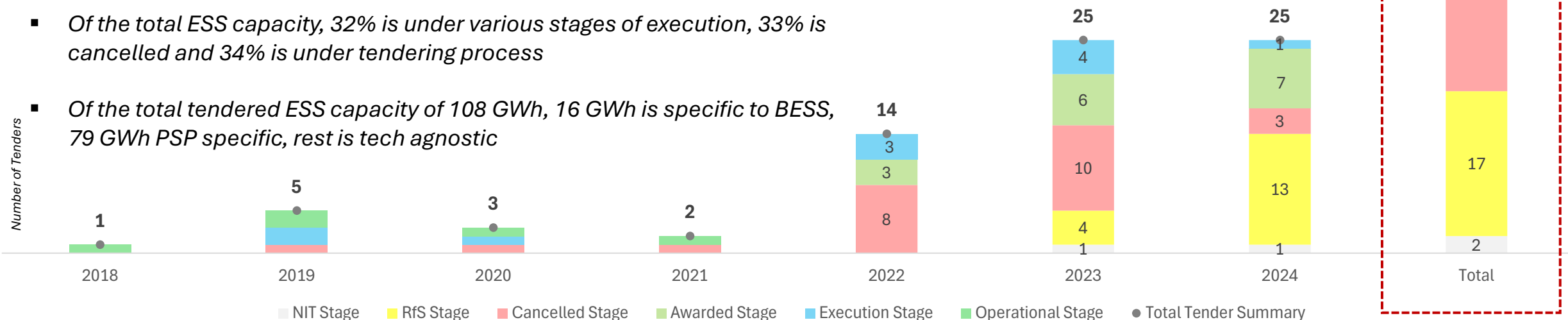


India Energy Storage Linked Tenders Tracker | 2018 - 2024

Stage	Number of Tenders	RE Capacity	ESS Capacity	PSP Capacity	BESS Capacity
		GW	GWh	GWh	GWh
NIT	02	1.50	0.02	-	0.02
RfS	16	7.50	37.20	19.50	7.30
Cancelled	24	10.78	36.30	31.50	3.05
Awarded	17	11.14	5.44	0.13	4.11
Execution	11	4.97	29.24	27.45	1.79
Operational	6	0.16	0.21	0.00	0.22
Total	76	36	108	79	16

- As of September 2024, BESS capacity of 0.2 GWh is operational, with 178 MWh capacity commissioned in 2024 alone
- Of the total ESS capacity, 32% is under various stages of execution, 33% is cancelled and 34% is under tendering process
- Of the total tendered ESS capacity of 108 GWh, 16 GWh is specific to BESS, 79 GWh PSP specific, rest is tech agnostic



Note: The numbers in the graph refers to the number of tenders. Captures only projects/ tenders in competitive bidding domain;
 Source: Tender nodal agency websites, press releases, compiled by Debmalya Sen

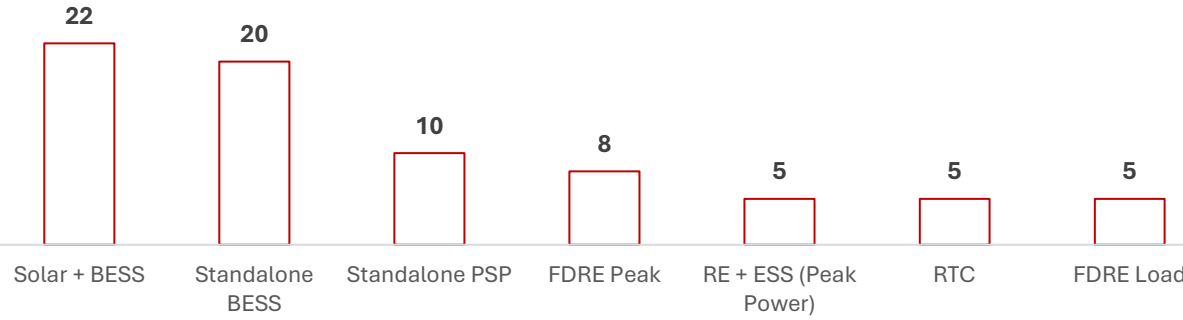
Updated till 29th October 2024

As of 29th October 2024, 108 GWh of ESS Capacity tenders has been shared of which 34 GWh is in various stages of execution and 37 GWh is in open tendering process with 36 GWh tenders cancelled

