

- Overview of KAS Group
- Relevance of Quality, Reliability and Stability of Facility Utilities for PV Industry
- Influence and Consequences of Hazards associated with Utilities
- Is Local Ecosystem Critical for future?
- Project Cost (Utilities) – Drivers



KAS Group



- UHP Technologies Pvt Ltd
(Turnkey Projects Division)
- KASTech Equipment Pvt Ltd
(Manufacturing Division)
- KAS Fab Tools Pvt Ltd

(Semiconductor Equipment Contract Manufacturing Division)



Corporate Office :
1256, 1st Stage, 4th Block, HBR Layout,
Bengaluru 560043

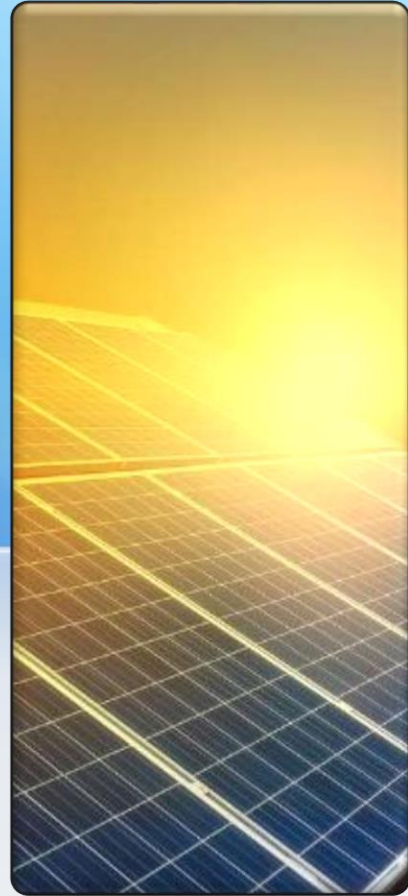


Manufacturing Facility :
Plot No.24, DITP, Apparel Park, Doddaballapur,
Bengaluru 561203

