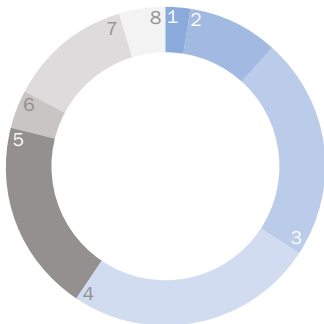




**DEVELOPING CORPORATE
ENERGY EFFICIENCY:
MANAGING RESOURCES
TO BOOST PRODUCTIVITY**

SINCE 2006, THE EBRD HAS PROVIDED MORE THAN **€4.5 BILLION** IN SUSTAINABLE ENERGY FINANCING TO THE CORPORATE SECTOR, REACHING OVER **317** CLIENTS IN **31** COUNTRIES.

THESE PROJECTS ARE PROJECTED TO DELIVER ANNUAL CO₂ EMISSION REDUCTIONS OF OVER **14.8 MILLION** TONNES.



	€ million
1 Central Asia	115
2 Central Europe and the Baltic states	412
3 Eastern Europe and the Caucasus	1,016
4 Russia	1,145
5 South-eastern Europe	873
6 Southern and eastern Mediterranean	170
7 Turkey	560
8 Regional*	212
Total	4,503

* Regional projects are those which cover several countries and/or regions.

EBRD clients have proven that implementing energy efficiency projects and initiatives raises productivity, enhances competitiveness, supports energy security and lowers CO₂ emissions.

In sectors such as manufacturing, agribusiness, and the service industry, access to EBRD funding and technical expertise enables companies to cut production costs and to turn waste materials into valuable goods. This reduces risk and increases profit margins while also minimising environmental impact.

PROVIDING INTEGRATED SOLUTIONS

Opportunities to save energy and resources exist in almost every business. The EBRD helps clients to identify these opportunities and turn them into economically viable projects, developing long-term investment programmes for the efficient use of energy and resources.

The Bank supports clients by offering:

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- TECHNICAL EXPERTISE PROVIDED BY SPECIALISED PROCESS AND ENERGY EXPERTS
- SUPPORT FOR THE INTRODUCTION OF ADVANCED ENERGY AND RESOURCE MANAGEMENT PRACTICES
- FINANCIAL SOLUTIONS TAILORED TO THE NEEDS OF CLIENTS AND THEIR PROJECTS



SPECIALIST SERVICES AND SUPPORT

The EBRD engages specialist consultants who work closely with decision makers and operations managers to bring increased efficiency to company operations.



Initial engagement

- REVIEW THE BUSINESS STRATEGY OF THE CLIENT COMPANY
- COLLECT DATA ON COMPANY OPERATIONS
- MEET WITH COMPANY MANAGEMENT
- LAUNCH AN ENERGY AUDIT, FUNDED BY EBRD DONORS.

Analysis

- MAKE SITE VISITS TO CONDUCT DETAILED DISCUSSIONS WITH PLANT ENGINEERS (THREE TO FIVE DAYS)
- REVIEW ENERGY AND RESOURCE CONSUMPTION, BENCHMARKING THEM AGAINST INTERNATIONAL BEST PRACTICE.

Capital investment appraisal

- UNDERTAKE TECHNICAL AND ECONOMIC FEASIBILITY STUDIES
- DEFINE PRIORITIES FOR INVESTMENTS IN RESOURCE EFFICIENCY.

Investment planning

- FINALISE THE ENERGY EFFICIENCY ACTION PLAN
- DEVELOP AN IMPLEMENTATION PLAN.

Financial plan

- GENERATE A FINANCIAL PLAN TOGETHER WITH THE EBRD BANKING TEAM.

FINDING THE BEST SOLUTIONS FOR EACH SECTOR AND INDUSTRY

Energy-intensive industries: optimising energy use

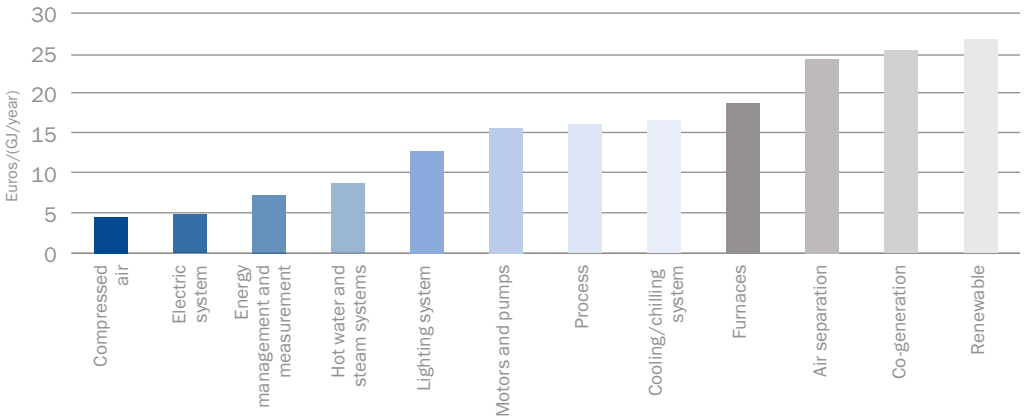
In industries with high energy consumption, projects focus on modernising manufacturing operations, creating capacity for on-site energy generation, or finding ways to capture and re-use process heat and waste products.



