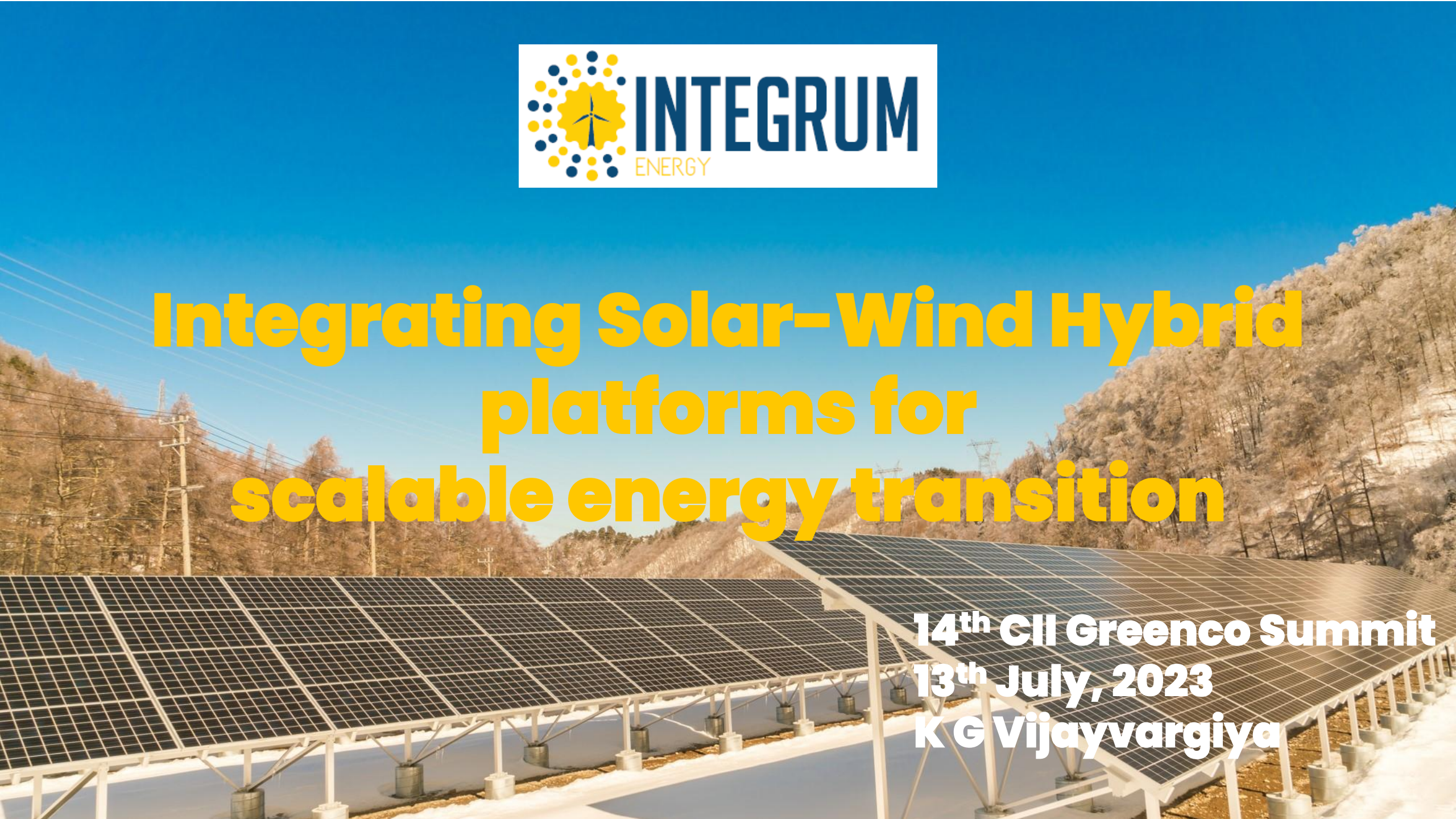
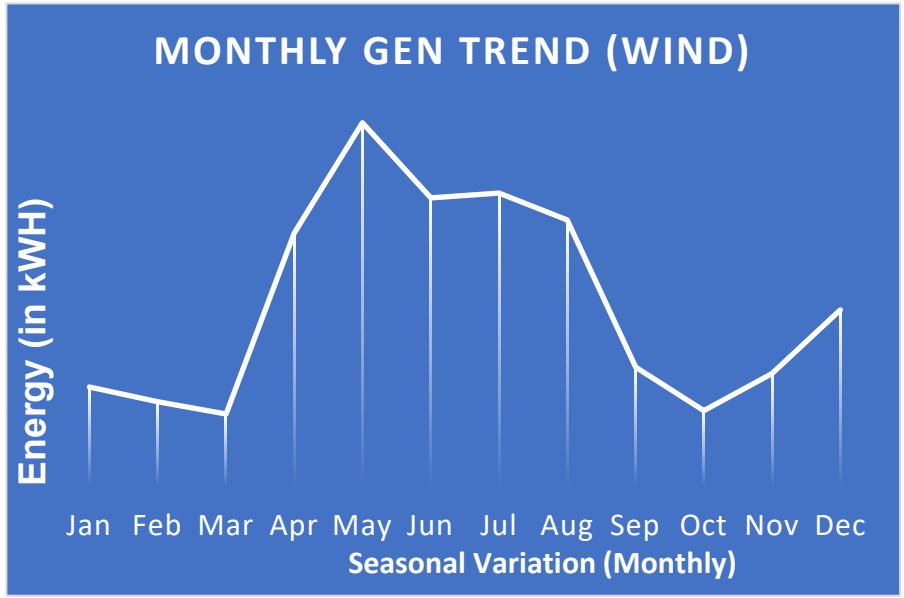
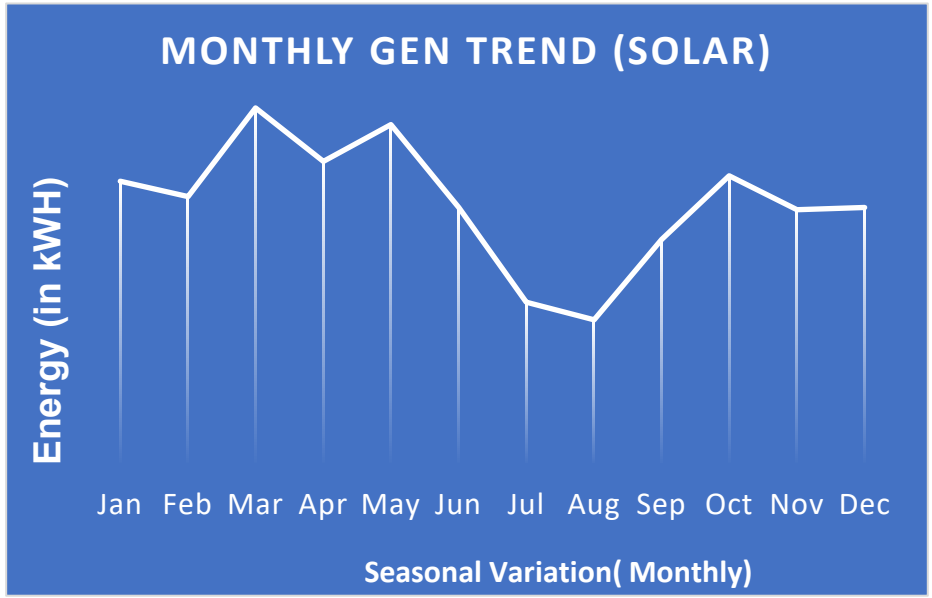

