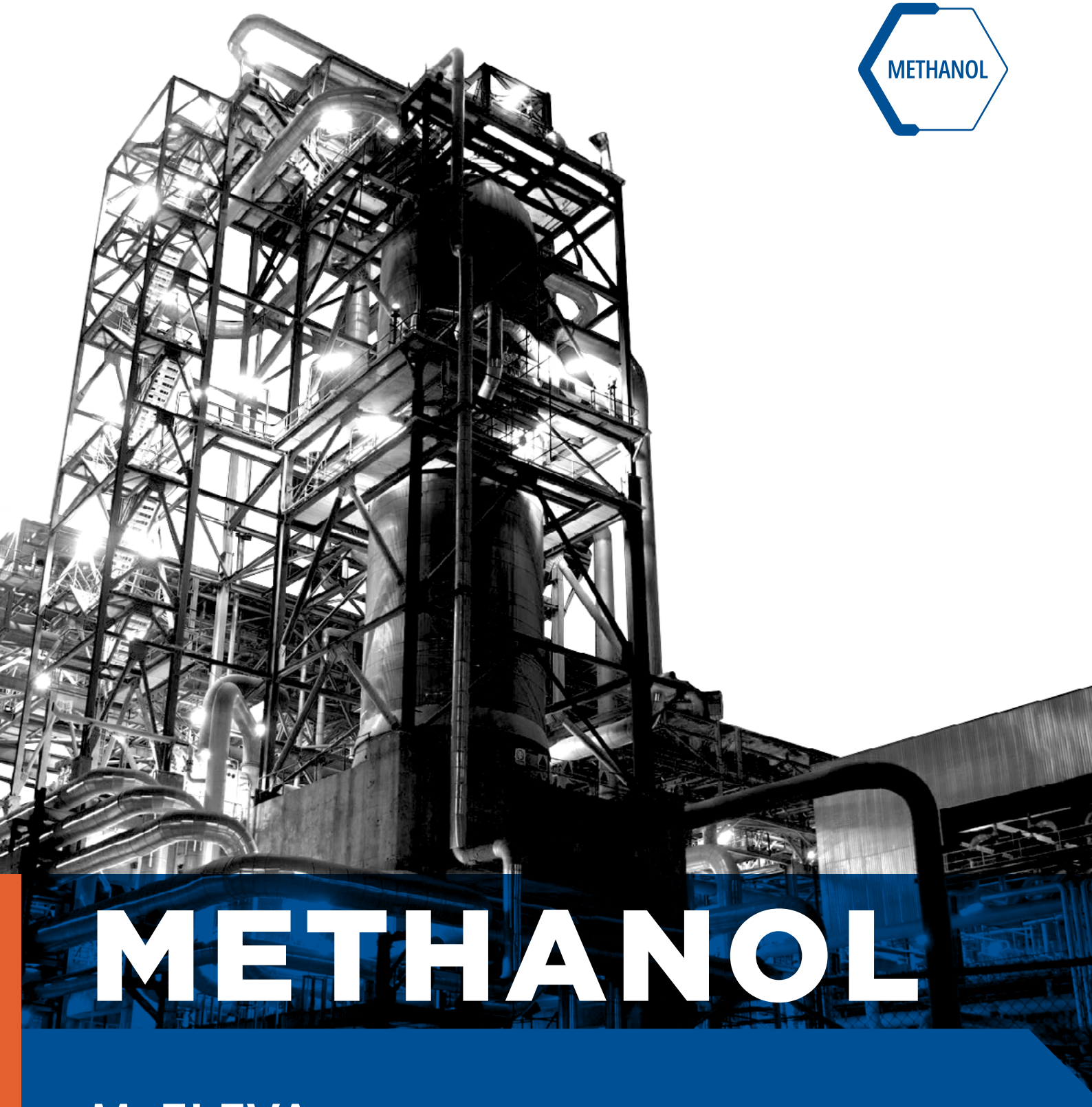

METHANOL

# METHANOL

## M-ELEVA

Casale's Methanol process for world-scale traditional plants

CASALE

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**

METHANOL

# M-ELEVA

**M-ELEVA is Casale process for traditional methanol plants, based on steam-methane reforming (SMR) of natural gas. The process can be customized to meet specific Client's needs as well as easily integrated in any downstream unit. If any $CO_2$ stream is available at battery limits it can be used as additional feedstock to boost the production. The process is extremely flexible, and it may be adapted to meet specific market needs and/or customer requirements.**

## Capacity

- Best suited from **1000 MTD** to **3000 MTD** of grade AA methanol, or grade A or IMPCA
  With some modifications, can also be easily further simplified and adopted for capacities below **800 MTD**

## Enviromental Impact

Total $CO_2$ emissions to atmosphere, per ton of methanol produced:

- less than 0.6 $CO_2$ / methanol
- less than 140 mg/Nm³ of NOx or even lower than 50 mg/Nm³ installing the SCR in primary reformer convection section.

## Performances

- Energy consumption: **7.3-7.6 Gcal/MT** on LHV basis
- Demi-water net consumption:
  as low as **0.6 t per MT** of methanol

## Benefits

- Low energy consumption
- Reduced CAPEX
- The steam balance can be optimized from zero export to maximum export
- Compact and simple lay-out, with all sections arranged in a way to minimize the overall footprint as well as optimize the connections across the different sections of the plant

## Casale technical assets

- Casale Axial-Radial® Pre-Reformer
- Casale design of primary reformer
- IMC® methanol synthesis converter

# PROCESS OUTLINE

Poison removal & pre-heating - Natural gas undergoes initial treatment to remove poisons, typically sulfur.

Steam-to-Carbon Optimization - A steam-to-carbon ratio of 2.5-3.0 is maintained to optimize overall gas consumption.

