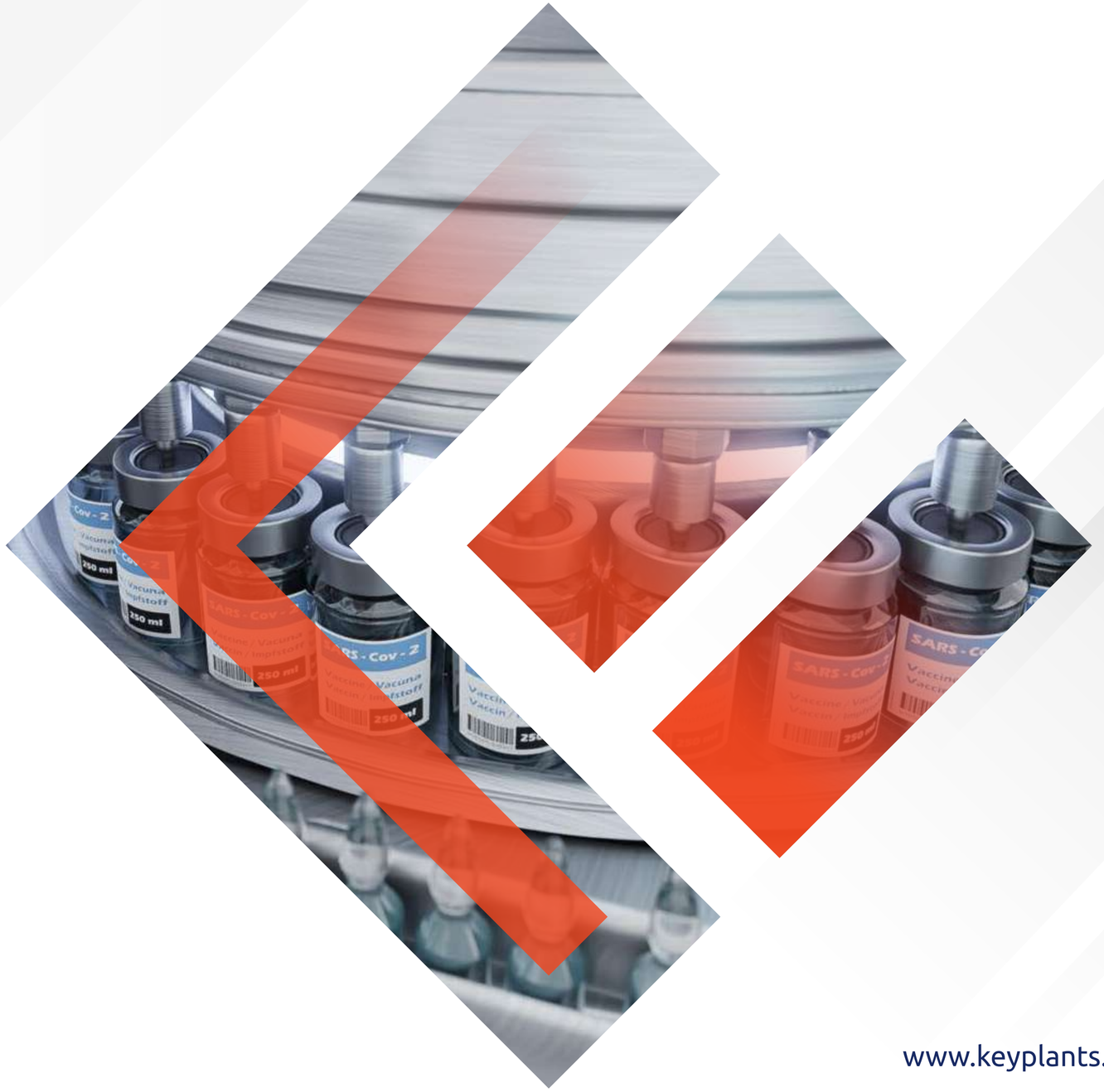
KeyPlants
MascoGroup

Company Profile



A leading provider of
innovative life science facilities

www.keyplants.com

Introduction to KeyPlants

Our capabilities include full in-house design and modular fabrication as well as subject matter expertise in biologics, aseptic filling, containment and manufacturing of APIs and oral solids. We deliver turnkey facilities including process equipment, utilities and digital solutions, as well as facility upgrades and expansions.

> **Leading provider of innovative life science facilities**

Global Modular Off Site Manufacturing Leader

PODs

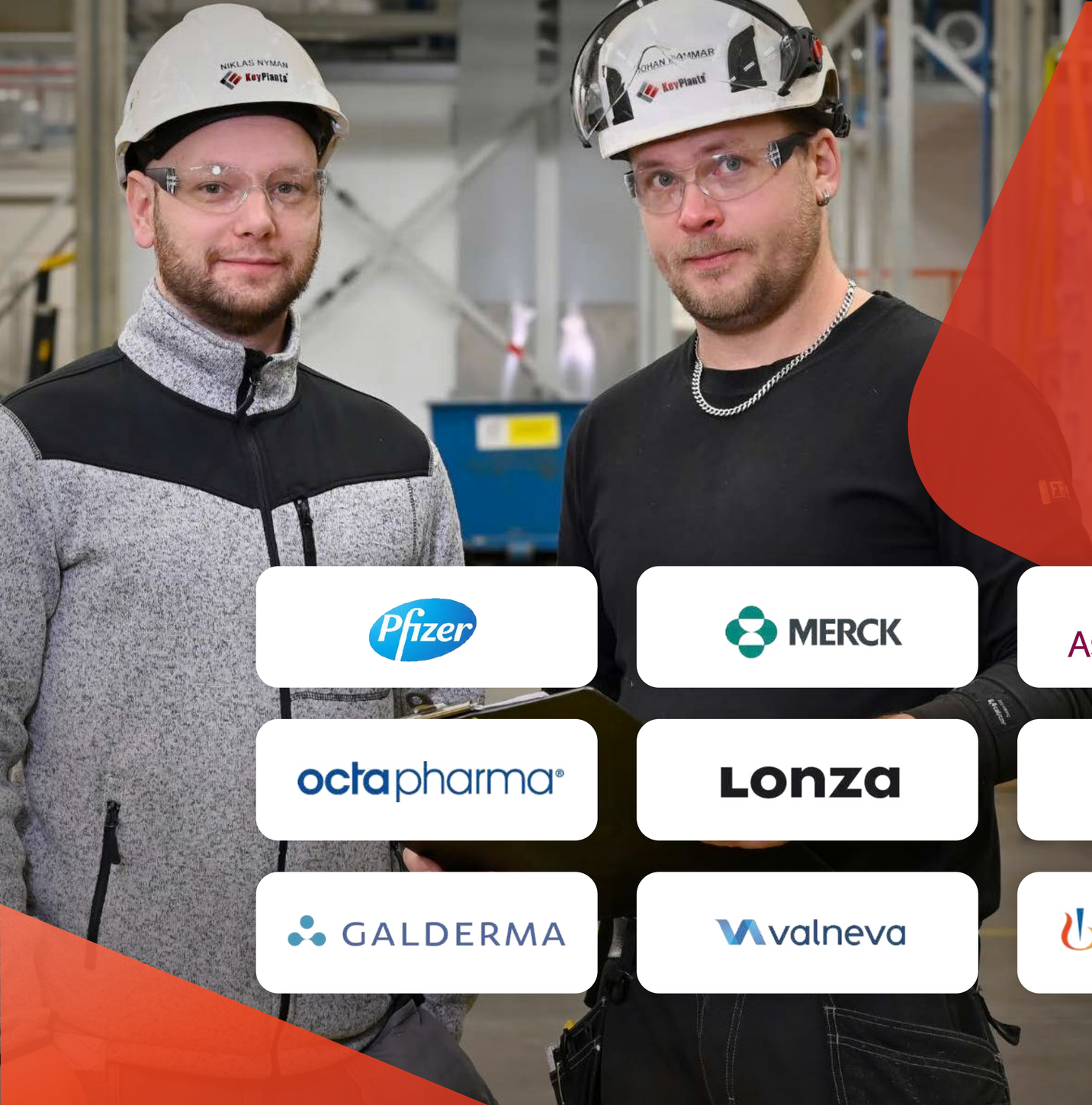
- Portable on demand clean rooms
- Standard Sizes

Internal Modules “Box-in-Box”

- Process integrated and self-contained
- Installed within a shell building

Modular Buildings

- Process integrated and self-contained
- Environmental closure



Experience and Trust

Based on the tradition of industrial innovation in Sweden, KeyPlants became pioneers bringing the modular facility concept to the life science industry. We have developed our ideas and solutions over the years, in close collaboration with leading Big Pharma companies. Today, we partner with several of the top 10 Big Pharma and many regional companies in the world.

