

Utthunga | Chemical & Petrochemical Industry Solutions

Engineering for Performance, Sustainability & Digital Excellence



Chemical and petrochemical plants operate at the intersection of high CAPEX, complex process chemistry, regulatory scrutiny, and energy intensity. To help navigate these challenges, Utthunga brings 18+ years of industrial engineering expertise, backed by a global team of 1,200+ engineers across 8 offices.

From sensors on the plant floor to cloud-based digital twins, our integrated capabilities in automation, energy systems, and smart manufacturing deliver measurable performance, ensure compliance, and maximize ROI for chemical and petrochemical operations.

1. Process Engineering — Engineering Precision that Protects Your CAPEX

We build the process backbone for profitable, safe and scalable plants.

Front End Engineering Design (FEED)

Objective



Reduce project risk and lock-in process performance before detailed engineering.

Process flow diagrams, mass & energy balances, equipment sizing, safety layers, P&IDs, and cost-risk optimization.



Deliverables

Value



- Reduced rework and change orders
- Improved CAPEX predictability
- Shorter time-to-commissioning

Dynamic Simulation & Operator Training Systems (OTS)

Objective



Validate control logic, optimize startup/shutdown, and improve operator decision-making.

- Multi-phase, non-linear dynamic modeling
- Control strategy validation
- Alarm rationalization & safety interlock testing



Deliverables

Value



- Reduced operational incidents
- Faster ramp-up to steady state
- Lower training costs & improved operator efficiency

Process Optimization

Objective



Increase yield, reduce raw material consumption, and improve process stability.

- Model predictive control (MPC)
- Advanced process control (APC)
- Statistical process control (SPC)



Techniques

Value



- Increased throughput with same equipment
- Reduced off-spec production
- Lower energy intensity per ton

2. Asset Performance — Maximum Reliability, Minimum Downtime

Chemical plants demand continuous, safe, and efficient asset performance.

Chiller Performance Optimization

Focus



Cooling load management, refrigerant efficiency, compressor staging, and condenser performance.

- Lower kW/ton
- Reduced thermal degradation risks
- Improved uptime



Outcome

Compressor Performance Optimization

Focus



Surge avoidance, thermodynamic efficiency, fouling monitoring, and control loop tuning.

- Higher volumetric efficiency
- Reduced unplanned outages
- Extended mechanical life



Outcome

Heat Transfer (HT) Performance

Focus



Fouling factor monitoring, heat exchanger performance curves, and energy recovery optimization.

- Lower energy consumption
- Higher heat recovery
- Reduced corrosion & fouling risk



Outcome

3. Emission Controls – Compliance + Decarbonization without Operational Trade-offs

Carbon Footprint & Low-Carbon Economy Strategy

Carbon Footprint & Low-Carbon Economy Strategy

Objective



Build a measurable decarbonization roadmap aligned with global ESG standards.

- Scope 1 & 2 emissions mapping
- Process carbon intensity benchmarking
- Low-carbon fuel and energy sourcing strategy



Deliverables

Value



- Reduced carbon tax exposure
- Improved investor confidence
- Competitive differentiation

Emission Monitoring Systems (EMS)

Objective



Real-time pollutant tracking and compliance reporting.

- Continuous emissions monitoring (CEMS) integration
- Automated compliance dashboards
- Audit-ready reporting and traceability



Capabilities

Value



- Lower compliance risk
- Faster incident response
- Transparent stakeholder reporting

4. Energy Management — The Single Largest Profit Lever

Chemical plants demand continuous, safe, and efficient asset performance.

Process-Level Energy Optimization

Focus



Process heat integration, steam balance optimization, and variable load efficiency.

- Lower energy intensity per ton
- Reduced steam and power consumption
- Improved plant margins



Outcome

Energy Monitoring Systems

Capabilities



- Real-time energy KPIs (kWh/ton, steam/ton, specific energy consumption)
- Utility metering integration
- Energy anomaly detection

- Faster identification of energy leaks
- Data-driven decision-making
- Improved energy procurement planning



Outcome

HVAC System Automation

Focus



Zone control, demand response, and cooling load optimization.

- Lower facility energy costs
- Better working environment
- Reduced emissions



Outcome

5. Smart Manufacturing – Digital Operations that Drive Agility

Digital Logbook

Objective



Digitize operational history, shift logs, and process events.

- Faster incident investigation
- Improved regulatory compliance
- Better knowledge retention



Outcome

Safety Work Permit System

Objective



Reduce human error and enforce safe execution of hazardous tasks.

- Reduced incidents
- Automated permit workflows
- Audit-ready safety compliance



Outcome

Objective



Move from reactive maintenance to predictive maintenance.

- Work order automation
- Condition-based monitoring
- Asset health scoring



Capabilities

Outcome



- Reduced downtime
- Lower maintenance cost
- Higher asset reliability

Why Utthunga is the Right Partner for Chemical & Petrochemical Leaders



End-to-End Technical Depth

From FEED and dynamic simulation to digital manufacturing, we deliver a complete engineering and digital lifecycle.



Domain-Driven Solutions

We understand chemical process constraints, safety, regulatory requirements, and energy intensity – not just automation.



Proven Methodology

We combine:

- Process engineering fundamentals
- Advanced analytics & AI
- Digital twin and simulation
- Industrial automation and control
- Performance optimization frameworks

Let's design and operate your plant with measurable performance, reduced risk, and sustainable growth.

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Our Footprint

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