

The European Bank for Reconstruction and Development's Industrial Energy Efficiency Audit Program

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ABSTRACT

The European Bank for Reconstruction and Development's (EBRD) Industrial Energy Efficiency Audit Program is a best-practice model for the integration of industrial energy efficiency (IEE) financing into a bank's standard loan operations. Energy efficiency (EE) accounted for 26 percent of EBRD's total investment in 2012 (€2.3 billion).¹ Energy efficiency advisory services are offered by EBRD to all of its industrial and commercial customers and constitute an increasingly important part of the bank's core business.

The key to EBRD's success has been its integration of EE technical and financial analysis into the loan transaction. Using in-house technical staff, EBRD categorizes each industrial or commercial loan for its energy efficiency potential and performs energy efficiency assessments for interested borrowers, in parallel to the evaluation of the underlying loan application.

The EE evaluation is an integral part of loan evaluation by the bank. The potential IEE project, its costs and its benefits are presented to borrower decision-makers before the loan is finalized to allow additional borrowing for the EE measures under the terms of the original loan – without additional guarantees.

Finally, EBRD has successfully replicated the integration of IEE technical and financial analysis in the technical assistance packages for its 16 Sustainable Energy Financing Facilities (SEFF) – involving 35 banks whose technical directors are supported by EBRD in-house staff.²

EBRD's 2006 re-organization of their existing EE unit into the Energy Efficiency and Climate Change Team, an EE technical support unit serving all bank lending departments, was the necessary condition for energy efficiency financing to evolve into a significant part of EBRD's business.

INTRODUCTION

Discussions of IEE finance almost invariably begin with a litany of barriers preventing many financially-viable EE projects from accessing capital. In recent years, this discussion has acquired a new urgency in light of the significant contribution required from IEE to achieve climate change goals.³ According to expert consensus, the failure of banks to integrate IEE financing into their mainstream operations stems from their lack of familiarity with IEE technologies, resulting in an exaggeration of their risks and an underestimation of their benefits. Further, IEE loans are seen as too small to support the costs banks must incur in their evaluation, processing and monitoring (transaction costs).⁴

On the industry side, financial decision-makers in companies are characterized as either unaware of IEE projects' savings potential or skeptical of engineers' or vendors' claims for the size of that potential. Even when the financial parameters of the EE investment are understood, we are told, investment in business expansion takes precedence over IEE investment and is routinely dismissed as infrastructure.⁵

EBRD's experience, however, demonstrates that these barriers can be overcome and that significant levels of IEE finance can be mobilized through the implementation of organizational and procedural changes that enable efficient, cost-effective and synchronized integration of IEE-relevant technical and financial assessments into standard bank industrial-lending operations.

1 This figure includes some renewable energy.

2 EBRD, *Sustainable Energy Financing Facilities*, April 2011.

3 See the *World Energy Report 2010*.

4 See, for example, International Energy Administration (2011), *Joint Public-Private Approaches for Energy Efficiency Finance*.

5 This attitude is often communicated as, "If it ain't broke, don't fix it."

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TABLE 1: Industrial EE finance during EBRD's Sustainable Energy Initiative (SEI), Phase II

	Number of operations/projects	IRR (%)	EBRD finance ¹ (€ million)	% of SEI in EBRD finance ⁴ (%)	Total project value ¹ (€ million)	SEI technical assistance ^{2,3} (€ '000s)	Estimated emissions avoided (-ktCO ₂ e/yr)
SEI Phase II (2009-11)	298	6,086	9,367	65	32,888	54,648	25,600
IEE	57	1,341	3,142	43	11,511	3,480	4,604

1. Figures refer only to EBRD operations/projects which have a SEI component.

2. Note that technical assistance was not given to all the operations/projects included here.

3. 122 industrial energy audits were carried out in SEI Phase II.

4. This refers to the SEI component within the EBRD's total financing of these projects.

Source: S. Stanescu, from EBRD database

EBRD'S SUSTAINABLE ENERGY INITIATIVE

The EBRD addresses energy efficiency and climate change through its Sustainable Energy Initiative (SEI). The SEI was launched in 2006 with the aim of scaling up sustainable energy investments, improving the business environment for sustainable investments and removing key barriers to market development.