Pfizer
MERCK
AstraZeneca
gsk
octapharma
Lonza
IPSEN
Innovation for patient care
FERRING
PHARMACEUTICALS
GALDERMA
valneva
NOVARTIS
TEVA

Global Experience

Historic Milestones

1986
First modular life science facility delivered from Emtunga Workshop

1990-2010
Current senior mgmt. at KeyPlants were pioneers bringing the modular facility concept to the pharmaceutical industry.

2010
KeyPlants founded

2012
Delivery of a modular OSD facility to the Middle East

2013
First Big Pharma order. Delivered an indoor modular facility to Switzerland in 6 months.

2017
Delivery of a modular Aseptic Fill-Finish facility to the Kingdom of Saudi Arabia

2018
Awarded a €80M modular facility to Latin America. Biologics bulk manufacturing and aseptic filling of mAbs.

2021
Awarded to build the first COVID-19 vaccine facility in Africa

2021
KeyPlants acquires Emtunga Workshop

2021
KeyPlants becomes a part of Masco Group and RSBG

2021
Modular extension to a vaccine facility for Big Pharma. Delivered to the USA in 13 months during the COVID19 restrictions.

2022 - 2023
Established US organization, new projects in Sweden, Europe and Middle East

KeyPlants is part of Life Sciences Division of Masco Group

RAG-Foundation funds the long-term obligations of the closed German hard-coal mining industry towards environmental protection, socio-economic development and responsible governance. RAG-foundation has in total over EUR 20B in capital

RAG STIFTUNG

RSBG SE is the future-oriented, reliable and strong investment partner for innovative and successful medium-sized companies.

RSBG SE

We foster innovation.

- **RSBG Infrastructure Technologies GmbH**
  - **Alfa Tech (US)**
  - **RGBG UK**
- **Information & Communication Technologies**
- **Automation & Robotic Technologies**
  - Dorsch Gruppe
- **Advanced Manufacturing Solutions**
- **Life Sciences**
  - MascoGroup
    - KeyPlants®

"Market-leading individual technologies, as well as integrated projects."

Our Value Proposition

KeyPlants is best in rapidly providing sustainable and high-quality turnkey design and modular projects for the life science industry by breaking down complexities into standardised solutions that deliver flexibility and safety for its clients.

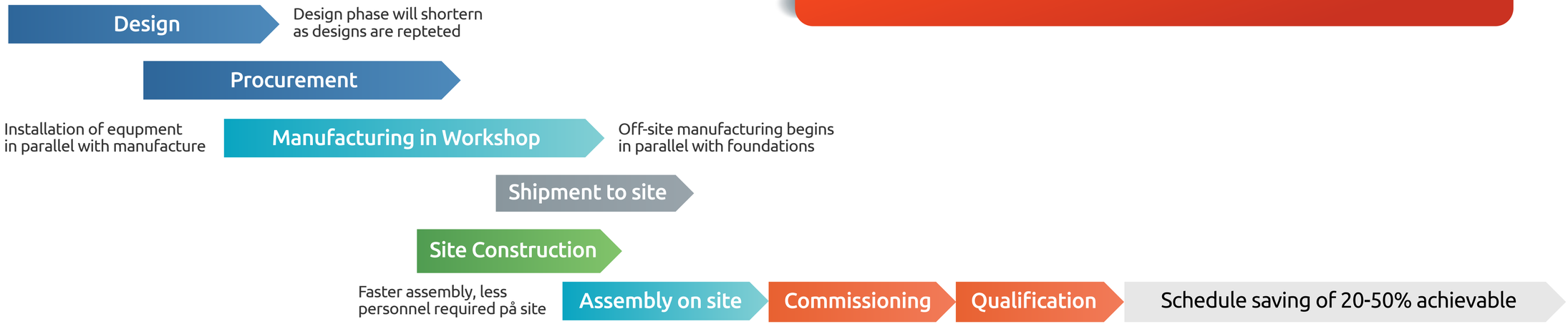
Advantages of Modular Off-Site Manufacturing

- Shorter time to market
- Manufacturing under controlled conditions
- Increased safety and sustainability
- Less disturbance of site operations
- Increased predictability in cost, schedule & quality
- The facility can easily be expanded and moved

Modular Off-Site Manufacturing
Shorter Time to Market

Conventional / Stick-Built Timeline

First-Of-Its-Kind on the Arabian Peninsula



Why KeyPlants
Modular Off-Site Construction Advantages

Global Modular Off Site Manufacturing Leader
unrivalled modular design and execution experience and capability

One-Stop-Shop
enhanced value with full in-house design and construction capability and use of subject matter experts in containment, oral solid dosage, aseptic and biotech processing and modular process plant design.

Vast Experience
we have executed a substantial number of projects to highest quality leading to expedient FDA and EMA approval.

Fixed price based on BOD
with culture of “No Change”

Modular projects have a probability to be executed **10-20 % more cost efficient and up to 12 months faster.**

Adopting modular or modular hybrid to a project **reduces the project risk both on cost and schedule.**

Increased Safety
Outstanding safety records with 85%+ of your facility built in our workshop.

Presence in the region and experience of GCC countries

Turnkey delivery of a modular Aseptic Fill-Finish facility to Saudi Bio, the Kingdom of Saudi Arabia

VACCINE CO is the first and only company aiming to set up state of art Vaccines manufacturing facility in Saudi Arabia.

Local Partners In Saudi Arabia & Other GCC

Selected Design Projects:

الهيئة العربية للاستثمار والإنماء الزراعي
ARAB AUTHORITY
FOR AGRICULTURAL INVESTMENT AND DEVELOPMENT

