The Latera Sviluppo project is based on the exploitation of geothermal resources at medium enthalpy, that is with fluid temperatures between 90 and 150 ° C. The aim is to create a closed combined cycle, as required by D.Lgs No. 22/2010 focused on the "reorganization of the legislation on exploration and production of geothermal resources."

The placement of the implant at the Latera area is due to a precise choice of reuse of a geothermal drilling system made by Enel in the 1970's. The exploitation of geothermal stream by Enel was characterized by the direct use of the fluid in a condensing turbine, the cooling of the fluid occurred in special towers and emission into the atmosphere of the condensable gas, or by employing groups to "open drain", with steam was being vented to atmosphere. Such systems have given poor results in efficiency (about 5%), due to the composition of the geothermal fluid and have created big problems to local populations as a result of the gases released into the atmosphere.

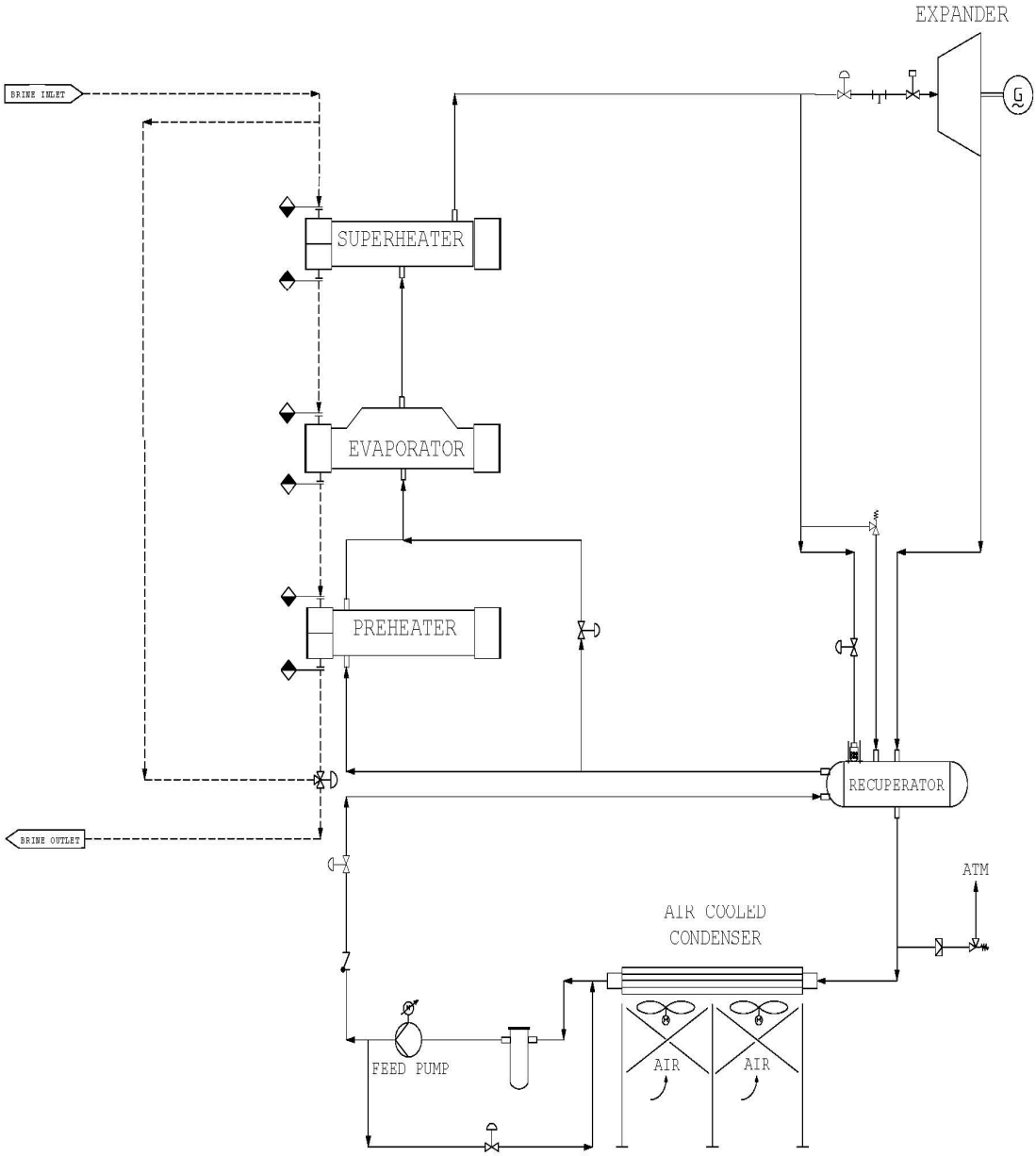
The Latera Sviluppo project, however, aims to use of geothermal fluids with a high gas content for the production of electricity and heat without the emission of gases into the atmosphere. This result will be attained thanks to the use of a turbine system ORC (Organic Rankie Cicle). This system will also allow to increase the overall efficiency of the plant.