INTEGRUM
ENERGY
Integrating Solar-Wind Hybrid platforms for scalable energy transition
14th CII Greenco Summit
13th July, 2023
K G Vijayvargiya

Intermittent RE gen. is characterized by seasonal & daily variations

Seasonal Variation of RE Sources

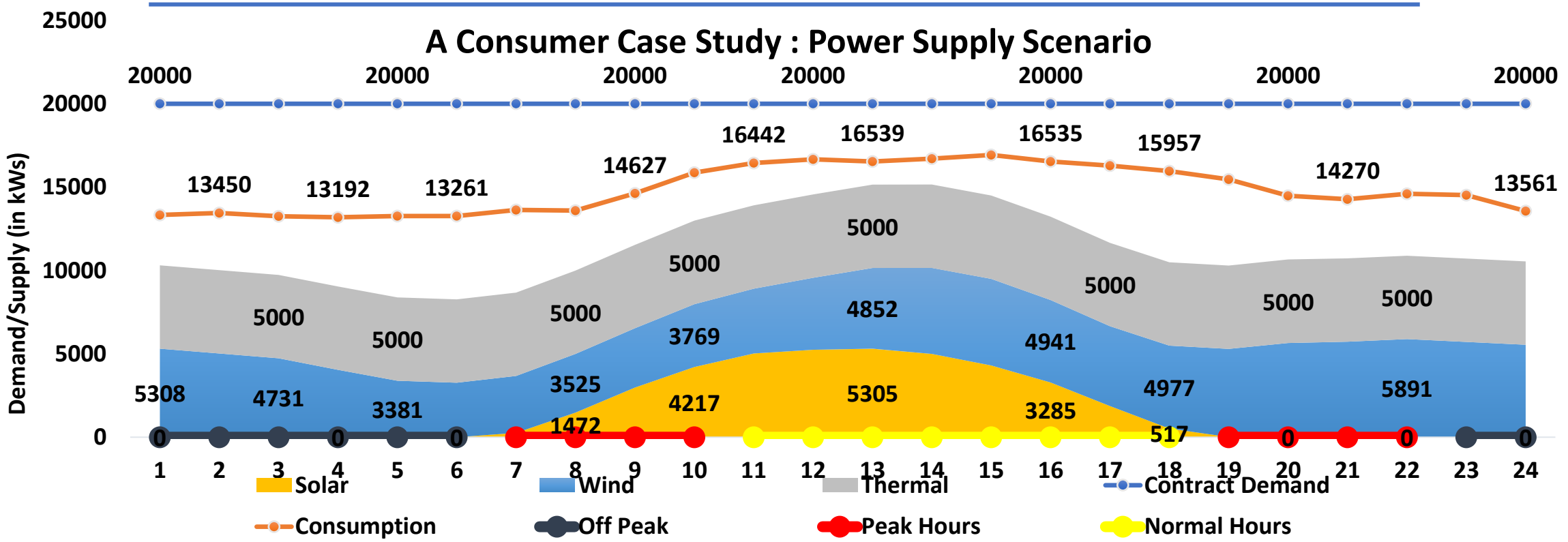




Generation profile characteristics:

- Wind generation shows higher trend during monsoon season and substantially dips during rest of the year.
- Typically 60% of the generation from wind comes in 5 months in a calendar year.
- Solar generation on other hand has lean season in monsoon which is complimentary to the wind generation profile.
- Considering evolving RE policies & OA Regulations, clients going for standalone RE power restrict their other purchase options and hence composite solution is best fit catering technical and economical feasibility.
- Solar wind hybrid (composite power) may substantially increase renewable power supply and overall savings.

Complimentary Gen. profile of RE enables RTC power to consumers



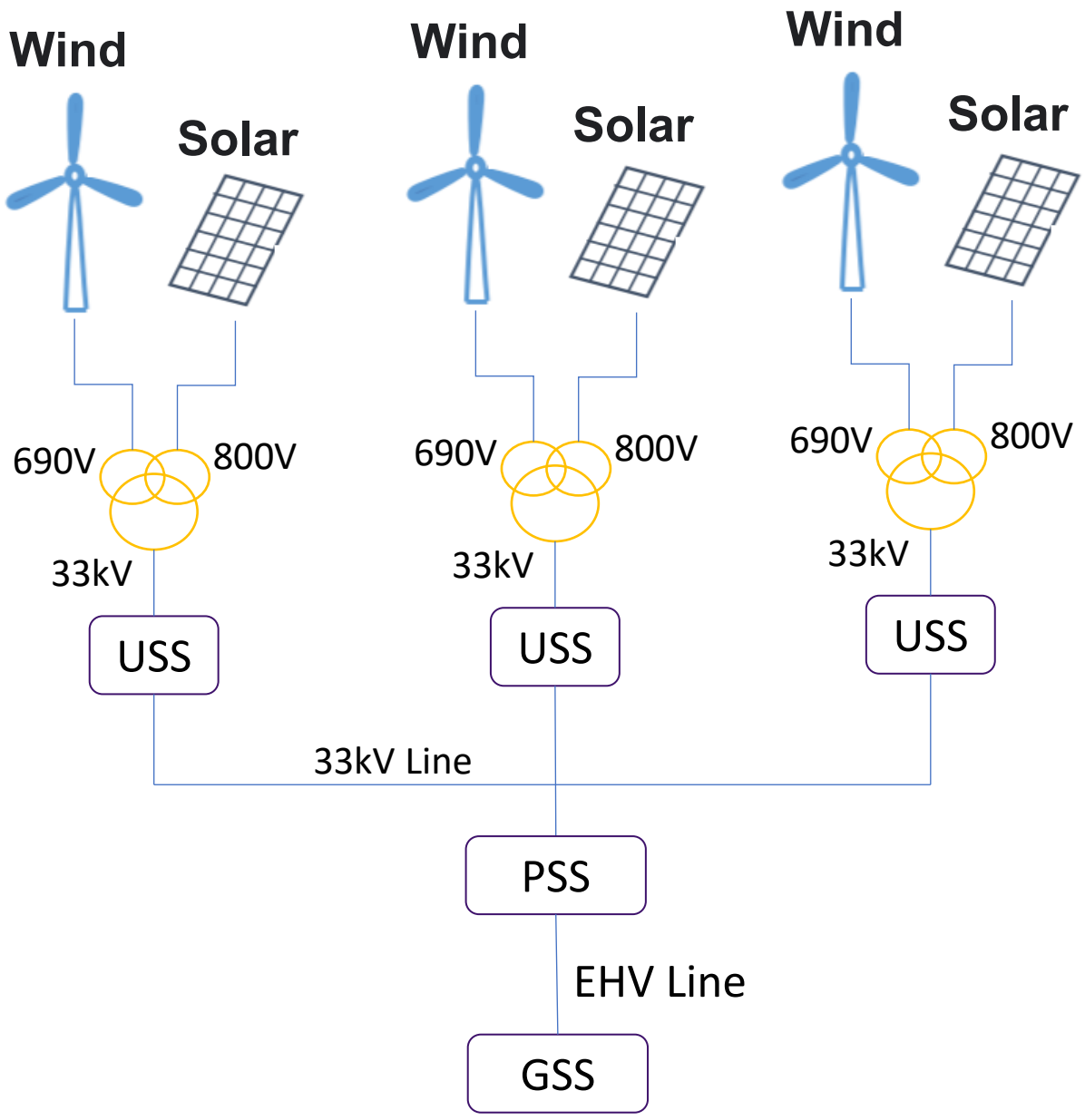
- Solar generation is only during the day – while wind power generation is available throughout the day
- As can be seen from the graph, wind and solar generation is complimentary to each other – more wind generation is available during the evening and night when solar is not available.
- Therefore combining both solar and wind provides nearly steady power to the consumer.
- As regulations are evolving it is increasingly important for the consumer to source hybrid power (virtual or real) to enable realization of best value for itself.