- Aseptic Fill-Finish facility for FDM Vaccines
- Dubai, UAE, 2018

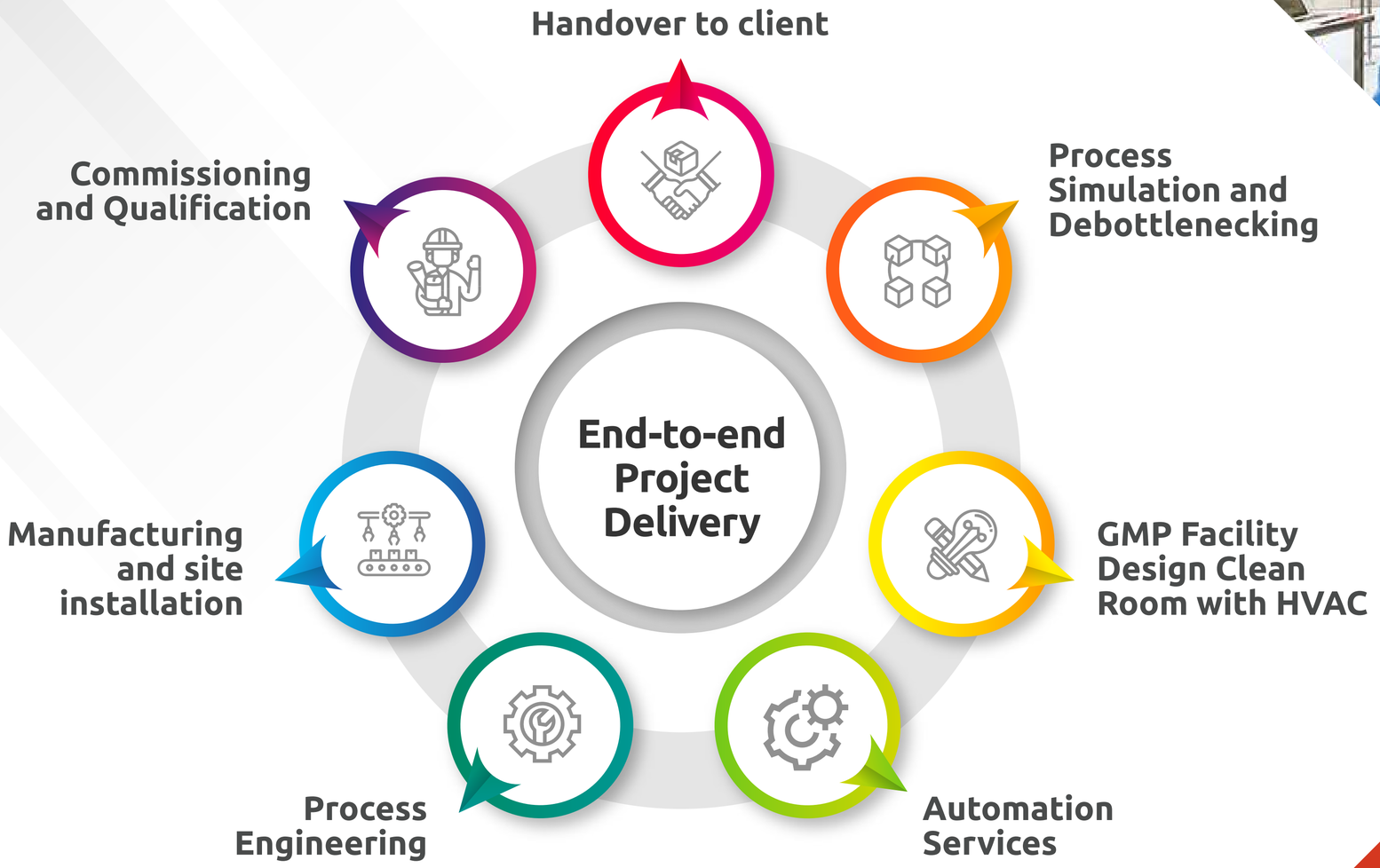
E20 INVESTMENT LTD.
FARMING, PROCESSING & TRADING

- Packaging of vials, PFS and cartridges
- KSA, 2020

PREX PHARMA

- Veterinary Vaccine Fill-Finish Facility
- Abu Dhabi, UAE, 2022

Full-Service
Turnkey Capital Assets



Full-Service Turnkey
Capital Assets

Objectives

1 Concept Design

Develop concept that addresses the client requirements

Budget and schedule according to the client's business case

2 Basic Design

Develop the scope for the selected concept

Prepare and plan the project for execution

3 Detailed Design, Fabrication

Complete the Detailed Design and procure materials

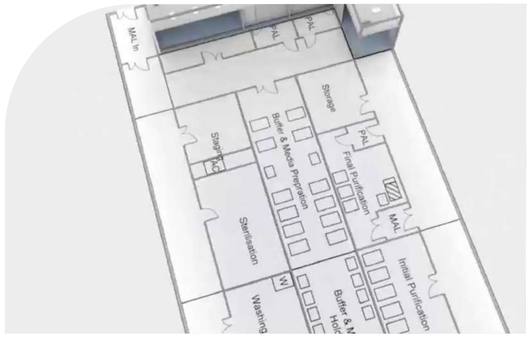
Pre-fabricate in workshop

4 Delivery, Site Construction & Installation, Commissioning and Qualification

Site construction, deliver the modular facility and make site installations

Verify and record all agreed requirements

Hand over to the client's operations organization.



Recent Projects

Project	Bulk and Aseptic Filling Facility, Latin America	Aseptic Filling Facility, Middle East	Vaccine Filling Facility, Senegal, Africa	Expansion of Vaccine Filling Facility, Big Pharma, The Netherlands	Large Syringe Filling Facility, Big Pharma USA
Aseptic processing	Formulation, liquid and lyo vials, powder-filling in vials and two-chamber syringes	Formulation, vial, syringe and cartridge filling	Formulation, pouch - and vial filling	Formulation and filling of vials with VHP	Syringe filling
KeyPlants Delivery	From concept design to operational facility	From concept design to operational facility	From concept design to operational facility	From concept design to operational facility	From concept design to operational facility
Facility with Equipment					

Timing 2020 2021 2022 2023

Galderma, Sweden, Uppsala

The largest Life Science facility ever built in Europe using modular off-site manufacturing

Scope:

Keyplants is responsible for the complete project, including detail design, ground works and construction on-site, installation of all equipment, as well as qualification. The floor area of the new facility is around 13 000 m2 and will be located in direct connection to Galderma's current Uppsala plant.

Delivery:

Off-site construction of the new facility for manufacturing of products in aesthetic treatment has started in January 2023.

Reference project

In the Workshop March 2023

Vaccine Facility, Big Pharma, USA

Scope:

Facility extension with a modular building to increase vaccine manufacturing capacity. A 4-story extension to an existing building with integrated cold rooms and buffer preparation process areas. Façade and roof installed on site to match the adjacent building.

Delivery:

13 months including Basic Design.

Reference project

Expansion of Vaccine Filling Facility, Big Pharma, Europe

Scope:

Turnkey delivery of two story 1,300 m2, BSL2 class modular facility for vaccine formulation and filling. Complex design with meeting requirements acc. to BSL2, Air tightness VDI class 1 and FM global requirements on safety systems. The biggest challenges came from the advanced automated Hydrogen Peroxide Vapor (HPV) decontamination system. Site with limited space close to residential district: just 20 meters away from the neighboring buildings.

Delivery:

Design, procurement and off-site fabrication of complete production building with all process equipment and automation. Site installation and commissioning on client existing site including integration to existing production facility. Delivery time from Basic Design to Finalized off site fabrication of building – 13 months. Site Installation 3 months.

Reference project

COVID-19 Vaccine Filling Facility, Senegal, Africa

Institut Pasteur de Dakar

Scope:

Turnkey delivery of a modular aseptic filling facility to Institut Pastur de Dakar (IPD) in Senegal, Africa. The first target will be COVID-19 vaccine production, with the flexibility to adapt to future needs.

Delivery:

Design, procurement, off-site fabrication and commissioning of a complete facility. This fully customized facility was delivered in less than a year after starting the design work.

When complete 2022

Reference project

2021 on site

Modular Movable Facility, Ferring, Germany and Indonesia

Scope:

This aseptic filling facility was designed and manufactured by KeyPlants in Sweden, shipped to Kiel (Germany) for Tech Transfer, production trials and process validation and finally shipped to Indonesia for validation batches, commercial production and launch. The newly formed production team from Indonesia travelled to Kiel for training, to take over and qualify the new modular units.

