very high; large nos. of players	Very high; large nos. of players	Moderate; limited nos. of players
Barriers to entry	Low	Low to moderate	Moderate
Concerns	Overcapacity; large unorganised sector	Overcapacity	Tender based procurement
Growth drivers	Industrial up-cycle and distribution network expansion	Upgradation of state transmission networks	ISTS and power gen capex

Source: Nuvama Research

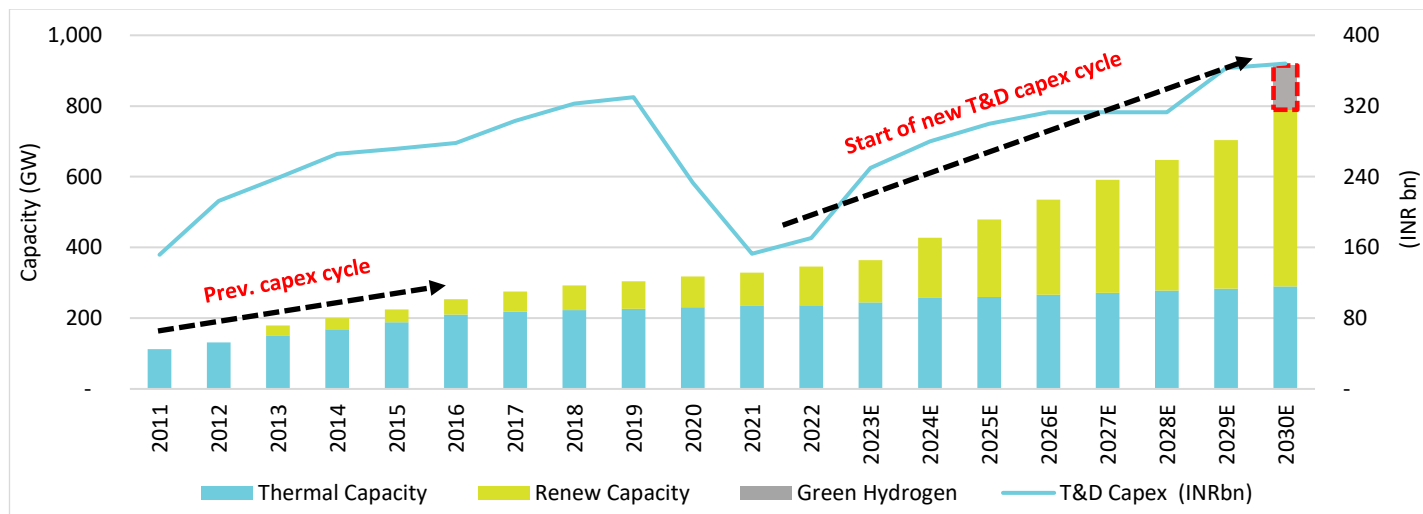
Exhibit 45: Value chain (FY23): Market size by product and top players thereof



Source: IEEMA, Nuvama Research

Appendix

Exhibit 46: Renewables capex to spur next cycle of T&D capex (inter-state)



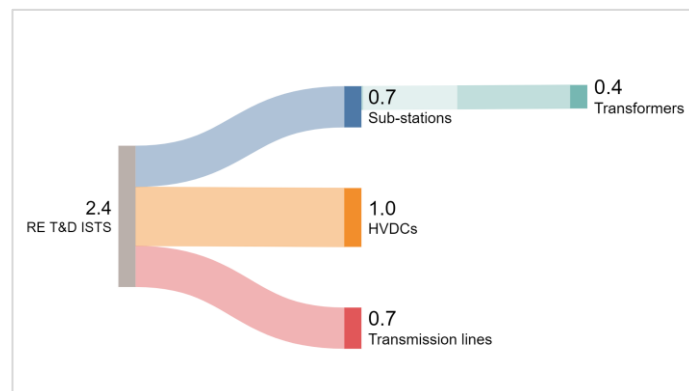
Source: CEA, PGCIL, Nuvama Research

Exhibit 47: Transmission system for RE capacity by 2030

Category	Capacity (MW)
RE Capacity already Commissioned (as on 31.10.2022)	1,65,943
66.5 GW RE capacity to be integrated to ISTS network (8.861 GW RE capacity already commissioned and included in SI. No. 1 above)	57,639
Additional RE capacity totaling to 236.58 GW (55.08 GW + 181.5 GW) to be integrated to ISTS network	2,36,580
Margin already available in ISTS sub-stations which can be used for integration of RE capacity	33,658
Balance RE capacity to be integrated to intra-state system under Green Energy Corridor - I (GEC-I) Scheme	7,000
RE capacity to be integrated to intra-state system under Green Energy Corridor - II (GEC-II) Scheme	19,431
Additional Hydro Capacity likely by 2030	16,673
Total (RE)	5,36,924

