



POLITEHNICA
UNIVERSITATEA "POLITEHNICA" DIN TIMIȘOARA

Biogas. Future perspective in greenhouse gases emission reduction

As. dr. ing. Adrian Eugen CIOABLĂ

**Department for Mechanical Machines, Equipment and
Transportation, POLITEHNICA University of Timisoara**

WHY BIOGAS ?

- In recent years there have developed the technologies used to convert biomass into secondary energy sources;
- Existing biomass potential can be harnessed using a different alternative conversion technologies (co-incineration, biogas production);
- It is necessary to determine the most suitable varieties of biomass waste that can be used in anaerobic digestion process with good results in terms of quality and quantity of produced biogas.





Biomass - biodegradable fraction of products, waste and residues from agriculture, including vegetable and animal substances, forestry and related industries, as well as the biodegradable fraction of industrial and urban waste.

POLITEHNICA
UNIVERSITATEA "POLITEHNICA" DIN TIMIȘOARA





ADVANTAGES IN USING BIOGAS AS AN ENERGY SOURCE

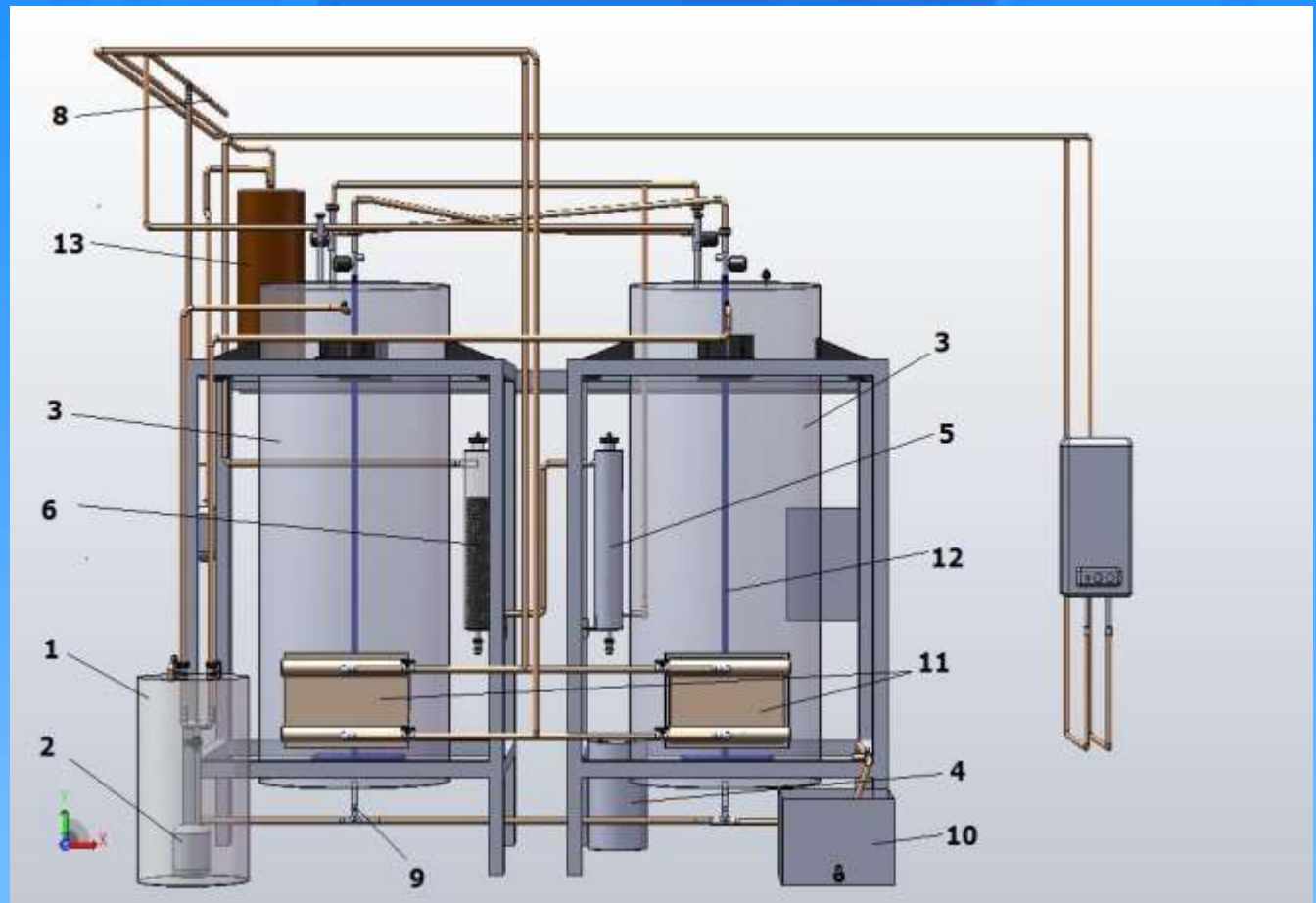
1. Biogas as source of bioenergy, is the result of biomass natural conversion;
2. The process of biogas production can occur both aerobically and anaerobically, displaying a wide range of solutions;
3. One of the main advantages is that for the production of biogas it can be used all residues containing degradable organic matter (both in agriculture and forestry);
4. Sources of biomass and biomass waste that can be used for biogas production are in large numbers, which confers an advantage in terms of possibilities;
5. Energy dependence reduction, which is a challenge and solutions for the energy future of the European Union, namely a chance to increase the number of installations in this area locally and regionally.