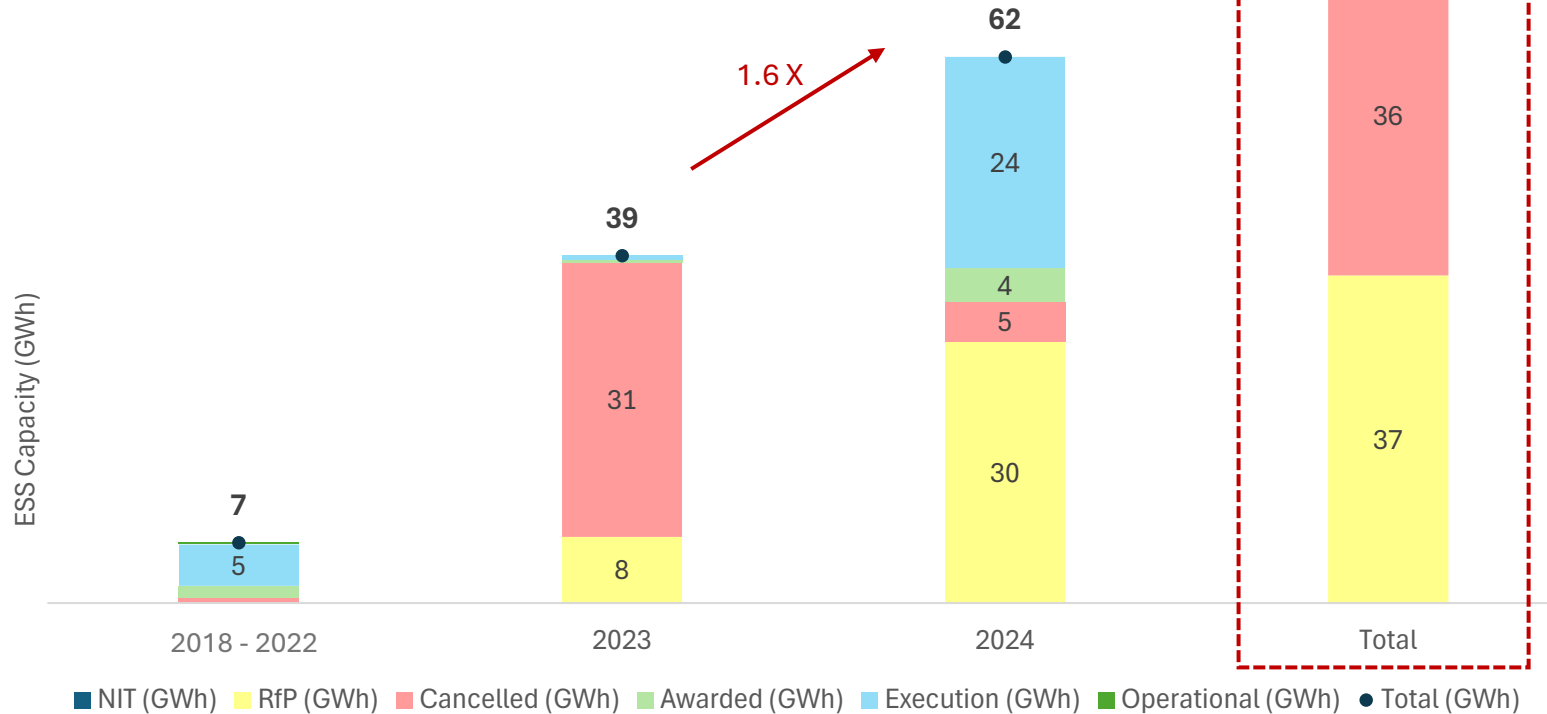
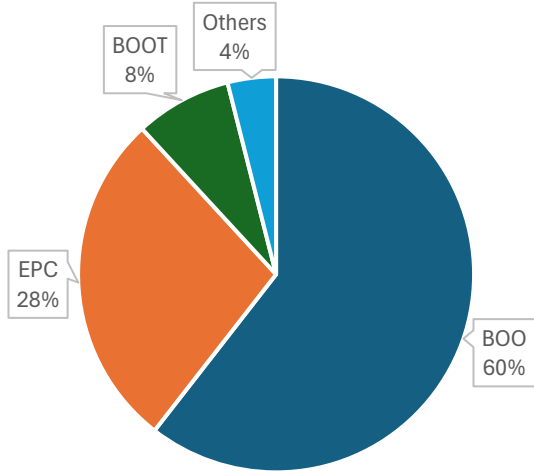
Capacity Breakup of Tenders (GWh)

Battery Storage	16 GWh
Pumped Hydro	79 GWh
Agnostic	13 GWh

Multiple variety of tenders associated with ESS has been on offer



Business Models



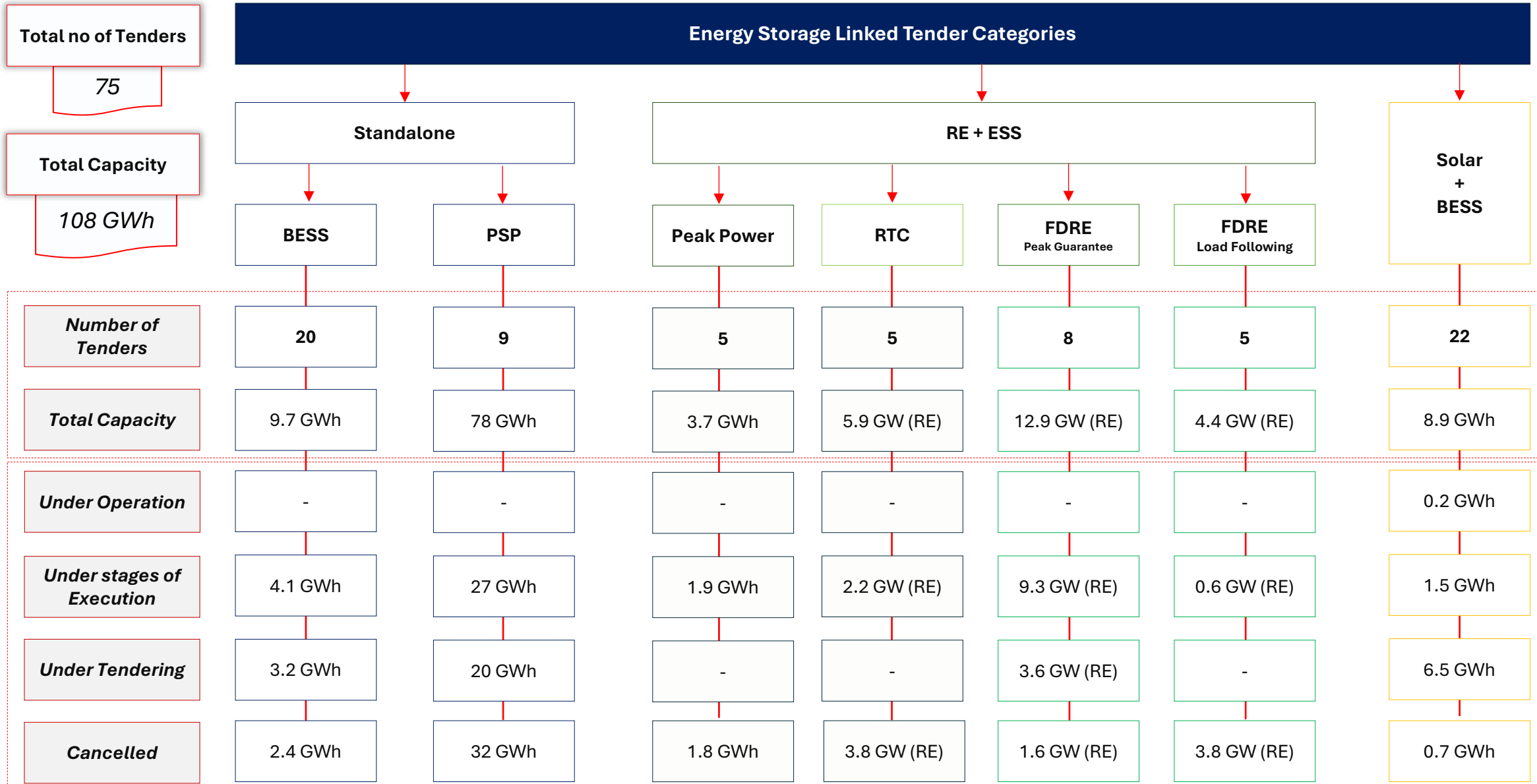
Note: Captures only projects/ tenders in competitive bidding domain; * BESS

