

Where energies make tomorrow ●

# Fertilizers

Covering the entire value  
chain from mining to fertilizers

**T.EN**

**TECHNIP  
ENERGIES**



# A key industry partner for the future

Technip Energies is putting its long-standing project expertise and experience at the service of an industry focused on a sustainable future.



## Our clients are increasingly concerned with meeting the highest environmental standards.

We help them improve their processes to comply with the most stringent regulations on effluents, gases, waste disposal and noise levels. At the same time, we are constantly innovating to help them achieve end-to-end project efficiencies and performances.

All of that is only possible thanks to our decades of experience in engineering and delivering large complexes and integrated units worldwide. That has given us extensive knowledge of our clients' marketing and technical expectations in all production conditions.

Technip Energies offers its clients a full range of services from concept to project delivery and beyond. We implement leading proprietary or licensed technologies and provide full range of basic and specialty chemicals processes, including associated effluent treatment.

“

Helping our customers meet the highest environmental standards.”



OVER  
**350**  
FERTILIZER  
COMPLEXES



**40**  
COUNTRIES  
OPERATED IN



MORE THAN  
**60**  
YEARS IN THE  
FERTILIZER  
INDUSTRY

## A full range of services

Technip Energies has competencies in the entire value chain from technical consulting to complete turnkey facilities and global strategic plans:



### EPC

Consulting, feasibility studies, project financing, process and design engineering, technology transfer, worldwide procurement, construction management, and operations assistance.



### CONSTRUCTION

Plants can be built in varying geographic and economic conditions, in developed and developing countries.



### DEBOTTLENECKING

Adding new facilities to existing plants.



### PROCESSES

Selection of processes and new process development adapted to a wide variety of raw materials.



