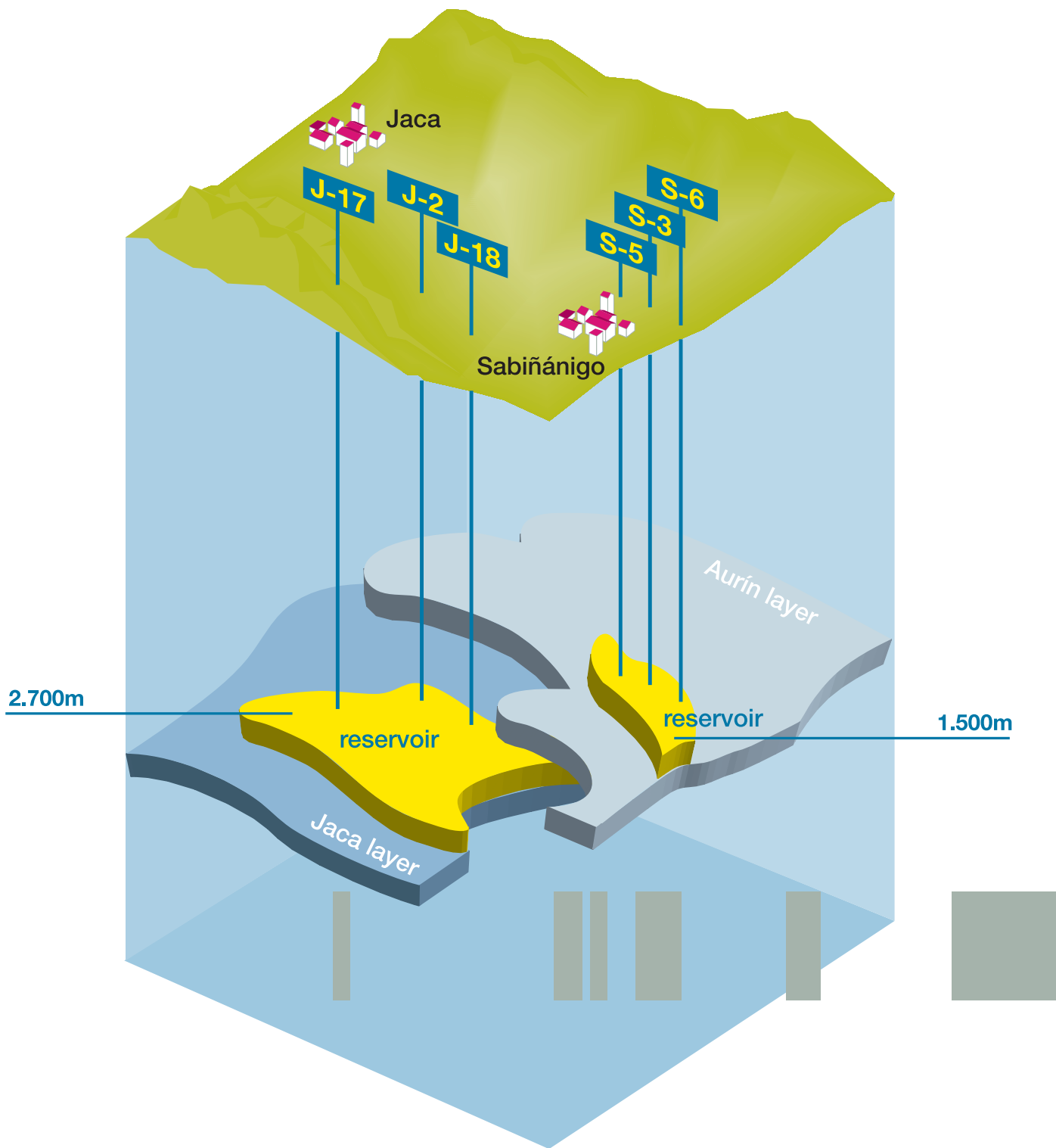


Serrablo Underground Gas Storage





Serrablo Underground Gas Storage

Serrablo Gas Storage concession is located within the Huesca region, between the cities of Sabiñánigo & Jaca. Serrablo was the first depleted gas field transformed into an underground gas storage in Spain, once the field production ceased in February 1989.