Opportunity @ 37 GWh ESS Capacity as on Oct 2024 | 7 GWh BESS, 20 GWh PSP, 10 GWh Agnostic

Tendering Authority	Location	RE (MW)	ESS (MWh)	Tender Scope	Use Case	Storage Technology	Tender Year	Tender Month
DoP, WB	West Bengal	-	4500	DFBOT	Peak Mgmt.	PSP	2023	Jul-23
RUMSL	MP	400	Mandatory	BOO	Firm and Dispatchable RE	Agnostic	2023	Oct-23
MPPMCL	PAN India	-	3000	BOOM	Peak Mgmt.	PSP	2023	Oct-23
SECI	Lakshadweep	1.4	1.1	RESCO	DG Optimize, peak mgmt.	BESS	2024	Mar-24
THDC	PAN India	-	12000	EPC	Peak Mgmt.	PSP	2024	Apr-24
KREDL	Karnataka	100	100	EPC	Peak Mgmt.	BESS	2024	Jul-24
SECI	PAN India	2000	4000	BOO	Peak Mgmt.	BESS	2024	Aug-24
UPPCL	Uttar Pradesh	-	1200	BOOT	Peak Mgmt.	BESS	2024	Aug-24
GUVNL	Gujarat	-	1000	BOO	Peak Mgmt.	BESS	2024	Aug-24
SECI	PAN India	2000	8000	BOO	Firm and Dispatchable RE	Agnostic	2024	Sep-24
SJVN	PAN India	1200	2400	BOO	Peak Mgmt.	BESS	2024	Sep-24
RUMSL	Madhya Pradesh	600	Mandatory	BOO	Peak Mgmt.	BESS	2024	Sep-24
OTPC	Assam	-	100	EPC	Peak Mgmt.	BESS	2024	Oct-24
NTPC	Ramagundam	-	400	EPC	Peak Mgmt.	BESS	2024	Oct-24

Note: Limited to utility scale competitive bid tenders only

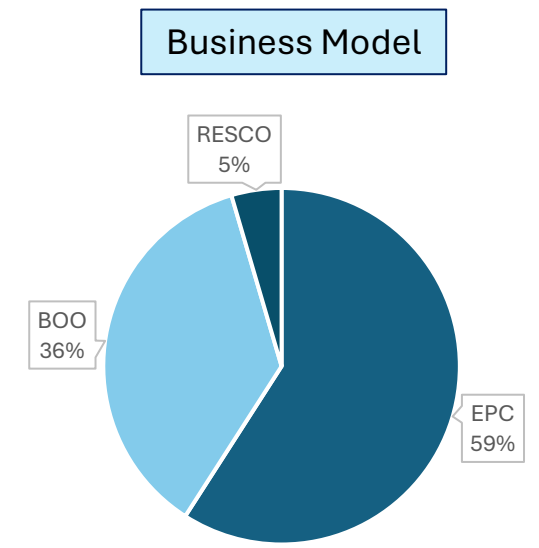
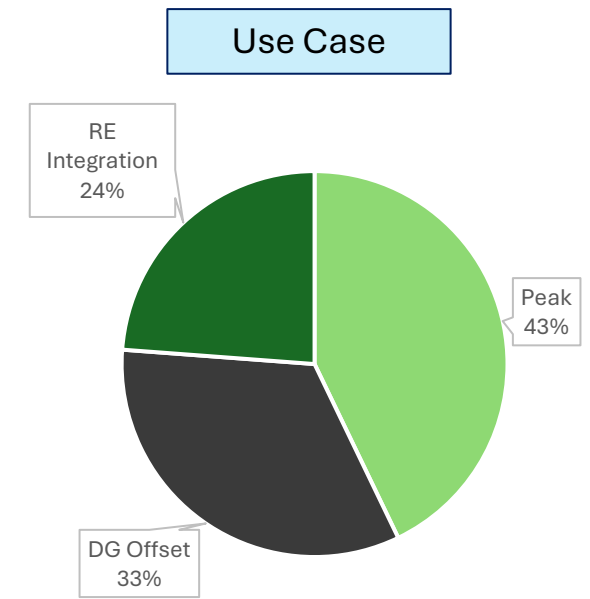
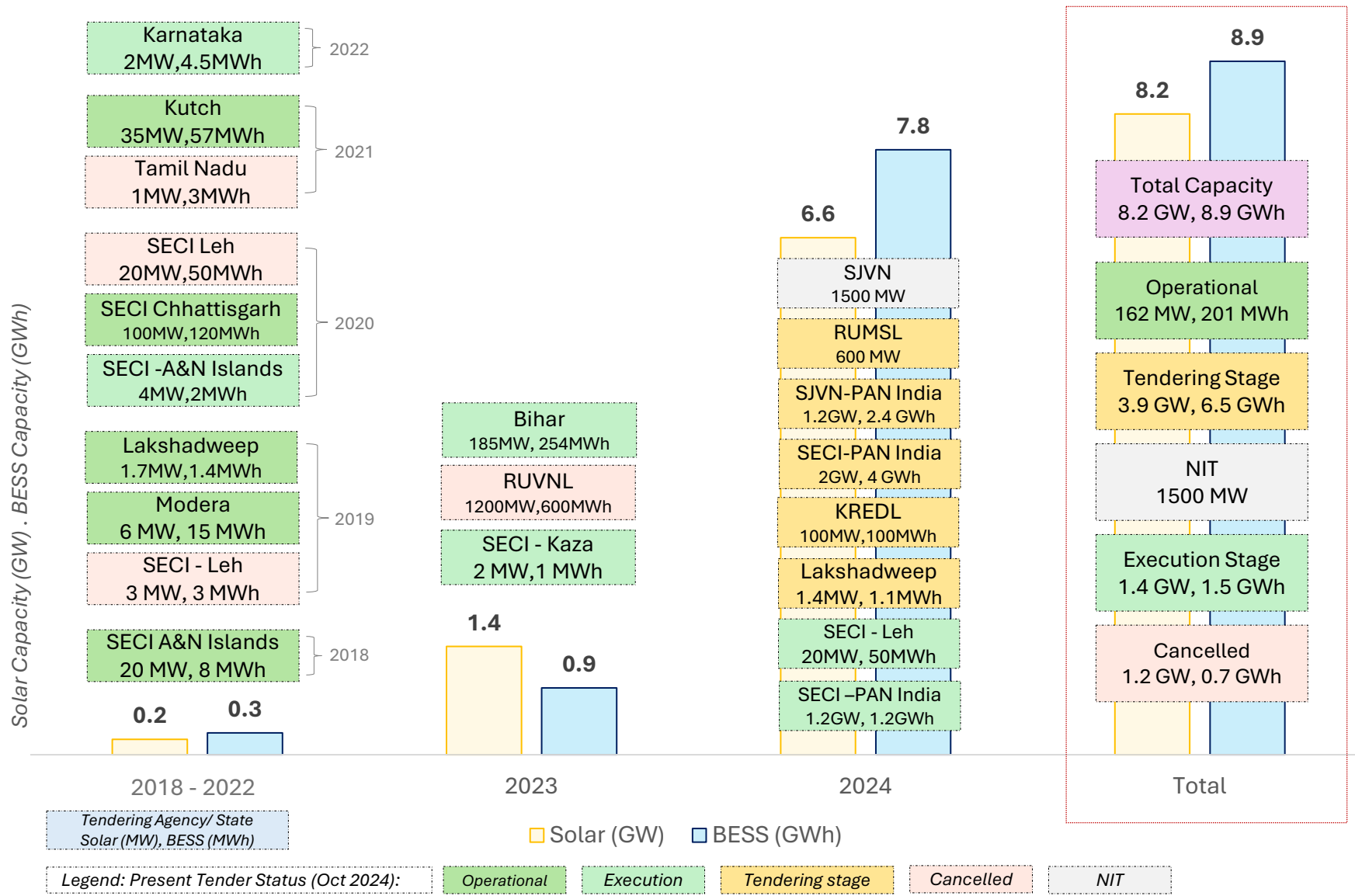
The Indian Energy Storage Tender Landscape – Multiple Innovations, some hits and some misses



