



Science explains the world
Science is our world

SCIENCE

of chemistry
of relationships
of inspiration



CSM



Agri



R&D



Pharma

Reimagining a Healthier Planet!

“Lead with science, technology and human ingenuity to create transformative solutions in life sciences”



Courageous

Think *Bold*, act with *Integrity*
and be *Accountable*.



Curious

Question conventional wisdom,
be *Open-minded*, *Adaptable* and *Curious*.



Creative

Differentiate, *Collaborate*,
Experiment and *Execute ideas at speed*.



Caring

Be *Transparent*, build *Trust*, bring the best
out of *People* and embrace *Sustainability*.



Partner Centric

First to identify &
deliver on latent
needs of our
customers



Science & Technology Driven

Sustainable solutions by
early adoption of
cutting-edge science /
technology



Digital Edge

Integrated digital
solutions to gain
competitive
advantage



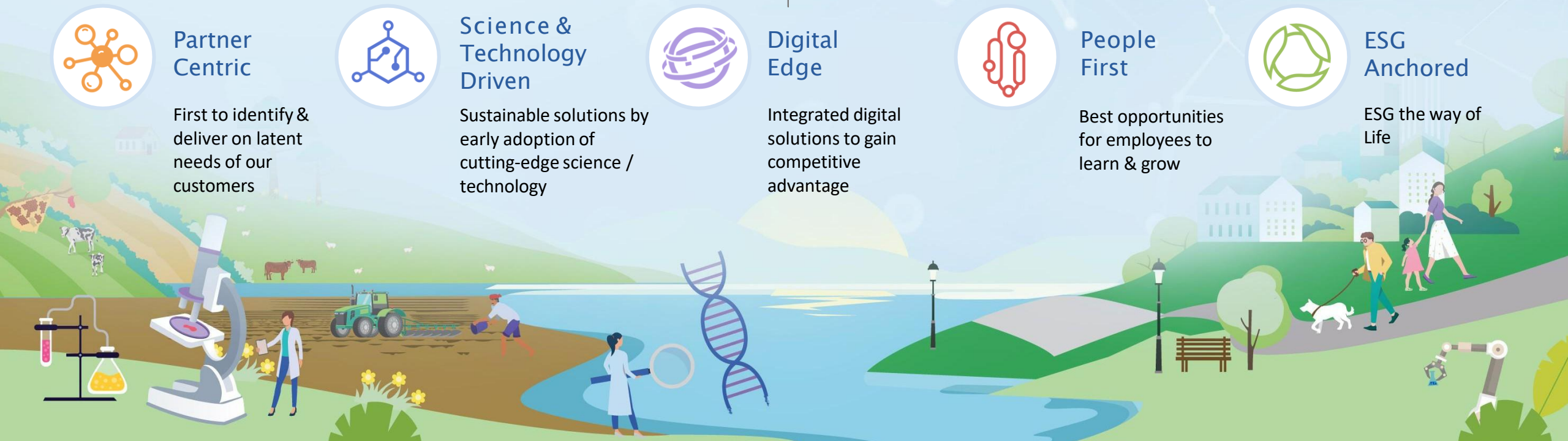
People First

Best opportunities
for employees to
learn & grow

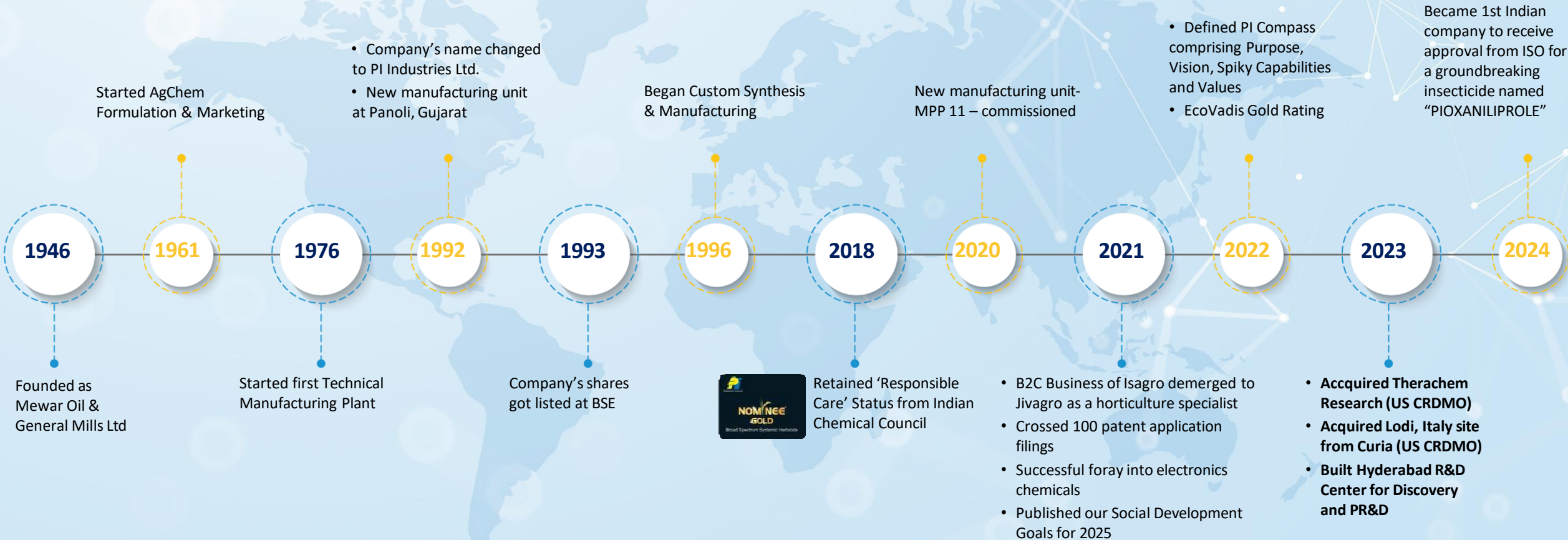


ESG Anchored

ESG the way of
Life



PI has a rich legacy...circa 80 years of delighting customers, and rewarding shareholders





PI Health Sciences (PIHS)

A global CDMO established via integrating,



- **Acquisition of Therachem®:**
 - Alabama (US),
 - Jaipur (India)
 - Ankleshwar (India)
- **Acquisition of Curia® site**
 - Lodi (Milan), Italy
- **Organic Build of R&D facility**
 - Hyderabad (India)

PIHS – An integrated platform from Concept to Commercial



PIHS – An overview of development & manufacturing





-  Team of **600+**
-  Key approvals



-  Life Sciences focused NCE manufacturing is our DNA

- Over 3 decades in Process R&D and manufacturing of NCEs
- OEB4 manufacturing (1 ug/m3)
- Azide, High Energy Chemistry, Phosphogenation, Flourination, Complex Chemistries
- A global leader in continuous flow (15 tons/day NCE)
- Center of Excellence, Enzymatic transformation (engineer own strains)
- ISO 9001:2015 Certified

-  60+ customers, **4** commercial NCEs launched

-  **\$600M** earmarked for future investment

PI Health Sciences: Global sites