INSTALLATIONS BUILT AT THE MECHANICAL ENGINEERING FACULTY IN TIMISOARA

Pilot installation for biogas production from biomass

POLITEHNICA
UNIVERSITATEA "POLITEHNICA" DIN TIMIȘOARA



Functional schematics of the installation



INSTALLATIONS BUILT AT THE MECHANICAL ENGINEERING FACULTY IN TIMISOARA

POLITEHNICA
UNIVERSITATEA "POLITEHNICA" DIN TIMIȘOARA



Front view of the pilot installation



Beech saw dust



Degraded corn grains

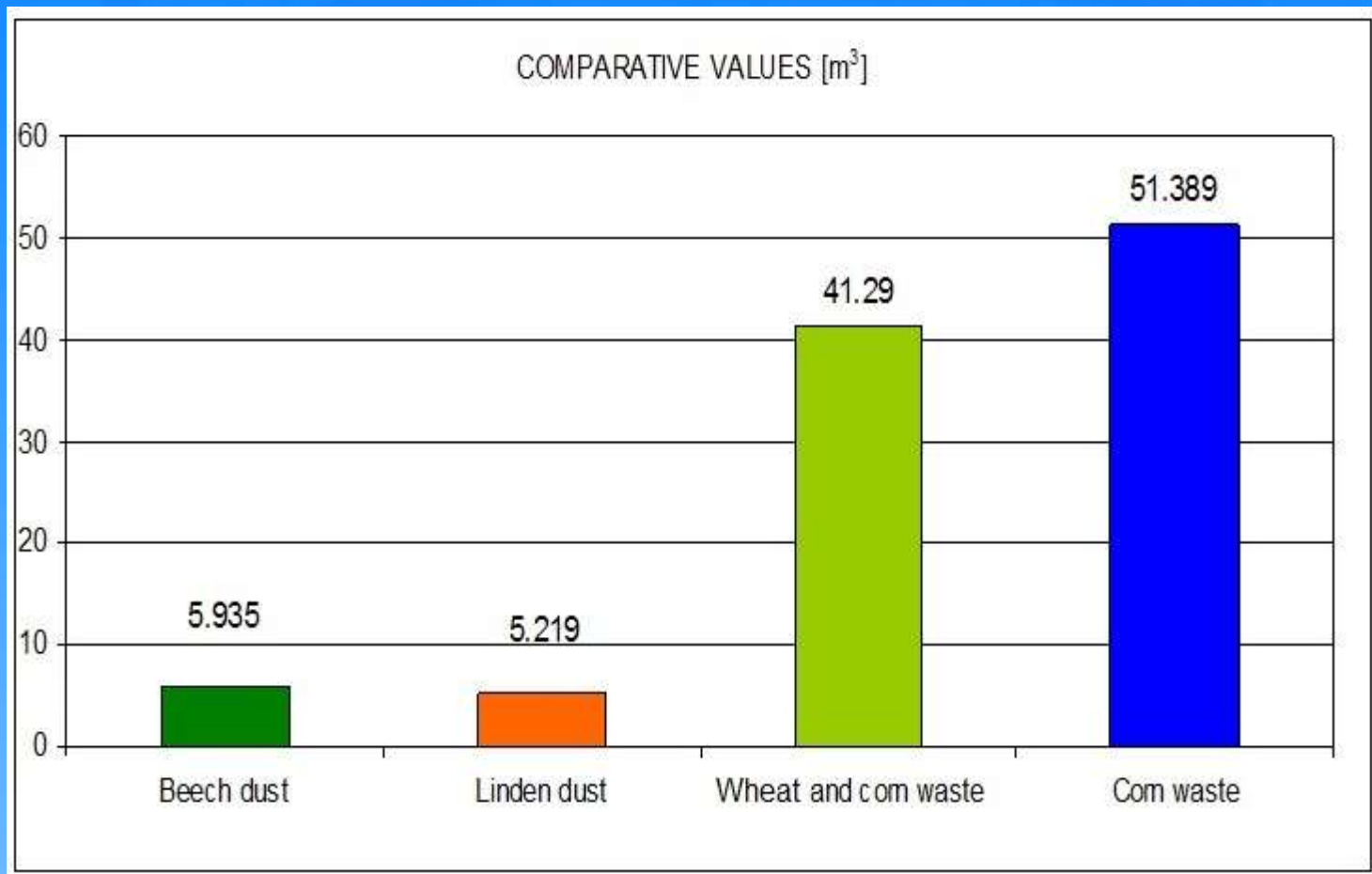


Degraded wheat and corn grains

EXPERIMENTAL RESULTS



POLITEHNICA
UNIVERSITATEA "POLITEHNICA" DIN TIMIȘOARA



Biogas production



INSTALLATION BUILT TOGETHER WITH THE MECHANICAL ENGINEERING FACULTY IN TIMISOARA

POLITEHNICA
