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BRIEFING PAPER

TYPICAL JI PROJECTS IN UKRAINE:
THREE CASE STUDIES

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Joint Implementation has started successfully in Ukraine, with 19 projects submitted to the JISC pipeline as of December 2007. The Ukrainian portfolio is dominated by few project types.

This paper presents three case studies of Ukrainian Joint Implementation (JI) projects. The analysis is based on interviews with project stakeholders and public presentations of the case projects. The main questions in focus here are as follows:

- What are the typical JI projects in Ukraine?
- What similarities and differences are there between the case projects?
- How has the financing of the projects been arranged?
- Have they been implemented, and how long did it take to launch a project?
- Have the same problems or barriers been experienced in all cases?

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**Introduction**

Ukraine is currently (31 December 2007) hosting 19 JI projects expected to reduce emissions by 49.8Mt of CO2e during the first commitment period. Main project types and their shares of the projected emission reductions are shown in Graph 1.

Three case projects have been chosen as the focus of this paper, two industrial energy-efficiency projects and one coal-mine methane project. As shown in Graph 1, these project types are representative of the Ukrainian JI portfolio submitted to the Joint Implementation Supervisory Committee (JISC) at the time of writing. The objective of the case studies is to compare 1) the investment arrangements of projects, including Emission Reduction Unit (ERU) sales; 2) the actors involved; 3) the dynamics of project cycles and timings; and 4) the problems experienced.

**Case 1: Podilsky cement**

The Podilsky cement plant project involves switching the factory from the wet cement production process to the more modern dry process. The highly energy-intensive wet cement process is the conventional common-practice technology used in Ukraine. Switching to the dry process will reduce energy

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**Emission reductions from Ukraine per project type**

- **Landfill gas**
  - 1%
- **Renewable**
  - 6%
- **Coal mine methane**
  - 51%
- **District heating**
  - 2%
- **Industrial energy saving / efficiency**
  - 40%

Graph 1 Ukrainian JI project categories
Source: [www.unfccc.int](http://www.unfccc.int)
consumption by 53%. The project is expected to reduce greenhouse gas (GHG) emissions by some 3 Mt during the first commitment period. (PDD #0001).

The Podilsky project is implemented inside a corporation, as both the investor and the project host are owned by the same company, the Irish CRH. The project idea was first reviewed for internal purposes in 2004 when the company was looking for ways to reduce its GHG emissions. The corporation found that the project would not have exceeded the required investment threshold as the internal rate of return was too low: thus, it would not have been implemented in the absence of JI. The project was approved by the company on the condition that it was to be registered as a JI project, and its practical implementation was held back until JISC approval had been granted. (Geraghty 2007.)

The local administration was involved in the negotiations with the state administration. This support was provided as the project would bring an investment of €150 million to the country. For the local administration it was important to secure continued operation of the plant, which is the largest local employer with some 1000 employees. Due to the upgrade, its products may become more competitive and support the plant’s business in the longer term. The project will also reduce dust emissions locally, as modern dust-reduction processes cannot be used with the wet process and reduce energy consumption in the local grid. (PDD #0001.)

The price of ERUs was defined as €15 per ton. This is an internal price used as an estimate of how large a share of the investment may be recovered by the sales of ERUs. The price of European Union Allowances (EUA) was €20 at the time of project preparation, and this was used as a reference figure. This price is fairly high, however, as the investor is implementing the project itself, the risk with sales of the ERUs is lower than for an outsider buyer of ERUs; moreover, there is no need to make a forward sale, which tends to lower the price.

There was no Clean Development Mechanism (CDM) baseline methodology available for switching from the wet to the dry cement production process. This is because the more modern dry process is already in use in many Non-Annex I countries, including China and Brazil, so no wet-to-dry process changes have been implemented as CDM projects. As a result, the project had to develop its own baseline methodology. Standardized emission factors for the Ukrainian electricity grid available from the Dutch ERUPT were used. There were no data problems with this project, as relevant data have been collected ever since the
Western corporation took over in the 1990s.