We are reimagining the C&I Energy Market –hybrid capex & solutions driven

Regulatory requirement	Characteristics of Solar and Wind		Implications
	Solar 1.4 MW DC / 1 MW AC	Wind (MW AC)	
OA capacity restriction	~21.5 L pa	~32.0L Pa	Wind will provide nearly 1.5 times more unit for the same OA capacity
Minimum Consumption	20Lakhs pa +	75Lakhs p.a.+	Solar is more modular in capacity
Monthly settlement	Lower month to month variation	Higher variation between monsoon and non-monsoon months	Solar is better. However, in a capacity restricted scenario, wind is better, as in the lowest wind generation month it is still nearly equal to solar generation in that month
Banking requirement	Higher	Lesser	Solar requires more than 2 times banking as compared to Wind. Has implications on banking charge and TOD restrictions on banking. Banking on RE power banking is no longer a feasible option.
Lower time block settlement	Limits settlement	Generation in all time blocks.	Solar generation largely limited to 8 hours in the day, limits the settlement of surplus TOD units.
Change in TOD tariff blocks	Limits settlement	Generation in all time blocks.	Scenario for solar will worsen as the TOD Tariff time block is being changed by SERCs
RT and OA simultaneously allowed	RT solar lowest cost		With rooftop solar, net grid power during day further reduces - OA solar becomes further difficult.

INTEGRUM ENERGY

LV integration – leading to substantial savings in cost, time and land

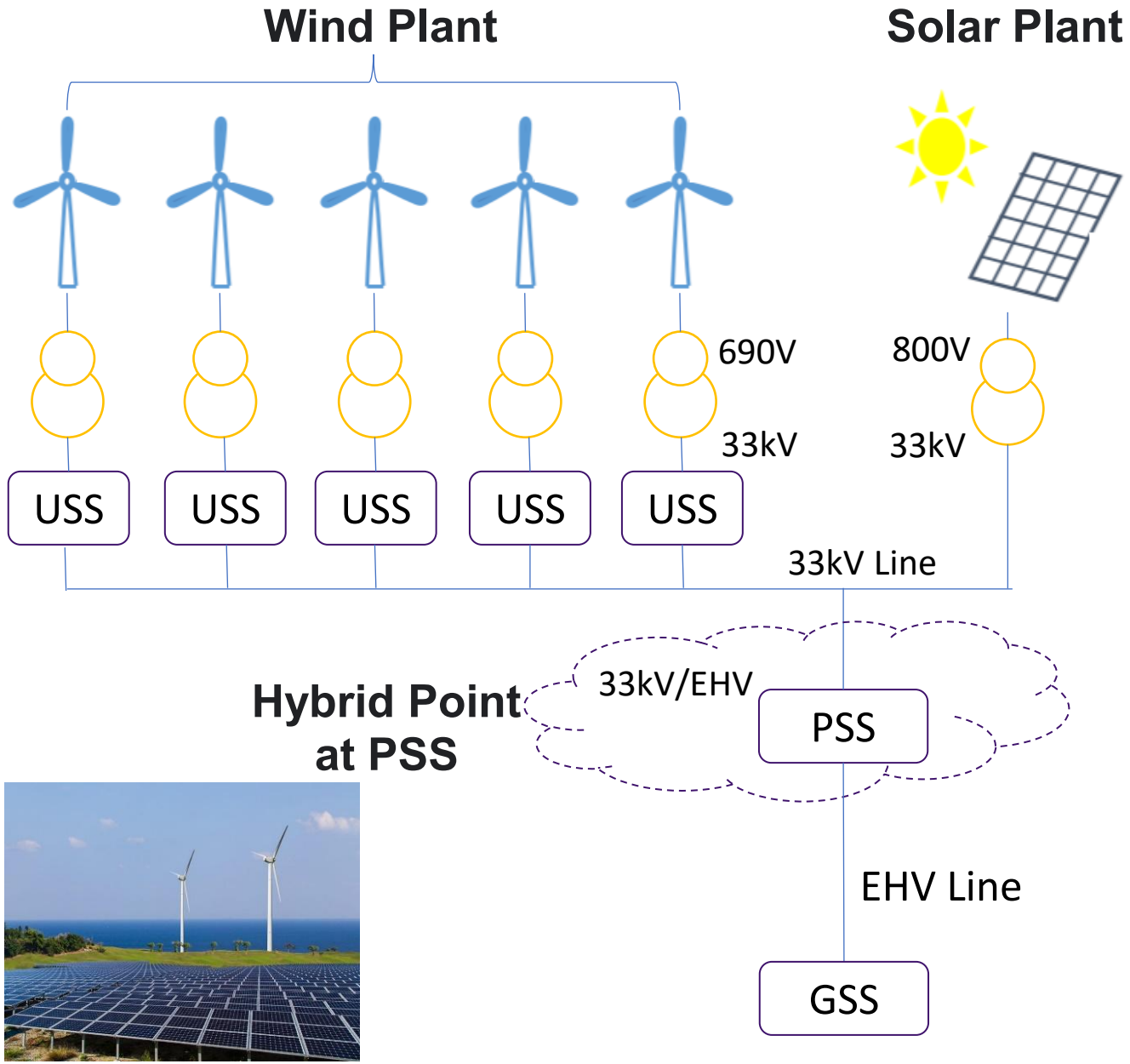


Current Scenario

- We are the first and only company to successfully integrate wind and solar at different voltages at LV level.
- Unified evacuation infrastructure, wind land used for solar (no extra land required), faster implementation
- Considerable savings in time and cost.