UNIVERSITATEA "POLITEHNICA" DIN TIMIȘOARA



Overview of the pilot installation

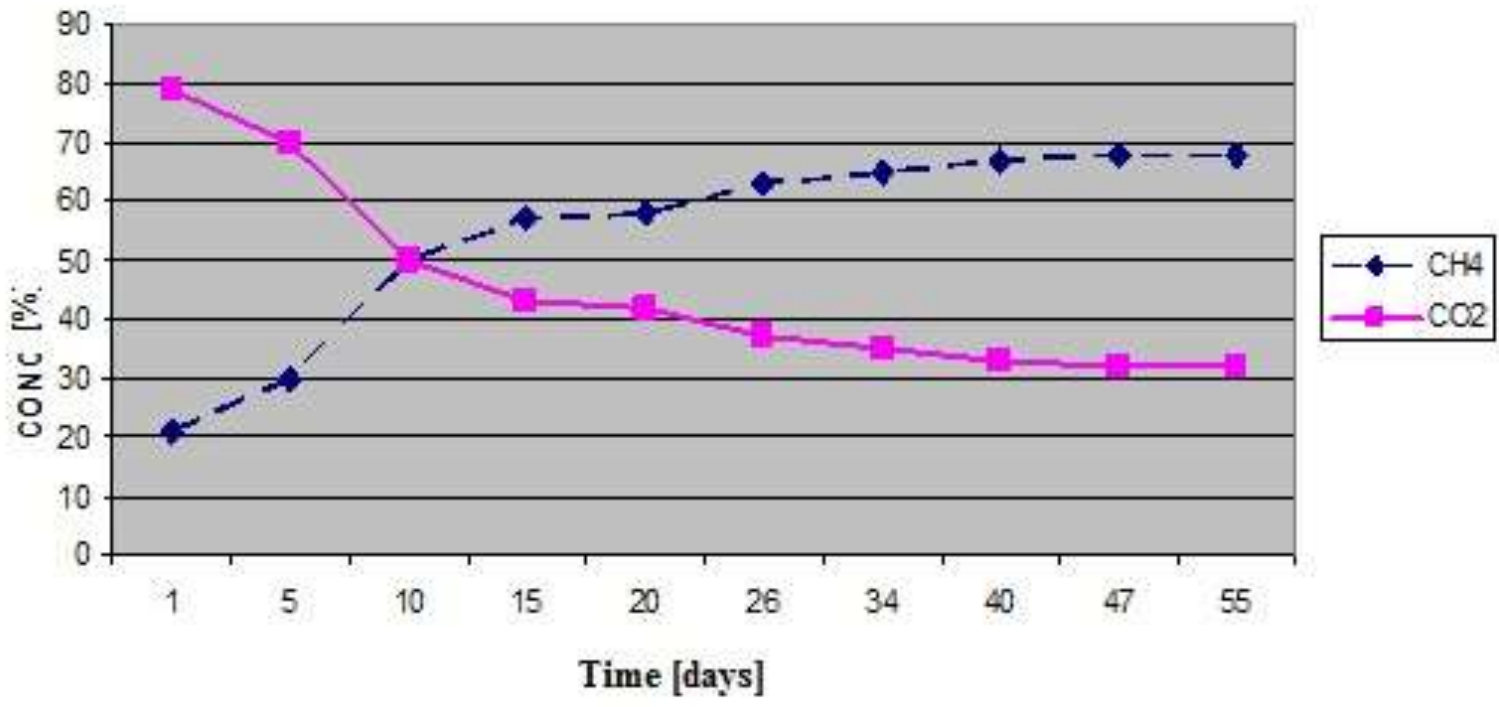


Front view of the pilot installation



CASE STUDY – EXPERIMENTAL APPROACH – AUTUMN BATCH

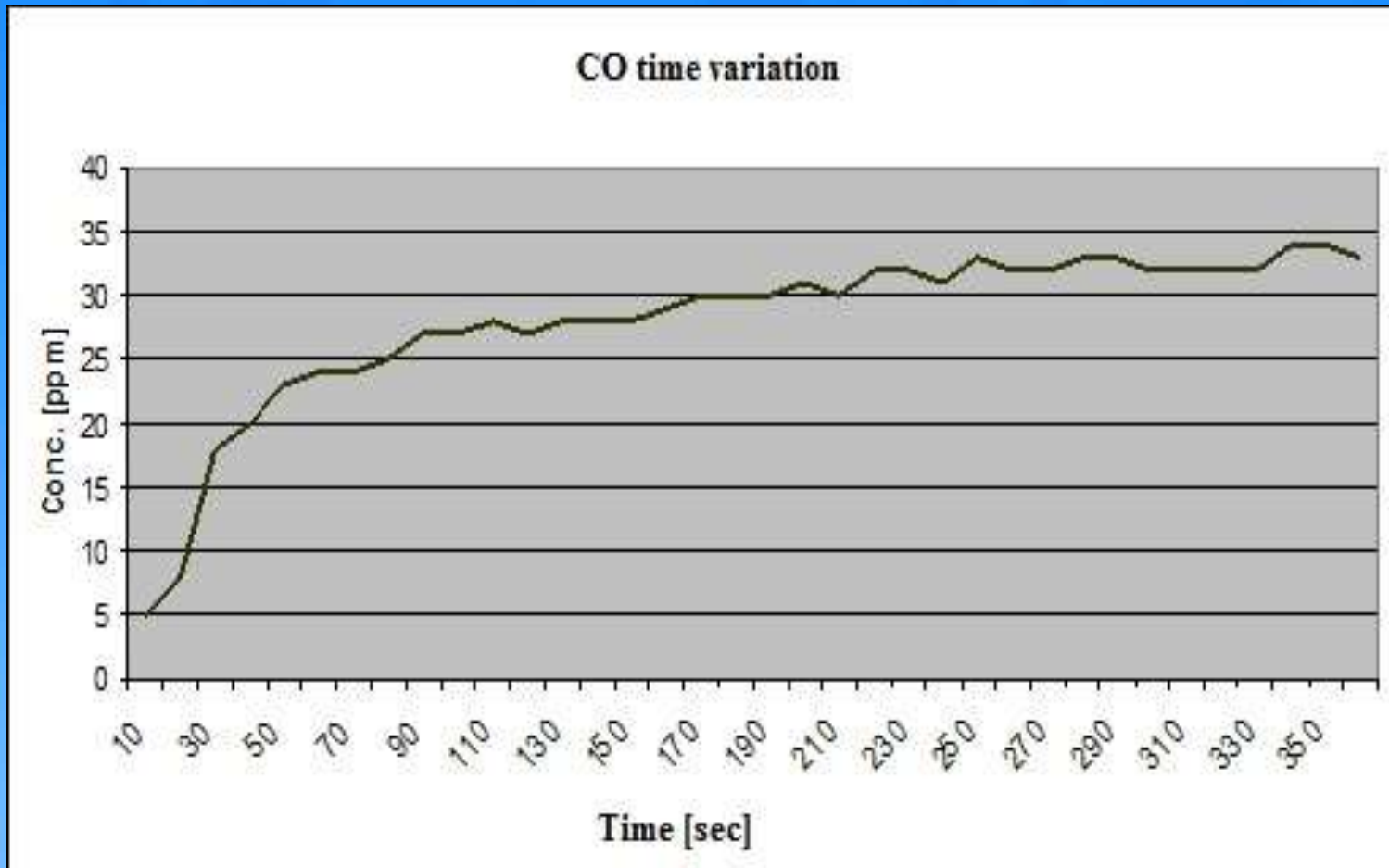
POLITEHNICA
UNIVERSITATEA "POLITEHNICA" DIN TIMIȘOARA





CASE STUDY – EXPERIMENTAL APPROACH – AUTUMN BATCH