Project implementation in the cement sector has long lead-times. In the case of Podilsky, the project concept was developed late 2004, the project was issued a Letter of Approval (LoA) by the Ukrainian government in December 2006, and approved was granted by the JISC in March 2007. The new process is expected to be commissioned in mid-2009. There are sizable potentials in Ukraine as well as in Russia for replicating this project. Some 70% of the cement plants in Ukraine are owned by foreigners, so from this point of view the Podilsky-type JI project, based on investment from within the corporation, may prove to be the rule than an exception.

When project development began in 2004, the Ukrainian JI approval process and the JISC did not exist. However, these problems were solved by the time the project was ready to be submitted to JISC. As this was the first JI project to be approved by the JISC, many practical hurdles had to be dealt with during the approval process.

**Case 2: ISTIL Steel mill**

The ISTIL mini-steel mill is one of the most up-to-date steel-making facilities in Ukraine, as it was modernized in the 1990s. The steel-making technology is based on the electric arch furnace method. The JI project, which is now totally implemented, focused on improving the energy efficiency of four different parts of the steel-making process: 1) replacing an electric arch furnace with a new one; 2) constructing a new steam generator to replace the steam purchased from the neighbouring facility; 3) installation of a new oxygen unit to replace the oxygen purchased from the neighbouring facility; and 4) installation of an automatic production process control system to optimize the process. This activity is projected to yield an emissions reduction of some 350,750 t CO2e during the first commitment period.

The ISTIL steel mill is owned by a vertically integrated Russian corporation, International Steel & Tube Industries Limited (ISTIL website). The bulk of the investment required was provided by the European Bank for Reconstruction and Development (EBRD) while the ERUs generated are sold to the EBRD Dutch carbon fund. The project brought to the region an additional investment of €17.9 million, which is part of an EBRD loan of €66.6 million (Maslichenko 2007). In early 2007 the EBRD provided the loan to refinance the existing loans the company had taken for project implementation (EBRD 13 February 2007). The price of ERUs paid for this project is confidential information, but based on the figures provided in PDD #0018 and Maslichenko
(2007), the price has been some €7.5 per ton\(^2\). 50% of the ERU revenue was paid upfront to the project host, as allowed by the EBRD Dutch Carbon Fund (Zahariev 2007).

The lead-time of the ISTIL project seems fairly short, some two and half years, with JISC approval still pending. The project was first considered for JI registration in September 2004, when a team of EBRD experts visited the plants. The Project Idea Note was submitted to the Ukrainian government for approval in March 2005. The project was issued a LoA in May 2007 and was submitted to the JISC for approval in December 2007 (as indicated, at the time of writing, this approval is yet to be granted). The project has been fully implemented: The electric arch furnace transformer was installed in December 2005, and the following year was spent optimizing its performance. The steam generator followed in January 2006 and the new oxygen unit in October 2006. The final part, the soaking pits control system, was installed in January 2007. (PDD #0018.)

The project leads to decreased fuel combustion and less indirect emissions as a result of reduced electricity consumption. The ISTIL project experienced some technical problems, as the project was complex and there was no suitable CDM methodology available. A new standardized baseline for the Ukrainian electricity grid was developed separately and was applied, but there were some problems in finding sufficient data for the baseline (de Klerk 2007).

**Case 3: Zasyadko Coal Mine Methane**

Zasyadko coal mine in the Donbass region had been operating with a coal-mine methane collection and venting system. The JI project is using this existing supply of collected coal-mine methane by introducing new capacity to produce electricity, heat and vehicle fuel instead of venting the methane to the atmosphere, which was the case of the project baseline (PDD #0035). The project has now been partly implemented, and has provided emission reductions of some 1.6 Mt during the period 2004–2007. Reductions until 2006 have already been verified. During the first commitment period, the projected emission reductions will reach 10.7 Mt, or some 2.1 Mt per annum, after implementation of the second phase of the project during spring 2008.