To obtain these results is carried out an accurate reconstruction of the buoyancy lithostratigraphic and tectonic characteristics of the area of interest.

The project plans to ensure the thermodynamic conditions allowing for a reinjection of the entire flow of water and gas in the tank of origin, as well as a fluid management to produce electricity preventing, during the process, the formation of scale due to the high content salt, a problem which had previously been among the causes of the failure of the experiments.

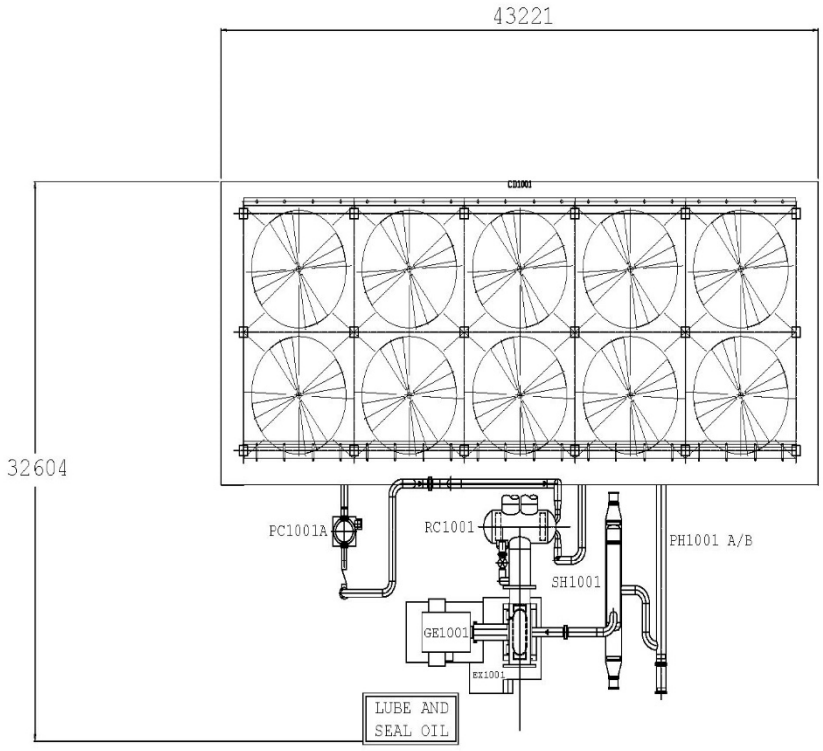
Below the operating principle of the system diagram that will be used:

LATERA
SVILUPPO S.r.l.



The system will draw out the fluid through a hydraulic pump which will provide the energy needed to keep the system pressure at a higher than the flash point value. In this way uncondensed will be immediately separated and ORC plant will only water, with transfer of heat to the system for the production of electrical energy. In exiting the ORC the water will be channeled and fed into the selected injection well to an injection pressure equal to zero.The ORC process is a completely closed cycle. The organic fluid used is preheated, after which it is sent to a vaporization system that is fed from the geothermal fluid. Once vaporized fluid is expanded in the turbine generation. From the exit of the steam turbine of the fluid it is then cooled and condensed through a heat exchanger. The design of the ORC system and selected organic fluid was precisely based on the peculiar characteristics of the geothermal fluid available in Latera. The characterization of the geothermal fluid thus appears to be a very important stage for the final choice of technology.

Below is a schematic of the system ORC:



The performance planned for the generation of electric power system are:

- Gross power at generator terminals 7MWe;
- ORC auxiliaries power consumption 0,86MWe;
- ESP + bop consumption 1,2MWe;
- Plant power output 5MWe;
- Reinjection temperature 110°C;
- Total required thermal input 47,910MWth;
- Gross efficiency 14%.

