



UREA

RENOVO-U

Casale's solutions for a new life: Revamp your Urea plants



We are a global partner
in the chemical industry,
offering **integrated technologies,
engineering, contracting
and construction solutions**
for over a century.

Our mission

Contribute to shape a new sustainable planet with our plants for the production of fertilizer, methanol, hydrogen, melamine and derivatives, and help our customers creating value respecting the environment.

We are a global company front leader in the energy transition: a key player in the sustainable transformation of the chemical and energy industry, from a social, economic and environmental point of view.

Our values

INNOVATION PEOPLE CARE **PROFESSIONAL EXCELLENCE**
QUALITY **SAFETY** ETHIC **SUSTAINABILITY**

RENOVO-U

The technology for industrial urea synthesis has gone through remarkable evolution since the first commercial installations of the second half of the 20th century.

Modern processes outperform all vintage designs in every aspect from energy consumption to environmental footprint. As urea synthesis is a severe process, which in the long time, wears out most of the critical equipment, after few decades of service more frequent and costly maintenance is required.

Ultimately, this is reflected in higher operational costs and lower margins. Revamping arises as a necessity, but often becomes an opportunity to extend the service life and improve profitability of vintage plants.

Urea revamping solutions

Casale has developed process schemes for the revamping of vintage or more recent urea plants with the aim to achieve the following targets

Capacity

- Increasing the urea throughput of the plant maximizing the potential of existing equipment

Equipment

- Replacing worn-out equipment and piping with best-in-class materials to cut maintenance costs

Quality

- Improving the quality of the urea product (mechanical strength)

Process control

- Smart instruments and predictive control algorithms to improve process performance and support the plant operation

Revamping Strategy

Casale follows a customer-oriented approach: specific process schemes are developed for the revamping of vintage technologies. Here is a selection.



Environmental Impact

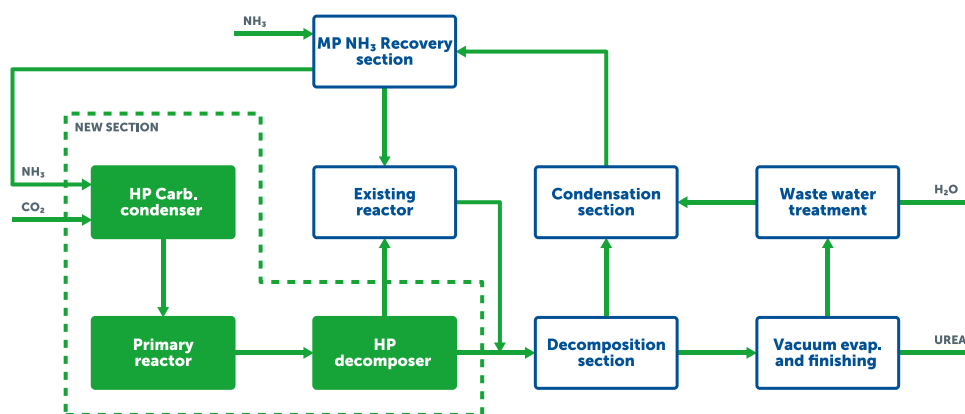
Minimizing pollutants in process vents and liquid effluents to meet regulations and established best practices;

Improving the conversion of the feedstock.

H.E.C. PROCESS

PROCESS OUTLINE

High Efficiency Combined (HEC) process for revamping Total Recycle or Once-Through plants. A new synthesis section with an HP carbamate condenser, a once-through reactor and an HP thermal stripper is installed in parallel with the existing reactor, which after revamp is dedicated only to process the carbamate recycle. The downstream MP/LP purification and recovery sections are maintained as existing.



Performances

- Capacity increase: **+70%**
- MP Steam consumption: **1100 kg/MT**
- Energy saving: **0.2 Gcal/MT** (with respect to Total Recycle)

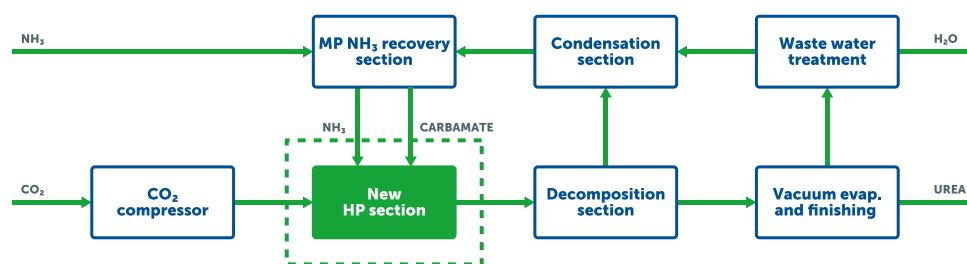
Benefits

- All New HP items are placed at ground level, avoiding costly supporting structures
- Low CAPEX
- Short plant down time for installation required
- No/minor modifications on MP/LP section

Total Recycle process to SELF-STRIPPING process

PROCESS OUTLINE

This scheme aims at revamping Total Recycle plants by upgrading to modern self-stripping plants. The HP synthesis section is modified by adding an HP stripper and an HP carbamate condenser. The existing MP/LP sections are maintained or debottlenecked with a "more-in-more out" approach.