RE Hybrid – Value Proposition

Hybrid System at two different locations at two different Unit Substation.



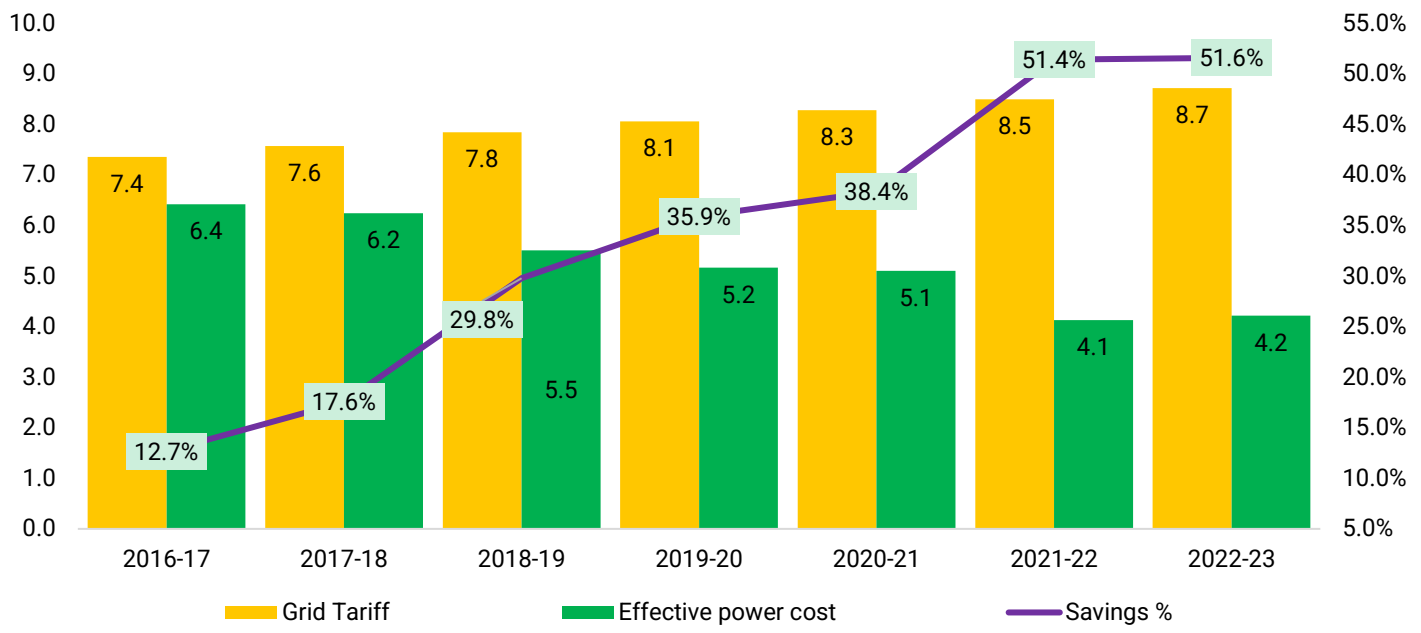
Case Studies

Differntiated Solutions – Leading to high EBIDTA contribution enhancing Enterprise Value

	Pioneers in Innovative solutions
Solutions driven	▪ Differentiated solutions making differentiated impact on our clients energy. We have matured in our solutions and delivery in the last four years and our differentiated solutions have made significant positive impact on our clients RE conventional energy replacement and energy procurement cost reduction.
LV & HV Hybrids	▪ First company to set up collocated hybrid (solar below wind turbine) and integrate them at Low voltage (2022). ▪ First wind solar hybrid of 46 MWs for two clients - We have implemented hybrid of wind and solar 4 years back – and that has enabled the clients to reach 95% to 100% conventional energy replacement and made them the lowest power cost consumer in the region.
HV – HV transm. cost optimization	▪ In states like Karnataka, Gujarat, transmission charges and losses are not applicable for HV to HV evacuation in the same discoms ▪ One of the first players to implement this solution in Karnataka for clients saving nearly Rs. 1 per unit recurring transmission charges for them.
Contract demand linked OA – wind focussed	▪ Many states restrict /link Open access to contract demand. ▪ In Maharashtra with OA restriction, we have been the first company to implement wind project under open access in the last five years (CUF for wind is 35% vs 22% for solar) – leading to much higher savings for our client. Conventionally everyone has done only solar in the state reaching to a max of 50 – 60% replacement; our solution has enabled the client to replace nearly 85 - 88% of his power consumption.
High performance solar panels with trackers	▪ First ones to install 540 Wp Mono crystalline panels with high efficiency trackers way back in Aug 2021. ▪ Only company to install bifacial solar panels with tracker on the footprint of a Large wind turbine.

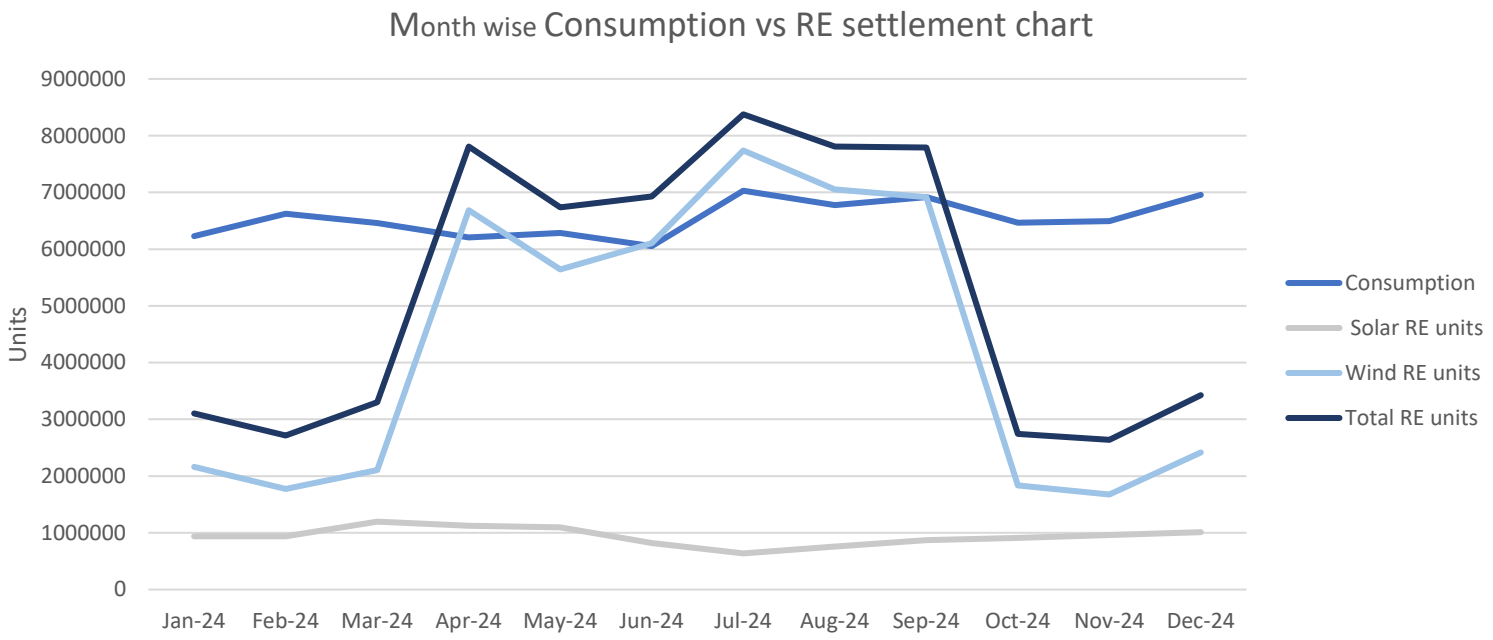
Case Study I – Captive Hybrid with Energy Sourcing Optimization (100% RE sourcing)