Given below is the positioning of the equipment within the plant:

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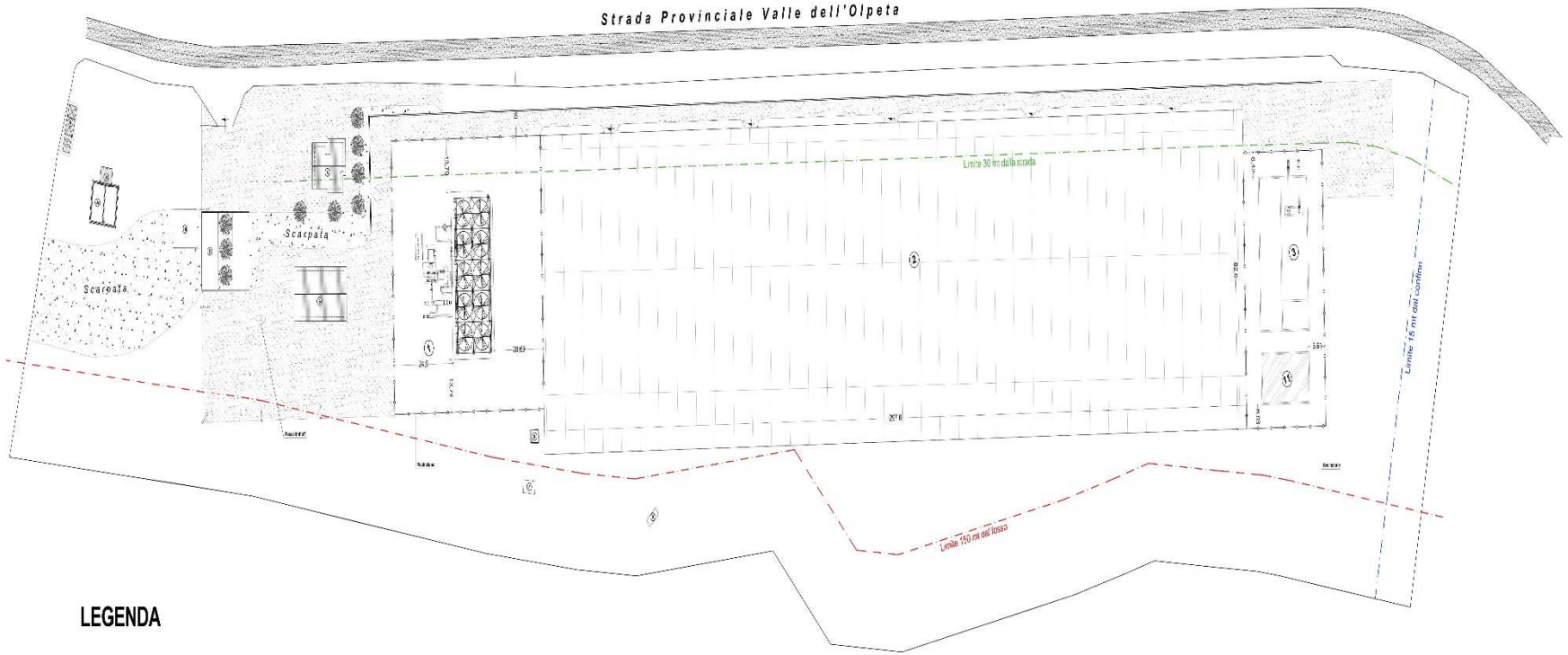
PLANIMETRIA GENERALE DI PROGETTO

SCALA 1:500



LEGENDA

- (A) Vascone accumulo acqua 100 mc
- (B) Tettoia per gruppo di pompaggio
- (C) Tettoia per gruppo elettrico
- (D) Rampe di accesso
- (1) Impianto ORC
- (2) Serra calda 297.60 x 82.60
- (3) Pozzo di estrazione
- (4) Alloggio custode e uffici
- (5) Fabbricato Servizi
- (6) Cabina Elettrica
- (7) Recinzione bombolone Gas
- (8) Tettoia caldaie
- (9) Vasca
- (10) Recinzione pozzo SIT
- (11) Vasca acqua industriale 500 mc