Delivery:

A complete manufacturing facility built in one location, further equipped, tested and qualified in another location and then moved again to a final site to begin production.

Reference project

Germany

Indonesia

Bulk Manufacturing and Aseptic Filling Facility, Latin America

Scope:

Turnkey delivery of two modular facilities for bulk manufacturing and aseptic filling. Based on KeyPlants' design platforms MBSTM and MASTM. Outdoor integrated process buildings. Bacterial fermentation with UF and chromatography purification. Liquid and lyo vials, powder-filling in vials and two-chamber syringes.

Delivery:

Complete modular buildings including all process equipment.

Reference project

Aseptic Filling Facility, The Kingdom of Saudi Arabia

Scope:

Turnkey delivery of a modular Fill Finish facility based on KeyPlants design platform Modular Aseptic Solutions (MASTM) from concept design to handover. Indoor “Box-in-Box” integrated process buildings. Combi-filler for vials, syringes and cartridges. Pre-sterilized RTU containers in nests. Formulation instainless steel tanks and disposables.

Delivery:

Complete modular facility with equipment was delivered in 16 months + lyophilization addition

First-Of-Its-Kind on the Arabian Peninsula.

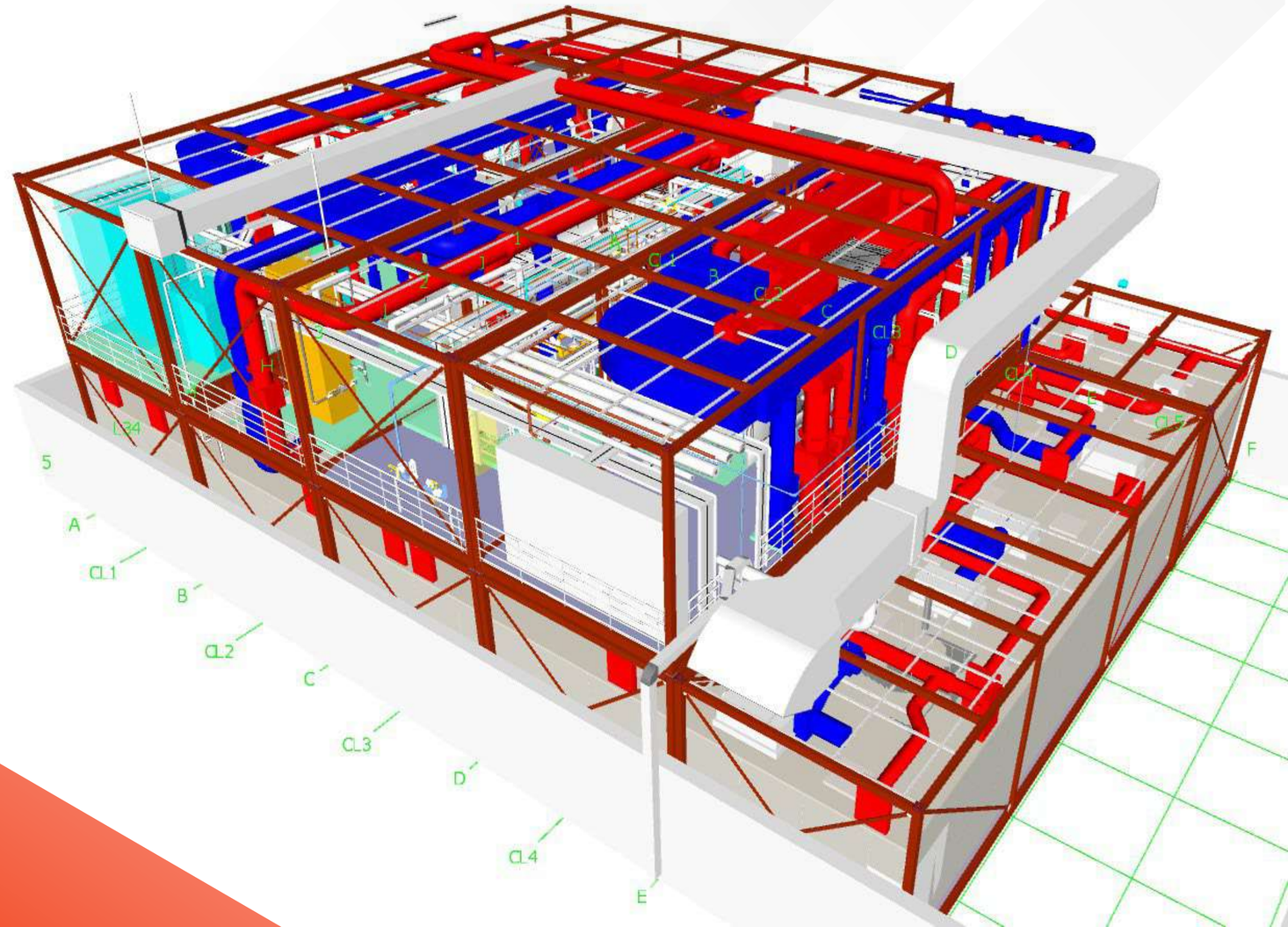
Reference project

Saudi Biotech Manuafacturing Co. Project

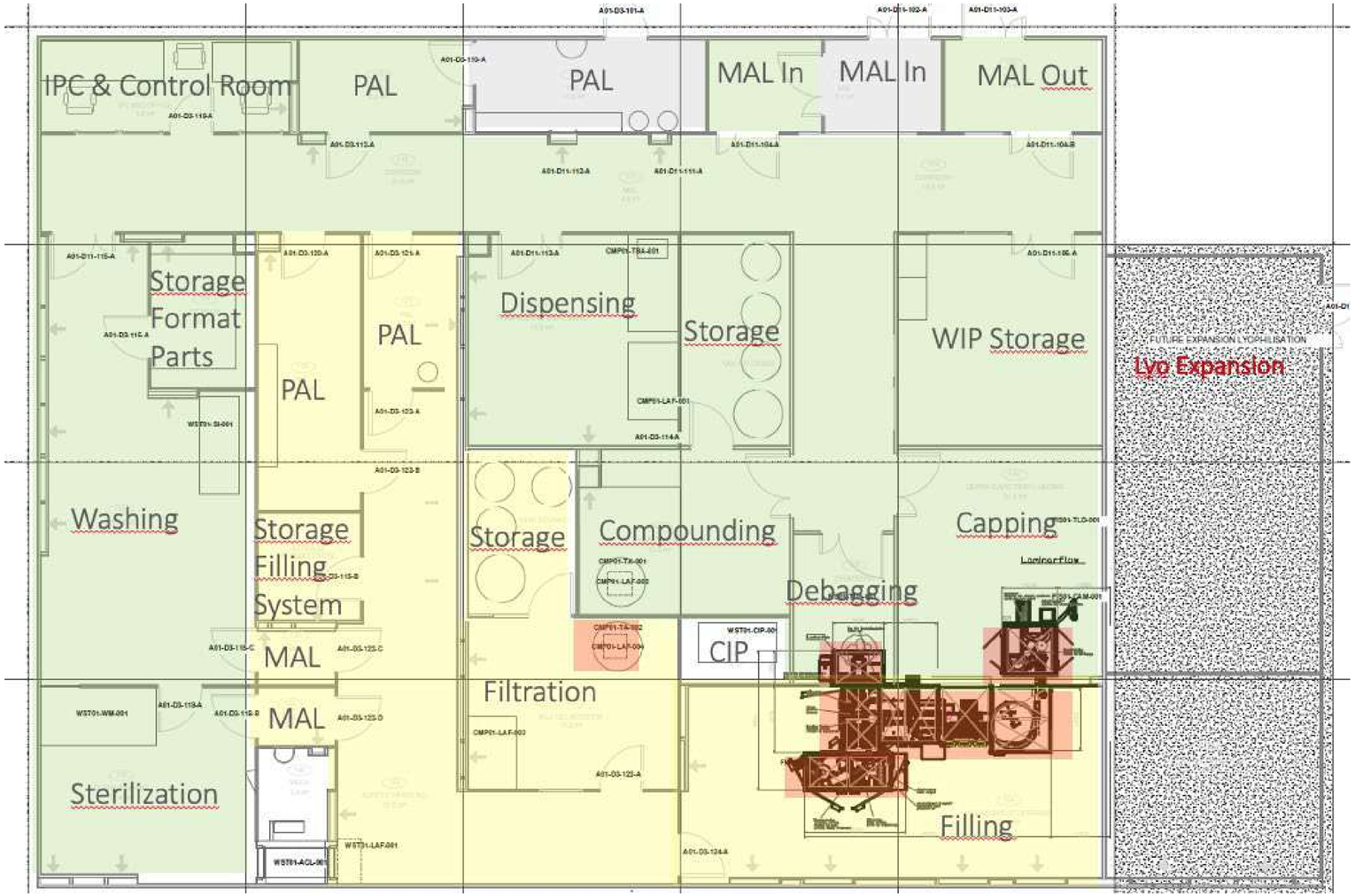
- A facility for rapid deployment globally
- Relocation possibility
- Designed for compliance with requirements of