Note: Limited to utility scale competitive bid tenders only

Source: Tender nodal agency websites, compiled by Debmalya Sen

Solar coupled with Batteries has gained significant traction in 2024, the year saw 6.5X increase in tendered capacity compared to 2018-2023 combined, SECI's tender saw price discovery of INR 3.41/kWh L1



Source: Tender nodal agency websites, compiled by Debmalya Sen

Solar with BESS Tenders Overview | 2018 - 2024

Sl. No.	Tendering authority	Location	RE (MW)	ESS (MWh)	Tender scope	Use Case	Current Status	Winner	Winning Bid (INR)	Tender Year
1	NLC	A&N Islands	20	8	EPC	DG Optimization	Operational	L&T	133 Crores (6.99/kWh)	2018
2	SECI 1	Leh	3	3.2	EPC	DG Optimization	Cancelled	Sunsorce		2019
3	GPCL	Modera	6	15	EPC	RE Integration	Operational	Mahindra-Susten	65 Crores	2019
4	SECI 2	Lakshadweep	1.7	1.4	EPC	DG Optimization	Operational	Sunsorce	-	2019
5	SECI 3	A&N Islands	4	2	BOO	DG Optimization	Under Execution	Sunsorce	-	2020
6	SECI 4	Chhattisgarh	100	120	EPC	RE Integration, peak mgmt.	Operational	TATA Power	770 Crores	2020
7	SECI 5	Leh	20	50	EPC	DG Optimization	Cancelled	TATA Power	368 Crores	2020
8	TANGEDCO	Tamil Nadu	1	3	BOO	RE Integration, peak mgmt.	Cancelled			2021
9	GSECL	Kutch	35	57	EPC	RE Integration	Operational	L&T	335 Crores (5.6/kWh)	2021
10	KREDL 1	Karnataka	5	16	EPC	Peak Mgmt.	Cancelled			2022
11	KREDL 2	Karnataka	2	4.5	EPC	Peak Mgmt.	Tender Awarded	NSure Reliable	-	2022
12	SECI 6	Kaza	2	1	EPC	DG Optimization	Under Execution	Suryam International	-	2023
13	RUVNL	PAN India	1200	600	BOO	Peak Mgmt.	Cancelled	Blupine, ACME	6.68/kWh (600 MW)	2023
14	BSPGCL	Bihar	185	254	EPC	Peak Mgmt.	Tender Awarded	L&T		2023
15	SECI 7	PAN India	1200	1200	BOO	RE Integration	Tender Awarded	Pace Digitech, ACME, HFE	3.41 - 3.42/kWh	2024
16	SECI 8	Lakshadweep	1.4	1.1	RESCO	DG Optimization	RfS Issued			2024
17	SECI 9	Leh	25	50	EPC	Peak Mgmt.	Tender Awarded	Prozeal		2024
18	KREDL 3	Karnataka	100	100	EPC	Peak Mgmt.	RfS Issued			2024
19	SECI 10	PAN India	2000	4000	BOO	Peak Mgmt.	RfS Issued			2024
20	SJVN	PAN India	1200	2400	BOO	Peak Mgmt.	RfS Issued			2024
21	RUMSL	Madhya Pradesh	600	Mandatory	BOO	Peak Mgmt.	RfS Issued			2024
22	SJVN	PAN India	1500	Mandatory	BOO	Peak Mgmt.	NIT			2024