Of the 298 loans made under EBRD's SEI Phase II between 2009 and 2011, 57 were industrial loans for projects with EE components, supported by the Energy Efficiency and Climate Change Unit. The industrial loans had a total project value of €11.5 billion, including €3.1 billion of EBRD financing, of which €1.3 billion was SEI financing (i.e. specifically for EE improvements). Further, €3.5 million of technical assistance was provided to prepare the EE lending. Table 1 above further demonstrates the scale of the program.

INDUSTRIAL ENERGY EFFICIENCY AT EBRD – A SHORT HISTORY

In 1994, a dedicated energy efficiency team was created, just three years after EBRD was founded. The team's search for EE projects was initially difficult, reflecting the challenge to develop industrial EE projects at that time.

In 2002, the EBRD started to use EE evaluation as a complement to existing transactions. The first step was to demonstrate to EBRD bankers that EE projects would be accepted by customers and increase EBRD lending. This included a review of the bank's loan portfolio to identify existing clients with IEE potential. In parallel, the EE team explained to their colleagues the potential for IEE to create new business with existing clients, to strengthen clients' cash position and to cement bankers' relationships with their clients. An energy engineer was hired to assess the EE potential, creating in-house technical capacity.

Initially, the EE team individually reviewed incoming loan applications and sought out the banker evaluating the loan to explain its IEE potential and offer assistance for a detailed IEE assessment. If a banker accepted this assistance, the team contracted engineers to perform an energy audit of the client's facility.

Subsequently, the EE team began to review loan applications for companies with high IEE potential and attended credit committee meetings at which loans were discussed to make the case that IEE measures would benefit their clients and EBRD.⁶ It became obvious that if IEE was to be mainstreamed at EBRD, the development of standardized documentation and procedures for bankers would be required. Accordingly, a simple energy efficiency rating system was developed that would become a standard part of the loan appraisal process. EBRD management supported the addition of this information to the standard preparation for each loan, thus making IEE an integral element in the loan evaluation process. As a result, IEE potential became a component of the regular work of bankers. Importantly, the modifications made in 2002 to the bank's "Deal Tracking Module"⁷ also provided a basis for subsequent tracking of IEE projects.

The energy efficiency assessment had to be completed in a timely way for the recommended measures, the investment required, the projected energy savings and the financial return to be presented to the company CFO or other decision-maker within the loan processing timeframe.

⁶ Since the savings on financially-viable IEE measures will always exceed their debt service, the IEE measures actually improve the client's cash position, making them more credit-worthy than before the IEE project.

⁷ Every loan at EBRD is assigned a unique identification number that allows it to be tracked from application through disbursement and evaluation. The creation of fields in the database to tag and track energy efficiency projects put them on an equal footing with other types of loans.

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To facilitate this process, EBRD stipulated that its engineer, as well as the borrower's chief engineer or facilities manager, join the banker and the CFO in a day of due diligence discussions. Bringing their estimate of potential EE savings front and center in the negotiations, EBRD then offered to commission an energy audit to verify and specify the investment and savings. Thus, the CFO would hear the recommendation for IEE measures first-hand from the bank, endorsed by his own technical staff. EBRD then offered financing for the IEE measures, additional to that sought by the company in its original loan application.

Another critical element in the development of the program was the build-up of EBRD internal technical capacity. In 2003, an engineer was hired to oversee the contracting and provision of audit services, and to develop energy management training for companies requiring it. A crucial factor in his selection, as well as for subsequent program success, was his ability to communicate with both bankers and customers, a requisite for all subsequent EBRD engineers.

EBRD then began to offer energy management systems training (EnMS), where appropriate, to facilitate the inclusion of energy efficiency improvements in borrowers' strategic investment plans. Having internal EBRD technical capacity also assured that the energy assessment for loans could be made within the timeframe of the underlying loan evaluation.

