USAID
FROM THE AMERICAN PEOPLE

Energy Security Project (ESP): Condensing Economizer Installation at CHP-5

OVERALL OBJECTIVE

Improve the efficiency of the generating equipment at CHP-5.

TECHNICAL SOLUTIONS

Installation of a condensing economizer (CE) to recover the heat of boiler flue gases through deep cooling using the effect of water vapor condensation with 30 MW heat power.

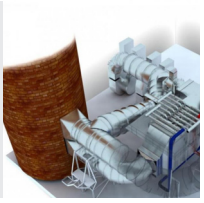
PROJECT IMPLEMENTATION STATUS

The full scope of work to prepare design documentation for CE installation at CHP-5 was completed with ESP support. The design documentation received a positive expert report and was transferred to CU Kyivteploenergo (KTE). This allows a tender to be held for CE installation at CHP-5 under anticipated EBRD program as per Memorandum of 2018.

PROJECT PARTNERS

ESP cooperates in project implementation with KTE, Ukrenergoprom-3, and EBRD.

CONDENSING ECONOMIZER INSTALLATION AT CHP-5

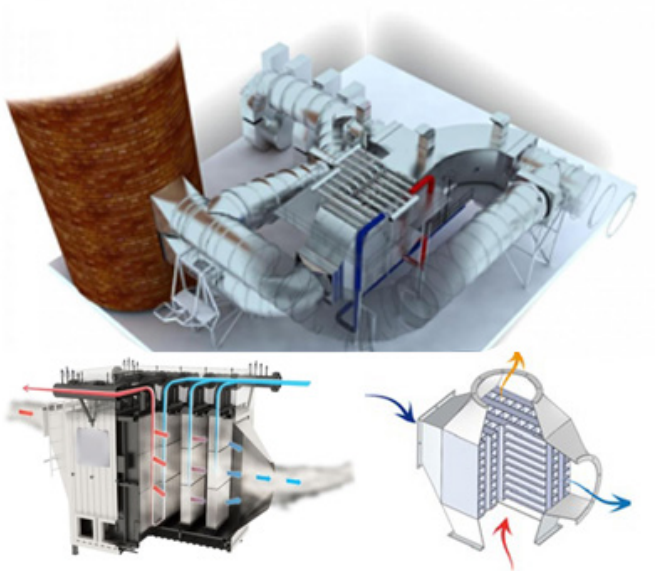


CONDENSING ECONOMIZER OPERATING PRINCIPLE

IMPACT: Heat recovery from flue gases increases boiler's efficiency by 10%.

OPERATING PRINCIPLE

A CE is a tubular heat exchanger installed behind a gas-fired boiler to recover heat energy from flue gases, including vapor-generated energy. In the first phase, the flue gases are cooled to dew-point temperature and transfer heat to the system water flowing in heat exchanger pipes. In the subsequent phases, the flue gases are cooled even more, below the dew point, and transfer heat to chemically-treated water that is used to replenish heat networks. The condensate is neutralized and used again in the water treatment cycle. Using a CE will increase boiler unit efficiency by 10%.



FEASIBILITY STUDY

IMPACT: Reduction of natural gas consumption for heat energy production through recovery of flue gas heat.

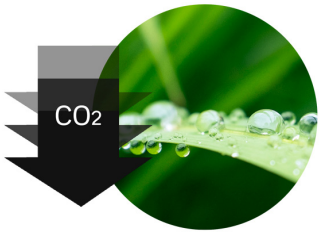
RESULTS

- Increased boiler capacity by 26 Gcal/h (30 MW)
- Annual fuel savings (natural gas) – 20.28 million m3
- Annual cost savings, at 7 UAH/m3 gas price – UAH 142 million
- Cost of implementation – UAH 373 million
- Project payback period – 2.6 years

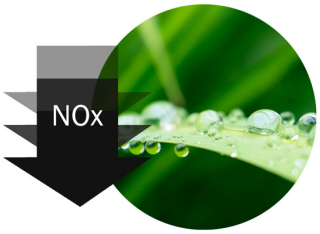
ENVIRONMENTAL IMPACT ASSESSMENT

IMPACT: Reduction in amount of emissions into the atmosphere, chemical neutralization of condensate's adverse impact.

Current boiler condition, t/year		After CE installation, t/year	
Nitrogen dioxide	Carbon dioxide	Nitrogen dioxide	Carbon dioxide
449	**215,055**	**408**	**200,587**



6.7% (14,183 t/year)



9.1% (40,855 t/year)

SUPPORT TO MUNICIPALITIES

IMPACT: With ESP support, municipalities plan long-term development and recovery of district heating systems to provide high-quality and affordable services to consumers.

RESULTS

ESP support of municipal partners meets the individual needs of each city. An example of this is assistance is collaboration with CU Kyivteploenergo to facilitate financing of several key investment projects under anticipated EBRD program as per Memorandum 2018 and to modernize Kyiv's district heating system and increase the efficiency of management and customer service.

ESP also provides support to develop heat supply systems for Ukrainian municipalities and integrate options for modern technologies into the new HSS.

This brief is made possible by the support of the American People through the United States Agency for International Development (USAID). The contents of this brief are the sole responsibility of Tetra Tech ES, Inc. and do not necessarily reflect the views of USAID or the United States Government. This brief was prepared by Tetra Tech, Inc., for the USAID Energy Security Project (ESP).