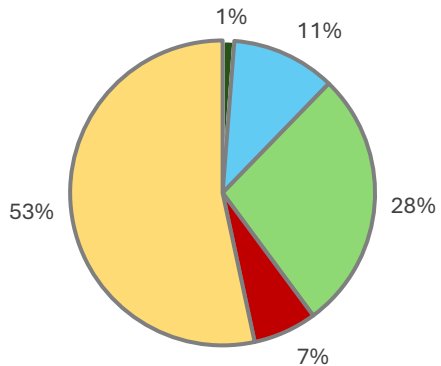
Battery Storage Tenders – Performance Tracker | 43 Tenders | 16 GWh Capacity | 7 GWh worth open tenders

Operational			Under Execution			Awarded			Cancelled			Tendering Stage			Notice Inviting Tender (NIT)		
Total Tenders	RE/ Solar Capacity (GW)	BESS (GWh)	Total Tenders	RE/ Solar Capacity (GW)	BESS (GWh)	Total Tenders	RE/ Solar Capacity (GW)	BESS (GWh)	Total Tenders	RE/ Solar Capacity (GW)	BESS (GWh)	Total Tenders	RE/ Solar Capacity (GW)	BESS (GWh)	Total Tenders	RE/ Solar Capacity (GW)	BESS (GWh)
6	0.2	0.2	7	0.7	1.8	9	1.4	4.1	11	1.3	3.1	9	2.7	7.3	2	1.5	0.1

Standalone			3		1.5	5		2.6	6		2.4	5		3.2	1		0.1
RE + BESS			2	0.7	0.3												
Solar + BESS	6	0.2	0.2	2	0.01	0.01	4	1.4	1.5	5	1.3	0.7	4	2.7	4.1	1	1.5

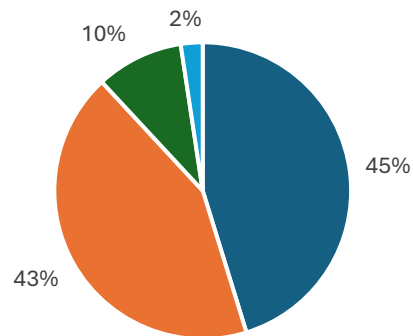
Project Winners | JSW Energy | Gensol | Indigrd | TATA Power | Reliance Power | Hero Future | ReNew | L&T | Suncsource Energy | Mahindra Susten | ACME | Rays Power | Pace Digitech | Hexa Climate | Jairam Industries | Nsure Reliable | Prozeal | Suryam International | Kintech Synergy | HG Infra

Tender Status Break-Up



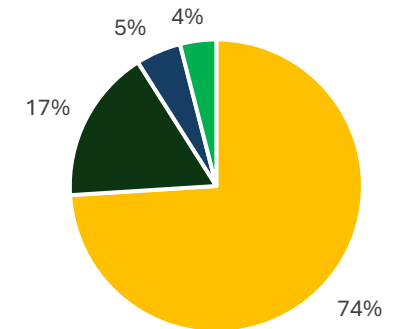
■ Operational ■ Under Execution ■ Awarded ■ Cancelled ■ Under Tendering

Business Models



■ BOO ■ EPC ■ BOOT ■ RESCO

Use Cases



■ Peak Management ■ DG Offset ■ Ancilliary Services ■ Round the Clock Supply

Source: Tender nodal agency websites, compiled by Debmalya Sen

Pumped Hydro Tenders under the Competitive Bidding Guidelines – Status Quo

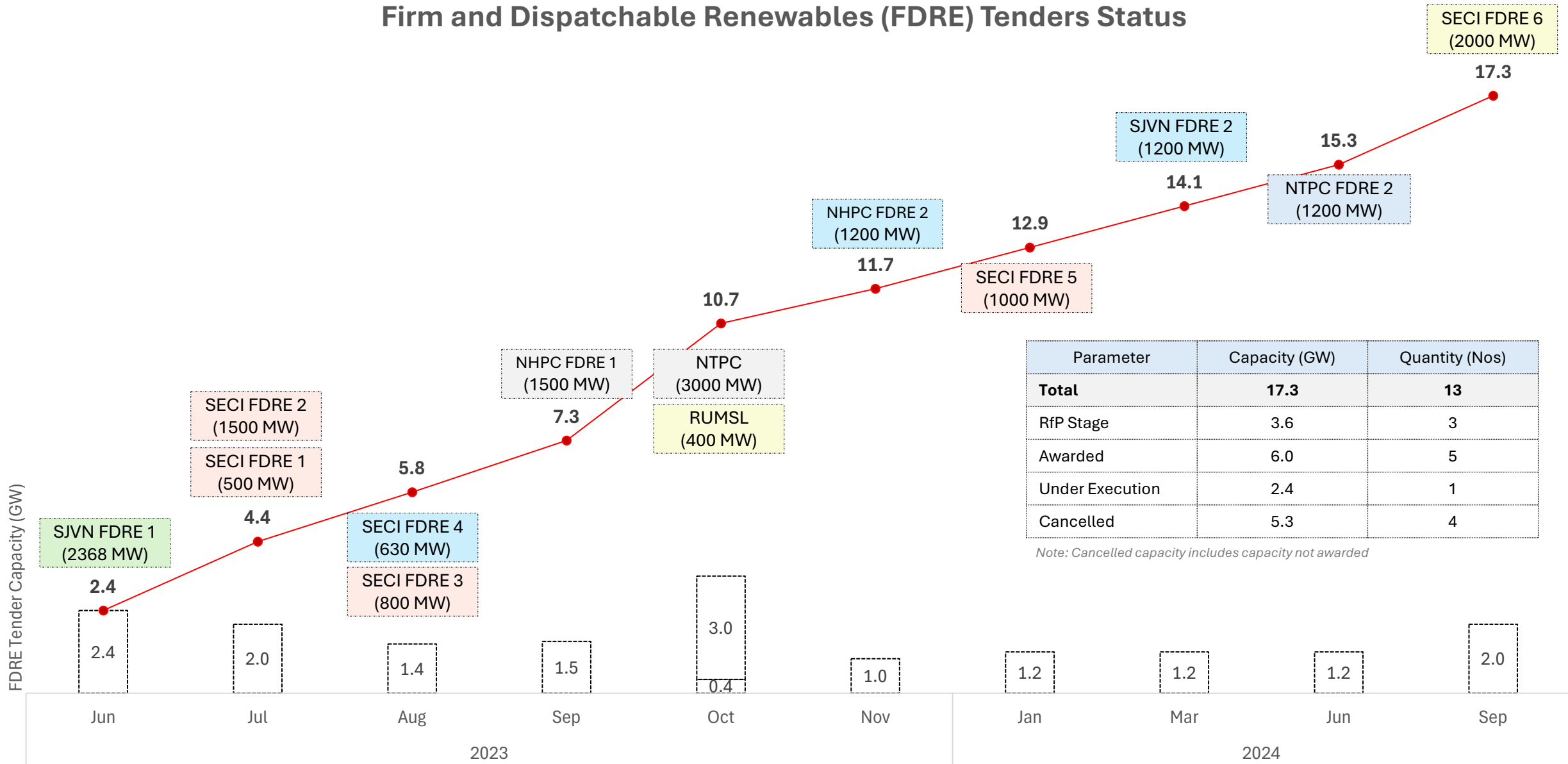
PSP Potential	Total Tenders	Capacity Tendered	Under Execution	Capacity Awarded	Under Tendering	Cancelled
176 GW	11	77 GWh	27 GWh	0.4 GWh	22 GWh	32 GWh