A global footprint that serves customers locally

PIHS sites- Early Development to Commercialization solutions



Process R&D

R&D, Enabling Technologies

R&D, Manufacturing

R&D, Manufacturing

Facility	Hyderabad & Alabama	Udaipur	Jaipur & Ankleshwar	Lodi
Temperature Range	Various	Various	-50/200°C	-20/160°C
Reactor Sizes	R&D unit	R&D Center of Excellence Enabling Technologies	0.05-5 m ³	0.05-10 m ³
Equipment	Parallel Reactors Potent Labs Scale up Simulators World class analytical State of the art Process Safety Labs	Cont. Flow Lab reactors Cont. Flow Pilot facility Enzyme characterization Assay development Whole cell biocatalysis Cell-free biocatalysis	Reactors Distillation Nutsche Filters Centrifuge, Tray Dryer	Reactors Distillation Columns Centrifuges, Filters, Ancillary Equipment, Fluid Bed, Double Cone
Construction Materials			Stainless Steel Glass Lined Halar coating	Stainless Steel Hastelloy Monel Glass lined

- Strong PRnD team
- Centralized Knowledge Center

- 33 strong Flow Team, ~10 years, Pilot Flow Reactor system: 1 ton/day
- 23 strong Enzyme team; State of the art infrastructure

- Potent manufacturing
- State of the art, DCS controlled, new kilo lab

State of the art Kilo Lab - GMP facility ISO 8 environment: Lodi

Built up area	Materials of Construction	Equipment Capabilities	HVAC	Automation	Features	Safety	Utilities
<ul style="list-style-type: none"> 36 x 7.2 m 252 Sq mt 	<ul style="list-style-type: none"> SS 316 All Glass Reactors Hast Alloy. C 	<ul style="list-style-type: none"> Reactor - 5 L to 100 L (7 no) Filtration – CF – 14" ANFD/PNF – 20 L Drying – Rotavapor – 20 L /VTD 4 trays Micronizer – 10kg/hr. 	<ul style="list-style-type: none"> ISO -8 Once through 	<ul style="list-style-type: none"> DCS MES 	<ul style="list-style-type: none"> Combination of Mixing Scale up studies Multiproduct operation. Batch size : 5kg API 	<ul style="list-style-type: none"> Equipment's installed in Fume Hoods Antistatic Epoxy flooring Closed Material Handling Vents through wet scrubber 	<ul style="list-style-type: none"> Single Fluid system Temp : (-)20 to (+) 150 Deg.c Purified water with EDI