Performances

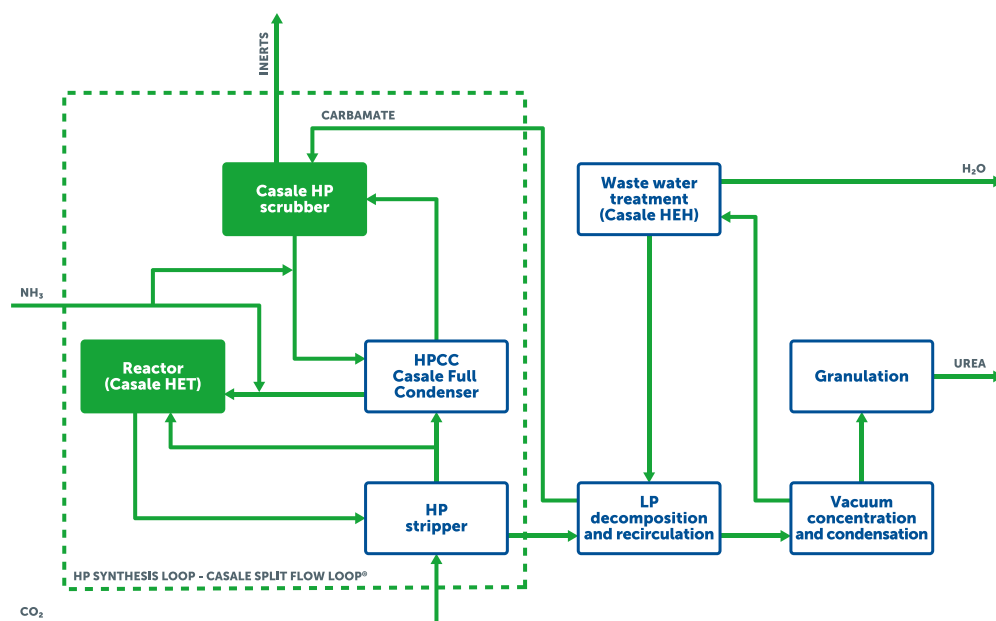
- Capacity increase: **+100%**
- MP Steam consumption: **650 kg/MT** (prilling)
- Energy saving: **0.55 Gcal/MT** (with respect to Total Recycle)

Benefits

- All New HP items are placed at ground level, thus avoiding costly supporting structures
- Operating pressure of the HP section reduced to **160 bar g**
- Short plant down time required for installation
- Minor modifications on MP/LP section required

SPLIT-FLOW LOOP® PROCESS OUTLINE

This Revamping scheme applies to standard CO₂ Stripping plants. The HP carbamate condenser is debottlenecked from falling-film design to submerged design just adding new patented internals. As an option, new Medium-Pressure section in series/parallel for energy saving and capacity increase.



Performances

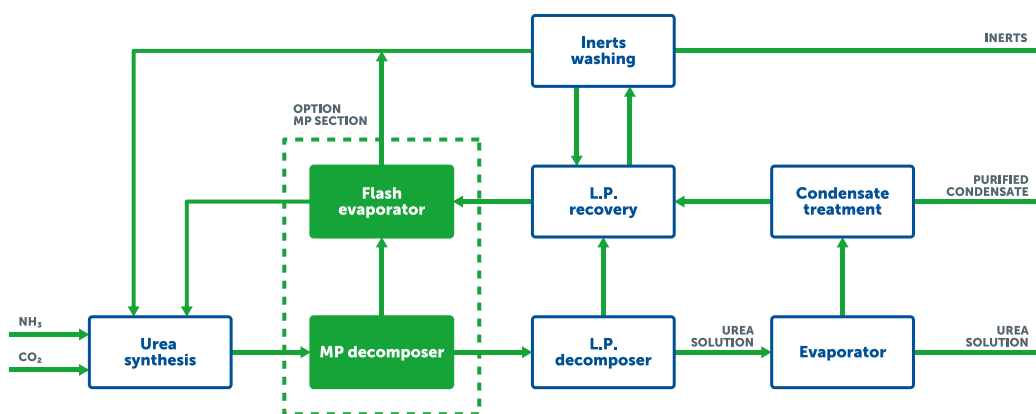
- Capacity increase: **+50%**
- MP Steam consumption: **650 kg/MT** (prilling with MP section)
- Energy saving: **up to 0.1 Gcal/MT**

Benefits

- Minimum impact on existing HP equipment
- Short plant down time for installation required
- Low CAPEX

SELF-STRIPPING ADDING PROCESS OUTLINE

This revamping scheme is specifically devised for for Self-Stripping plants to achieve energy saving and capacity increase. A new Medium-High Pressure (MHP) carbamate recovery section at 30 bar is added between conventional HP and MP sections. An additional heat integration is step is achieved since MHP carbamate vapors are used for urea concentration.