Sectors



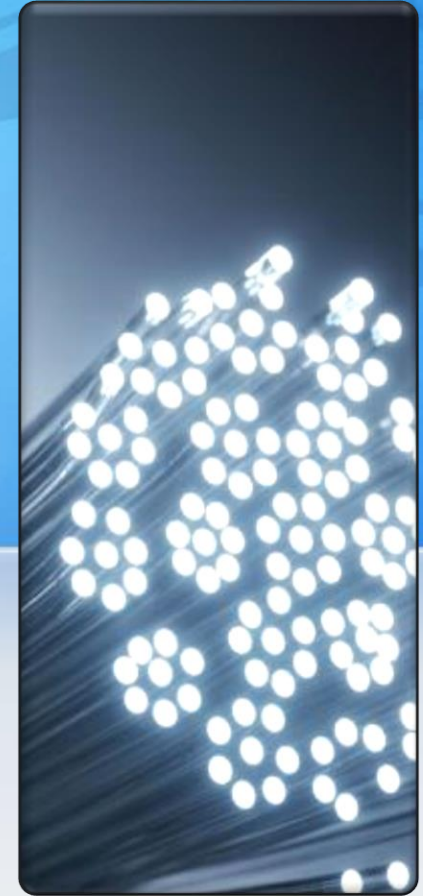
Semiconductor



Polysilicon to PV Cell



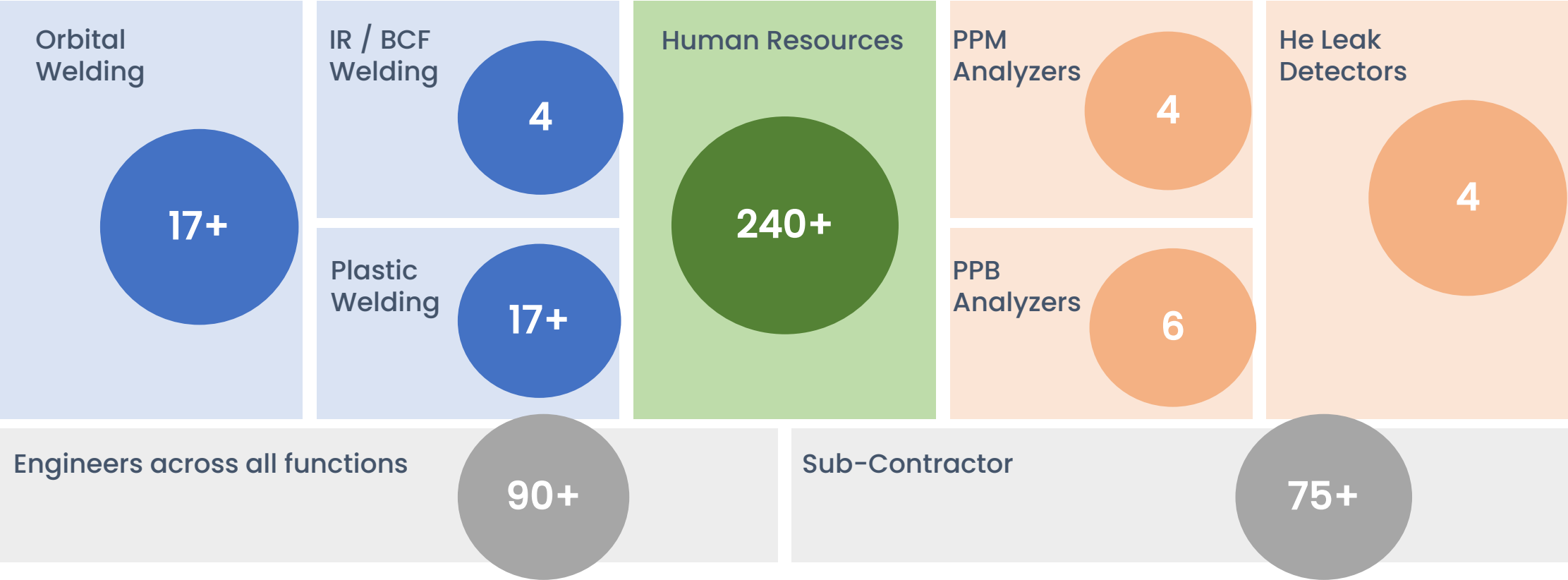
Oil & Gas, Pharma



Optic Fiber