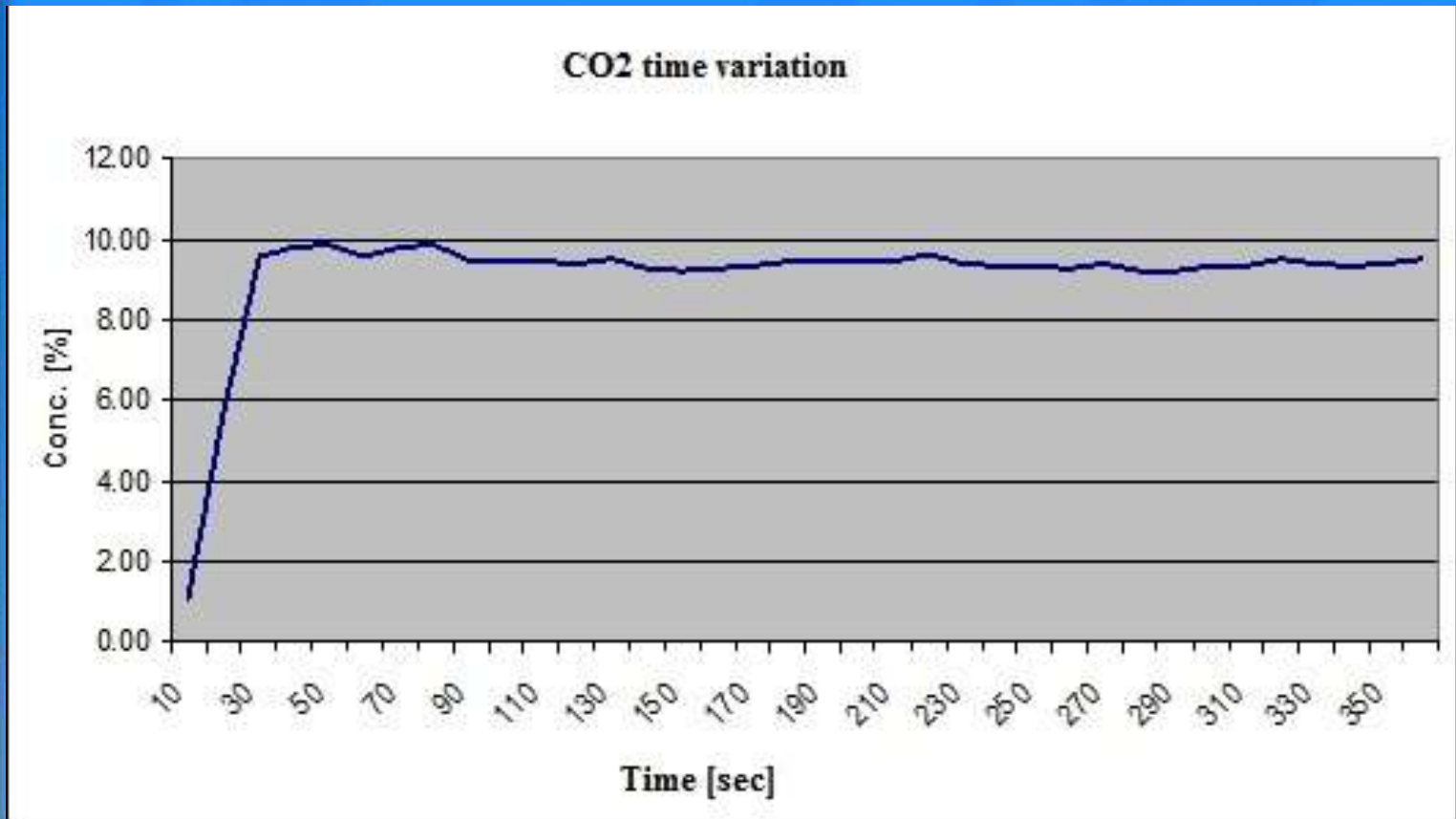
POLITEHNICA
UNIVERSITATEA "POLITEHNICA" DIN TIMIȘOARA





CASE STUDY – EXPERIMENTAL APPROACH – AUTUMN BATCH

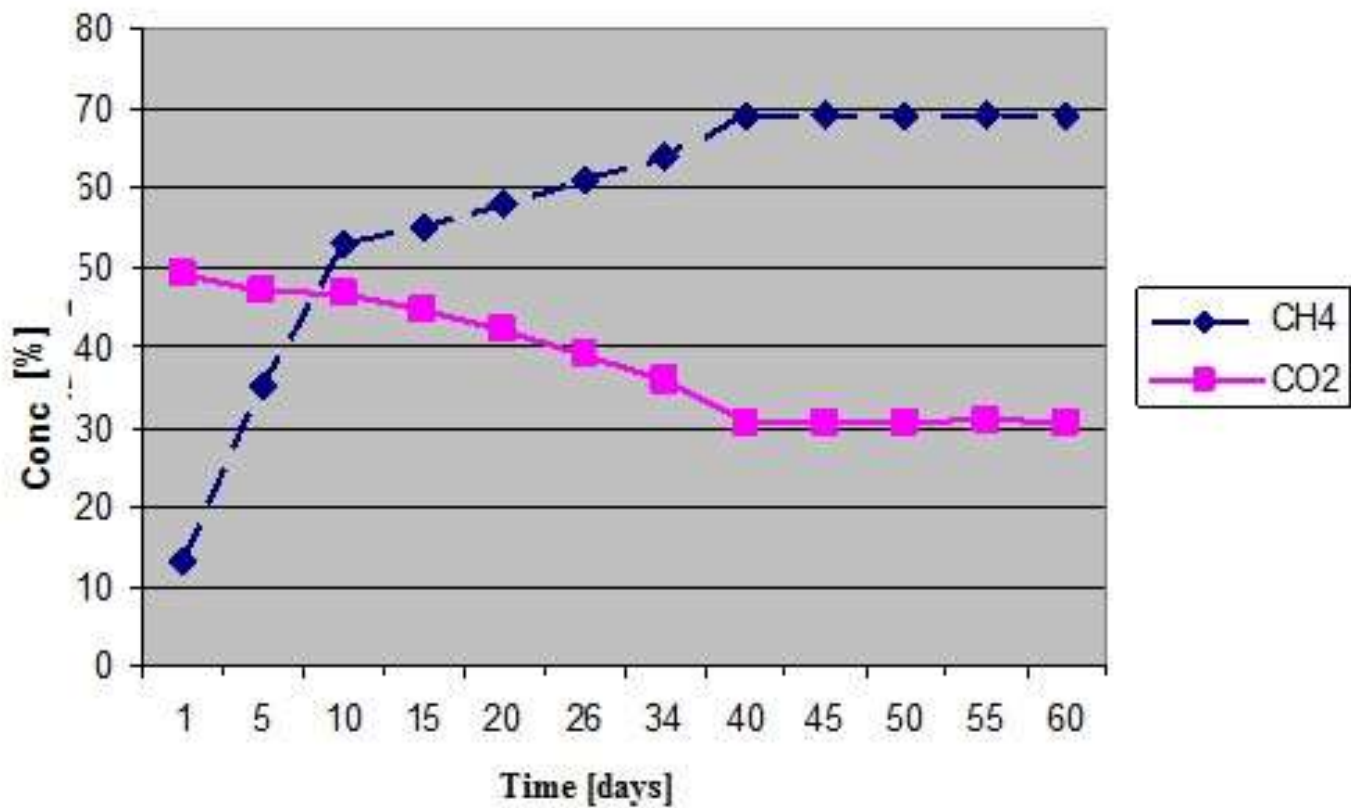
POLITEHNICA
UNIVERSITATEA "POLITEHNICA" DIN TIMIȘOARA





CASE STUDY – EXPERIMENTAL APPROACH – SUMMER BATCH

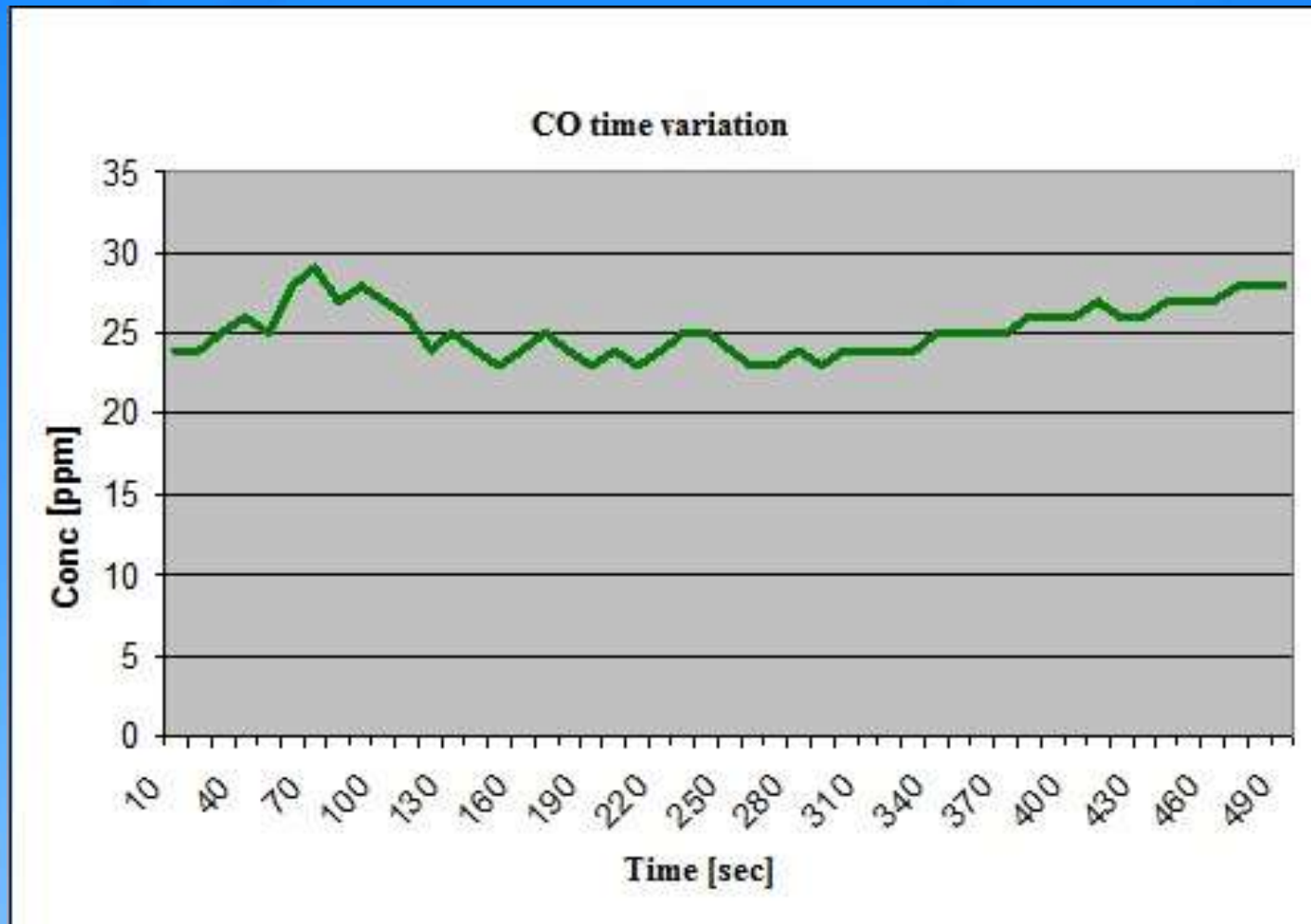
POLITEHNICA