EUROPEAN MEDICINES AGENCY
SCIENCE MEDICINES HEALTH

PIC/S



Modular Layout with LYO Expansion



- Combi Filler for Vials, Syringes & Cartridges
- Disposable Fill System Pre-sterilised RTU
- Containers in Nests Stainless Steel or
- Disposable formulation system
- Expanded with a LYO module at a later project stage

Fabrication in KeyPlants workshop in Sweden

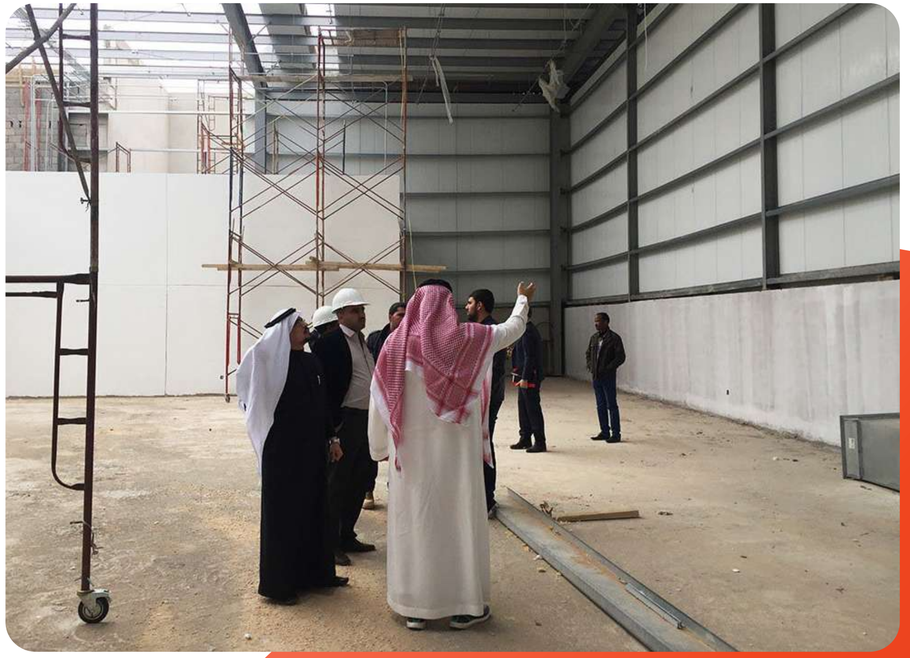
- Fabrication of modules
- Installation of clean rooms, process equipment, utilities and piping
- Testing (IQ)
- Preparations for Transport & Site Assembly

Transportation Route

- Modular facilities can be shipped anywhere in the world
- Modules are shipped below deck to guarantee environmental conditions
- For Saudi Arabia, Dammam on the east-coast or Jeddah on the west coast are harbours options
- For KeyPlants' project to Saudi Bio in Sudair, the harbour in Jeddah was selected

Site Preparations

- KeyPlants assisted the client in sourcing qualified local contractors for installations
- Local constructed building with offices and warehouses and a prepared open space for installation of the modular plant inside the shell-building
- KeyPlants and Saudi Bio checked interfaces between the modular facility and the conventional constructions and local installations



Arrival to the Site in KSA and Site Assembly

- Total transport time from workshop to the site approx. 6 w depending on timing of connecting boat of re-loading
- As arrived and unloaded the modules are lifted on top of each other and winched into the shell building
- As the modules are placed into their final location the structural hook-up of architectural, Piping, E&I and HVAC interfaces are finalized

Qualification (OQ) & Training of Personnel

- Building IQ/OQ executed by KeyPlants
- Main equipment IQ/OQ executed by vendors
- KeyPlants staff and equipment vendors trained clients personnel in operating the facility

Service & Maintenance

KeyPlants provide service and maintenance for completed facilities. This would be detailed in a separate service agreement.

”We compared KeyPlants’ estimate with conventional alternatives and KeyPlants was lower. KeyPlants’ was also able to offer a fixed price for the part of the project manufactured off-site in their workshop, after completed Basic Design. This reduced Saudi Bio’s risk.” - Dr Abdulaziz Awad, CEO

ISO Certified Manufacturing Workshop

- 160 modules indoor and 160 modules in expanded workshop on yard
- 50.000m² area

Modular Offering for the Life Science Industry

PODs

- Portable on demand clean rooms
- Standard Sizes
- Process Tech Agnostic
- Installed within a shell

Modular Facilities

Complete Process & Infrastructure integrated and self-contained

Internal Modules

- Process integrated and self-contained
- Single level or multi-level
- Installed within a shell building or warehouse