Resources

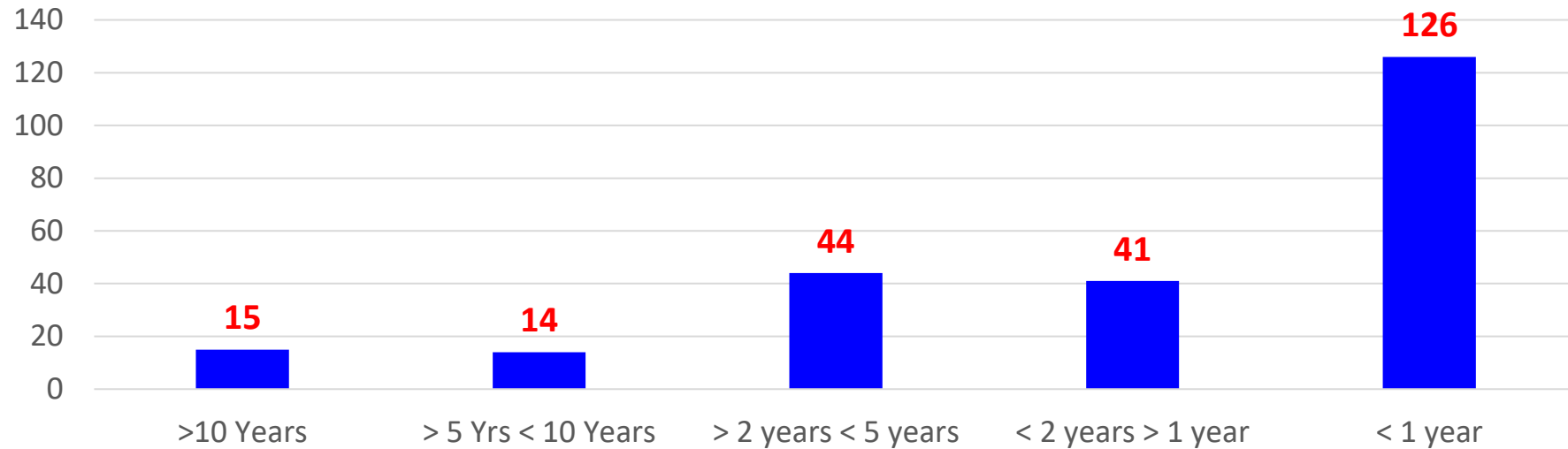
Resources on Human and Machine front is key enabler with external resources being developed on continuous basis



