

## Survey on Odorisation costs

### 1. CONTEXT

MARCOGAZ, for several years, has implemented an analysis on the Odorisation processes in Europe. The results are contained in tables that are available on the MARCOGAZ web site; these data, however, do not cover the economic aspects regarding the different Odorisation processes, so MARCOGAZ decided to collect information regarding Odorisation procedures and organisation, in order to give the possibility to evaluate cost analyses related to Odorisation practices.

In the last part of 2013, a questionnaire was sent to the Members of WG Odorisation, to collect information. Answers were received from 9 (BE, CZ, DE, EL, ES, FR, IT, NL, RO) out of 20 MARCOGAZ Countries; frequently the answers were produced at a Company level, so the survey is limited both in the number of represented Countries, and, for every Country, in the representation of the entire gas market. The results are presented in the following chapter.

### 2. COSTS ANALYSIS

The data are analyzed in two sections: centralized (Transmission) and local (Distribution) Odorisation. As written above, this analysis is partial and it cannot be utilized to evaluate if a kind of process is preferable to another, because it does not deal with technical and legal aspects, neither other national or regional constraints.

#### 2.1 Centralized odorisation

3 answers were received; related to these answers, the dimensions of the transmission grids were comprised between below 4.000 km and more than 35.000 km, with an amount of odorized gas between 4 and more than 55 billions of cubic meters of natural gas.

**Plants:** not many data are available; usually injection systems are used, with a number of plants very variable, from 1 every 25-30 km to 1 every 2.000 km. The estimated costs of the plants are comprised between 20.000 and 100.000 €, depending on the size; only one answer estimates the operational costs (excluded odorant purchase), between 1.000 and 5.000 €/year.

**Odorants:** the costs of the odorant is depending on the delivery method, where delivery by tank is about 40% cheaper than by safety barrel (in this case the cost is about 10 €/kg). Usually the odorant used is THT (tetra hydro thiophene).

**Controls:** the cost is depending on the analysis method: with fixed gaschromatographs (usually the apparatus includes local and remote alarm in the case of instrument's failure or low concentrations of odorant, sometimes with feedback to the plants, to increase odorant injection) it can be estimated between 50 and 75.000 € per analyzer.

Otherwise, portable microGC can be utilized, at variable points in the grid, in presence of an operator; the cost of one microGC is around 30.000 €.

The points are located every 300 - 700 km (about).

In some cases analyzers are located at the Odorisation plants.

## **2.2 Local odorisation**

6 answers were received; related to these answers, the dimensions of the distribution grids were comprised between 5.500 km and around 125.000 km, with an amount of odorized gas between 1,5 and 25 billions of cubic meters of natural gas.

**Plants:** both injection systems and by-pass systems are used; injection systems can be constituted by pumps or tank pressurized injection systems, with a number of plants variable from 1 every 85 km to 1 every 1000 km. The estimated costs of the plants are comprised between 10.000 and 130.000 €, depending on type and size; for injection systems, the operational costs are between 550 and 12.500 €/year; one answer reports a quantification of 15 - 30 working hours per year per plant. The cost of the By-pass odorizers is between 10.000 and 30.000 € per plant; no electronic devices are available; for this kind of apparatus, operational costs are usually limited to extraordinary maintenance.

**Odorants:** the costs of the odorant vary from 5 to 18 €/kg (usually, the higher prices include refilling/maintenance).

**Controls:** usually the analyses are performed with portable or transportable gaschromatographs (25.000 - 30.000 €). The cost of 1 analysis can be estimated as about 2 working hours when performed by internal personnel (only analysis - not travel and excluding the cost of the instruments investment).

Two answers report the quotation of checking with odorant sensors (cost around 2.000 € in one case, around 4.500 € in the other), performed by internal personnel: about 30 minutes of working hours per point.

## **3. RELEVANT CONSIDERATIONS**

The costs are highly influenced by:

- Configuration of the grid: dimension, shape, consumptions, location of the connections of the customers (usually to the Distribution grid; sometimes directly to the transmission grids), etc.
- Type and size of plants and their remote monitoring;
- Requested odorant concentrations;
- Frequency in Odorisation controls;
- Special constraints by law and/or National Authorities.