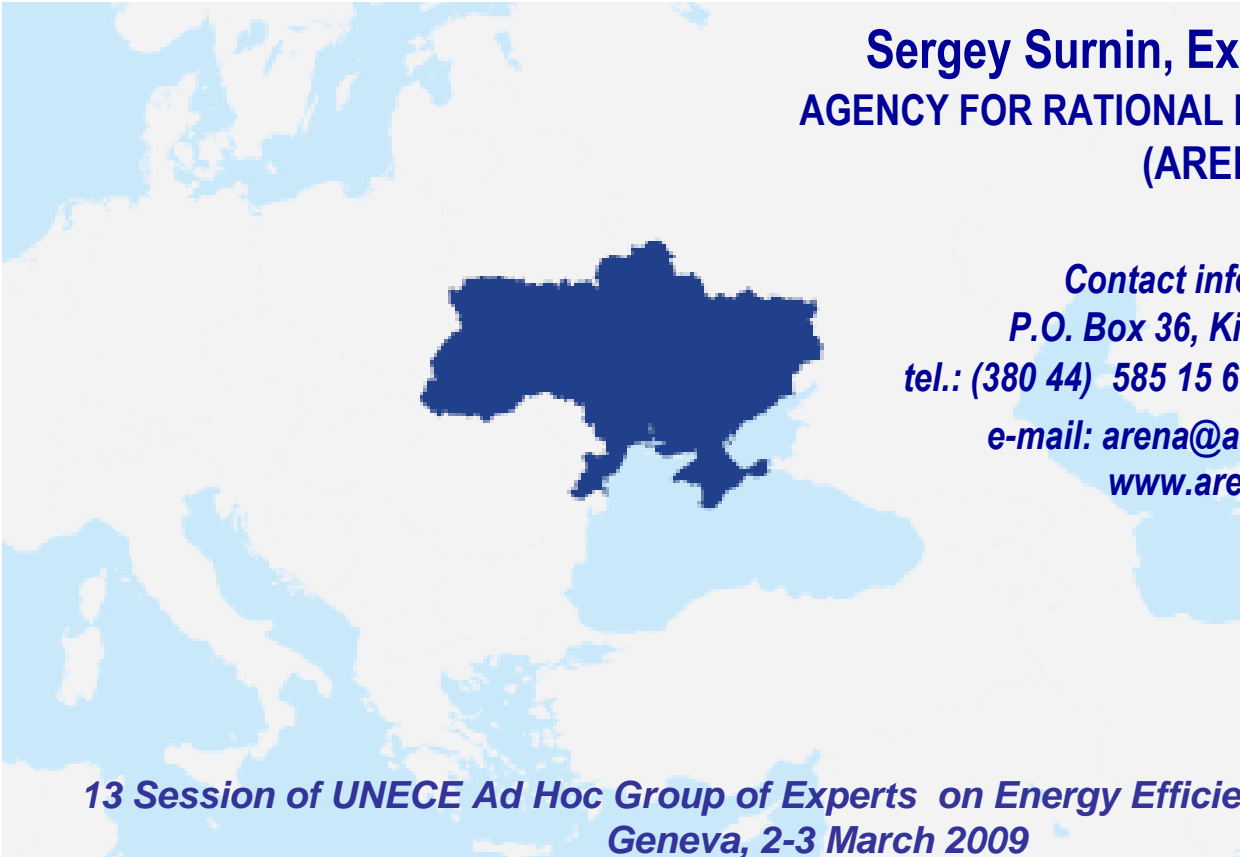


**PROJECT "FINANCING ENERGY EFFICIENCY INVESTMENTS  
FOR CLIMATE CHANGE MITIGATION":  
FINANCING OF ENERGY EFFICIENCY PROJECTS IN UKRAINE**



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**13 Session of UNECE Ad Hoc Group of Experts on Energy Efficiency Investments,  
Geneva, 2-3 March 2009**



## GENERAL INFORMATION ABOUT THE PROJECT

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- ***Project Title:* Financing Energy Efficiency Investments for Climate Change Mitigation**
- ***Project No:* (ECE – INT- 04-318)**
- ***Basis:* Memorandum of Understanding No: ECE/GC/2008/022**
- ***Client:* United Nations Economic Commission for Europe**
- ***National Participation Institution:* Agency for Rational Energy Use and Ecology (ARENA-ECO), Kyiv, Ukraine**
- ***National Project Coordinator:* Mykola Raptsun, President, ARENA-ECO**



## UKRAINIAN ENERGY EFFICIENCY PROJECT EXAMPLES

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- **Financed and implemented projects**
- **Projects under development and implementation**
- **Not financed (causes) projects**
- **Potentially possible projects**

## **COGENERATION IMPLEMENTATION IN IVANO-FRANKIVSK DISTRICT HEATING SYSTEM (Implemented in 2004)**

- **Developer: Agency for Rational Energy Use and Ecology (ARENA-ECO), Ukraine**
- **Implementation site: Ivano-Frankivsk boiler house**
- **Indices: Total project cost - USD 668.8 thousand**
- **Financing source: Foreign financing of the project – commercial bank’s loan– USD 468.2 thousand;**
- **Domestic financing of the project – USD 200.6 thousand**
- **Short description:  
Cogeneration unit installation and operation based on 1 MW gas-piston combustion engine;**
- **Project implementation benefits:  
Reduction of enterprise's electricity, operation and repair costs;  
Improvement of enterprise’s financial condition;  
Production of additional electricity to meet municipal consumers’ needs;  
Produced electricity since commissioning in 2004: in 2005 – 6.1 million KW\*h, in 2006 – 5.3 million KW\*h, in 2007 – 4.7 million KW\*h.**