Resources

Resources on Human and Machine front is key enabler with external resources being developed on continuous basis

Employee Journey so far



Sales Engineers - 8

Process Design - 4

Project Design - 8

Project Engineers - 29

Instrumentation Engineers - 8

EHS Engineers - 3

O&M Engineers - 4

Orbital welder / Fitters / TIG Welders / Plastic Welder / Fabricators/Electricians - 98

Product Design - 10

Production Engineers - 9

QA/QC Engineers - 4

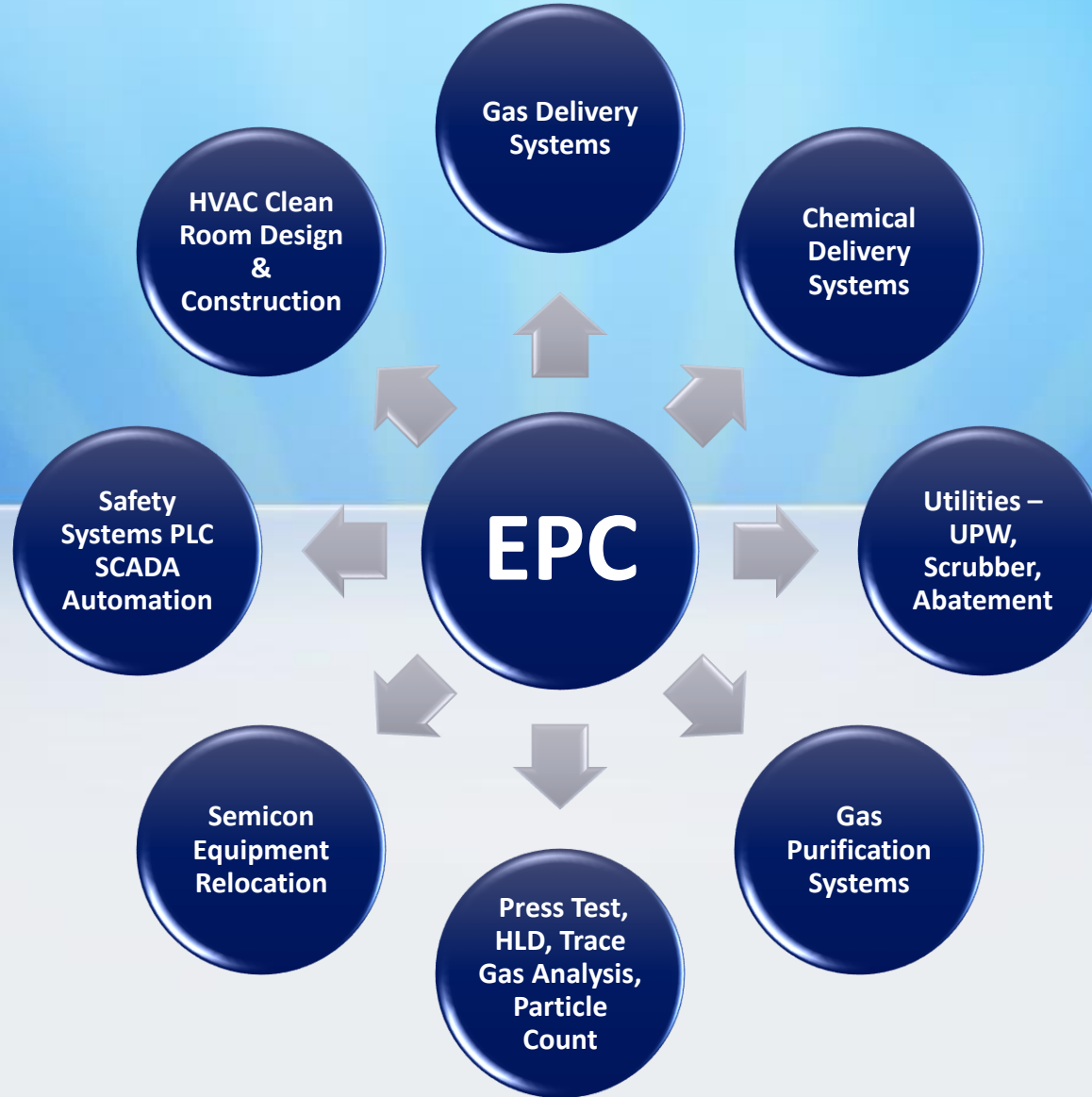
SCM Engineers - 5

Finance, HR, Admin, Graduate Engineer Trainees - 40

UHP Technologies Solutions

UHP's journey is backed by strong inter-dependent solutions for customers under One roof.
Thus, process of meeting Suppliers & Customers growth is critical to UHP's success.

One Stop Solution for all your Utilities.
Design to Delivery
Turnkey Solution



17 years, 275 Projects
India, Singapore, Israel, Turkey, GCC, Egypt

Design Center

Preliminary Engineering

Site Master Plan

Budgetary Estimate

Project Schedule

Basic Engineering

DBR, Room Data Book to
Architects / Consultants

FUM, Utility P&ID,
Layout & RFP.

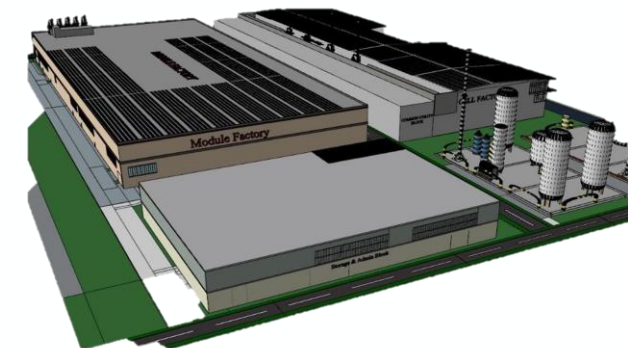
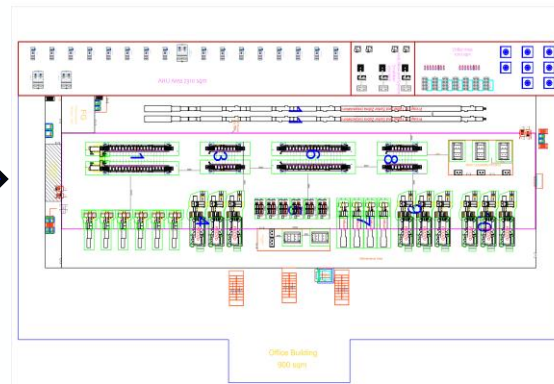
On Boarding of
Sub-Contractors