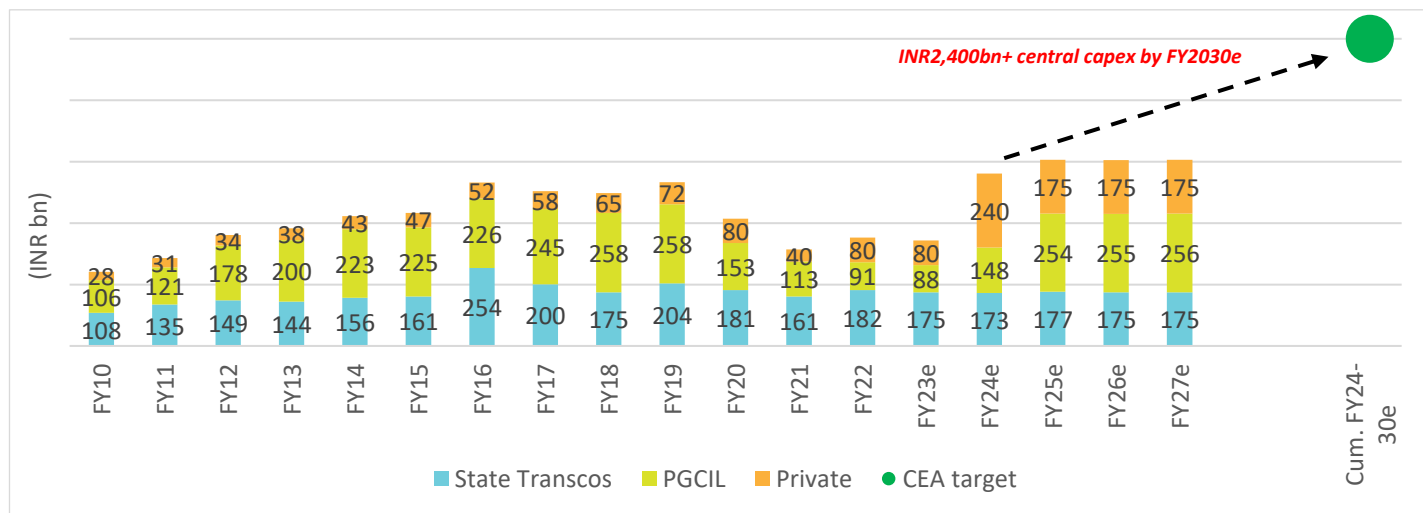
Source: CEA, Nuvama Research

Exhibit 48: ~15% of INR2.4tn ISTS capex is transformers' TAM



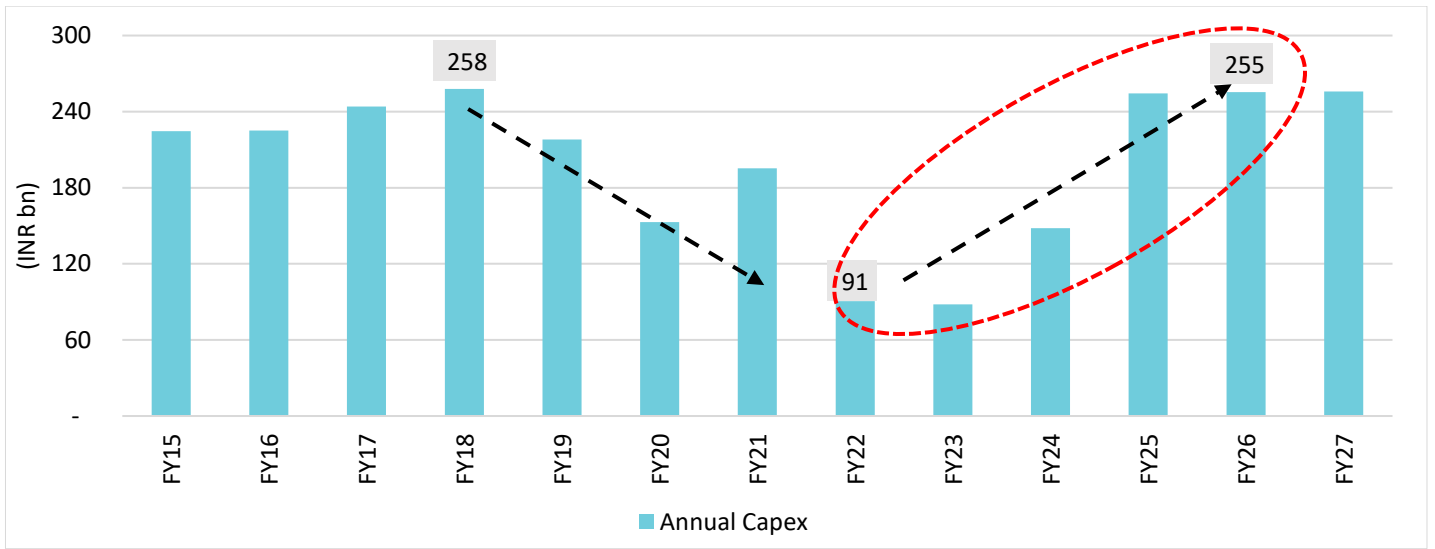
Source: CEA, Nuvama Research

Exhibit 49: Upcoming transmission capex cycle expected to dwarf previous cycle (FY24-30E)



Source: PGCIL, PFC India, CEA, Nuvama Research

Exhibit 50: PGCIL's capex to grow 2x, assuming 40% share of INR2.4tn capex



Source: PGCIL, Nuvama Research

Additional Data

Management

Chairman	Jitendra Mamtora
MD & CEO	Satyen Mamtora
CFO	Chanchal Rajora
VP Marketing	Ashwani Sharma
Auditor	K.C. Mehta & Co.

Holdings – Top 10*

	% Holding	% Holding
L&T Mutual Fund	0.56	
HSBC Asset Mana	0.54	
Dimensional Fun	0.02	