GLENEAGLES AND THE ENERGY EFFICIENCY AND CLIMATE CHANGE TEAM

Despite EBRD's commitment to EE finance and the best efforts of a dedicated EE finance team, the then seven-person (four-banker) team was unable to achieve any significant scale of energy efficiency lending. From 2002–2005, the division accounted for just over €275 million, or 4.5 percent of EBRD lending.⁸

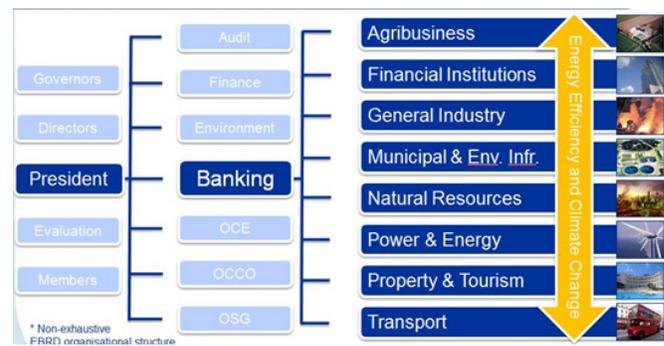
As part of the Infrastructure Department and later the Energy Department, it had difficulty building up its portfolio, in part because of competition between the EE bankers and their colleagues in other departments for credit for industrial loans with EE components.

The 2005 G–8 Summit in Gleneagles, Scotland spurred the launch of EBRD's own climate finance initiative, producing radical changes in the way that the bank would do EE finance. The summit recommendations included the creation of an investment framework for clean energy and sustainable development with an enhanced role for multilateral financial institutions.

To respond to the call to scale up investment in this area, Dr. Josué Tanaka – who was then EBRD's Corporate Director for Strategy, Planning and Budgeting – was asked re-organize the energy efficiency team and other bank activities to drive a significant increase in clean energy financing.

Inasmuch as his strategic and planning responsibilities cut across all bank departments, Tanaka was well aware of the potential leverage of an initiative that served all banking departments. This consideration and the complementary nature of climate change and energy efficiency investment led to the design of Sustainable Energy Initiative implemented by a re-organized and transversal Energy Efficiency and Climate Change Team. Boldly, and crucially, Tanaka decided to eliminate banker positions from the team, transferring the EE bankers to other banking units in order to accelerate the mainstreaming of EE financing across bank sectors (See Figure 1).

FIGURE 1: EBRD organizational structure: the role of the energy efficiency and climate change team



Source: EBRD, SEI Overview PPT – June 2012

The result was an explosive growth in EE lending, which, by 2012, constituted more than a quarter of EBRD's total lending.

⁸ By comparison, in Phase 1 of the SEI (2006–2008) €679 million of EE financing accounted for 17.1 percent of EBRD's total financing

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TABLE 2: EBRD's Energy efficiency financing

EE (and climate change) finance and EBRD finance	Phase	Industrial energy efficiency incl. transport (€ million) ¹	EE (and climate change) finance (€ million) ¹	Total EBRD ABV during the period (€ million) ^{1,2}	Proportion of SEI finance in total EBRD finance (€ million) ^{1,3}
2003-2005	pre-SEI	275	506	12,131	4.2
2006-2008	SEI Phase I	679	2,665	15,606	17.1
2009-2011	SEI Phase II	1,341	6,086	25,920	23.5

1. This refers to signed financing within that period (not disbursed).

2. This refers to the total signed EBRD lending within the period (i.e. not just the projects with an EE/SEI component).

3. Note that total EBRD lending grew by a factor of ~2.5 between 2003 (€3.7 billion) and 2011 (€9 billion).

Source: S. Stanescu, from EBRD database

THE ENERGY EFFICIENCY AND CLIMATE CHANGE TEAM TODAY

EBRD has now had twenty years of experience in developing an institutionalized approach to IEE financing and has achieved the holy grail of energy efficiency finance, making it an intrinsic, and increasingly important, part of its core banking business.

Under its SEI, EBRD's Energy Efficiency and Climate Change (E2C2) Team, which comprises engineers and policy experts, supports the bankers and sector experts on all other banking teams. The collaboration between bankers and EE engineers has evolved to the point that bankers request that engineers accompany them on marketing calls to customers. With six full-time staff engineers, E2C2 provides EE advisory services to clients' technical experts and financial decision-makers and arranges 70 industrial EE audits per year⁹ for interested companies.¹⁰ It also structures finance for bankable projects identified by the audits, classifies all loans on the basis of the energy consumption and greenhouse gas emissions avoided, and tracks them on the bank's project database. Over the industrial audit program's life, each euro spent on outside auditors has resulted in nearly 1,000 euros of IEE investment.¹¹

While the EE assessment is a standard part of EBRD's evaluation of loan applications, clients are not required to implement the IEE investments identified. Nevertheless, more than 60 percent do so voluntarily, according to EBRD estimates, as in many cases the