The project is being implemented on the basis of an internal investment of €40 million by the mine (owned by a workers’
collective) and revenues from the sales of the ERUs. The JI investment was part of a larger investment by the mine. Early credits have already been sold to the Japanese Marubeni, which has a contract with the Zasyadko mine to purchase 2 Mt of emission reductions annually until 2012 (PointCarbon 24 January 2007). The price paid for ERUs in this project is confidential, but based on the figures available in the media, it can be estimated that the average price paid was some €4.8 per ton of CO2e; however, according to Schay and Kushko (2007), the lowest price paid by the Japanese was some €1.18 per ton. According to another source, the price paid was even lower, €1 per ton (Lubchuk 2007). The Ukrainian government’s estimate of the cost of implementing coal-mine methane (CMM) projects is €5.1 per ton (Sasyuk 2007).

Local benefits from the project include safer working conditions and new jobs. Even though the project does not directly contribute to the de-gasification activities of the mine, some of the revenues from ERU sales can be channeled to this purpose. There are also significant savings of both electricity and heat locally. The heat supply will replace some of the municipal boilers and the excess electricity will be fed into the grid.

The lead-time of the project has been some four years, depending on what is regarded as the end point. Project implementation started in March 2004. A project idea note (PIN) was submitted to the Austrian JI tender in August 2004, and to the Dutch ERUPT 5 tender in October 2004. The first version of the project design document (PDD) was finalized in March 2005 and an Environmental Impacts Assessment was conducted in June 2005. The first set of new combined heat and power (CHP) units was commissioned during January–April 2006, and the project received a LoA in March 2006. The emission reductions to be generated, including early credits, were contracted to Marubeni in January 2007. The baseline study was completed and the final version of the PDD submitted to the JISC in December 2007. The early reductions generated during 2004–2006 are already being monitored and verified at the time of writing. The second set of new CHP units is scheduled to be commissioned by March 2008, and the supply of heat to the district heating system is planned to begin in September 2008. Taking the first delivery of emission reductions and their sale as the point of completion of the project, the lead-time is likely to be some four years, although finishing the second phase of the project would add another 6 months.

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3 According to ARENA-ECO 27 March 2006, the mine will receive some €60 million by 2012 through the project. The project was estimated to generate a reduction of 12.3 Mt.
The baseline methodology of the project was based on the approved CDM methodology ACM0008, which has also been used by other CMM projects in Ukraine. This project was the first CMM project in Ukraine, and its approach has contributed to other similar PDDs submitted from Ukraine. Standardized emission factors for the Ukrainian electricity grid developed under the ISTIL project were used.

The risks related to the delivery of ERUs through projects of this type was demonstrated when a methane explosion took place in the Zasyadko mine in November 2007, killing at least 70 persons (BBC 19 November 2007). However, the implications of this accident were minor to the projected GHG emission reductions. Also the fact that as yet there exists no legislation on the ownership and transfer of assigned amount units and ERUs in Ukraine is a problem for this project, as the first early credits have already been generated and are to be sold to the Japanese buyer shortly.

**Comparison of case studies**

The impacts of the ownership of the project hosts are likely to differ between the projects. This is so even though case facilities 1 and 2 are both owned by foreign corporations, because governance practices between an Irish and Russian corporation may differ. Case 3 is owned by a workers’ collective, which is a dramatically different format of ownership compared to the other two facilities, involving a potentially much larger number of formal decision-makers. It is, however, beyond the scope of this study to establish who has genuine decision-making power in the collective.