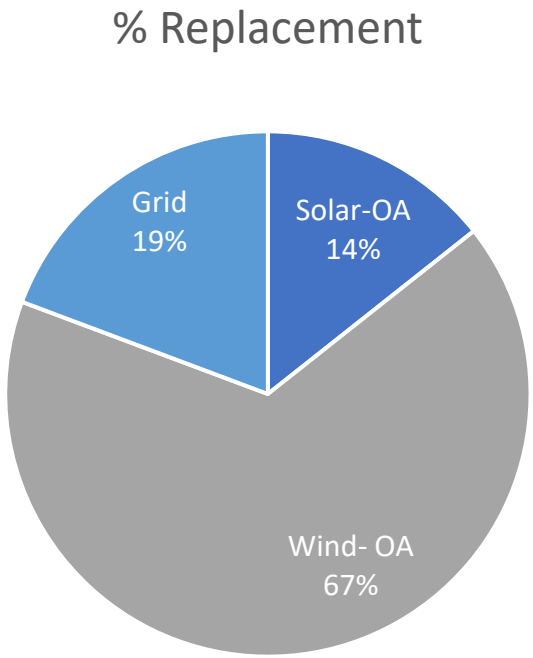
Sources	FY17	FY18	FY19	FY20	FY21	FY22	FY23
Exchange	60%	30%	20%	5%	5%	-	-
GC – Thin Equity	-	50%	-	-	-	-	-
GC - Equity	-	-	60%	80%	85%	70%	71%
Captive Hybrid	-	-	-	-	-	30%	29%
Grid/Discom	40%	20%	20%	15%	10%	-	-
Total MU's	93	88	104	88	94	98	103



- Transitioned from 100% conventional to 100% RE
- Continuous optimization leading to greater than 50% saving equivalent to 40% of the bottom-line
- Path for RE optimized sourcing even without any incentives from govt
- Sustainability also leading to most cost competitive player

Case Study II – Non colocated Hybrid





Source	Capacity	% Replacement	Key Purpose
🌀 Wind- OA	9 x 2.1 MW = 18.9 MW	66.38%	Offsetting majority power requirement
🌞 Solar-OA	8.8 MWp Rooftop	14.35%	Daytime consumption offset
Grid		19.3%	Balance through Grid
Total RE	27.7 MW	80.7%	80% power replacement by RE

Case Study II – Impact & Savings

Metric	Before RE Power March23	After RE Power April 25	Benefit
Monthly Power Bill	₹7 Cr	₹2 Cr	₹5 Cr Savings (71% ↓)
Annual Bill	₹84 Cr	₹24 Cr	**₹60 Cr Annual Savings**
RE Replacement %	0%	~80%	Clean Power Shift

Robust Planning – Future Proofing

- ✅ **Banking Risk Mitigated**: Only 20% of RE depends on banking
- ✅ **Policy-Proof**: Even with banking cap (like Gujarat's 30%) or no banking – Impact negligible
- ✅ **Load Growth Mapped**: if Annual load increase of ~15% naturally offsets excess RE Banked units
- ✅ **State-Specific Strategy**: Designed per Maharashtra policies, ensuring regulatory compliance

Case III – Extensive study of a leading cement client's 13 consumption locations and optimizing the RE sourcing options to achieve RE 100

Power cost reduction: INR 7 to 3 on marginal cost basis + Developed Capex & Opex solution + Roadmap for 100% RE compliant

	2026 - Sourcing in %						Cost of Power - LCOE (Rs./ unit)					
State	BTM Solar	WHRS	CPP	New RE Capacity	Grid	RE %	BTM Solar	WHRS	CPP VC	Hybrid cost	Grid	Avg. LCOE
				Interstate								
S1	11.6%	34.9%	0.0%	32.1%	21.4%	78.6%	0.40	0.46	0.0	2.9	5.46	2.32
S2	4.7%	25.3%	35.4%	20.7%	13.8%	50.7%	0.4	1.00	4.5	3.1	6.2	3.37
S3	11.1%	33.5%	0.0%	33.2%	22.2%	77.8%	0.4	1	0	2.9	6.1	2.70
S4	4.2%	15.4%	0.0%	48.3%	32.2%	67.8%	0.4	1.2	0	2.69	6.75	3.67
S5	9.8%	0.0%	0.0%	54.1%	36.1%	63.9%	0.4	0	0	3.05	7.2	4.29
S6	9.7%	57.9%	0.0%	19.4%	13.0%	87.0%	0.4	2.02	0	2.91	6.81	2.66
				IntraState								
S7	4.7%	7.2%	34.8%	40.0%	13.3%	51.9%	0.5	0.5	3.9	2.7	6.9	3.45
S8	3.4%	0.0%	0.0%	72.5%	24.2%	75.8%	0.4	0	0	2.8	6.88	3.72
S9	6.9%	34.1%	0.0%	53.1%	5.9%	94.1%	0.4	1.43	0	2.8	6.59	2.39
S10	0.0%	31.0%	57.3%	0.0%	11.7%	31.0%	0	0.6	4.8	0.0	8.2	3.87
S11	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0	0	0	0	3.6	3.60
S12	0.0%	32.7%	46.6%	0.0%	20.6%	32.7%	0	0.6	4.6	0.0	6.2	3.62
S13	1.5%	31.1%	68.3%	0.0%	0.0%	32.7%	0.4	0.4	4.4	0	0	3.15
Weighted Average cost												**3.22`**

Developed

Generation profile for wind & solar for each location

Quantum of power that can be met from Hybrid RE

Interstate vs intrastate on cost & % energy replacement basis

Capital & operating cost

Additional RE generation and its utilization in battery

Trading of surplus & deficit power at different points in time

The solution was a combination of interstate renewable power supply, intrastate renewable power supply, Behind the meter solar, waste heat recovery and residual captive thermal plant. An overall RE power consumption of 60% of the group's total power consumption was seen to be achieved by 2026.