SS Reactor



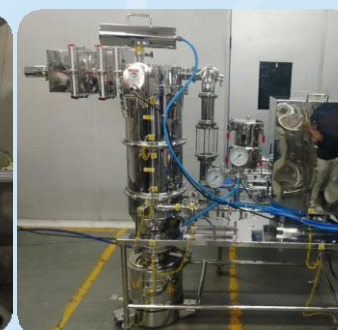
Glass 10 L Reactor



Glass 20 L Reactor



Hast.c ANFD



SS Micronizer



Heating/Cooling system

Areas of expertise and experience...

Reaction	Lab scale	Pilot scale	Commercial
Asymmetric Synthesis	●	●	●
Chiral Resolution	●	●	●
Auxiliary assisted Chiral synthesis	●	●	●
Homo- & Hetero- Atomic Coupling	●	●	●
Metal Catalyzed Reduction	●	●	●
Modified sugars deoxy, fluoro, aza-sugars, thio-sugars	●	●	●
Lactones	●	●	●
N-Heterocycles	●	●	●
O-Heterocycles	●	●	●
S-Heterocycles	●	●	●
N-, O-, S- Benzocycles	●	●	●
Linear Peptides	●	●	
Peptide Building Blocks	●	●	●
Polymorphism	●	●	●
Flow Chemistry	●	●	●
Bio-Catalysis	●	●	●

Project Management: Core Competency at PIHS

Strong team of experienced Project managers with PMP/Agile certifications

RM Procurement

- 2-3 days from PR
- Locally available- next day



Raw Materials



Timelines

Project Timelines

- Estimated timelines proposed project start
- Gantt tracked by weekly report

Data Exchange

- Secured Share point
- Experiments recorded on ELN (eNB: Perkin Elmer)



Data Sharing



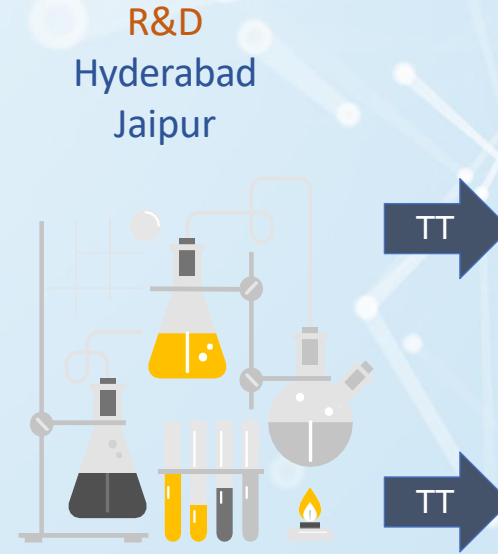
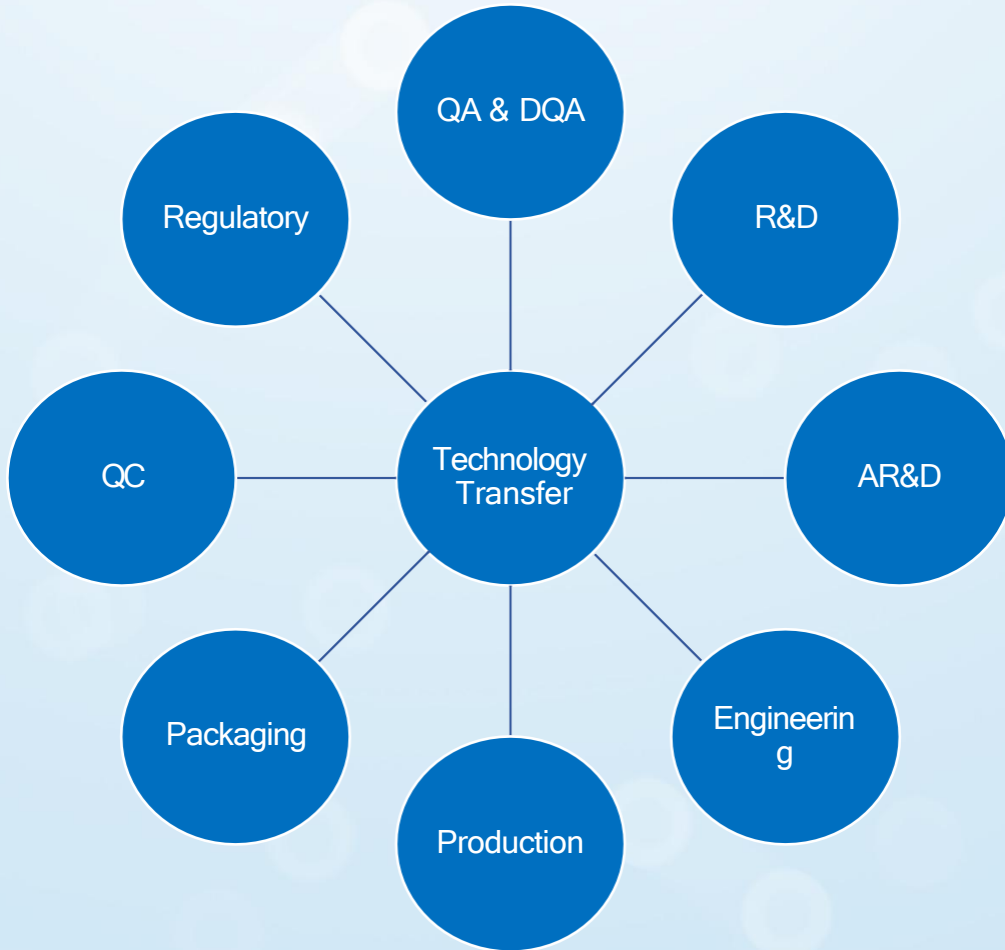
Communication