Examples of industry projects include:

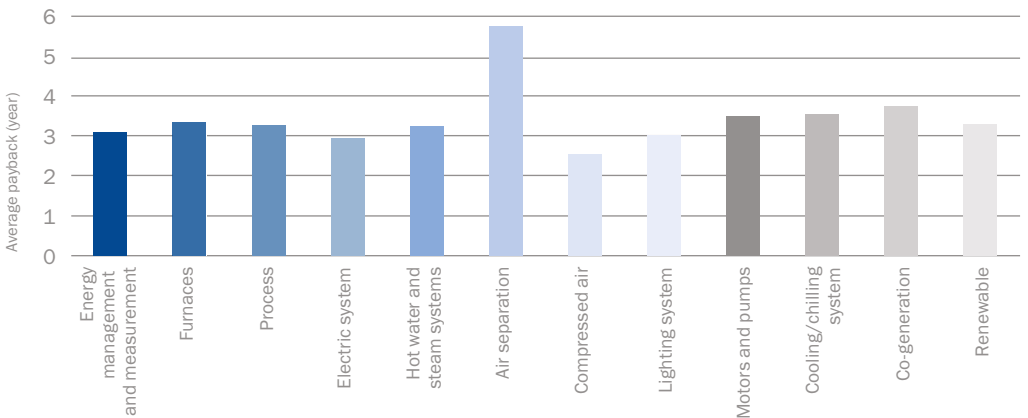
- **CEMENT:** Switching from wet to dry kilns, use of vertical mills, pre-calciner technologies, high-efficiency coolers
- **PULP AND PAPER:** Introduction of new de-barking machinery or washing equipment, new pulp mill digesters, faster or wider paper machines, improvements to supply-chain integration
- **PETROCHEMICAL OR CHEMICAL:** Use of hydro-cracking, hydro-treating, hydro-coking, high-density polymer reactors, new catalysts, upgrades to reactor columns (for example, internals, packing)
- **STEEL:** On-site power generation, recovery of waste heat, furnace gas, use of process controls, recovery of by-products.

Chart 1: Specific cost of energy savings



Note: Chart 1 shows the average specific costs required to achieve a unit of energy saving (GJ) in one year, in each of the twelve categories shown (2011).

Chart 2: Average payback for each category of interventions

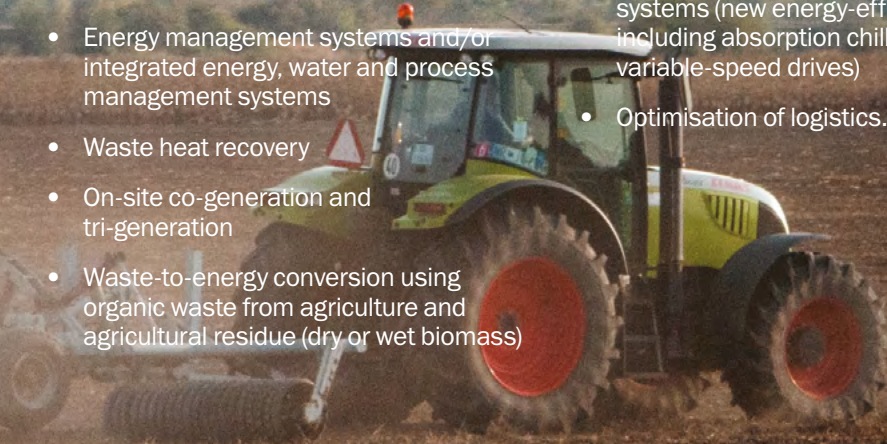


Note: Chart 2 illustrates the average payback period for each proposed action (2011).

AGRIBUSINESS: IMPROVING EFFICIENCY

From livestock breeding to food production, packaging to distribution, agribusiness has an array of opportunities to improve energy efficiency throughout the value chain, including:

- Process integration of fermenters, dryer upgrades, conversion from batch to continuous operation, and enhanced automation
- Energy management systems and/or integrated energy, water and process management systems
- Waste heat recovery
- On-site co-generation and tri-generation
- Waste-to-energy conversion using organic waste from agriculture and agricultural residue (dry or wet biomass)
- Waste-to-biofuel conversion which uses agricultural residue to obtain solid fuel pellets, or liquid fuels such as bioethanol, biodiesel and bio-oil
- Improvements to electricity distribution systems, including the use of reactive power compensation
- Chilled water production and distribution systems (new energy-efficient chillers including absorption chillers, control with variable-speed drives)
- Optimisation of logistics.