Case IV – Feasibility review of RTC power sourcing options for a new cement plant in AP

Integrated solution of Wind solar hybrid with Coal /PSP/Gas Power Plant for RTC operation

- We have considered Hybrid Renewable energy as the primary source, with balance coming from one of the three options (scenarios) :
  i. Gas
  ii. PSP
  iii. Coal
- Gas plant will be co-located with Cement plant and behind the meter.
- PSP is sourced through a long term contract. PSP plant is CTU connected.
- Use existing coal plant of client at reduced capacity. Power supply through short term open access.

Scenario I - Wind solar Hybrid with coal based thermal plant

					in Mn units									Investment in Rs Crs			
Scenarios	WtG	W (MWs)	S (MWs)	coal (MWs)	Consump	From Hyb	From Coal	Surplus	Grid	Hyb Price	Coal Price	Surplus Price	Grid Price	**Wt. avg cost**	Wind	Solar	Coal	Total
Sc I	12	32.4	20.4	7	175.2	113	35	19	27	3.36	5.4	0.00	6.9	**4.3**	264	117	0	381
						65%	20%	11%	15%									

Continued… Case IV – Feasibility review of RTC power sourcing options for a new cement plant in AP

Scenario II - Wind solar Hybrid with Gas based plant

					in Mn units									Investment (Rs Crs)			
Scenarios	WTG	W (MWs)	S (MWs)	Gas (MWs)	Cons. (Mn units)	From Hyb	From Gas	Surplus	Grid	Hyb Price	Gas Price	Grid Price	**Wt. avg cost**	Wind	Solar	Gas	Total
Sc I	15	40.5	25.5	7	175.2	129.5	27	30	18	3.4	14.0	6.9	**5.4**	330	146	28	504
						74%	15%	17%	10%								
Sc II	15	40.5	25.5	7	175.2	130	27	30	18	3.4	10.0	6.9	**4.8**	330	146	28	504
						74%	15%	17%	10%								
Sc III	15	40.5	25.5	9	175.2	130	33	30	13	3.4	10.0	6.9	**4.9**	330	146	36	512
						74%	19%	17%	8%								
Sc IV	15	40.5	25.5	9	175.2	130	33	30	13	3.4	14.0	6.9	**5.6**	330	146	36	512
						74%	19%	17%	8%								

Scenario III - Wind solar Hybrid with PSP based plant

				in Mn units										Investment in Rs Crs			
Scen.	W (MWs)	S (MWs)	PSP (MWs)	Consu	From Hyb	From PSP	Surplus	Grid	Hyb Price	PSP Annual cost (Rs Crs)	PSP input cost	Grid Price	Wt. avg cost	Wind	Solar	PSP	Total
Sc I	35.1	59.5	18	175.2	133	25	37	17	4.3	19.8	4.3	6.8	5.8	286.0	340.9	0.0	626.9
					76%	14%	21%	10%									
Sc II	24.3	56.1	12	175.2	118	21	22	37	4.1	13.2	4.1	6.8	5.6	198.0	321.5	0.0	519.5
					67%	12%	13%	21%									

Corporate Profile

An “IDEA” is born; the first step towards a breakthrough

The company was started with the objective of – Delivering **'IPP'-style comprehensive** Hybrid RE, **maximizing financial** benefits with **customized** solutions.

- **IPP Style** – Site identification, resource assessment, land and ROW and local stakeholder management, approvals, engineering, procurement, foundation, erection and commissioning. Life cycle O&M and asset management.

- **Maximising fiscal benefits** – there is a 30 – 35% cost advantage - (i) GST credit on capex (14%); (ii) Accelerated dep tax benefits (18 – 20%); (iii) lower interest rate (2 – 3%). Payback is as low as 3 years in most states.

- **Customized solutions** – Our problem solving skills, regulatory insight and focus on most efficient solution, allows us to design market leading RE projects providing the most cost effective outcome for our clients.

We are not an EPC company. **We are the largest, integrated, hybrid self owned captive solution provider.**

We are reimagining the C&I Energy Market – hybrid capex & solutions driven

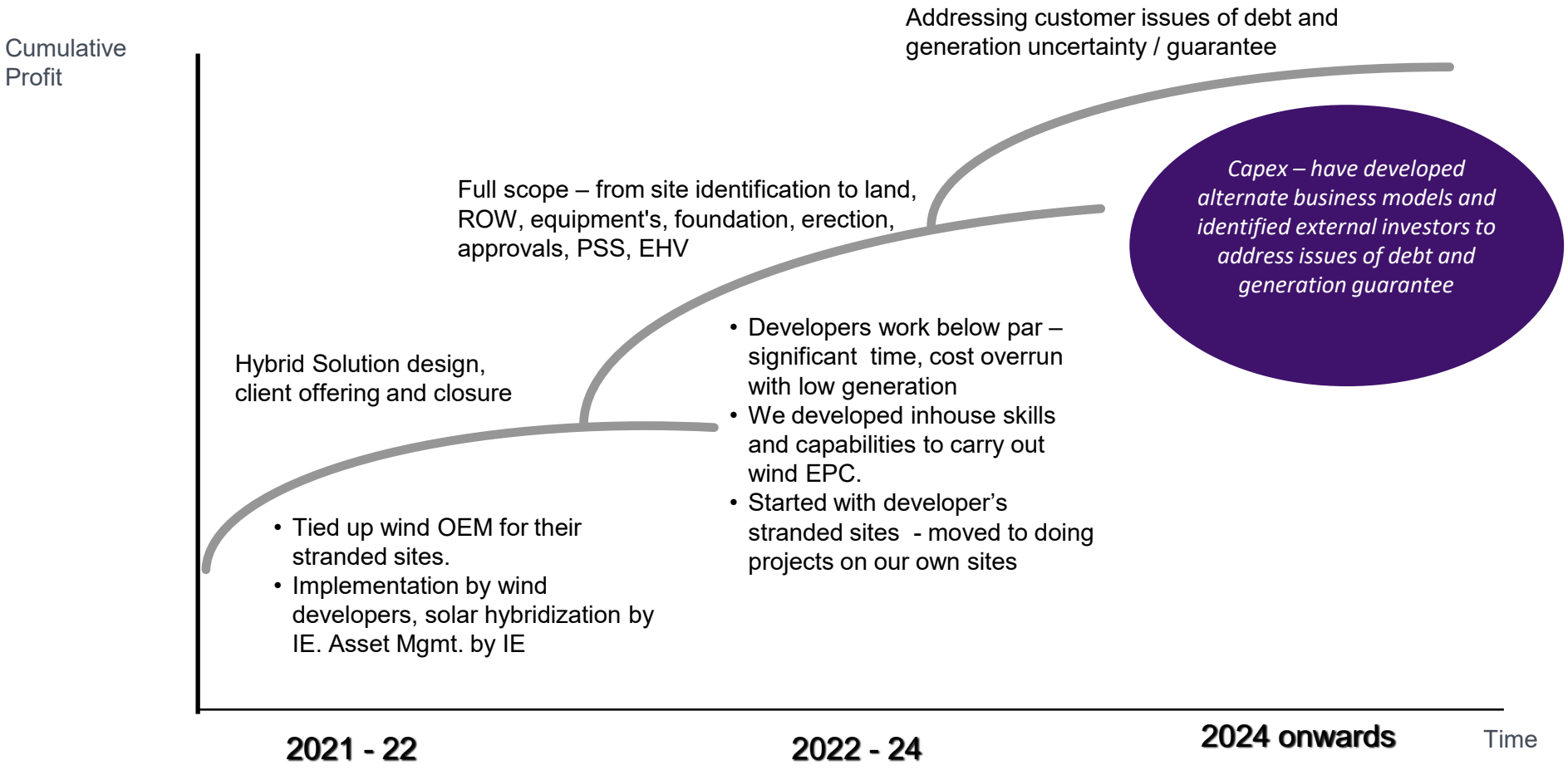
Tax saving focus	Saving in energy cost	Saving in energy cost	Enhanced Saving in energy cost
FiT/Self consumption	Long-term PPAs	Long-term PPAs	Capex - 25 Year investment
OEM Turnkey Solution	IPP driven	IPP driven	Solution driven
Wind	Solar or Wind	Solar or Wind	Hybrid
		Actual equity by consumer	**Capex Plug & Play Hybrid**
AD led Investment	**Thin Capital Opex**	**26% Group Captive Opex**	
Tax and OA Incentive driven (2008 to 2017)	**OA Incentive driven & minimum investment (2013 onwards)**		**No incentive dependency (2020 onwards)**