IRR of IEE project components is higher than capacity expansion investments.¹²

EBRD reviews all incoming industrial (and commercial) loan applications for IEE potential. After eliminating projects with little EE potential, the EBRD banker and EE engineer arrange a visit to the client to discuss the loan application. In preparation for the visit, the EE engineer sends the potential client an EBRD Energy Use Questionnaire (see Annex I). Based on the client's responses to the questionnaire, the EBRD engineer can determine what energy efficiency upgrades are likely to be appropriate, given the company's sector, history and investment plans. He advises the client of potential IEE investment opportunities that are then discussed with the chief financial officer and facility manager on the site visit, which includes a tour of the facility. The EBRD team is then able to advise the company of the size of the estimated investment required to implement the EE measures and to characterize the expected returns on that investment. If the investment is financially attractive to the customer and the company has a strategic investment plan, the EBRD engineer offers to engage with the company's technical staff in revising the plan to take energy efficiency into consideration. This includes an energy audit to verify and specify the investment, for which third party experts are contracted and funded by EBRD. The audit is undertaken in parallel with the evaluation of the loan application, so that EBRD can present the company's decision-makers with a project specifying appropriate energy efficiency measures, including their investment costs and projected returns,¹³ to be financed in the loan. If the company has no strategic investment plan, EBRD may stipulate that the company establish an

9 EBRD contracts with industry specialists for the average €20-30,000 per audit costs, with funding from bi-lateral donor funds.

10 With the steady growth in the number of audits and competition for grant monies, the bank has begun to share audit costs with some clients.

11 €SEI Finance: €EE TA= 991. Total project value: €EBRD finance, that is, the value of the SEI (EE) financing per euro of EE technical assistance. Note that using numbers from Table 1 for the calculation produces a higher leverage number because the total project value includes projects with EE components for which no technical assistance was provided.

12 Nacci, Gianpiero, *Energy Efficiency Operations of the EBRD Energy Audits and Residential EE Credit Lines*, prepared for CEI Summit Economic Forum (SEF). *Mobilising Resources for a Common Future; Moving Energy Efficiency Forward*. Sofia, 21 November 2007.

13 See Annex II, Cement Plant in Kazakhstan.

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energy management system as part of its loan.¹⁴

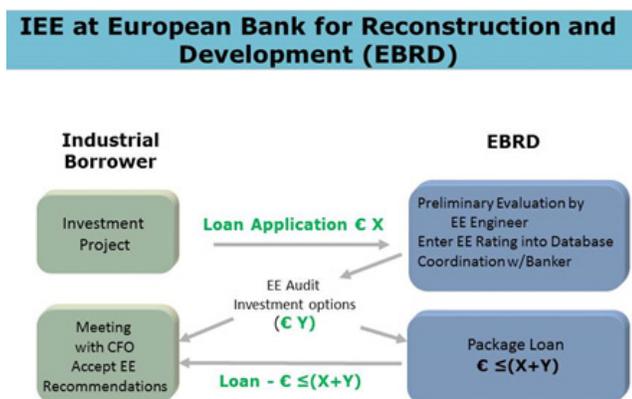
EBRD offers to finance the cost of IEE measures that are above the original application amount on the same terms as the original loan. They are able to do this because the savings from the energy efficiency measures are more than sufficient to repay the EE-related financing (i.e. the savings create free cash for the company), often in less than two years. No additional security is required for the additional loan amount.

Peter Hobson, now a Senior Banker at EBRD, was EBRD's first energy efficiency banker. He refers to the approach as "project finance in a corporate finance wrapper." In other words, the stream of energy savings is sufficient to justify the IEE project as a stand-alone investment, even though the loan is made on the basis of the borrower's balance sheet.

A SEI-SUPPORTED TRANSACTION

Figure 2 below illustrates a typical SEI- support transaction. Each EBRD loan application (represented as € X in the diagram) is classified as EO, E1, or E2, E3, representing minimal, normal and intensive energy use, and energy production, respectively. The classification is entered into the data sheet created upon EBRD's receipt of the application for the underlying loan.