In cases 1 and 3, the investment required for the JI project beyond the revenues from the sales of ERUs was achieved by using internal financing, while the EBRD provided a loan to facility 2. In effect, the source of funding was foreign in cases 1 and 2, and domestic in case 3. It looks as if the projects were genuinely additional, as case 1 had originally been rejected by the corporation as a result of an internal rate of return (IRR) which did not exceed the required threshold, and its implementation was on hold until the JISC approved the project. Case 2 was implemented in a facility which had already been modernized, so the further energy efficiency improvements were certainly beyond business-as-usual in the Ukrainian market. Case 3 had invested in a de-gasification system prior to the JI project. As coal mining is the main business of the facility, and the utilization of the collected gas for energy production at site was deemed not profitable, the project would have been impossible without the revenues from the sales of ERUs.
<table>
<thead>
<tr>
<th>Ownership type of project host</th>
<th>Case 1: Podilsky cement</th>
<th>Case 2: ISTIL steel</th>
<th>Case 3: Sazyadko CMM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investor type /investor</td>
<td>Corporate</td>
<td>International Bank / EBRD</td>
<td>Internal / Zasyadko coal mine</td>
</tr>
<tr>
<td>Origin of investment</td>
<td>Foreign</td>
<td>Foreign</td>
<td>Domestic</td>
</tr>
<tr>
<td>Amount of investment</td>
<td>€150M</td>
<td>€17.9M</td>
<td>€40M</td>
</tr>
<tr>
<td>Investment instrument</td>
<td>Internal corporate finance</td>
<td>Loan</td>
<td>Cash flow</td>
</tr>
<tr>
<td>Status of implementation</td>
<td>Implementation begun after JISC approval in March 2007</td>
<td>Implemented</td>
<td>First phase implemented</td>
</tr>
<tr>
<td>Status of approvals</td>
<td>Ukrainian government, JISC</td>
<td>Ukrainian government</td>
<td>Ukrainian government</td>
</tr>
<tr>
<td>Average annual emission reduction</td>
<td>755,851 CO2e</td>
<td>70,155 CO2e</td>
<td>2,148,004 CO2e</td>
</tr>
<tr>
<td>Total emission reduction by 2012</td>
<td>3.0 Mt</td>
<td>0.35 Mt</td>
<td>12.35 Mt</td>
</tr>
<tr>
<td>Price of ERU</td>
<td>€15 (projected)</td>
<td>€7.5</td>
<td>€1.2 – 4.8</td>
</tr>
<tr>
<td>Share of ERU financing</td>
<td>30% (projected)</td>
<td>14.7%</td>
<td>32.2% – 128.9%</td>
</tr>
<tr>
<td>Baseline methodology</td>
<td>Own</td>
<td>Own</td>
<td>CDM methodology: ACM0008</td>
</tr>
<tr>
<td>Lead-time</td>
<td>5 years</td>
<td>2.5 years, JISC approval pending</td>
<td>4–4.5 years, JISC approval pending</td>
</tr>
<tr>
<td>Replication</td>
<td>There are plans to replicate this project.</td>
<td>Unlikely in Ukraine, as ISTIL is the most modern plant in the country.</td>
<td>Based on CDM methodology which has been used also by other projects in Ukraine.</td>
</tr>
</tbody>
</table>

Table 1 Comparison of case studies

The amount of investment has varied between projects. By far the largest investment was required for case 1, while the investment for case 3 was roughly twice the size of that in case 2. Case 1 based its financial projections on the estimated ERU price of €15, which would bring the share of ERU financing up to
30% of total investment. However, as case 1 was implemented within the corporation and it is planned to sell the ERUs after they have been produced, this price – and share of total investment – remain hypothetical, and might prove to be much higher, depending on the EU ETS price. Case 2 has sold the ERUs. Judging from the projected emission reductions, the share of the ERU financing would be 14.7%. Given the information that was available, it was difficult to estimate the share of the investment covered by the sales of ERUs of case 3. However, from these data it seems that the sales of ERUs could not only cover the investment but also generate profit, as the revenues from the ERU sales could cover between 32% and 129% of the investment required. However, the profit depends on the volumes sold at each price, and if some of the sale prices are as low as €1.2 / ton, it seems unlikely that an overall a profit will result.

All the case projects have been issued a LoA by the Ukrainian government, but only one had been approved by the JISC at the time of writing. Lead-times vary, and depend on whether they are calculated from the project idea to the beginning or end of project implementation, or the sale of ERUs. Graph 2 illustrates the main steps of the project cycle of the case projects. Project implementation is showed as a thicker black line. For instance, case 1 was not implemented prior to receiving JISC approval, whereas the other cases have been implemented either fully or partly even though JISC approval is still pending. In cases 2 and 3, the project has been at least partly implemented and some of the ERUs generated have been sold, while case 1 is only beginning to implement the updates that will bring emission reductions and has not sold the rights to the ERUs as yet.