KeyPlants PODs

Expandable, express PODs
from the experts

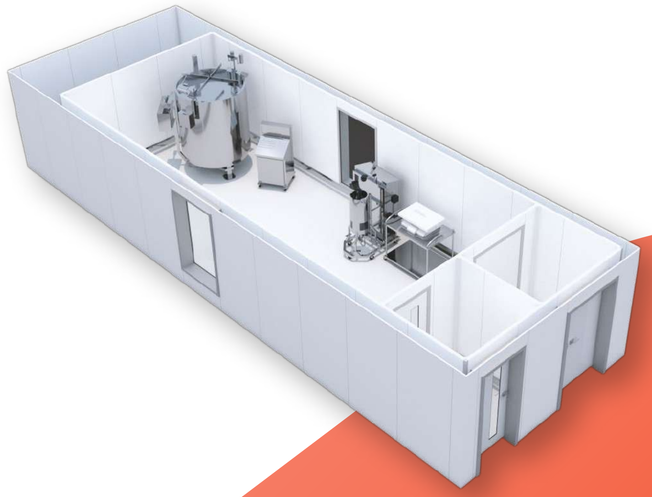
Your Project Partner

Leading provider of innovative life science facilities

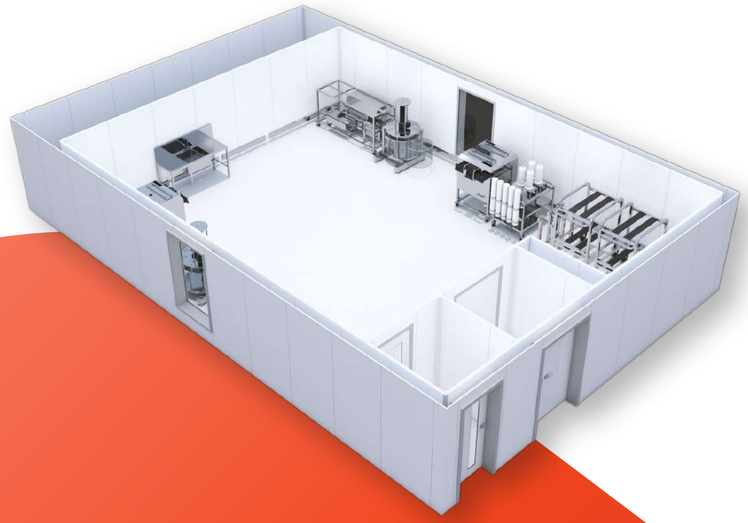
Modular Platform - PODs

- Portable, on-demand cleanrooms for development, clinical and manufacturing
- Self-contained GMP environment
- Installed within larger conditioned building (Gray Space/CNC/Grade D)
- Equipped with dedicated air handling, building management system (BMS), fire protection, and electrical and process utility distribution
- Designed with minimal connections to wider facilities (power, condensate, make up air)
- Personnel/material link on one end and utility access/ connects on other end and process suite in middle

Single wide



Double wide



Single POD Dimensions

Length: ~ 15 m / ~ 50 ft
Height: ~ 4 m (3 m interior)
Width ~ 4.5 m / ~ 15 ft
Area: ~ 70 sqm (per POD)


With airlocks for personnel and material respectively
HVAC control & door interlocks
Superior operator visibility with viewing window
Single point of interfaces (utilities, HVAC, electrical)
Mechanical areas access from ground floor
Removable skin for service access to void between clean room and external skins. Allows for service and reconfigure installations with minimum disturbance from clean room side.
Secondary Air Handling Units with sufficient cooling power
No-ramp entrance
Grid-based ceiling & floor track system for ease of future reconfiguration
Robust design with steel frame Stackable Easy to move with equipment installed
Design prepared for global deployment

KeyPlants' Design Platforms:
MBSTM - Modular Bio Solutions and MASTM - Modular Aseptic Solutions

KeyPlants' design platforms have been developed to simplify the construction of turnkey biopharmaceutical and aseptic filling pharmaceutical facilities. A flexible facility solution for rapid deployment of new biomanufacturing and aseptic filling facilities.

Speed

- Less design efforts – an Alignment Study saves time for Engineering
- 4 months delivery time for prefabricated clean rooms
- 12 months delivery time for a complete facility for commercial production

Flexibility

- Configurable to any biomanufacturing or aseptic filling process
- Ability to add on unit operations such as fill finish
- Expandable to manage increased demand forecast
- Mobile to enable re-location

Predictability

- Fabrication in workshop secures predictable quality and timeline
- Fixed price on fixed scope after Basic Design

Modular Bio Solutions

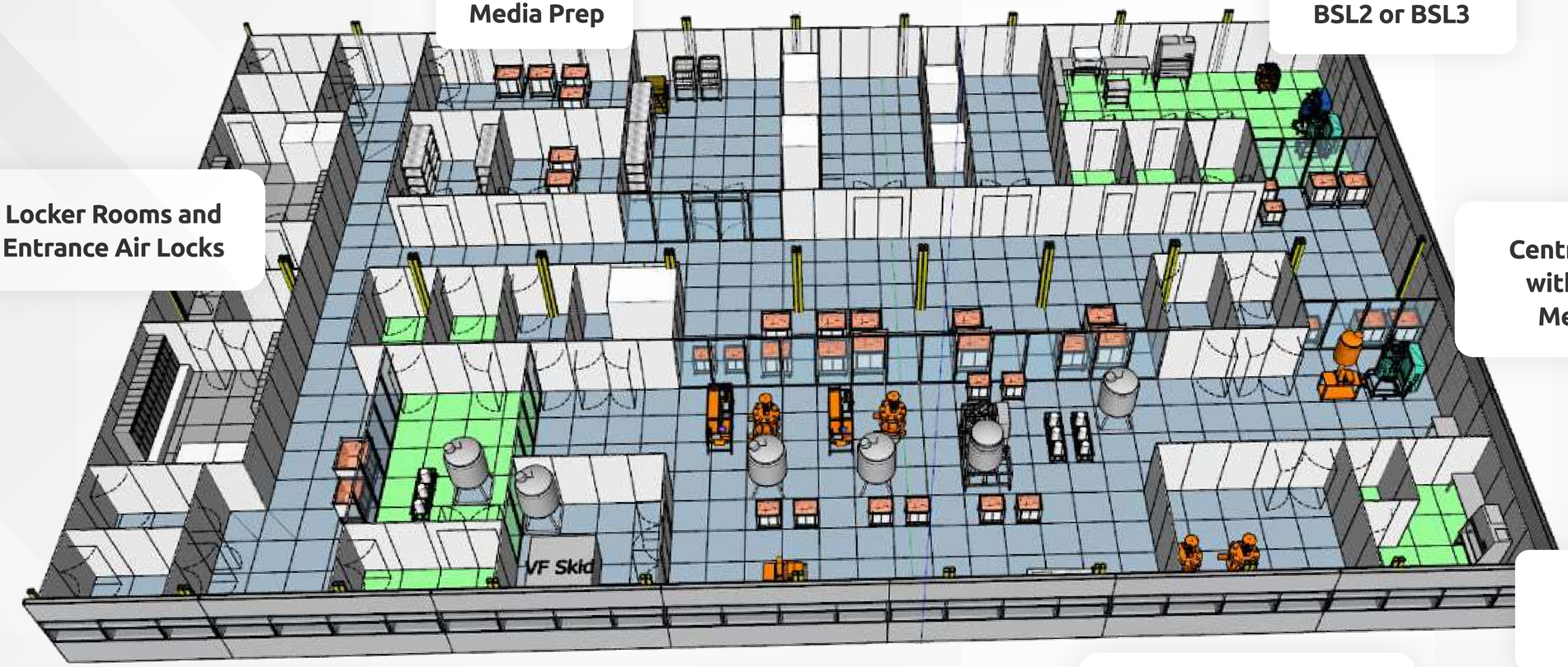
- Pre-Engineered design platforms to reduce time to market
- Turnkey delivery including in-house bioprocessing expertise ensure industry standards are met
- Optimised layout and equipment positioning for reduced footprint and savings in utility and energy consumption, operations costs and maintenance

Modular Bio Solutions

The MBSTM Design Platform is available for the following biomanufacturing processes

- Therapeutic Proteins
- Monoclonal Antibodies
- Viral Vectors
  (vaccines and gene therapies)
- Microbial Vaccines