COMMERCIAL AND RETAIL BUILDINGS: REDUCING ENERGY CONSUMPTION

Applied during construction or refurbishment, effective design and integrated systems can reduce energy consumption in buildings through:

- Advanced thermal insulation
- Low-emission glazing
- Efficient lighting (LED, T5, automation and sensor control)
- Automation and control of building services (metering equipment, temperature and pressure control equipment, programmable controllers and software, presence detectors, light sensors)
- Efficient boilers, chillers and refrigerators (condensing boilers, chillers with centrifugal compressors, absorption cooling, closed display refrigerators)
- Application of renewable energy systems (heat pumps, solar thermal, photovoltaics).



RETAIL CONVENIENCE STORES

COUNTRY

GEORGIA

PROJECT

SMART RETAIL

TOTAL EBRD FINANCING

€34 MILLION¹

EBRD SEI FINANCING

€18 MILLION

ENERGY SAVINGS/YEAR

> 2,800 TOE²

CO₂ SAVINGS/YEAR

> 6,000 TONNES

Disposable income in Georgia is expected to increase by 10 per cent per year up to 2020. In a country where 85 per cent of shopping occurs in open markets and small stores, Smart Retail sees an opportunity to use its network of petrol stations to open retail shops in which bulk purchasing, efficient logistics, technology and distribution lower costs and provide consumers with a better mix of price and quality.

In 2012, the EBRD worked with Smart Retail to carry out an energy assessment. The review analysed energy consumption data,



identified opportunities for improvement, provided a cost-benefit analysis, and benchmarked energy performance against national and international best practice.

The assessment prompted Smart Retail to amend the design of their stores and invest in efficient food refrigerators, boilers, and air-handling units with heat recovery features. The company piloted an energy management system and full automation of mechanical and electrical services in three stores. Smart Retail plans to expand these measures to the whole retail chain.

¹ Where US dollars (US\$) have been converted from euros, the rate applied was €1 : US\$ 1.32.

² TOE = Tonne of oil equivalent.

ACRYLIC FIBRE MANUFACTURING

COUNTRY

TURKEY

PROJECT

AKSA

TOTAL EBRD FINANCING

€39 MILLION

EBRD SEI FINANCING

€32 MILLION

ENERGY SAVINGS/YEAR

> 15,000 TOE

CO₂ SAVINGS/YEAR

45,000 TONNES

Acrylic fibre, a synthetic product resembling wool, is used widely in the manufacture of garments, household textiles and in other industrial processes. With more than 40 years of industry experience, AKSA is a leading producer in terms of capacity, product quality and diversity, in domestic as well as global markets.

By combining EBRD technical and financial expertise with the know-how of AKSA's highly skilled, in-house R&D team, the company increased profitability through efficiency measures and cost-saving projects.



The initiative identified key areas for improvement:

- MAINTENANCE PROJECTS – UPGRADES TO AUTOCLAVES, DISTRIBUTED CONTROL SYSTEM AND DYNAMIC UPS
- MODERNISATION OF EXISTING 6KV ELECTRICAL SYSTEM
- RENEWAL OR MODERNISATION OF POLYMER REACTORS
- INTRODUCTION OF EFFICIENT ELECTRIC MOTORS
- UPGRADE OF SOLVENT UNIT

The energy efficiency initiatives have brought the company annual cost savings of €8 million, which will enable a return on the investment within just five years.

SUGAR FACTORY EQUIPMENT UPGRADE

COUNTRY

UKRAINE

PROJECT

ASTARTA GROUP

TOTAL EBRD FINANCING

€47.2 MILLION

EBRD SEI FINANCING

€27.8 MILLION

ENERGY SAVINGS/YEAR

> 34,000 TOE

CO₂ SAVINGS/YEAR

60,000 TONNES

Astarta Group is one of Ukraine's largest vertically integrated companies, owning nine sugar plants plus significant operations in primary agriculture.

In 2007, Astarta used an EBRD loan to modernise equipment at farms and factories, boosting production and improving energy efficiency. An energy audit identified areas for investment which led to energy savings of 30 per cent and a substantial reduction in CO₂ emissions.



Two subsequent loans supported the restructuring of the group's balance sheet, energy efficiency improvements and the construction of sugar storage facilities.

In 2012, a €7.7 million (US\$ 10 million equivalent) loan provided long-term financing to develop a biogas plant fuelled by waste generated at the sugar plant. This plant was successfully commissioned in 2013.