Increased energy savings

- **Business model focused on – primary product**
  - Capex (consumer investment) driven plug & play hybrid plants (solar + wind)
  - Our offerings include financing, lifetime O&M & generation linked AMC
- **Associated solutions**
  - Offer OPEX solutions by bringing together developers and consumers
  - Short term power sourcing
  - Operational power sourcing optimization and contracting management
- **Leading to significant improvement in market breadth and depth**
  - **Breadth –** no restriction on rating, corporate consumers uncomfortable with GC, many states not allowing GC arrangements.
  - **Depth –** Hybrid along with power sourcing can cover 80% of client power requirement.

Our Journey, so far ….

We have rapidly built inhouse skills and capabilities across the complete value chain



We are completely redefining the renewable energy space

About the Company

1st company in the country to implement wind and solar Hybrid projects in the same land integrated at low voltage level

Group Overview

Company Overview

- Incorporated in 2021 and headquartered in South India
- C&I player, provides end-to-end solar, wind and hybrid project management and asset management services

Key Highlights

Team developed, constructed and operated nearly 1 GW of Wind and solar plant

OEM onboarded
- Suzlon
- Senvion
- JA Solar
- Waaree
- SunGrow

100 MW+ Hybrid Power plant constructed for more than 12 captive customer

Projecting AUM of 1,000 MWs & 100+ clients in three years

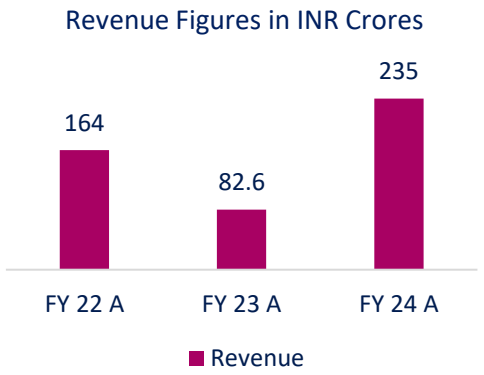
Sites identified in MH (100MW), GJ (50MW), TN (20MW), KN (50MW) for further expansion

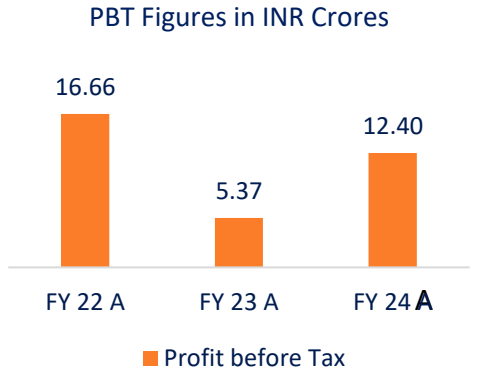
EBITDA positive in year 1 of operation and does everything in-house

Key Highlights

Business segments	Installing Hybrid Power plants	OPEX and short-term solutions	Lifetime O&M	Technology Platform
	Capex (consumer investment) driven plug & play	OPEX solutions by bringing together developers & consumers	Real time monitoring, Power demand & supply forecast, etc	Scheduling, contract management, Power trading, etc

Financial Overview





We are a "ZERO" debt company

Our competitive advantage – integrated power management accounting for each KWH….

1. Execution - Existing Team with Development, construction and operations execution experience. Deep working relationships with - wind OEM
2. Cost savings - Innovative design & customized solutions focused on cost savings
3. Supply management - Variable Supply – less predictable. Power trading, storage etc.
4. Leveraging technology and analytics - IOT Capabilities, Tracking operational activities & Forecast & match consumption with generation
5. Demand management - Variable Demand, Breakdowns & Market dynamics of product, pricing etc

First of its kind integrated offering

	IE	IPPs	EPC / Developers	Traders
Solar	Yes	Yes	Yes	No
Wind	Yes	Yes	Yes	No
Hybrid	Yes	Yes	No	No
Trading	Yes	No	No	Yes
Sourcing optimization / consultation	Yes	No	No	No
Financing	Yes	No	No	No
Lifetime O&M & Gen.	Yes	Yes	No	No
GST and AD benefit	Yes	No	Yes	No
REC / CDM realiz.	Yes	Yes	No	No
Online platform	Yes	Yes	No	No

Integrum Services in brief

EPC & Asset Management

- Pre feasibility
- Engineering & Design
- Procurement
- Project Management
- Construction
- Asset monitoring
- Asset Optimization

Consulting

- Market analysis & recommendations
- Energy cost optimization
- Regulatory analysis & forecast
- Financial analysis with model sales

Portfolio Management

- Entire energy sourcing & optimization
- Demand side Management
- Generation & consumption analysis
- Real-time generation vs. consumption analysis
- Power Trading

IE - Team - Leadership

ANAND LAHOTI	PUNEET GOEL	K G VIJAYVARGIYA	RANGANATHA H R
			
Strategy, Business Development, Project & Operations – CEO	**Strategy, Regulations, & Risk Management Expert - COO**	**Power Market Expert – Head of Sales**	**Eng., Design, Implementation Expert – Executive director (Projects)**
Expertise in New Business / Practice Building, Strategy and Business Planning, Client Acquisition, Business Operations Performance Improvement, Contract Development	**Expertise in New Business / Practice Building, Strategy and Business Planning, Policy and Regulatory in Energy and Mining, Business Operations Performance Improvement, Contract Development**	**Seasoned Expert Business Leader having worked with MNCs. Established new businesses from scratch, scaled up existing businesses with deep understanding of multiple industry verticals.**	**Seasoned Project expert with experience in Project feasibility studies, Project structuring, Engineering and Project/construction management for Renewable Energy Projects.**
16 years of experience in Renewable Power and Utilities, Investment Banking, Equity Research	25 years of Experience in Power and Utilities, Mining, Government, Donor / Multilateral funding agencies. Infrastructure.	25 years of experience in Cement, Metals, F&B, Plastics & Packaging, Real Estate, Data Centre, Textile and Renewable Energy	16 years of experience in implementing RE projects starting from land identification to Commissioning of the project.
▪ MBA, IBS Hyderabad ▪ BCOM (Hons), St.. Xavier's College, Calcutta	▪ PGDM, IIM Lucknow (1998) ▪ BTech (Mechanical), IIT BHU (1995)	▪ MBA(IB), ICFAI (2012) ▪ BE (Mechanical), Raj University (1995)	B.E (Mechanical), UPTU (2007)

Industry recognition….