In the competitive bidding space, of the total capacity tendered, **35%** is in various stages of **execution**, **28%** in under **tendering** process while **37%** has been **cancelled**. The table below details the status of all 11 tenders issued by various nodal agencies since 2019

Tender Year	Tendering authority	Location	RE (MW)	Power (MW)	Energy (MWh)	Tender scope	Use Case	Current Status	Winner	Winning Bid (INR)
2019	SECI	PAN India	900	-	450	BOO	Peak Mgmt.	Under Execution	Greenko	4.04/kWh
2022	NTPC	PAN India	-	500	3000	BOO	RE Integration, peak mgmt.	Under Execution	Greenko	27.8 lac/MWh/year
2022	MSEDCL	PAN India	250	-	125	BOO	Peak Mgmt.	Tender Awarded	Ayana, NTPC	4.09/kWh
2023	PCKL	Karnataka	-	1000	8000	BOO	RE Integration, peak mgmt.	Cancelled	JSW, Greenko	1.48 Cr/MW/year
2023	NTPC	PAN India	-	1500	9000	BOO	RE Integration (RTC)	Cancelled		
2023	NTPC	PAN India	-	2000	12000	BOO	Firm and Dispatchable Renewables	Cancelled		
2023	DoP, WB	West Bengal	-	900	4500	DFBOT	Peak Mgmt.	RfS Issued		
2023	MPPMCL	PAN India	-	500	3000	BOOM	Peak Mgmt.	RfS Issued		
2024	MSEDCL	Maharashtra	-	3000	24000	BOOT	RE Integration (RTC)	Under Execution	JSW & Torrent	0.80 - 1.10 Cr/MW/year
2024	GRIDCO	PAN India	-	500	2500	BOO	Peak Mgmt.	Cancelled		
2024	THDC	PAN India	-	2000	12000	EPC	Peak Mgmt.	RfS Issued		

Note: Limited to utility scale competitive bid tenders only

Firm and Dispatchable Renewables (FDRE) Tenders Status



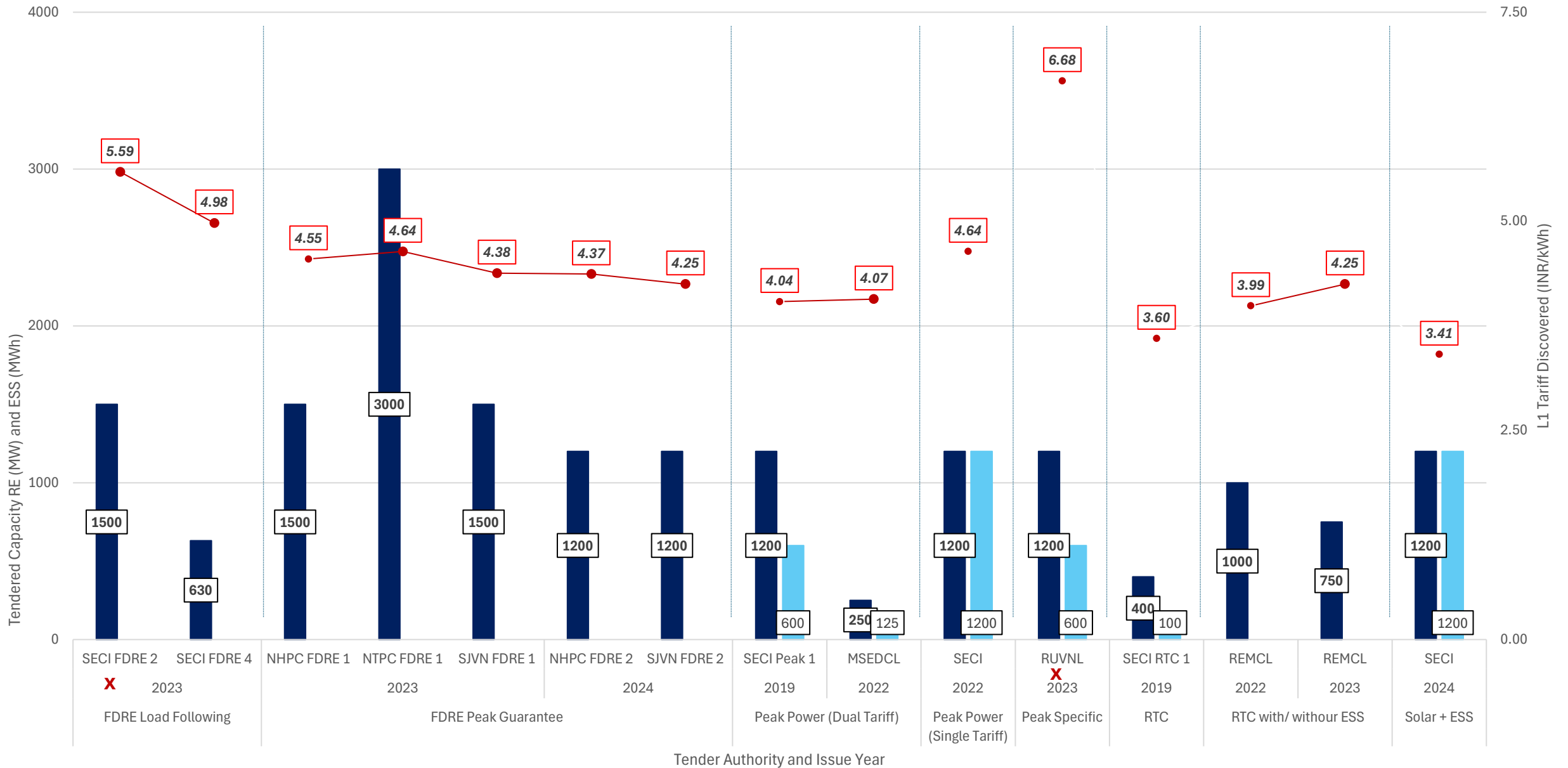
Legend: Present Tender Status (Oct 2024): PSA Signed (Green), Cancelled (Red), Awarded (partial) (Grey), Awarded (Blue), Tendered (Yellow), Bid closed (Light Blue)