FIGURE 2: EBRD's loan evaluation process



Initially, most energy audits were performed on E3 companies but, since 2007, E2 companies also receive on-site assessments. Each E1 and E2 loan application is assigned to an EBRD engineer, who accompanies the EBRD banker to the site visit with the CFO and the head of the client's technical staff. Drawing on the company's responses to the EBRD Energy Use Questionnaire, as well as his

own experience and the EU Best Available Technologies Reference (BREF) documents (<http://eippcb.jrc.ec.europa.eu/reference>), the EBRD engineer is able to make a preliminary determination of the client's opportunities for energy efficiency savings for discussion with the CFO and plant engineers on the site visit. EBRD offers EnMS training for companies that enables technical staff to understand facility energy use and identify and prioritize opportunities for energy savings. The adoption of EnMS planning and the mindset that it fosters also helps the implemented energy efficiency measures to deliver the forecast savings. Moreover, the training sets the stage for continuous energy efficiency improvement, once the client's staff understands the potential to enhance operations and cut costs.

If the borrower has the requisite level of interest and information about potential EE investments and operations (see the FAQs Mainstreaming Energy Efficiency Finance, p. 3; www.iipnetwork.org/FAQ-financing-IEE), EBRD contracts an expert team to perform an energy audit. The company's chief engineer is often invited to bring in a knowledgeable local engineer to participate in the audit. The inclusion of the latter allows the company to involve someone in whom they have confidence to learn from the EBRD engineer and the international expert, thereby building local capacity in the sector.

Once the audit is concluded and the scope of the energy efficiency project defined, the EBRD/borrower technical team presents the IEE project to the decision-makers in the borrowing company. They are given the option to borrow the funds for the IEE measures (€ Y in the diagram below). Because the IEE measures often produce a return greater than that required to service their additional investment cost, EBRD may lend € X+Y to the company on the same terms, as required for a loan of € X. It should be noted, however, that modifications in the loan application at the request of the borrower may sometimes result in a final loan amount smaller than X+Y – i.e. € ≤ (X+Y). While the costs of EBRD's internal engineering staff are covered by the proceeds of IEE lending, EBRD continues to rely on European bi-lateral trust funds to pay for energy efficiency audits and other specialized technical services to its customers.

LESSONS LEARNED FROM EBRD'S PROGRAM

1. The crucial achievement in EBRD's successful integration of EE financing into its standard lending operations is the **integration of EE technical analysis with the bank's broader appraisal process** at transaction level. Focusing efforts on loans already in process avoids the difficulties encountered in the development of free-standing EE projects for bank financing. As previously noted, projects developed within companies or by energy services companies specifically to save energy often face management skepticism about projected savings, as well as competing claims

¹⁴ For a more detailed discussion of the loan process, see the FAQs *Mainstreaming Energy Efficiency Finance*. (www.iipnetwork.org/FAQ-financing-IEE)

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on limited company investment capital. Projects developed by third party programs for bank financing fare even worse, as they require that banks deal with companies they don't know, deploying little-understood technology. Moreover, from the point of the view of the client, the bank's expertise in EE evaluation is more persuasive than the vendor's, and, sometimes, more persuasive than own staff's recommendations.