Layout Example



Washing, Preparation and Storage

Buffer & Media Prep

Cell Cultivation BSL2 or BSL3

Locker Rooms and Entrance Air Locks

Central Corridor with Buffer & Media Hold

Virus Seed Lab

Final Filtration & Formulation

Virus Inactivation

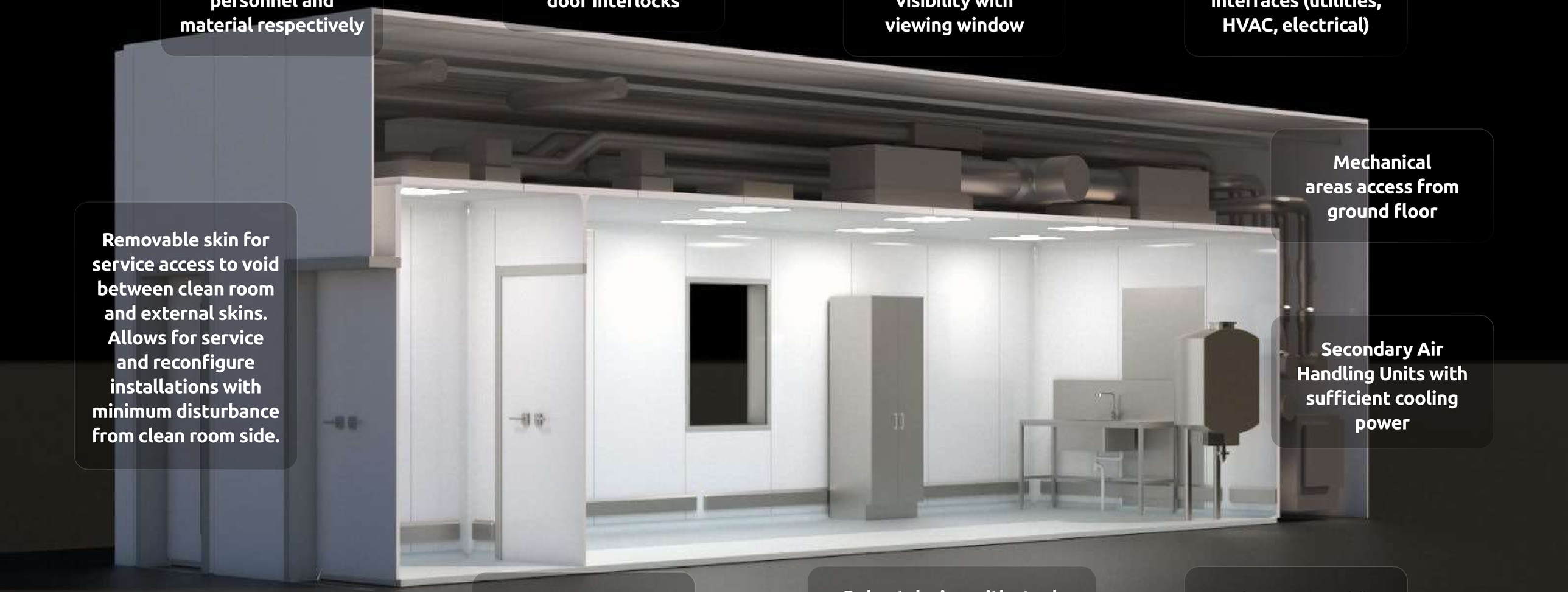
Virus Infection, Harvest & Purification BSL2 or BSL3

With airlocks for personnel and material respectively

HVAC control & door interlocks

Superior operator visibility with viewing window

Single point of interfaces (utilities, HVAC, electrical)



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Grid-based ceiling & floor track system for ease of future reconfiguration

Robust design with steel frame Stackable Easy to move with equipment installed

Design prepared for global deployment

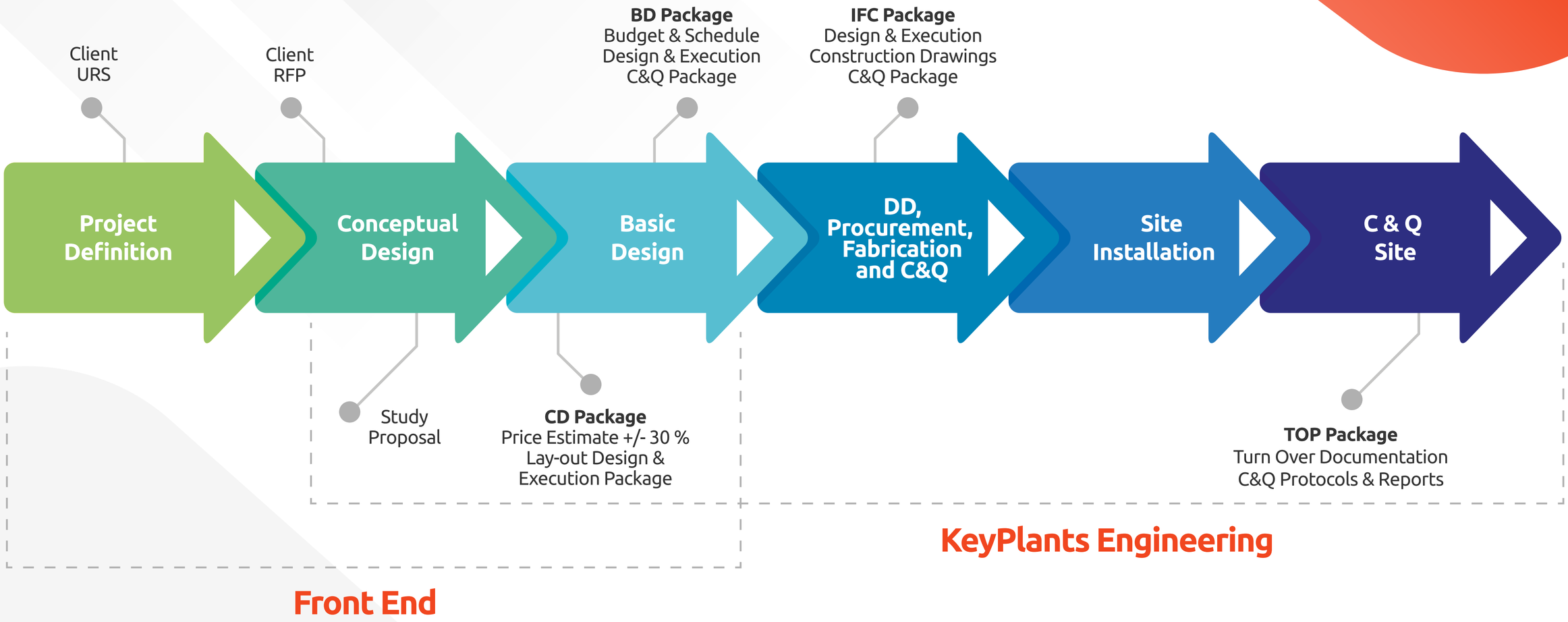
Functions to Establish Local Manufacturing

Client	**Business Case**	**Financing**	**Product Licencing**
	Organization and Human Resources	**Quality System and Training**	**Regulatory**
KeyPlants	**Design**	**Production Facility Build**	**Site Infrastructure**
	• Concept Design • Basic Design • Detailed Design	• Building • Utilities • Process Equipment • Automation	• Infrastructure • Warehouse • QC Lab • Office and Admin
	Technology Transfer	**Process Validation**	**Maintenance**