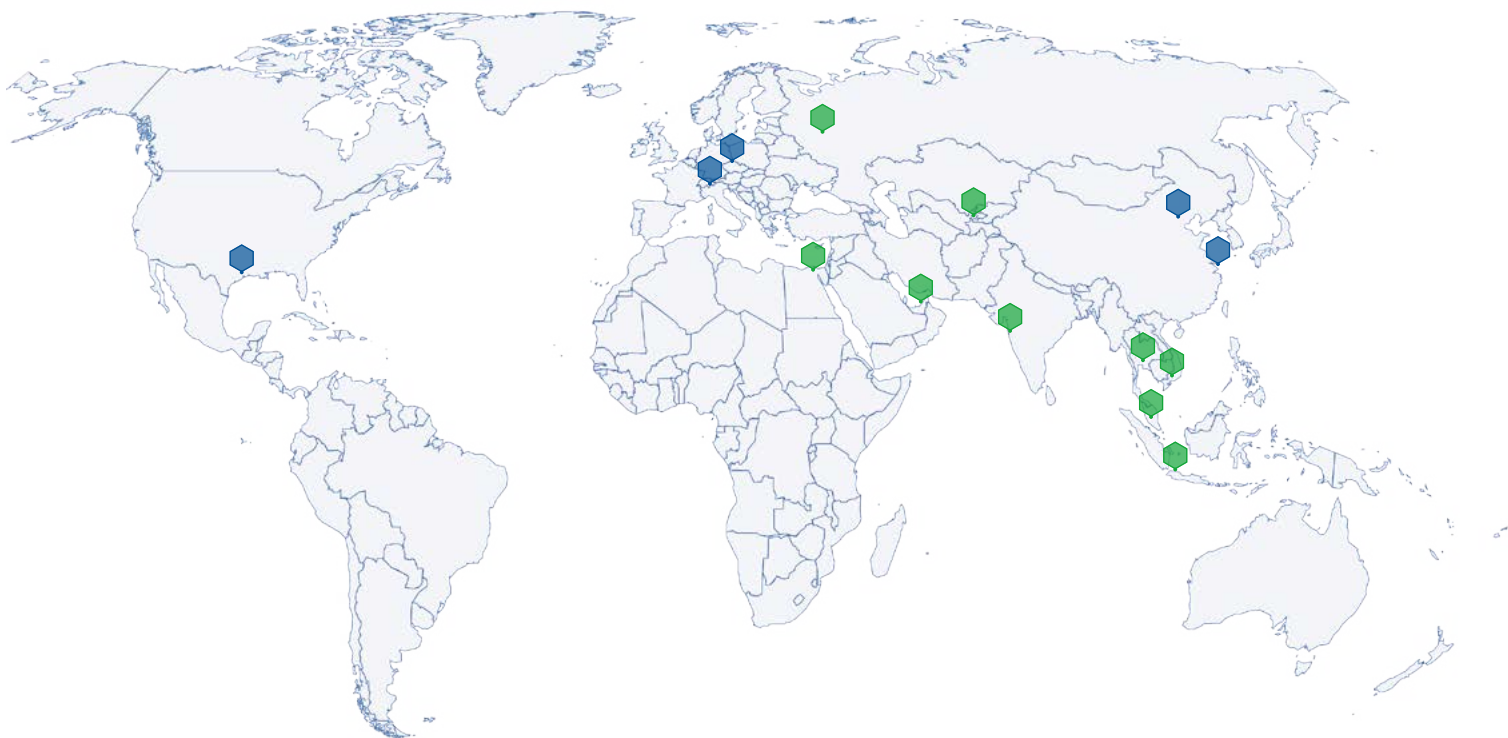
Performances

- Capacity increase: **+30%**
- MP Steam consumption: **600 kg/MT** (prilling)
- Energy saving: **up to 0.1 Gcal/MT**

Benefits

- All New HP items are placed at ground level, thus avoiding costly supporting structures
- Operating pressure of the HP section reduced to **160 bar g**
- Short plant down time required for installation
- Minor modifications on MP/LP section required

Casale in the world



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Russia, United Arab Emirates,
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