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**PnD Thesis, ABSTRACT**  
**CONTRIBUTIONS REGARDING THE RECOVERY POSSIBILITIES**  
**OF THE WASTE PRESSURE LET DOWN ENERGY FROM THE**  
**UNDERGROUND GAS STORAGE SYSTEMS**

The present thesis highlights the recovery possibilities of the waste pressure let down energy from the underground gas storage systems. Gas production is decreasing every year and because of that it is very important to take into consideration alternative ways of producing energy.

The thesis consists of four chapters, preceded by an introduction, followed by conclusions, personal contributions and bibliography

**The introduction** contains the main aspects of the thesis problem, stressing the need and opportunity to use turbo expanders on underground gas storages and it is also described the current state of research and achievements in the use of turbo expanders

In chapter 1, entitled **Presentation of the Bilciurești underground natural gas storage**, are listed the components of an underground gas storage system, basic features of the Bilciurești underground gas storage, the maximum operating pressure and the underground gas storage capacity.

Chapter 2, **Theoretical aspects involved in approaching the thesis**, underlines the energy recovery process from the gases by adiabatic relaxation in the expander in order to use the turbo expander to produce mechanical energy. It is being analyzed the adiabatic relaxation process of the gases considered to be perfect and in the same time are being underlined the inherent errors that can appear when we are using real gas. The study of thermodynamic process for producing mechanical power by adiabatic relaxation through an expander is elaborated, process that is being used for both perfect and real gases simulation.

Conclusions drawn from this chapter lead us to believe that large amounts of mechanical energy transformed into electricity by recovering the waste pressure let down energy from natural gas by using Turbo expanders can be obtained.

Chapter 3, **Experimental research of the behavior of the extraction wells from Bilciurești underground gas storage**, materialize the experimental study activity conducted on the Bilciurești structure. Specific technological aspects regarding gas extraction and storage are being specifically addressed. The pressure and flow rates of the gases extracted from the underground gas storage were analyzed in order to recover a portion of the waste pressure let down energy.

Chapter 4, **Experimental research of recovery possibilities of the waste pressure let down energy from the Bilciurești underground gas storage delivered to the natural gas transmission system** completes the thesis, containing the solution offered by theme. In this chapter are presented in a synthetic manner the results of measurements made on the Bilciurești structure and simulations that were made by using computer programs.

**The conclusions** that can be drawn from the present thesis are optimistic and the proposed solutions regarding, the recovery possibilities of the waste pressure let down energy from the Bilciurești underground gas storage before the gases are delivered to the natural gas transmission system are efficient.