Detailed Engineering

Footprint of Equipments

GFC Drawings, Capacity
calculation

Coordination Layout



EPC

Engineering	Procurement	Construction
P&IDs, Specifications, BOQ	Onboarding Subcontractors	Equipment Installation
Equipment / Component Data Sheets	Releasing Orders on OEM	Piping & Power cable Installation / Hookup
Coordination Layouts, Pressure Drop	Logistics, Customs, Assembly	Commissioning

All Facility Utility Packages required for Solar / Semiconductor Fabs are part of EPC scope

- Bulk Gases
- Compressed Dry Air
- Speciality Gases
- Process Chemicals
- Process Cooling System
- Ultra Pure Water / DI Water
- Waste Water Treatment
- Waste Gas Treatment
- Chillers, Cooling Tower, Hot Water
- Clean Room Envelope, AHU, MAU
- FFU, BMS
- Facility Control & Monitoring System

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ENABLING NOVEL TECHNOLOGIES

MAKE IN INDIA PARTNERS

SEMICONDUCTORS AND NANO TECHNOLOGY



ULTRA HIGH
Purity Delivery



WET
Chemistry



2D
Materials



WAFER
Processing



GAS
Purification



Environmental

KASTECH Equipment

A knowledge driven team exploring engineering excellence to support local ecosystem growth

Only Indian Co with Class 100 cleanroom for building **SEMI** certified equipment



Over 1000+ equipment on ground producing ~ 10 GW of PV Solar cell

KASFAB Tool

KAS FAB Tools

India's first third party semiconductor equipment fabrication facility
for Thermal and Wet Chemistry tools

Facility Area - 1000 m²

Cleanroom Area- 400 m² (ISO 4 to 8)

Clean Rooms
Machining facilities
Ultra Pure Water cleaning
Acid & Alkaline etching

Vacuum Packing
Orbital welding
Ultra Sonic Baths
Facility with advance QA QC set up

Plastic welding
Critical Tig welding
Electropolishing*

Value Chain Partner for Contract Manufacturing



Value Chain Partner for Contract Manufacturing



Value Chain Partner for Contract Manufacturing



Value Chain Partner for Contract Manufacturing



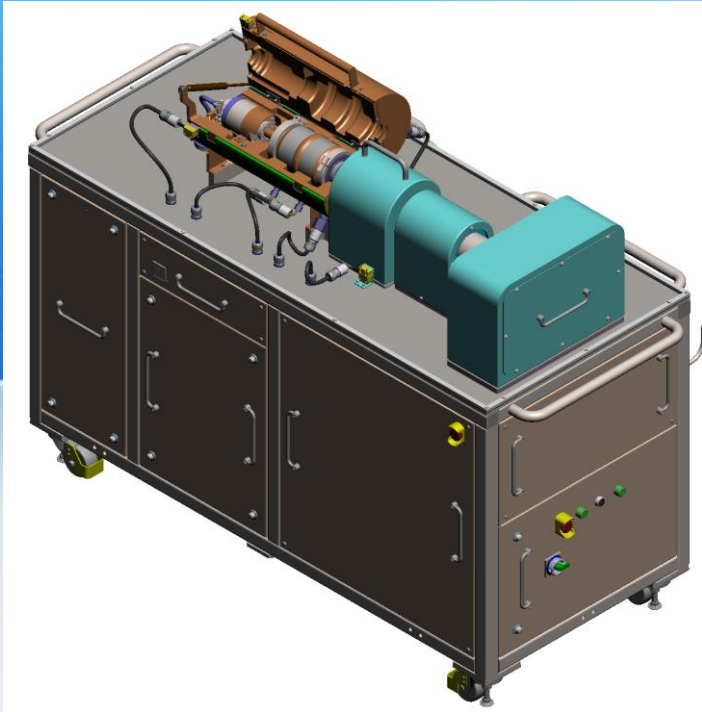
Value Chain Partner for Contract Manufacturing