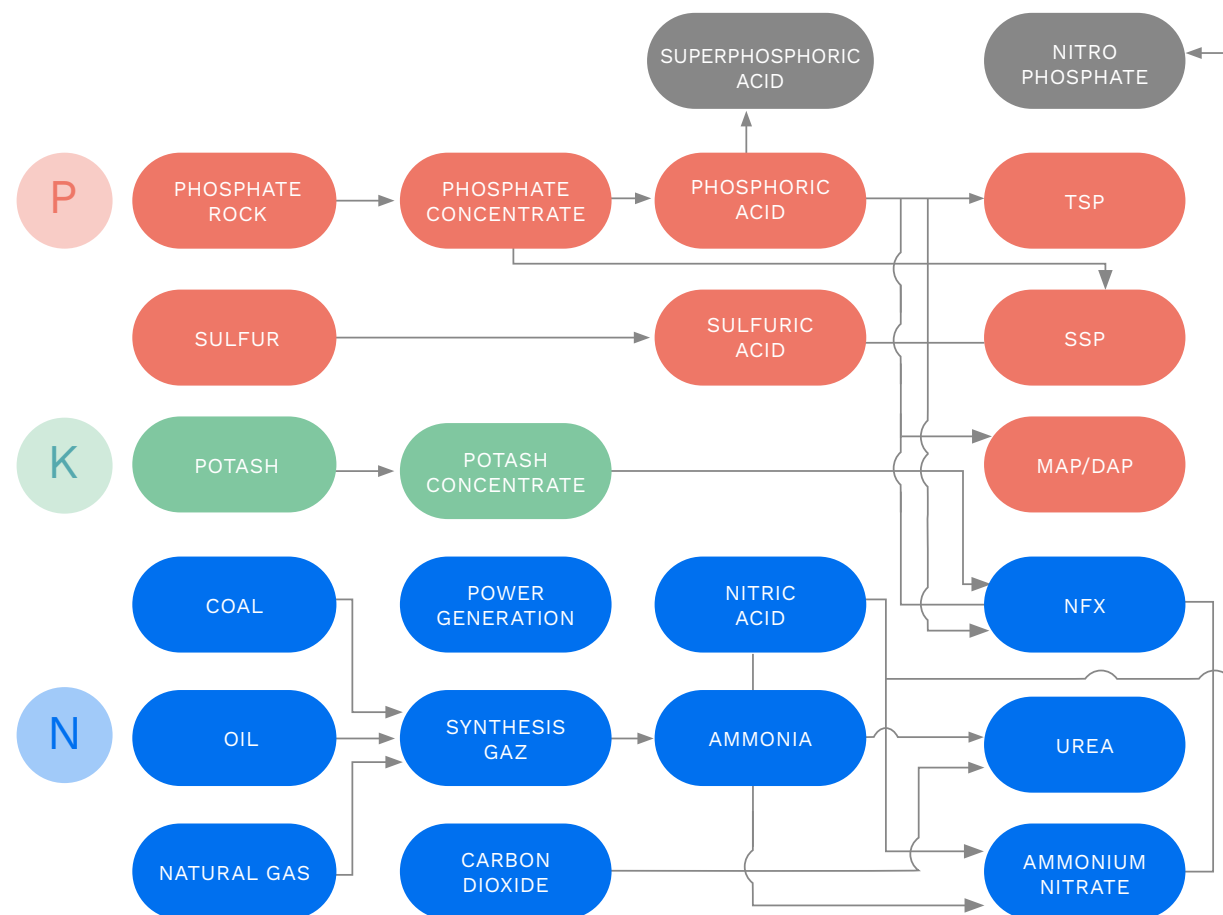
### TECHNOLOGIES

Providing a choice of technologies adapted to local conditions such as existing infrastructures, energy and product specifications, and available staffing and skills.



# A one-stop shop covering the entire value chain

We implement our own proprietary process technologies as well as leading licensed technologies to produce a variety of fertilizing products, including acids, single nutrients and multicomponent fertilizers.



“

A focus on sustainable processes and designs.”

## POLLUTION CONTROL AND EMISSION LIMITATIONS

Technip Energies strictly follows all environmental regulations with respect to effluents, gases, waste disposal and noise levels.

As a company committed to a sustainable future, we design our plants to meet the highest environmental safeguards. We also focus on improving processes to meet stringent anti-pollution standards.



# Proprietary technologies available for licensing

Technip Energies offers a constantly expanding portfolio of proprietary and licensed process technologies.

## Proprietary technologies

**Phosphoric Acid:** With over 70 reaction and filtration units installed in 28 different countries, Technip Energies offers 3 technologies for the production of phosphoric acid:

- Single reactor process: The traditional technology based on process, with a single large reactor.
- DIPLO process: Using 2 reactors in series to optimize reaction/filtration performance, especially for reactive rocks.

**Dorr-Oliver FluoSolids®:** The leading technology for phosphate rock calcination processes. It Can be applied in ore beneficiation, and organic and cadmium removal.

**UCEGO® filter:** Designed to process phosphogypsum slurry for the industrial production of phosphoric acid. This filter is owned, perfected and marketed by Technip Energies and exclusively manufactured by ANDRITZ. With over 90 filters sold in 28 countries, the technology represents over 20% of the world's production of phosphoric acid. The vacuum filter uses a patented rotating table and slurry feedbox to ensure perfect distribution and a uniform cake.

**LCFC (Large Capacity Flash Cooled reaction system):** Using 2 reactors in series, maturation tank and flash cooler, the process is designed for large capacity units , and offers high operation factor and great flexibility.

**Krebs Mixer-Settler technology:** Successfully operated in solvents extraction and purification units in the chemical and metallurgical industries.



4  
PROPRIETARY  
TECHNOLOGIES



UCEGO vacuum table filter

## From mines to crops from Masterplan to EPC

Mines to crops

Mines



Beneficiation



Calcination



Sulfuric acid MECS®

Phosphoric acid



Ammonia

Nitric acid

Urea

Ammonium nitrate

Phosphates fertilizers

### Geology and Mining:

Comprehensive characterization of resources (evaluation of reserves, accounting for quality variations and optimal recovery).

**Beneficiation:** Intimate understanding of rock behavior (phosphate rock characterization, laboratory tests up to pilot stage, process definition and plant design) as an interface between mine and process chemistry.

### Phosphoric/ Sulfuric Acids and Fertilizers:

Our phosphoric proprietary technology has been tested in over 570 different phosphate rocks and analyzed in more than 1,300 pilot test runs.

**MECS alliance for sulphuric acid:** Since the 1980s with more than 150 plants built in 42 countries.

**Ammonia/urea:** Technip Energies is an established member of the Ammonia and Urea Clubs of Contractors, with deep know-how and expertise from concept to EPC.

**Nitric acid, Ammonium Nitrate and Phosphate fertilizers:** Technip Energies can propose technologies upon client request such as:

- Nitric acid: CASALE
- Ammonium nitrate: CASALE: ANS/granulate AN and INCRO: all AN product grades (ANS/HDAN/LDAN)
- Phosphates fertilizers MAP/DAP/NPK: CASALE and INCRO





# Serving a variety of plants

With more than 350 projects engineered in the fertilizers industry worldwide, Technip Energies has acquired significant experience, technological competence and strong references.

