

**condorchem
envitech**

DENOX RECOVERY™

**NOx abatement system
Thermal Energy Storage**



DENOx RECOVERY™

To counterbalance the non-activity of the solar power plant, on a rainy day or when the sun sets, thermal energy storage has been installed in various sites. The sun's energy can be stored by heating up molten salts contained in a storage tank and then electricity is generated by a turbine process. This technology allows almost double the hours of production and helps to plan in advance the electricity production.

The downside of the technology is the large emissions of Nitrogen Oxide by-product NO_x, which are highly harmful for the environment. Condorchem Envitech has responded to the issue with a NO_x recovery technology process.

Advantages

- >99% NO_x removals
- Salt recovery
- No chemical waste
- No harmful compounds released to the atmosphere
- Replication of the natural atmospheric mechanism

Since 2007, numerous solar power thermal stations have emerged in different parts of the world and have contributed to the global progress of renewable energy use. In close co-operation with our partners, we commercialized an atmospheric photochemical air purification solution under the name of **Climatic®**.

Pure Chemistry

Condorchem Envitech propose a new and innovative way of NO_x cleaning. The technology is based on accelerating the self-cleansing mechanisms of the atmosphere, with a controlled combination of the NO_x emissions, water vapor, ozone and UV lights.

The NO_x treatment process is operated in four stages:

1



High reactivity of the Ozone O₃ towards the Nitric Oxide NO

2



The UV lights catalyze the reaction between the ozone O₃ and the water to create OH radicals

3



The OH radicals are extremely reactive with the Nitrogen Dioxide NO₂ and lead to Nitric Acid HNO₃

4

Salt Recovery

All the NO_x transformed into HNO₃ caught inside the scrubber can be recovered as salt



NOx ABATEMENT SYSTEM FOR THERMAL ENERGY STORAGE

DENox Recovery™ is a complete green recovery process divided into four stages:

1. Cooling System

The off-gas from the tank storage is cooled down in order to reach an acceptable temperature for the upcoming process.

2. Photo-Oxidation

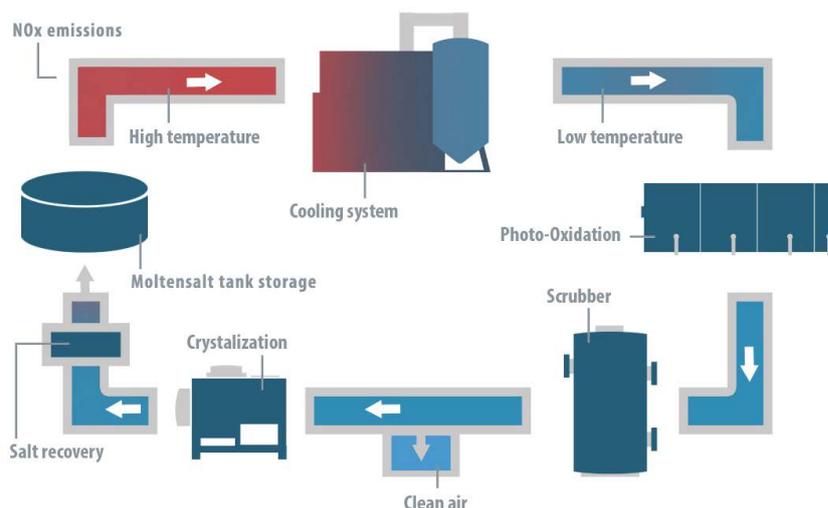
The NOx are oxidized in the gas-phase by the combination of UV lamps and ozone.

3. Scrubber

The NOx are caught and neutralized by contact with a water scrubbing solution.

4. Crystallization

The neutralized NOx are crystallized in the water into salt to be recovered or resold.



The result of the process is clean air which can be released directly to the atmosphere and the recovery of the salt, created from the emissions themselves.

Condorchem Envitech is one of the world's leading companies in the treatment of volatile organic compounds in Concentrated Solar Power (CSP) plants. 25% of the plants installed worldwide have our solutions for the treatment of VOCs generated in their ullage system. Some of our main references, as of March 2017, are:

- Mojave (USA)
- Solana (USA)
- Helios 1 (Spain)
- Helios 2 (Spain)
- Ouarzazate – Noor I (Morocco)
- Noor II (Morocco)
- Morón (Spain)
- Olivenza (Spain)
- La Florida (Spain)
- La Dehesa (Spain)
- Bokpoort (South Africa)
- Borges (Spain)
- Soluz Guzmán (Spain)
- Enerstar Villena (Spain)
- Shagaya (Kuwait)
- Kathu (South Africa)
- Ilanga (South Africa)
- Duba Green (Saudi Arabia)
- Atacama (Chili)

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