Note: NTPC: 1,584 MW awarded out of 3,000 MW, SJVN 1: 1.18 GW awarded out of 1.5 GW, NHPC: 1.4 GW awarded out of 1.5 GW

Apart from SECI, all other FDRE tenders are on Guaranteed Peak Availability Model, SECI is Load Following Model

Source: MNRE Guidelines, tender nodal agency websites, compiled by Debmalya Sen

Round The Clock/ FDRE Tenders and Solar + ESS Tariff Trend (2019 - 2024)



Source: Tender nodal agency websites, compiled by Debmalya Sen

Firm and Dispatchable Renewable Energy Tenders – Performance Tracker

Sl. No.	Tendering authority	Location	RE (MW)	Model	FDRE Model	Present Status (As of Sep 2024)	Winners	Winning Bid Range (INR)
01	SJVN	PAN India	2368	BOO	Peak Guarantee	Under Execution	O2, Blupine, ACME, HFE, TPREL, Juniper, ReNew	4.38 – 4.39/kWh
02	SECI	PAN India	500	BOO	Load Following	Cancelled		
03	SECI	PAN India	1500	BOO	Load Following	Cancelled	HFE, JSW, Serentica, ReNew	5.59 – 5.60/kWh
04	SECI	PAN India	800	BOO	Load Following	Cancelled		
05	SECI	PAN India	630	BOO	Load Following	Tender Awarded	Serentica, JSW, HFE, Vena, Hexa	4.98 – 4.99/kWh
06	NHPC	PAN India	1500	BOO	Peak Guarantee	Tender Awarded	Brightnight, HFE, Blupine, Juniper, ReNew, ACME	4.55 - 4.64/kWh
07	RUMSL	MP	400	BOO	Peak Guarantee	RfS Issued		
08	NTPC	PAN India	3000	BOO	Peak Guarantee	Tender Awarded	Axis, ReNew, TPREL, Juniper, Serentica, Brightnight, ACME, HFE	4.64 - 4.73/kWh
09	NHPC	PAN India	1200	BOO	Peak Guarantee	Tender Awarded	Essar, Serentica, Juniper, Hexa Climate, Avaada	4.37 – 4.38/kWh
10	SECI	PAN India	1000	BOO	Peak Guarantee	Cancelled		
11	SJVN	PAN India	1200	BOO	Peak Guarantee	Tender Awarded	HFE, Zelestra, Juniper, ReNew, Avaada	4.25/kWh
12	NTPC	PAN India	1200	BOO	Peak Guarantee	Bid Closed		
13	SECI	PAN India	2000	BOO	Peak Guarantee	RfS Issued		

Note: SECI FDRE 2 cancelled after being awarded; NTPC: 1,584 MW awarded out of 3,000 MW, SJVN 1: 1.18 GW awarded out of 1.5 GW, NHPC: 1.4 GW awarded out of 1.5 GW

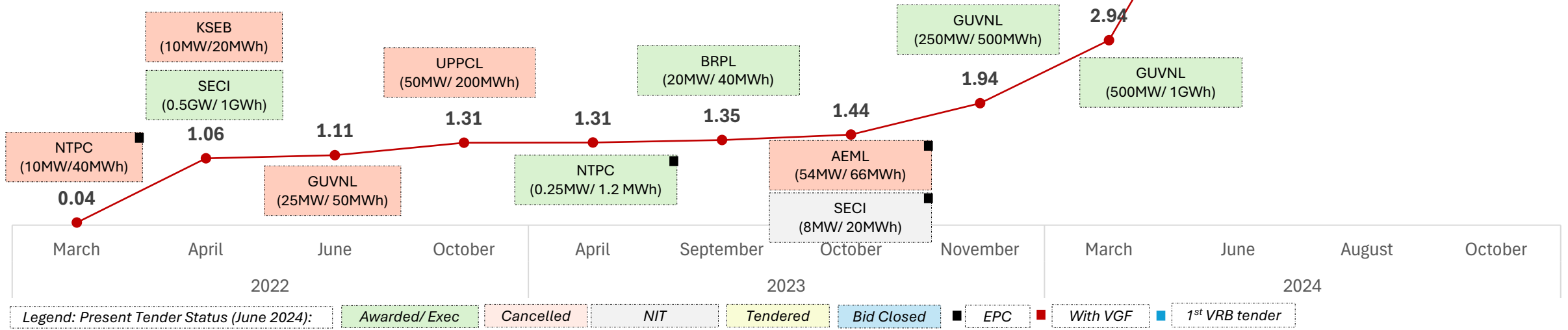
Apart from SECI, all other FDRE tenders are on Guaranteed Peak Availability Model, SECI is Load Following Model

Source: MNRE Guidelines, tender nodal agency websites, compiled by Debmalya Sen

Standalone BESS Tenders Growth Trend | 2022 - 2024

Parameter	Capacity (GWh)	Quantity (Nos)
Total	9.74	20
RfP Stage	2.70	4
Awarded/ Under Exec	3.15	7
NIT Stage	0.02	1
Cancelled	2.40	6

