



# CERTIFICATE OF PARTICIPATION

This is to certify that

**Alina Pihul**

**Sumy National Agrarian University**

has successfully participated in the International Workshop-Webinar  
“Sustainable Development of Renewable Energy:  
Economic, Managerial, and Technological Aspects”  
held on April 6–10, 2026.

## **Learning Outcomes (1.5 ECTS Credits)**

### **Module 1. Bioenergy Heating Systems: Technologies and Economic Assessment**

- Technological foundations and operational features of biomass-based heating systems
- Methodological approaches to the economic assessment of biomass heating systems
- Comparative analysis of heating costs using different energy sources
- Investment attractiveness & Economic efficiency of district heating systems

### **Module 2. Photovoltaic Systems: Technologies and Economic Aspects of Use**

- Technological principles and economic efficiency of photovoltaic systems
- Models and economic aspects of self-consumption of electricity in photovoltaic systems
- Technical characteristics and economic feasibility of energy storage systems

### **Module 3. Renewable Electricity Systems**

- System principles of wind and hydropower generation
- Investment attractiveness & Economic efficiency of wind and hydropower installations

### **Module 4. New Energy Solutions and Energy-Efficient Mobility**

- Economic efficiency of electric vehicle usage
- The role of electromobility in the transformation of modern energy systems

**Ralf Schlauderer**  
**Prof. Prof. h.c. mult. Dr. Dr. h.c. mult.**