Received four awards in just 36 months from inception –

- Best C&I Hybrid Project Award
- Best Design & Engineering Award: Hybrid Projects
- Energy Solution Provider of the Year 2023
- Company of the Year : EPC Solutions in Wind and Hybrid Energy 2024

Industry recognition….

Projects implemented and commissioned till date

1. First hybrid - One of the first hybrid implementations in the country - capacity 46 MWs

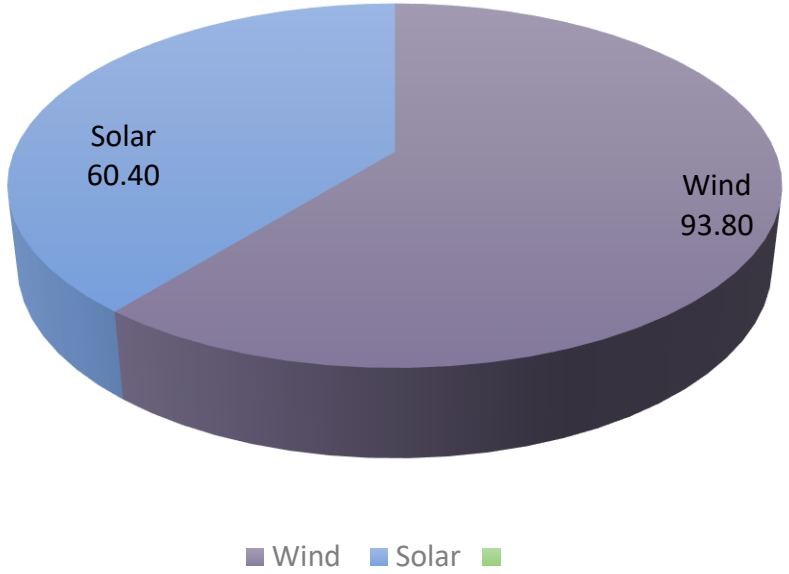
2. Repeat order - Nearly 40% of our recent orders have been repeat – reinforcing our belief in our product and process

3. Only player to have executed wind solar hybrid in the same land area with common evacuation.

4. Demonstrated expertise in complex wind-solar hybrid design and implementation.

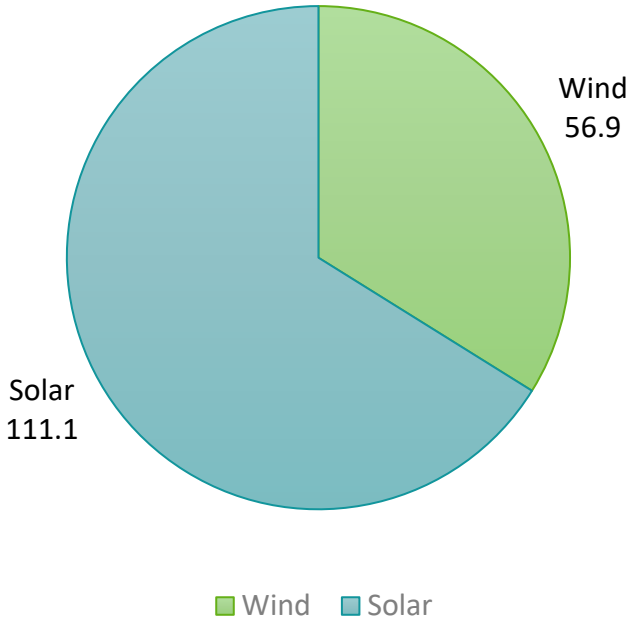
5. Maharashtra – first OA wind implementation (30 MWs) + first wind-solar hybrid implementation at two locations with 85% RE replacement.

6. 90% + RE replacement – at least 3 clients in our portfolio achieving nearly 95% RE replacement



Commissioned as on date			
	Hybrid	**Wind**	**Solar**
Wind Solar Hybrid	64.50	36.7	27.80
Only Wind		57.10	
Only Solar			23.30
Solar RT / BTM			9.30
Total capacity	64.50	93.80	60.40
	154.20		

Projects under development / implementation



1. First large-scale hybridization - Hybridization of existing 50 MW wind with a 70 MWp / 50 MWs solar power plant for a large consumer in Gujarat.

2. Starting the PSU journey with wind - We have won 50 MW wind tender from a Navaratna / Maharatna PSU

3. Energy as a Service – We have signed LOIs with two clients aggregating to 15 MW solar under “Energy as a Service” Model.

	Hybrid	Wind	Solar
Projects under execution			
Wind Solar Hybrid	4.2	2.7	1.5
Only Solar			88.51
Only Wind		6.3	
Projects under development			
Hybrid		14.7	12
Wind		50.4	
Total		74.1	102
Total under development / execution	**176.1**		

Our Key Clientele – C&I

INTEGRUM ENERGY

Steel

KHAYATI STEEL INDUSTRIES PRIVATE LIMITED
Mfrs. Of Billets & Apex Thermex TMT Bars

BALDOTA

Cement

Shree Cement

JKCement

Dalmia Bharat Cement

Paper

A N S Paper Mills

JODHANI PAPERS

Balaji Malts Pvt. Ltd.
MANUFACTURER OF GOOD QUALITY KRAFT PAPER

Plastics

sipani fibres ltd.
QUALITY IS OUR PRIORITY

KLENE PAKS LTD

PLASTO TANKS & PIPES

Textiles

CHIRIPAL INDUSTRIES LIMITED

Nandan
One world with denim

Shanti Spintex

Nandan Industries

GIMATex

Our Key Clientele – C&I

INTEGRUM ENERGY

Consumer/Retail

Greenply

STOVEKRAFT

cloudnine #WeKnowMoms

Automotive

SAAB ENGINEERING

HONDA

PRECISION DRAWELL

O&G/Chemical

GI Graphite India Limited

Syngene Putting Science to Work

HMEL Energising a Brighter Tomorrow

Bharat Petroleum

Others

Amul The Taste of India

mp Micropack Pvt Ltd

BAL PHARMA LIMITED

Thank You

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