EDIBLE OIL PLANT

COUNTRY

SERBIA

PROJECT

VICTORIA GROUP

TOTAL EBRD FINANCING AND INVESTMENT

€45 MILLION

TOTAL EBRD SEI FINANCING

€5 MILLION

ENERGY SAVINGS/YEAR

> 13,000 TOE

CO₂ SAVINGS/YEAR

> 23,000 TONNES

Victoria Group (VG) is Serbia's largest private agribusiness organisation, with operations in seed procurement and fertiliser production, as well as the largest crushing facility for edible oils in south-eastern Europe.

Using an EBRD loan enabled VG to purchase commodities during the harvest season to support its operations. A component of the loan financed the introduction of a biomass boiler using process residues and agricultural wastes from VG suppliers.



The project allowed the company to lower costs and to reduce significantly its dependency on external energy sources such as natural gas.

STEEL MAKER EFFICIENCY GAINS

COUNTRY

RUSSIA

PROJECT

NLMK

TOTAL EBRD FINANCING

€100 MILLION

EBRD SEI FINANCING

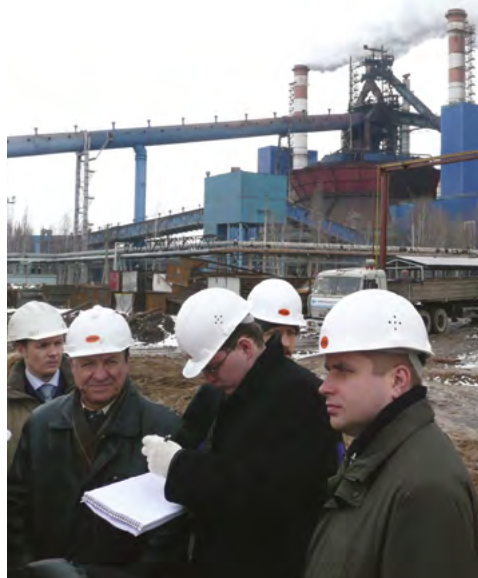
€100 MILLION

ENERGY SAVINGS/YEAR

> 1,000,000 TOE

CO₂ SAVINGS/YEAR

> 1,500,000 TONNES



With exports to more than 60 countries, NLMK is among the world's largest and most profitable steelmakers. Yet falling demand and prices prompted the company to explore energy efficiency and waste-to-energy measures for short-term cost savings and long-term competitive advantages.

The EBRD loan is part of a €490 million energy efficiency investment programme that includes:

- **INSTALLATION OF A 150 MW CO-GENERATION COMBINED CYCLE GAS TURBINE (CCGT) PLANT USING WASTE GAS FROM BLAST FURNACES**
- **INSTALLATION OF TOP-PRESSURE EXPANSION TURBINES FOR POWER GENERATION**

- **IMPLEMENTATION OF BEST PRACTICE ENERGY EFFICIENCY IMPROVEMENTS IN PROCESS FACILITIES.**

These projects have improved product quality, lowered exposure to energy price volatility and reduced the environmental footprint of NLMK while demonstrating the company's leadership in cutting energy intensity.

With EBRD support, NLMK implemented the ISO 5001 standard, becoming the first large industrial company in Russia to achieve the certification in 2013.

OTHER AREAS OF SEI ACTIVITY

www.ebrd.com/sei



CLIMATE CHANGE ADAPTATION

Developing approaches to integrate climate risk management and adaptation into project appraisal and development with a particular focus on the private sector.

POWER SECTOR ENERGY EFFICIENCY

Improving the energy efficiency of transmission networks and thermal power stations which generate the majority of energy in the region. The ageing energy infrastructure includes a large number of plants with low generation efficiency, high running costs, and excessive pollution and carbon emissions.

RENEWABLE ENERGY

Supporting the development of renewable energy sources by providing project finance and technical cooperation to shape the institutional and regulatory frameworks for renewable energy investments.

MUNICIPAL INFRASTRUCTURE ENERGY EFFICIENCY

Upgrading neglected municipal infrastructure to provide efficient district heating, public transport networks and water supply systems.

SUSTAINABLE ENERGY FINANCING FACILITIES

Financing facilities through local banks in countries of operations to support industrial energy efficiency in small and medium-sized enterprises (SMEs), small-scale renewable energy and building energy efficiency projects.

CARBON MARKET DEVELOPMENT

Promoting the financing of low carbon projects in the region through the use of carbon market tools. The development of this market requires the creation of new institutions, clear regulatory frameworks and a critical mass of investments.



European Bank
for Reconstruction and Development

SEI

SUSTAINABLE
ENERGY
INITIATIVE

The EBRD is investing in changing people's lives and environments from central Europe to Central Asia, the Western Balkans and the southern and eastern Mediterranean region. With an emphasis on working with the private sector, we invest in projects, engage in policy dialogue and provide technical advice that fosters innovation and builds sustainable and open-market economies.

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