Project Communication

- Weekly/ Fortnightly report in power point
- TCs on a mutually agreed day and time
- Transparent and quick communication

- Quick/clear communication through TCs, Emails, Calls.
- Standard packaging and shipment through ambient temperature or cold temperature through DHL/world courier partners
- Handles and shares MoMs, invoices, shipments, internal escalations and collects customer feedback

Seamless Technology Transfer



non-GMP Manufacturing
Ankleshwar Jaipur



GMP Manufacturing
Lodi



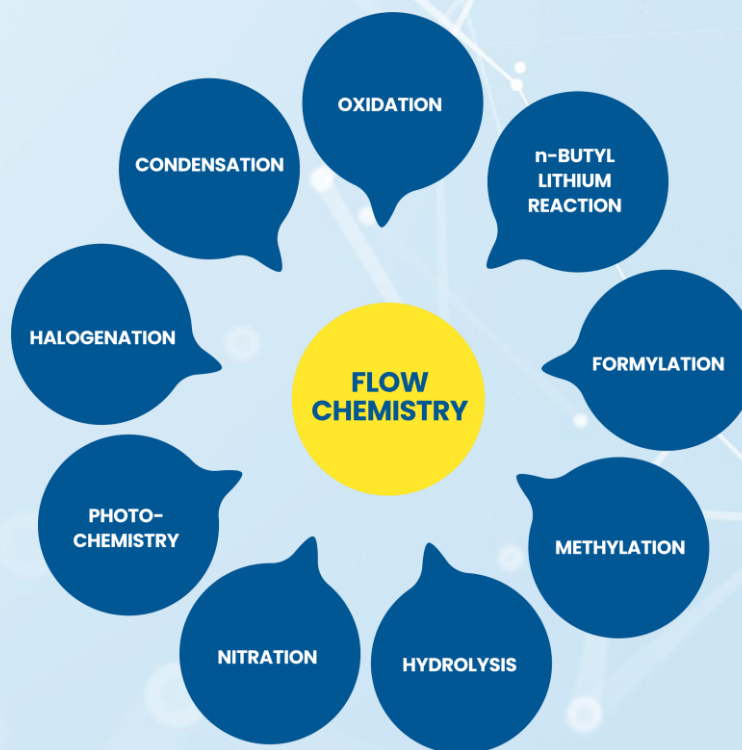
- QBD and DoE approach
- Defining CQAs, CMAs, and CPPs
- Determining In Process Controls
- Demonstration batches
- Kilo/ Pilot batches
- R&D support during validation
- Consistency, Quality, Reproducibility

A global leader in Flow chemistry...