Project Execution Model Overiew

Project Phase G0	Conceptual Design G1	Basic Engineering G2	Detailed Design + Fabrication + Commissioning. EXW G3	Delivery + Construction/ Installation + C&Q G4
Objectives	• Develop various alternatives that addresses the client opportunity • Select the preferred concept and define the conceptual scope • Budget and schedule according to the client's business case and as agreed in the CD contract	• Develop the scope and complete the basic design as agreed with the client for the selected concept • Align, prepare and plan the project for the execution as agreed with the client and according to the client's business case	• Complete the Detailed Design and procure materials • Pre-fabricate as applicable regarding scope and according to the approved and contracted scope, cost and schedule.	• Deliver, construct/install the scope of works • Verify and record all agreed requirements in the contract. • Hand over to the client's operations organization.
Key Input	• Client URS or similar document • Client Project drivers and business needs • Target value design cost	• CD Report and updated URS's by client • Client insurance and EHS req. • Lessons learned • Client stakeholders, drivers, decision roadmap and target value	• Agreed contract with client • Incl. KeyPlants' Basic Design or • (client design if bid or similar)	• Construction/Installations drawings • C&Q protocols • Site Execution Plan
Key Deliverables	• Project Estimate • Draft Project Schedule • Concept and execution strategy • Scope Description • Risk assessment • QEHS strategy • Constructability & Permitting strategy • IT and Automation Strategy • CD Report with process description • CD Design Deliverables	• Price, Estimate and schedule • Scope, requirements & VE • Agreed vendor list • Interfaces & responsibilities • Risk assessment's • Quality plan with procedures • Execution plan with procedures • Contract for execution • Constructability and permitting • Codes, regulations compliance report • Agreed documents review & approval	• MTO's and procurement packages • Construction drawings and specifications • C&Q plans • Test protocols • EHS Plan • TOP	• As-builts • Executed test protocols and reports • Final and complete TOP
Typical Commercial Terms	T&M	T&M	Fixed price if risk can be absorbed	T&M
Accuracy Project Budget	+/- 30%	Fixed price or T&M +/- 10%, firm schedule	Fixed price for Ex works parts, cost plus for equipment, firm schedule	T&M budget
Gate	Technical and commercial review CD Submittal. Commercial roadmap	Technical and commercial review BD Submittal, project ready for contract.	Project ready for delivery	Project Closing check list Client take over

KeyPlants Project Execution



Front End Design and Process Simulation Services

- **Site Master Planning**
- **Process Architecture**
  Adjacency Studies
  Facility Layouts (Floor Plans, Equipment Layouts, Zoning)
  Flow Layouts (Product, Material, Personnel)
- **Process Simulations and Production Scheduling**
- **Process Design**
  Process Flow Diagrams
  Design of production systems for biopharmaceutical and aseptic manufacturing
- **Containment Strategies**
- **Technical Audits**
- **Subject Matter Experts**
  Biotech / API / Fill & Finish

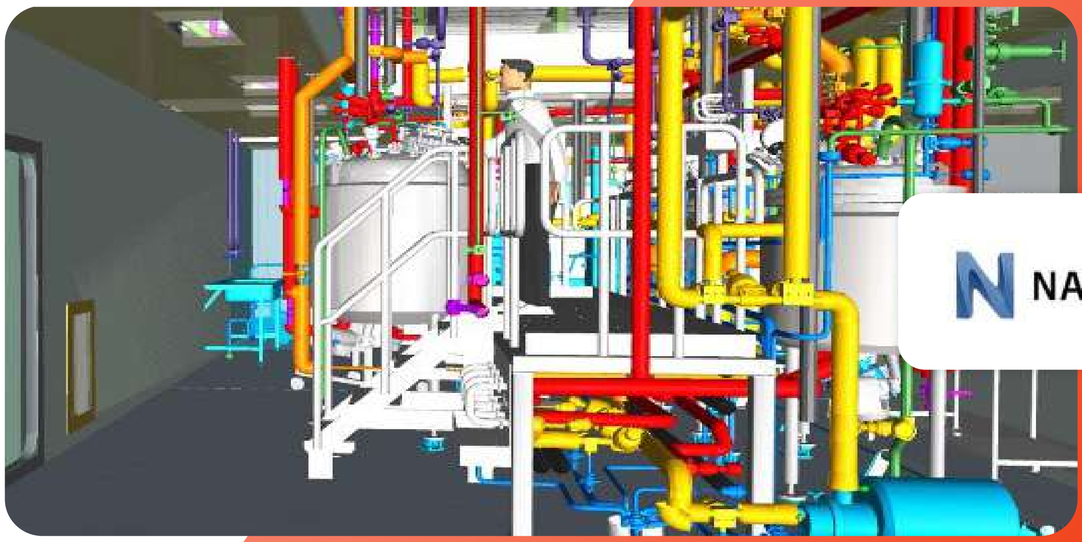
Process Simulation and Production Scheduling

- Simulation of batch and continuous processes
- Scheduling of batch operations
- Throughput analysis
- Cycle time reduction and debottlenecking
- Equipment occupancy
- Sensitivity analysis
- Clean utility consumption
- Utility consumption
- CIP/SIP system set-up
- Drain system simulations

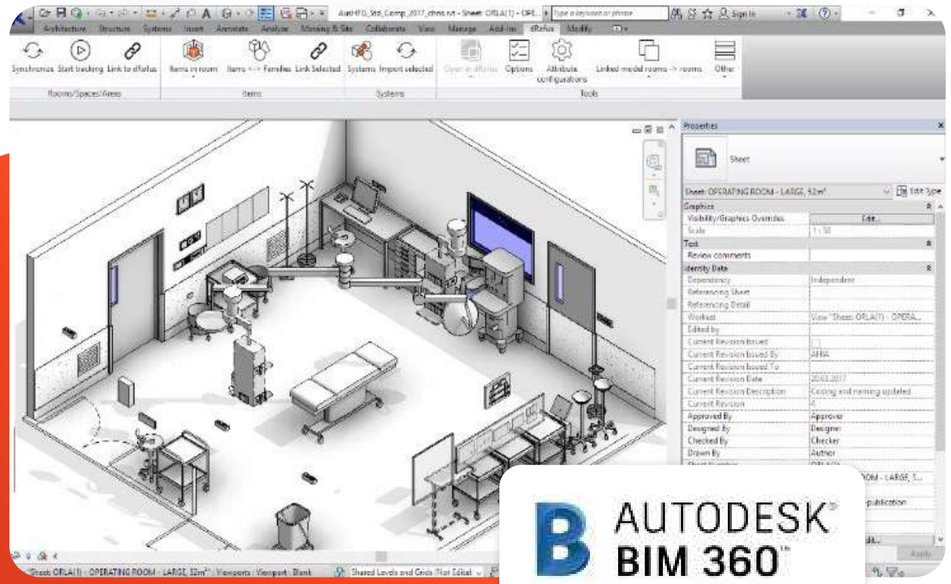
Design and Engineering

State of the art data-based design and design management tools for efficient design and communication with client and project partners.

- BIM Model with one source of data
- Navisworks as coordination and client review tool
- Design Integration of process equipment with vendors



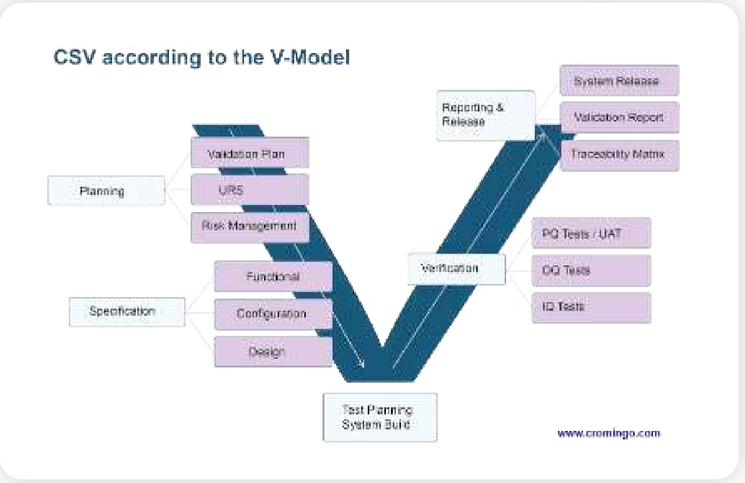
NAVISWORKS



AUTODESK® BIM 360™

Automation

- Established Siemens solution partner for PCS7 and Tia Portal with extensive execution experience on the Simatic platforms.
- Proven project experience from conceptual design to full engineering, installation and qualification.
- Specialists in automation for regulated industries such Biopharma and Synthetic Pharmaceuticals with dedicated automation CSV resources.



KeyPlants
MascoGroup

عصر الحيوية
BIOERA

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