![Graph 2 Comparison of the project cycles of the case projects](image)

Graph 2 Comparison of the project cycles of the case projects

Key: 1 – concept 2 – PIN 3 – PDD 4 – LoA 5 – to JISC 6 – JISC approval 7 – sale of ERUs
Different barriers apply to the case projects, and it can be argued that some barriers are project-specific or project-type-specific. Case 1 started already in early 2004, prior to the establishment of the JISC or the Ukrainian JI approval system. It was also the first project that was approved, and as a result, experienced additional hurdles as a test case for both governmental (Ukraine and Ireland) approval systems as well as the JISC. There was no suitable CDM methodology available for this project, so it had to develop its own methodology. Case 2 was a complex project, and it experienced some technical difficulties as well as problems in finding sufficient data for the electricity baseline. There was no CDM methodology available for this project either. The case 3 facility had a serious mining accident in the November 2007, but the impact on the projected emission reductions was minor. The project has already sold and verified emission reductions, but Ukraine has no legislation concerning the ownership and transfer of ERUs as yet (however, such a law is under preparation).

Table 2 summarizes the barriers identified. Obviously they may differ significantly from project to project, depending on the phase of project cycle as well as the technology in use. Also early-mover projects are likely to experience more institutional problems because the relevant institutions are still under development.

<table>
<thead>
<tr>
<th></th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>JISC</td>
<td>When project started, JISC did not exist</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Institutional</td>
<td>When project started, no UA approval system; problems as first project to test systems</td>
<td>N/A</td>
<td>Lack of legislation on ownership and transfer of ERUs</td>
</tr>
<tr>
<td>Technical</td>
<td>N/A</td>
<td>Technically complex project</td>
<td>Mining accident</td>
</tr>
<tr>
<td>Baseline</td>
<td>No CDM methodology</td>
<td>No CDM methodology, problems in finding data</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Table 2 Summary of barriers reported
Source: Interviews
Lead-times varied between 2.5 and 5 years. As a result, the window of opportunity for industrial JI projects is closing, due to the post-2012 deadline of the first Kyoto commitment period. Also, uncertainty as to the price of ERUs beyond 2012 adds to the project risk.

Some of the projects could be replicated. In particular, there are several cement-sector projects both in Ukraine and in Russia that were abandoned when the sector experienced difficulties getting CDM projects approved. Thanks to the acceptance of the case 1 project by the JISC, some of these ventures may still enter the project pipeline.

**Conclusion**

These case studies show that some additional foreign investments have been channeled to Ukraine as a result of the JI projects. Case 1, involving the Podilsky cement plant, is a good example of such an investment in addition to the revenues from selling the ERUs. Also in case 2 at the ISTIL steel plant, foreign capital was received from the EBRD. And even though case project 3 covered the investment from its own cash flow, the sales of ERUs could bring a significant amount of money to cover these costs.

The Ukrainian JI portfolio consists of almost 50 Mt of project emission reductions (as of December 2007). The three case projects presented here represent a good sample of projects varying in size from the projected 0.35 Mt emission reduction at the ISTIL steel plant to the 12.3 Mt at the Zasyadko coal mine.

The barriers experienced varied significantly between the projects, and are dependent on the time of the launch of the project as well as the technical complexity of the project. On the other hand, in none of the projects do the barriers seem overwhelming. Even though the approval process could still be improved (see Korppoo, 2007), all the case studies have received a LoA and one has also been approved by the JISC. As a result, it seems that the Ukrainian project approval system is functional.

One of the main concerns of project developers was the closing window of opportunity for further projects in Ukraine. The importance of this factor can also be read in the lead-times of the case projects; if launched in, say, early 2008, some types of projects would be unlikely to get off the ground in time to generate any emission reductions by the end of the first commitment period (case 1 had a lead-time of five years), while also others could prove financially non-viable due to the short crediting period left (case 2 had a lead time of 2.5 years). Therefore, the suggestion by some project developers to allow a five-year crediting period for all
JI projects launched during the first commitment period in the EU emissions trading scheme sounds like a welcome initiative which could contribute further to the modernization of the Ukrainian economy.

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