- 2. Champion.** As with many initiatives, the EBRD Industrial Energy Efficiency Audit Program came into existence through the efforts of its champions. Peter Hobson and Gianpiero Nacci constituted the core of the first EE team and began the institutionalization of IEE in EBRD's operations, raising the awareness of energy efficiency in the bank. Between them, they had operational experience of EE projects and financial transactions as well as an understanding of EBRD's organization and procedures. Notwithstanding the integration of IEE assessment and lending into the bank's standard loan operations, IEE languished. Against a backdrop of an increased global focus on climate change mitigation, organizational changes introduced by Josué Tanaka, specifically the team's transversal location in the bank's organizational structure and the refocusing of the team into a supportive, as opposed to transactional role, enabled the program's explosive and continuing growth.
- 3. Management buy-in.** Senior management support was important because the program required the involvement and coordination of different departments in the bank. The level of senior management involvement increased significantly with the launch of SEI – a dedicated managing director being appointed, reporting directly to the EBRD's First Vice President. Of course, as a response to the G-8 (chaired at the time by Great Britain) the re-organization of the EE finance unit into the Energy Efficiency and Climate Change team, as part of the SEI, had approval from the Board of Directors.
- 4. Documentation.** The appearance of IEE ratings in loan evaluation documents made the program a reality for loan committee users and for the bank, in general. The EBRD Energy Use Questionnaire sent to clients (Annex 1), provides the basis for developing the information eventually presented in the energy efficiency template. The template is prepared by the EE engineer for submission with other loan documentation to the Credit Committee at the concept review meeting. Further, the evaluations provide a starting point for the chain of documentation required for program monitoring and evaluation. While the value of individual EE financings are credited to the banker, the EE program is evaluated on the basis of aggregated EE financing activity.
- 5. Due diligence coordination.** It is essential that the energy efficiency assessment be timed to be completed simultaneously with the processing of the loan application. Whatever initial willingness bankers might have to promote IEE would dissipate quickly if the IEE assessment becomes an impediment to the closing of transactions. Since the program seeks to affect a significant part of the bank's lending operations, the possibility of systemic delays in loan processing could also create resistance elsewhere in the bank.
- 6. In-house technical capability.** The bank needs to have experienced energy efficiency engineers on staff who can communicate with bankers and clients and coordinate the work of contracted energy auditors. This internal capability gives the bank control over the coordination of IEE assessments and, in particular, their timing. Moreover, in-house staff has a better understanding of bank process and accountability within that process. Internal technical staff can also develop the kind of close collaboration that EBRD has seen between bankers and engineers around other bank activities, such as marketing. Finally, internal staff constitutes an institutional memory of technology solutions.
- 7. Human resources.** Once the program is fully implemented, the number and skills requirement of in-house staff can be determined on the basis of actual demand for IEE assessment services within the bank to assure that staff are fully booked. In the medium-to-long-term, in-house technical capability should also be the most economical solution.
- 8. Energy management training.** EnMS training should be made available in conjunction with the energy audit. While a full investment-grade IEE audit takes into consideration the energy used in both industrial processes and facilities, EnMSs provides a baseline for a company's energy strategy and a framework for implementing that strategy. Once the IEE mindset is adopted, new opportunities for IEE investment are continuously identified. EnMSs reinforce the important behavioral changes that are critical to the successful ongoing operations and maintenance of the installed IEE measures, assuring that they deliver the projected operational efficiencies and energy savings.
- 9. Payment for energy assessment and EnMS training.** EBRD has generally offered its IEE assessments and EnMS training free of charge to its customers, funded by various European donor funds. Given that the program has generated 1,000 euros of IEE investment for every euro of subsidized EE audits, this has proven to be an efficient approach to leverage public finance for IEE with scarce donors. From this perspective, the argument can be made that that this is an excellent use of public funds for governments

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wishing to promote IEE. Indeed, if a government was to mandate banks to institute such a program, such grant support could provide an effective incentive to induce banks to start an IEE financing activity.

CONCLUDING COMMENTS

The EBRD IEE program successfully addresses a large number of the barriers to the private financing of industrial energy efficiency and should be a replicable model for other banks.

Benefits to the bank:

- Through their integration with ongoing loan evaluations, IEE transactions become part of standard loan operations.
- The transaction costs of the IEE transaction are significantly reduced, since the borrower credit evaluation and sector analysis must, in any event, all be performed for the underlying loan application.
- The relatively small size (often 10–15%) of the IEE loan, compared to the underlying loan, makes it possible to add the IEE transaction to the underlying loan.¹⁵
- The project analysis performed for the IEE loan demonstrates that it will improve the cash position of the borrower.
- Lending for EE projects reduces the bank's risk from other loans to the same borrower by increasing the borrower's free cash and reducing their exposure to increasing energy prices.¹⁶

Benefits to the company:

- The IEE opportunity is presented to the CFO or other financial decision-maker, and not left exclusively in the domain of the technical staff.
- The company does not need to choose between investment in their core business and investment in energy efficiency. In effect, the company's borrowing capacity is augmented by investing in energy efficiency.
- The company accepts the bank's IEE analysis as authoritative with regard to the risks and benefits of the IEE measures proposed.
- Training in energy management systems assures the ongoing

contribution of the IEE measures to the company's bottom-line and makes it possible to identify new IEE opportunities.

- The company can earn regulatory capital and other benefits by implementing EE investments as well as additional revenues under carbon credit or white certificates schemes (as in Poland) as these are rolled out (e.g. the emissions trading scheme being piloted in China).