## KIEV PUBLIC BUILDINGS ENERGY EFFICIENCY INVESTMENT PROJECT (implemented in 2001-2004)

- **Developers:** Agency for Rational Energy Use and Ecology (ARENA-ECO), Ukraine; Pacific Northwest National Laboratory (PNNL), USA
- **Implementation sites:** More than 1,300 educational, health-care and cultural buildings financed from the municipal budget.
- **Indices:** Total project cost - \$30.4 million
- **Implementation period** - 5 years
- **Pay-back period** - about 7 years;
- **Fuel savings** - 58.1 thousand t.c.e. per year;
- **Emission reductions:** NO<sub>x</sub> - 238 t/year, SO<sub>x</sub> - 166 t/year, CO<sub>2</sub> - 61,183 t/year.
- **Sources of financing:**  
World Bank (loan \$18.3 million), Kiev Municipality (internal financing \$10.1 million), Swedish agency SIDA (grant \$2 million).
- **Short description:**  
Prepared investment project covers hospitals, polyclinics, kindergartens, schools, cultural institutions and administration buildings, with total annual consumption of more than 1 million Gcal.  
High-return energy efficiency measures were selected for implementation, such as upgrading building substations with installation of heat meters and temperature controls, weatherization of windows and doors, installation of radiator reflectors, faucet aerators and low-flow shower heads, installation of hot water heat exchangers and controls in building substations.  
Estimated heat energy savings from recommended measures make up about 27% of baseline consumption, or 298 Gcal/year.

## RECONSTRUCTION AND MODERNISATION OF THE CITY DISTRICT HEATING SYSTEM OF IVANO-FRANKIVSK

(Under development, potential Investor – European Bank for Reconstruction and Development)

- **Developer: Agency for Rational Energy Use and Ecology (ARENA-ECO), Ukraine;**
- **Indices : Investment, thous. \$ – 61.5 million;**
- **Annual production of own electricity– 32.6 million KW\*h;**
- **Annual consumption of wood waste – 26.1 thous. t/y;**
- **Annual natural gas saving – 29.8 million m3;**
- **Annual electricity saving – 1.24 million KW\*h;**
- **GHG emission reduction – 76.1 thousand t CO<sub>2</sub>-e/y;**
- **Financing sources :**
  - European Bank for Reconstruction and Development (EBRD);**
  - State and municipal budgets;**
  - Fund of the Ministry of Environmental Protection of Ukraine;**
  - State Energy Efficiency Fund;**
  - Loans of commercial banks;**
  - Carbon funds – sale of emission reduction units (Joint Implementation projects);**
  - Own costs of SE “IFTKE”;**
  - Income from the tariff investment component.**
- **Short description :**
  - Modernization of boiler houses , installation of boiler units using natural gas and wood waste as fuel, installation of cogeneration units, modernization of existing four-pipe system with shift to closed heat supply double-pipe system, introduction of individual heat substations.**

## INVESTMENT PROGRAM “KHARKIV HEAT SUPPLY IMPROVEMENT FEASIBILITY AND INSTITUTIONAL RESTRUCTURING STUDY (NOT FINANCED)

- **Developers:**  
Agency for Rational Energy Use and Ecology), Ukraine;  
Parsons E&C (USA),  
Tysak Engineering (USA),
  
- **Implementation site:** Kharkiv District Heating Networks
  
- **Short description:**  
The project is aimed at district heating (DH) system efficiency and reliability improvement, its structure enhancement, DH service costs decrease and institutional aspects of DH supply services, including the following key activities: forecast of the system heat loading, optimization of operation of sources and network loading; distribution system modernization, alternative heat supply options, improving efficiency of heat use by consumers; optimization of organizational structure of the city.  
Technical rehabilitation covers the following areas: upgrade of the existing sources with cogeneration introduction; reconstruction of the 33 km primary and 250 km secondary pipelines using pre-insulated pipes; pumping stations reconstruction with introduction of variable speed drives.
  
- **Indices:** Total project cost - \$231.6 million
- **Project financing:** International financial institutions, commercial banks, private investors
- **Reasons:** Lack of own costs and narrow banking terms.

## PRELIMINARY ESTIMATION OF POTENTIAL ENERGY EFFICIENCY AND RENEWABLE PROJECTS (POTENTIALLY POSSIBLE)

No.	Project title	Project cost, EUR mln.	GHG emission reduction, thous. t CO <sub>2</sub> -e	Number of projects (sites)
1	Installation of cogeneration units	63.0	2,235.6	7
2	Solid waste disposal site (SWDS) biogas utilization	12.8	1,728.3	5
3	CMM utilization	30.0	4,985.0	6
4	Construction of recovery turboexpander units for electricity production by gas distribution stations of "Ukrtransgas" subsidiaries within NJSC "Naftogas of Ukraine"	18.0	833.1	10