Heat Recovery & Steam Generation - Hot reformed gas is directed through a series of exchangers for efficient heat recovery.

Synthesis Gas Adjustment - The $H_2$ content in the produced synthesis gas allows for $CO_2$ addition from an external source.

Pre-reformer Efficiency - The pre-reformer reduces steam content, enabling a smaller primary reformer.

The synthesis loop - Is very simple. It features a single synthesis converter, a gas-gas exchanger to preheat the converter feed and cool the converter effluent, a methanol condenser, a liquid methanol product separator.

The heart of the synthesis loop - Is the Casale IMC® (Isothermal Methanol Converter), in which the heat of reaction is continuously removed by means of a set of heat exchanging plates embedded in the catalyst, either preheating the incoming gas or boiler feed water or raising steam.

Efficiency - The IMC® converter's internal cooling system is more efficient and requires less maintenance.

High Conversion & Equipment Size - High conversion rates in the Casale IMC® lead to a lower rate of gas recycle and smaller equipment.

## DISTILLATION SECTION

**Methanol Purification** - AA grade methanol is obtained by purifying crude methanol through a two-step distillation process.

**Topping Column Isolation** - The first step involves a topping column that isolates lighter compounds from the crude methanol.

**Refining Section Separation** - The second step, the refining section, separates water and higher-end impurities.

**Atmospheric Distillation Column** - Typically, the refining section comprises a single distillation column operating under atmospheric conditions.

**Two-Column Layout** - Alternatively, a two-column layout can be used for the refining process.

**Energy-Efficient Configuration** - This two-column configuration is more energy-efficient, minimizing the energy required for distillation.

**PLANTS FOR**
**A NEW PLANET.**
**SINCE 1921.**

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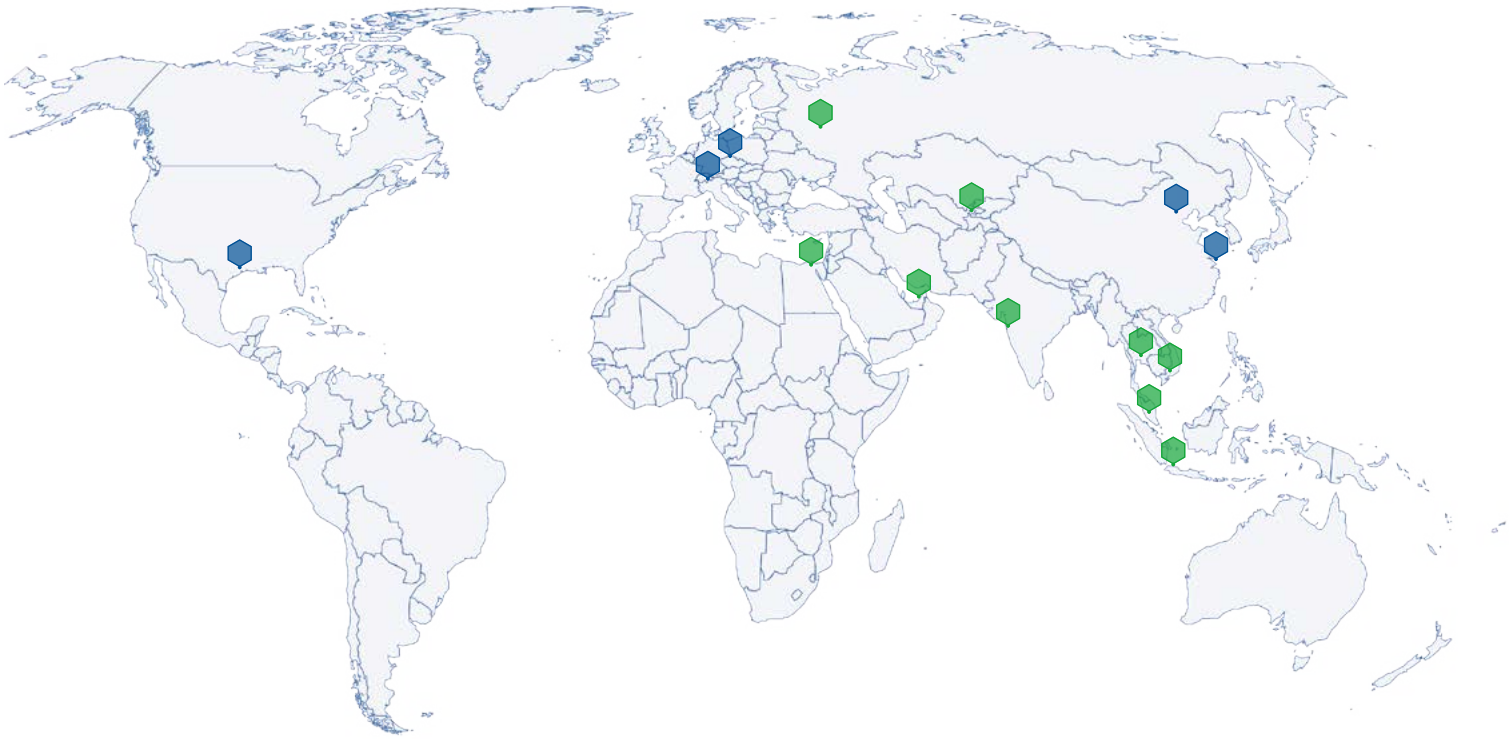
# Casale in the world



## Headquarter

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Switzerland | Lugano
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China | Beijing, Shanghai
North America | Houston

## Network of Representatives

Egypt, India, Uzbekistan, Indonesia, Thailand, Malaysia, Russia, United Arab Emirates, Vietnam

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