The EBRD model appears to be replicable. EBRD has had signal success in the provision of technical assistance packages for the integration of IEE technical and financial analysis to each of its 16 Sustainable Energy Financing Facilities (SEFFs). While the credit lines that EBRD extends to the SEFFs are dedicated to EE/RE financing, the SEFF's ability to present technical and financial information to customers in a coordinated and efficient manner has been an important factor in building EBRD's portfolio of SEFFs through local commercial banks, whose lending has reached a value of € 1.5 billion.

This is not to say that the EBRD program can be adapted to every bank. The necessity to coordinate the program across departments would make it more difficult for larger institutions to adopt, particularly if departments were geographically dispersed. Also, EBRD has always offered the IEE auditing and capacity-building services at no charge to clients. As discussed, this may prove difficult for some private banks, either because of their unwillingness to accept public funds or because of the lack of their availability.

The EBRD approach does, however, provide a significant opportunity for governments and multilaterals to achieve high leverage on funds used to support an efficient market mechanism for promoting IEE, particularly through official infrastructure development or related financing facilities.

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¹⁵ In the words of Chaucer's *The Wife of Bath's Tale*, EBRD has "made a virtue of necessity", designing a process that exploits exactly those IEE project characteristics that are seen as barriers to IEE investment.

¹⁶ Oxford Energy Associates report to EBRD (2011), *Scaling-up Financing of Energy Efficiency through Provision of Targeted Risk Management Products*.

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ANNEX 1: ENERGY USE QUESTIONNAIRE FOR BORROWERS

Below is a screenshot of the first page of the Energy Use Questionnaire. The questionnaire itself can be found on IIP's website: www.iipnetwork.org/ebrd_energyusequestionnaire

The screenshot displays a spreadsheet interface with three main data tables. Each table has columns for 'Amount' and 'Sale price' (or 'Disposal cost' for wastes), and data columns for the years 2008, 2010, 2011, and 2012. The 'Total Production' row at the bottom of the first table shows values of 0 for all years.

MAIN PRODUCTS		2008	2010	2011	2012
Product	Unit				
	Amount				
	Sale price				
Total Production		0	0	0	0

MAIN BY-PRODUCTS		2008	2010	2011	2012
By-Product	Unit				
	Amount				
	Sale price				

MAIN WASTES/RESIDUES		2008	2010	2011	2012
Waste	Unit				
	Amount				
	Disposal cost				

ANNEX 2: CEMENT PLANT IN KAZAKHSTAN

Below is a description of the energy efficiency assessment that was undertaken by EBRD as part of the evaluation of an eventual \$35 million project to support the expansion and modernization of Kazakhstan's Karaganda cement plant. The project doubled the plant's production capacity, satisfying rapidly increasing demand for cement in Kazakhstan. It included refurbishment and re-commissioning of a mothballed production line to use the "dry-process" method, which is much more energy efficient and environmentally-benign than the wet process that was used.

The evaluation process

- Review priorities and CAPEX plans of the company
- Fill out initial EBRD Energy Use Questionnaire
- Site visit by EBRD engineer to discuss priority EE projects
- Identify areas for technical support (energy audit, energy management system, alternative fuels, carbon finance, etc.)
- After signing the mandate letter with EBRD, provision of energy audit and other technical support (free of charge for the client)
- Priority EE projects may be included in EBRD financing

Potential projects identified

- Switch from "wet" to "dry" process
- Alternative fuels/alternative raw materials
- Scenario analysis against the EU-ETS Phase III benchmarking
- Modernization of energy supply and distribution systems
- Process integration and optimization, heat recovery
- Modernization of boilers and heat distribution networks
- Replacement of electric motors, compressed air systems, installation of variable-speed drives
- On-site heat and power generation, waste utilization
- Modernization and replacement of energy-intensive process equipment (furnaces, ovens, presses, etc.)
- Building insulation, energy efficient lighting
- Implementation of an energy management system
 - Metering
 - Monitoring of processes /workshops, norms and target setting

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Post-audit options

Project	Investment cost (€ ,000)	IRR (%)	Payback (years)
Refurbishment of dry line	20,000	16	5.6
Replacement of mono burner with a multi-channel burner for kiln	198	89	1.1
Installation of dip tubes in line pre-heater cyclones	460	28	3.5
Replacement of coal mill bag filter system	204	87	1.1
Energy management system	150	49	2
Boiler and heating distribution network replacement	70	15	6