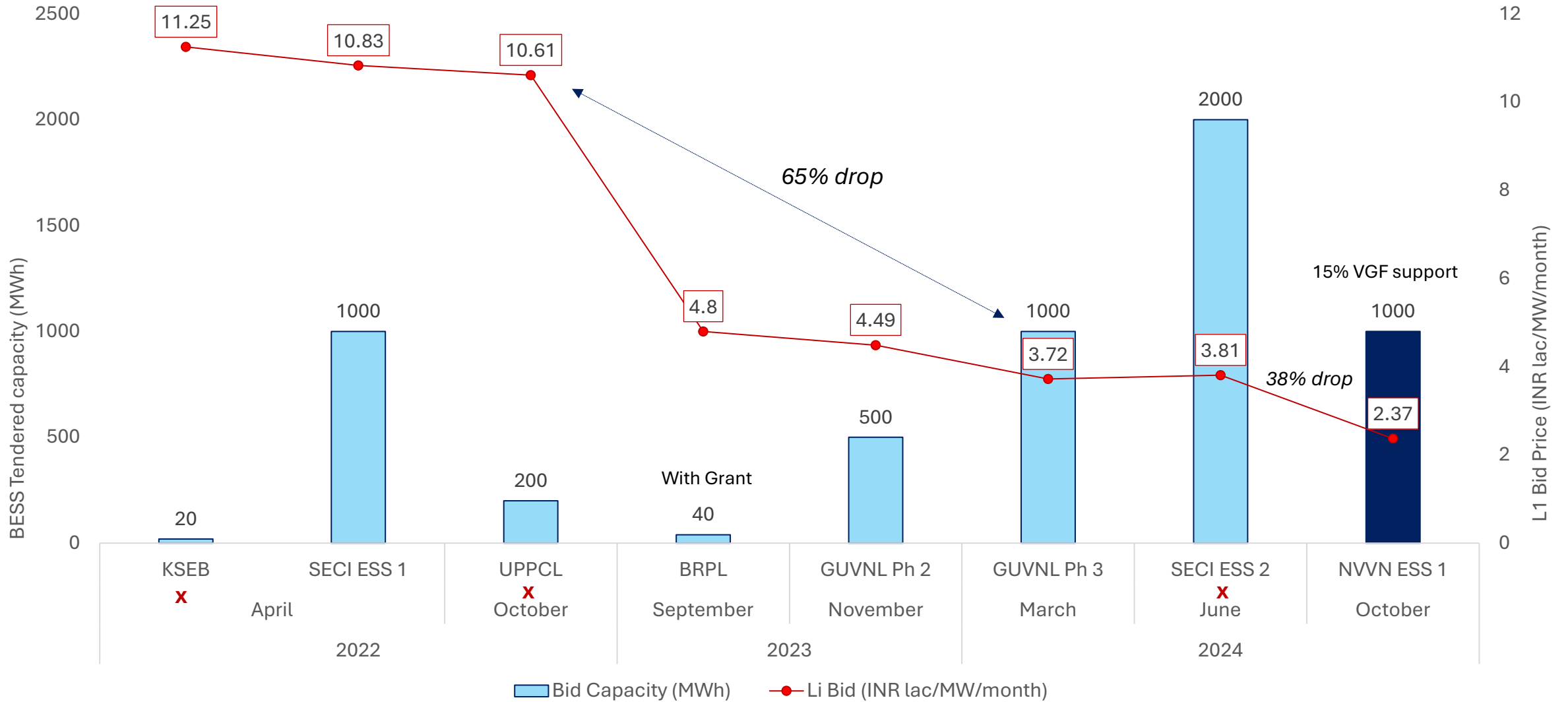
Tender Type	Capacity (GWh)	Quantity (Nos)
EPC	1.13	7
BOOT	2.46	5
BOO	6.00	8



Source: Tender nodal agency websites, press releases, compiled by Debmalya Sen

Tariff Discovered for Standalone Tenders has seen 66% drop over in 2 years timeframe despite increasing storage penetration and stricter resource availability requirements

Standalone Battery Storage Tenders - Price Discovery Trend



Standalone BESS Tenders – Tracker (2022 – 2024)

Tender Month	Tendering Authority	Power Capacity (MW)	Energy Capacity (MWh)	Business Model	Present Status	Winners	Winning Quote (INR)
Mar-22	NTPC	10	40	EPC	Cancelled		
Apr-22	SECI	500	1000	BOOT	Under Execution	JSW Energy	10.83 lac/MW/month
Apr-22	KSEB	10	20	BOO	Cancelled	Hero Future	11.25 lac/MW/month
Jun-22	GUVNL	25	50	BOO	Cancelled		
Oct-22	UPPCL	50	200	BOOT	Cancelled	ACME, JSW, Continental Milkose	10.66 - 12.79 lac/MW/month
Apr-23	NTPC	0.25	1.2	EPC	Tender Awarded	Jayram Industries	-
Sep-23	BRPL	20	40	BOOT	Under Execution	Indigrid	57 lacs/MW/year
Oct-23	AEML	54	66	EPC	Cancelled		
Oct-23	SECI	8	20	BOO	NIT		
Nov-23	GUVNL	250	500	BOO	Under Execution	Indigrid, Gensol	4.49 lacs/MW/month
Mar-24	GUVNL	500	1000	BOO	Tender Awarded	Gensol	3.72 lacs/MW/month
Mar-24	SECI	250	500	BOO	NIT		
Jun-24	NTPC	250	500	EPC	RfS Issued		
Jun-24	NTPC	0.6	3	EPC	Tender Awarded	Rays Power	
Jun-24	NTPC	500	1000	BOO	Tender Awarded	Indigrid, HS Infra, Kintech Synergy	
Jun-24	SECI	1000	2000	BOO	Cancelled	JSW, Reliance ADA	3.81 lacs/MW/month
Aug – 24	UPPCL	300	1200	BOOT	RfS Issued		
Aug – 24	MSECDL	300	600	BOO	Tender Awarded	Not Declared	2.19 lacs/MW/month
Aug – 24	GUVNL	400	800	BOO	RfS Issued		
Oct-24	NTPC	100	400	EPC	RfS Issued		
Oct-24	OTPC	25	100	EPC	RfS Issued		

Note: Only captures tenders under competitive bidding

Source: MNRE Guidelines, tender nodal agency websites, compiled by Debmalya Sen