*Latest public data

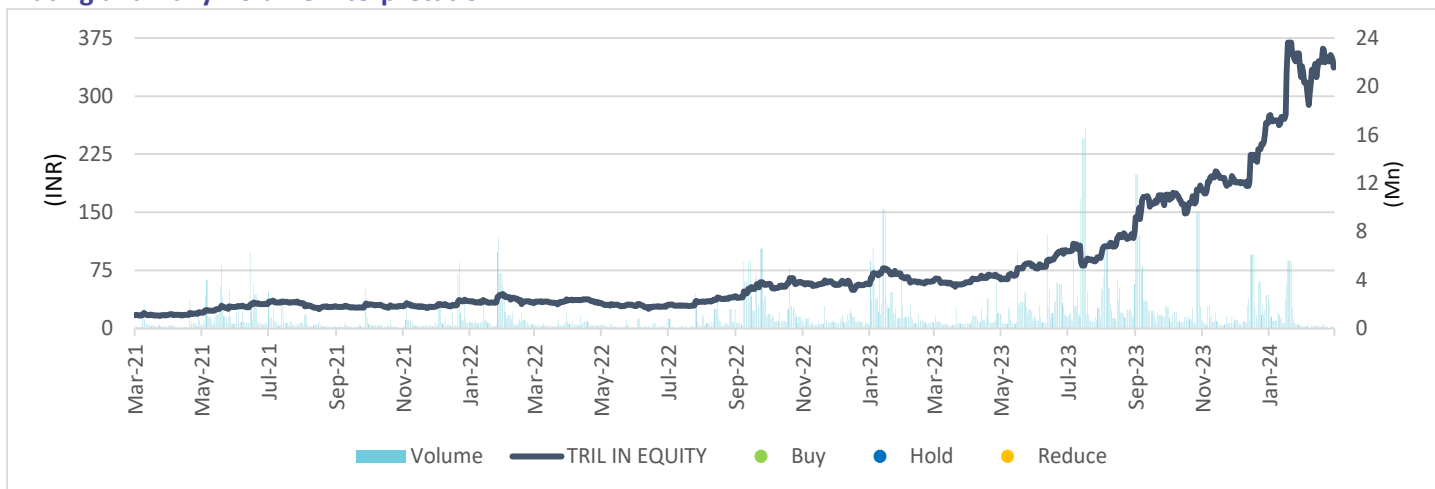
Recent Company Research

Date	Title	Price	Reco

Recent Sector Research

Date	Name of Co./Sector	Title
02-Mar-24	Ramkrishna Forgings	Orders to drive growth; <i>Company Update</i>
23-Feb-24	Kalpataru Projects	Mega project wins likely from Saudi; <i>Nuvama Flash</i>
21-Feb-24	ABB India	Great year, but will rapid pace continue; <i>Result Update</i>

Rating and Daily Volume Interpretation



Source: Bloomberg, Nuvama research

Rating Rationale & Distribution: Nuvama Research

Rating	Expected absolute returns over 12 months	Rating Distribution
Buy	15%	208
Hold	<15% and >-5%	61
Reduce	<-5%	24

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