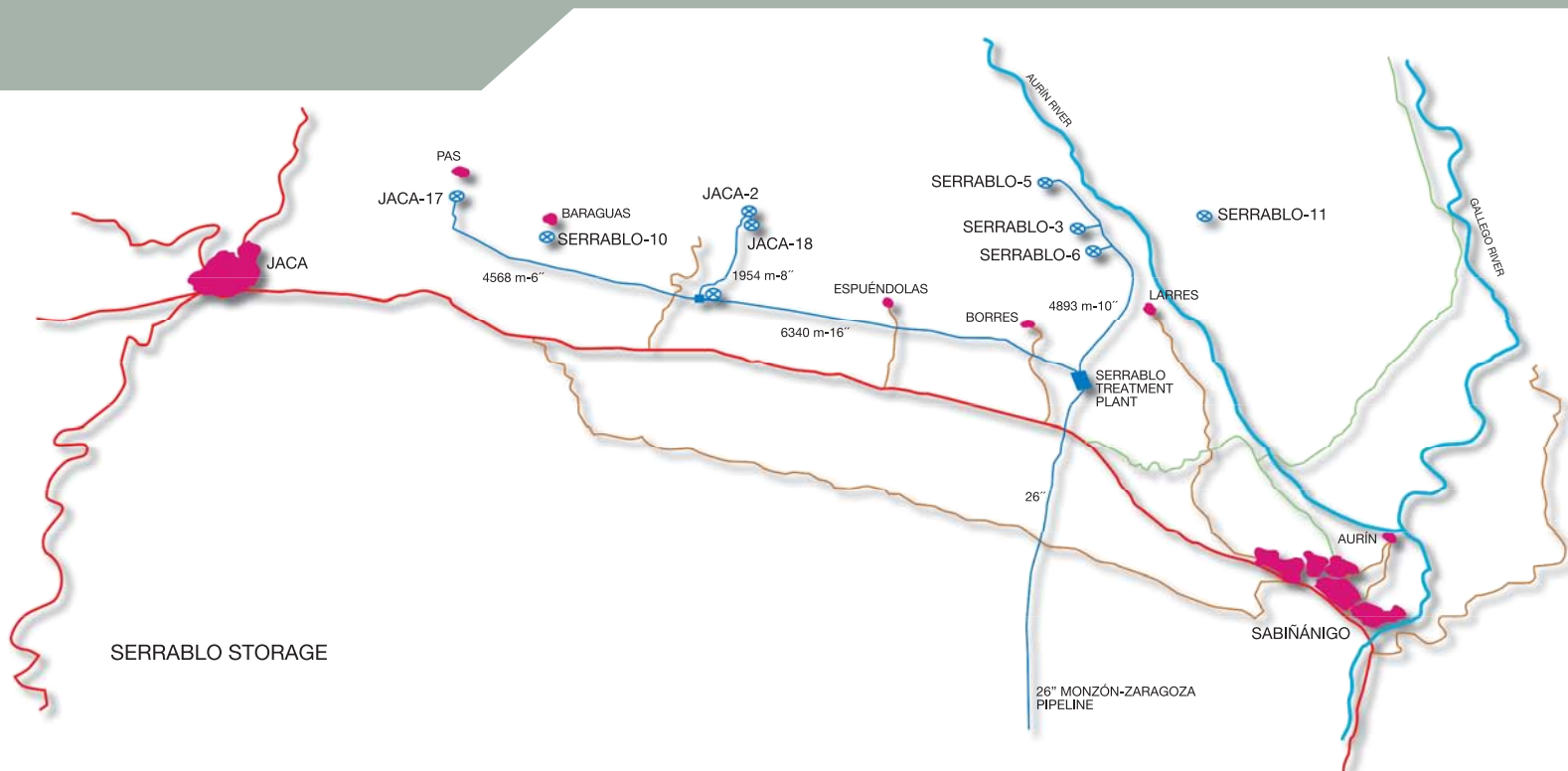
From 1978 to 1983, ENIEPSA (today Repsol-YPF) drilled 14 wells and two reservoirs were discovered: Aurín & Jaca, both of them set up the Serrablo Field.

During the production phase the cumulative production volume from 1984 up to 1989 was equal to 910 Mm³(n) of dry gas.

Jaca reservoir is located about at 2.700 mbGL and Aurín reservoir at 1.500 mbGL.

Gas storage set up first phase comprised a revamping of the surface facilities to increase its treatment capacity, new compression units to inject gas in the different wells, and a new well drilled in the Aurín reservoir. A gas pipeline was built up to connect Aurín reservoir to the surface facilities.

In a second phase, a new revamping of the surface facilities was performed, sidetracks were drilled in Jaca wells to improve the production capacity and a new well, J-18, was drilled within this reservoir. Additional compression units were installed.



SERRABLO STORAGE

Serrablo gas storage capacities

CHARACTERISTICS

Mm ³ (n)	AURÍN	JACA	TOTAL
Working Gas	160	520	680
Cushion Gas	135	285	420
TOTAL	295	815	1100

Mm ³ (n)/day	AURÍN	JACA	TOTAL
Injection	1.4	2.5	3.9
Production	2.5	4.3	6.8

Installations

Wells

Aurín reservoir is drained by 3 production/injection wells: S-3, S-5 & S-6, there is an observation well S-11. Wells in Jaca reservoir are 3: J-2, J-17 & J-18 (actives) and one observation well J-10.

Compression units

The compression units are located near the wellheads and in the treatment plant. There are two centrifugal turbo-compressors, one is located in the plant and it is used to booster, the other one is located in the J-2 wellsite and it is used to inject gas in J-2 & J-18 wells. The rest of the compression units are alternatives, 3 units located in the Jaca-17 well & 4 units located in the Aurín wellsites.





Gas pipelines

The gas pipe line which connects Aurín with the treatment plant is about 5 km in length and has a diameter of 10". The one which connects Jaca node with the plant is about 7 km in length and it has a diameter of 16".

Treatment plant

Gas treatment capacity is about $7.5 \text{ Mm}^3(\text{n})/\text{day}$. Gas from the reservoirs entries into the slug catchers, where most of the water contained in the flow is separated from the gas. After this, the dried flow passes to the dryer towers where the water contain is reduced by means of TEG.

TEG is regenerated by distillation. The following step is to measure and odorize the gas before going out to the main gas pipeline net.

Storage objectives

An underground gas storage in this area helps to obtain the natural gas supply required without over dimensioned infra-structures. The gas emission from the storage allows accomplished with the high intra-daily modulation during winter period. Furthermore the injection/production gas cycles increases the gas system flexibility. Strategic reserves is the other objective accomplished by the storage. The gas is storied during the summer time and produced during winter season.



Enagás, S.A.

Serrablo Underground Gas Storage
Ctra. Jaca a Sabiñánigo, Km. 3,300
22600 Sabiñánigo (Huesca) Spain

Tel: +34 974 481 761

Fax: +34 974 481 907

www.enagas.es