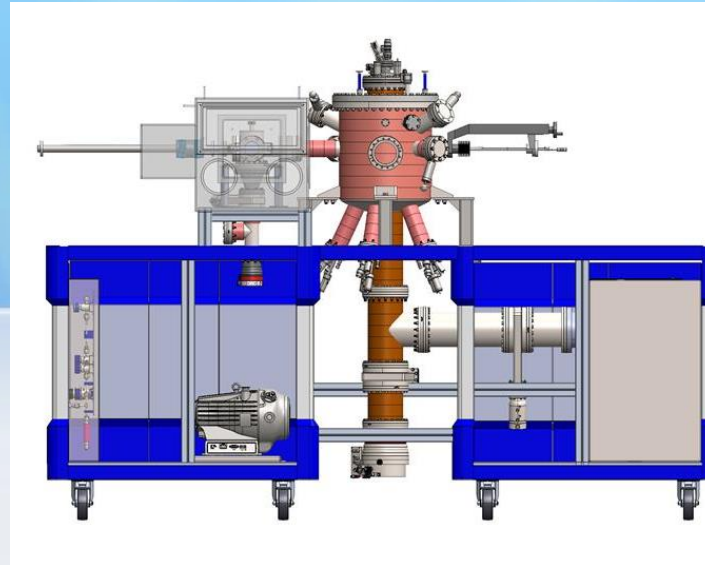
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26 January 2025 at 1:11 pm

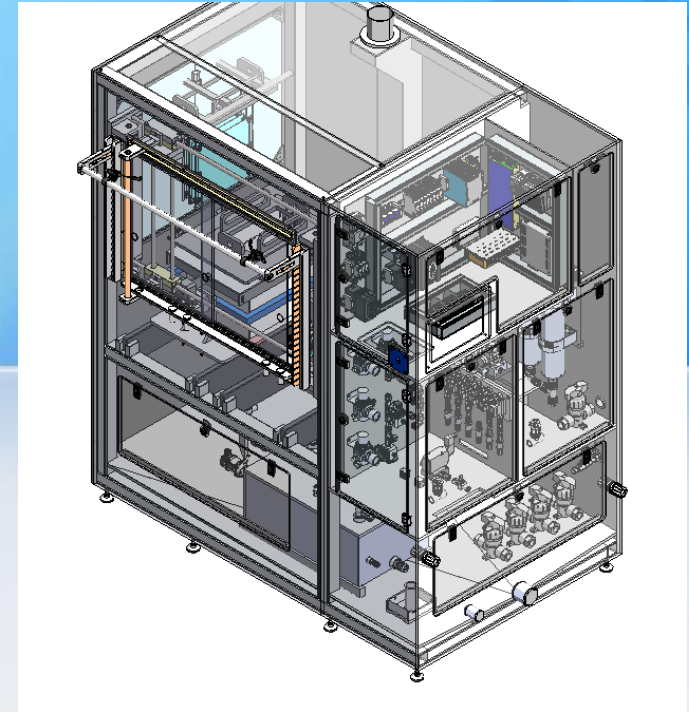
Value Chain Partner for Contract Manufacturing



ALD



E - Beam



Wet Chemistry

Relevance: Quality, Reliability & Stability

- There are many utilities, but some are critical (contact with wafers) like:

Gases



Chemicals



DI Water



Cleanroom

Relevance: Quality, Reliability & Stability

- The impact of impurities from these utilities is profound: (Efficiency)
 - Moisture,
 - Oxygen,
 - Hydrocarbons,
 - CO & CO2 etc.,
 - Contributors are source or
 - Equipment like Gas Cabinets, CDU, Piping, fittings etc.,

Relevance: Quality, Reliability & Stability

- Reliability is function of
 - Right Engineering (Sequence & Sizing) of Equipment
 - Selection of compatible components
 - Proven track record of Performance (PTR), MTBF