UNIVERSITATEA "POLITEHNICA" DIN TIMIȘOARA





CASE STUDY – EXPERIMENTAL APPROACH – SUMMER BATCH

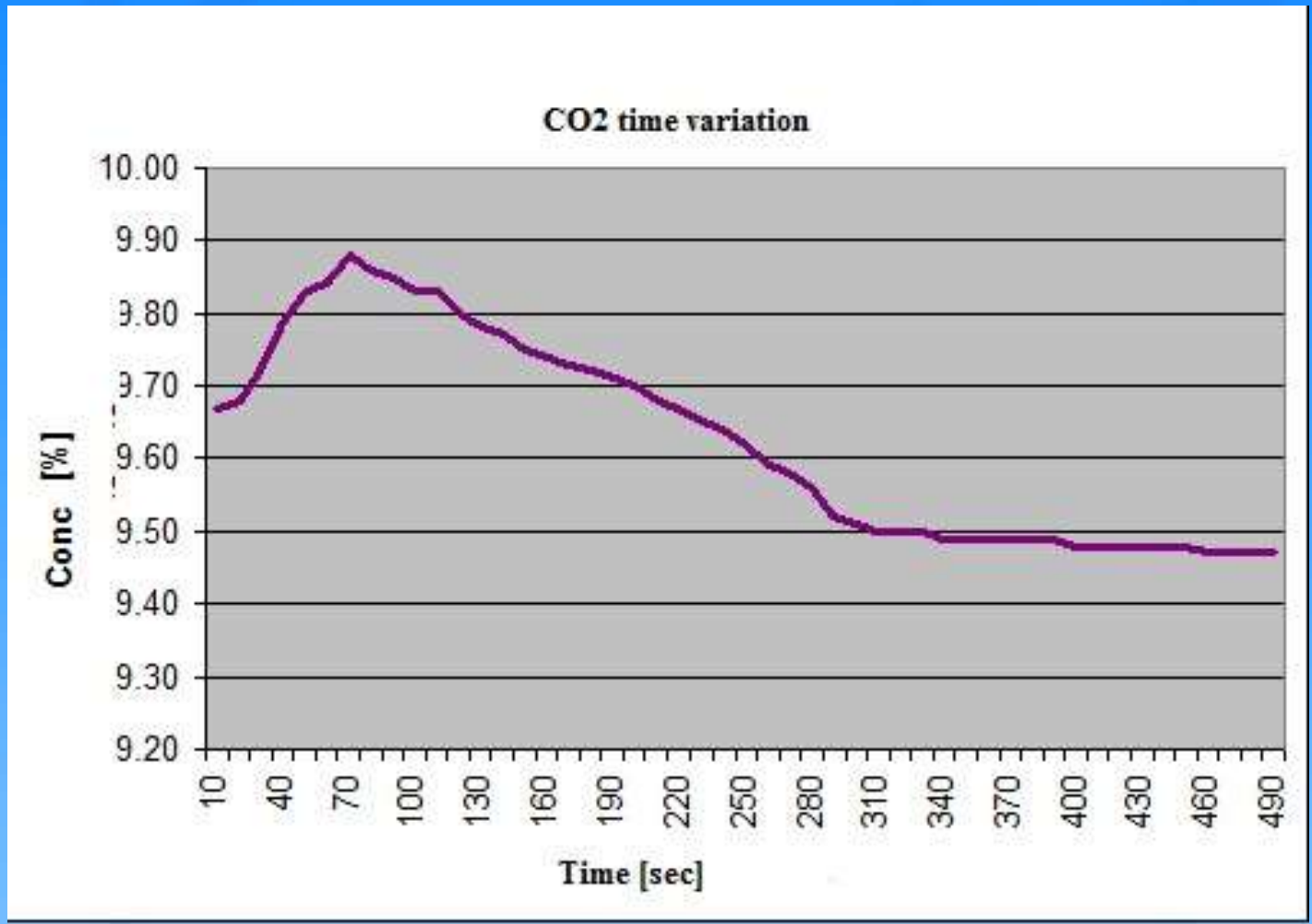
POLITEHNICA
UNIVERSITATEA "POLITEHNICA" DIN TIMIȘOARA





CASE STUDY – EXPERIMENTAL APPROACH – SUMMER BATCH

POLITEHNICA
UNIVERSITATEA "POLITEHNICA" DIN TIMIȘOARA





INSTEAD OF CONCLUSIONS

- **Experimental studies connected with the utilization of different biomass substrates in order to improve the quality and quantity of the produced biogas;**
- **Studies related with biogas applications in firing or co-firing processes;**
- **Potential of decreasing hazardous emissions (H₂S) resulting from the process;**
- **Optimisation of CO₂ capture from the obtained biogas.**



POLITEHNICA
UNIVERSITATEA "POLITEHNICA" DIN TIMIȘOARA

**THANK YOU FOR YOUR KIND
ATTENTION !**

As. dr. ing. Adrian Eugen CIOABLA

Universitatea "Politehnica" din Timișoara, Facultatea de Mecanică,
Blv. Mihai Viteazu, Nr. 1, cod 300222, Timișoara, România,
Tel: +40256 403746 Mobil: +40728123289, Fax: +40256 403669,
Mail: adrian.cioabla@upt.ro