One of the world's largest, life science, commercial flow chemistry plant coming online this quarter
NCE, 15 tons/day, 8 step process, Gujarat, India



- 1 MT/day capacity Flow Pilot plant (Udaipur R&D center)
- Completely Automated with PLC controller
- Heterogeneous/Homogeneous reactions, High pressure/temperature, Hazardous chemistries
- Centralized LIMS system



PI Experience at scale

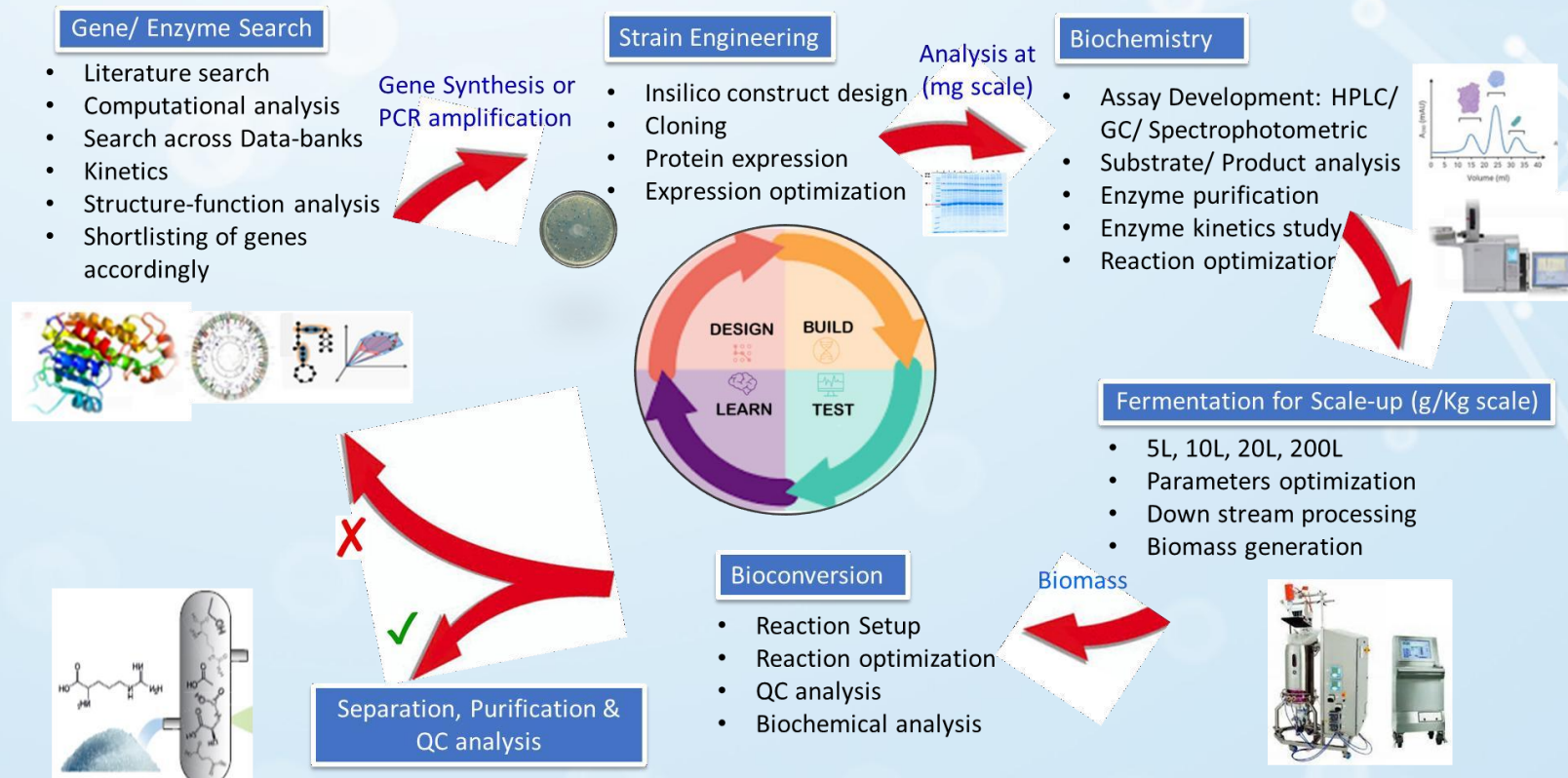
Flow R&D began, 2018
33 scientists & Engineers
Lab units (multiple)
Pilot plant (1 ton/day)

Team Structure

Vaportec, ACR, ATR
PFR, Photo-flow
Spin-Pro, Liq-Liq
Liq-Solid, Liq-Gas

Expertise Systems & Processes

Emphasis on Green chemistry with in-house biocatalyst engineering unit...



Team of 23 scientists
Metabolic Engineering
DNA transformation
Whole Cell Biocatalysis
Cell Free Biocatalysis

Enzymatic transformation & biotechnology lab

PMI
Atom Efficiency
Catalysis
Green Chemistry award

Green Chemistry Emphasis



THANK YOU!