## A wide range of plants

- Geology and Mining
- Beneficiation
- Sulfuric acid plants - Up to 3,600 tpd\* capacity
- Phosphoric acid plants - Up to 1,250 tpd capacity
- Phosphate fertilizer plants - Up to 2,670 tpd capacity
- Ammonia/urea plants - Up to 3,300 tpd capacity
- Urea plants - Up to 3,850 tpd capacity
- Nitric acid plants - Up to 1,060 tpd capacity

\* tpd: tons per day

## Fertilizers products may be produced in a variety of forms, e.g:

- Granular, prilled or compacted
- Powdered Liquid or suspension and available in bulk, drums or tank cars



MORE THAN  
**350**  
PROJECTS ENGINEERED  
WORLDWIDE

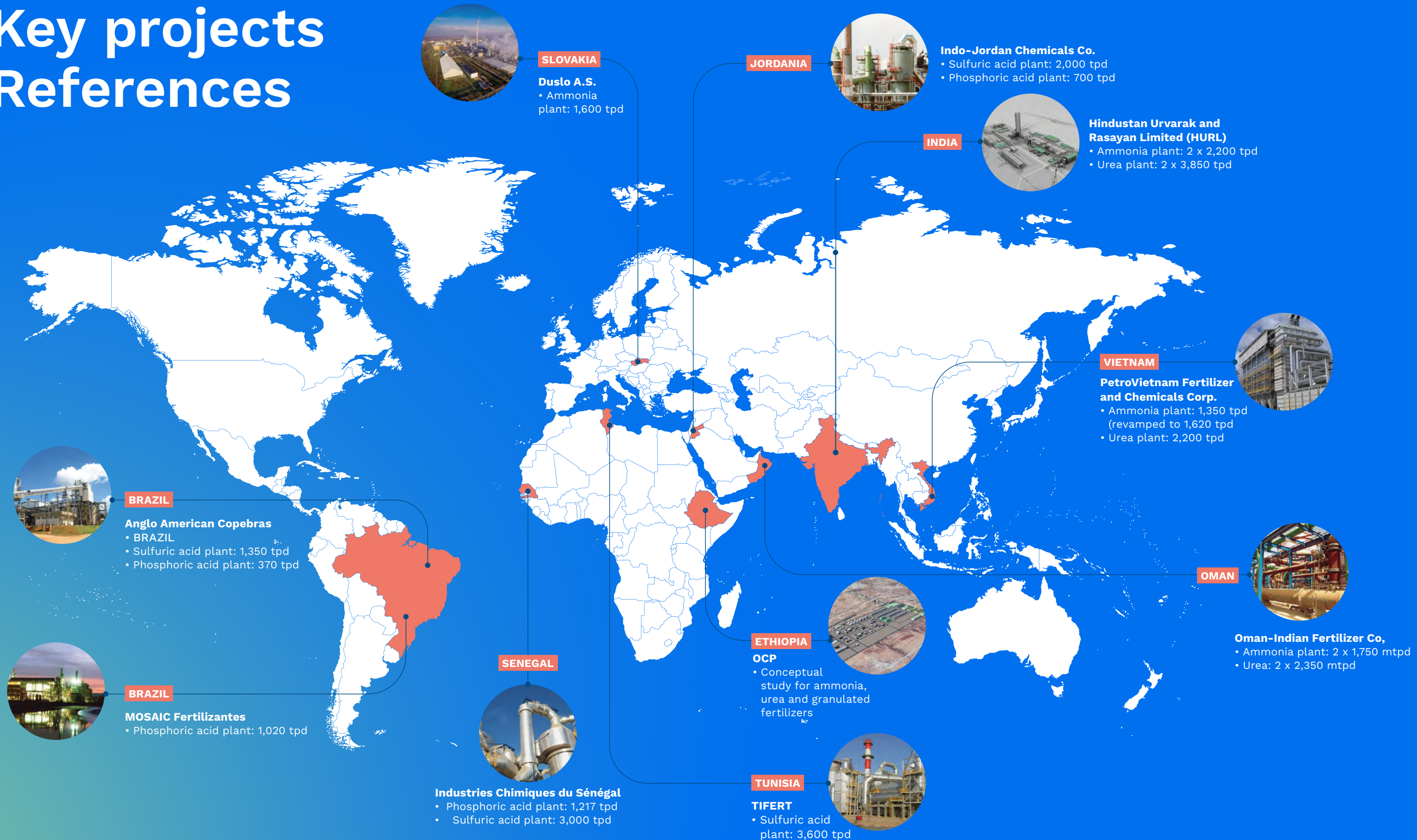


Duslo A.S ammonia plant, Slovakia





# Key projects References





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