Relevance: Quality, Reliability & Stability

- Stability during Ramp up
 - Design validation to withstand pre-agreed peak & average flow
 - Pressure deliverables

Hazards : Influence and Consequences

- Hazards are influenced by:
 - Lack of adequate checks and balances in design
 - Wrong selection of components: mismatch
 - sizes,
 - capacities and
 - wetted parts
 - Operational mistakes
 - Interference / Failure of other services:
 - Exhaust
 - CDA
 - UPS
 - Poor quality of incoming raw material packaging or contents
 - Connectors damaged, poor quality manifolds
 - Impurities (liquid form) due to saturation when compressed

Hazards : Influence and Consequences



Hazards : Influence and Consequences



UHP Technologies Pvt Ltd, India's Leading Speciality Utilities EPC Company

Hazards : Influence and Consequences

- Consequences:
 - Fire – Visible
 - Corrosion – Slow and hence capital loss not recognisable immediately
 - Toxicity:
 - Immediate to slow depending on exposure
 - Short term to Long term to permanent disabilities to fatality
 - Asphyxiation – instant impact
 - Production Loss
 - Business Continuity is at risk
 - Human life at stake results into potential:
 - Legal Liabilities
 - Reputation Loss
 - Failure of Moral responsibility,
 - Loss of Trust from employees

Is Local Ecosystem Critical for future

Tools like Reverse auction have never been successful due to lowest cost basis and cutting corners

- **Case studies**

- Lack of support for commissioning
 - An early entrant in Solar cell manufacturing, got into trouble due to TMA gas cabinet imported from China did not start up.
 - If not for local support, company would have lost 3 months production loss of high efficiency Mono PERC, assuming they would have shipped replacement in 4 weeks.
- Due to short lead time pressures, vendors have dumped non-uniform materials, makes in one system, poor hardness tubes etc., causing significant challenges

Is Local Ecosystem Critical for future

Tools like Reverse auction have never been successful due to lowest cost basis and cutting corners

- **Case studies**

- Failure to meet FAT
 - Vendor who received order from India's large conglomerate for equipment based on lowest cost, did not qualify the FAT.
 - Customer had to release additional order to make the equipment good.
 - Revised cost is more than L2 during order finalisation
- IRR of project suffers in reality due to
 - Integration challenges and
 - Execution delays

Potential Opportunity Loss- Typical

	Rs Crores	Time delay, months		Cost Savings / Loss, Rs Crores			
Cost Over runs	CAPEX	Design Integration	Project Execution	Capex savings @ 10% on paper	Interest Cost due to delay	Opportunity Loss / GW	Total Loss
Projects < 2 GW	1100	3	8	110	91	844	-825
Projects > 3 GW	2000	6	12	200	270	1,688	-1,758
BASIS			RM Cost, Rs	55.8	per cell		
Power, Watt, 182mm	9.56	per cell	Selling Price, Rs	92.0	per cell		
Yield (Post breakages, downtime)	90%		Throughput (rated), Nos	15000	per hour		
		Loss, Rs	488295	per hour			
		Loss, Cr, Rs	35	per month			
		Loss, Cr, Rs	422	per year			

Project Cost for Utilities

- Project Cost – drivers
 - Higher Capacity gives Lower capex / GW. But non uniform across all utilities.
 - Expansion Plans clearly driven by strong Go To Market strategy
 - Technology changes – Are you in beginning of evolution, mature stage or end of the era
 - Having clarity gives a framework for designing the Facility Utilities with optimum cost and preparedness for future

Unfortunately no consultant is able to give you clarity on different scenarios, as it involves beyond the copy paste model of design services.

This exercise involves engineering manhours, knowledge and execution experience leading to upfront cost, which many would not be open to spend due to perception about Industry and hearsay knowledge from people who don't have complete understanding.

Our experience – never fool engineering. Its not Excel sheet but collective experience

Thank You !