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Центр біля чистого виробництва

**FINAL REPORT
CLEANER PRODUCTION PROJECT**

**NATIONAL CLEANER PRODUCTION CENTRE
OF UKRAINE**

UNIDO PROJECT NUMBERS: UE/UKR/06/001
UNIDO CONTRACT No.: 16001727
PROJECT MANAGER: PETRA SCHWAGER

Funded by:

Government of the Republic of Slovenia

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List of abbreviations

CPC Cleaner Production Centre

CP Cleaner Production

IE International experts

IPA In-plant assessments

ISO International Organization for Standardization

LLC Limited Liability Company

Ltd. Limited Company

NEFCO Nordic Environment Finance Corporation

NE National Expert

NTUU KPI National Technical University of Ukraine “Kyiv Polytechnic Institute”

RECP Resource Efficient and Cleaner Production Programme

SECO Swiss Secretariat for Economic Affairs

SMEs Small and medium enterprises

UAH UAH: Code of Ukrainian currency (Hryvna) according to ISO 4217

ULIE Ukrainian League of Industrialists and Entrepreneurs

UNDP United Nations Development Programme

UNEP United Nations Environment Programme

UNIDO United Nations Industrial Development Organization

1. Summary

Implementation of the UE/UKR/06/001 Project in 2009-2011 was based on the No 16001727 Contract signed between the United Nation Industrial Development Organization (UNIDO) and the National Technical University of Ukraine - Kyiv Polytechnic Institute (NTUU KPI).

NTUU KPI is one of the largest universities in Ukraine, and is recognized world-wide for its graduate programs. It was founded in 1898 and since then has remained one of the best technical universities in Europe, famous for its academic excellence and innovative research. Since 2007, KPI has successfully coordinated UNIDO's ongoing CP activities in the country and it is the only institution in Ukraine that has experience in UNIDO's CP methodology and its application at company level.

The Ukrainian Cleaner Production Centre was established in June 2009 within the framework of the UNIDO program of National Cleaner Production Centers. It is sponsored by the government of the Republic of Slovenia through UNIDO as executing agency. The Centre is hosted by the NTUU KPI and located at its premises.

Ten new companies from different sectors participated in the Cleaner Production Project and 19 new national CP experts were trained. CPC organized 4 awareness raising seminars (one in Kyiv, two in Vinnytsia and one in Zaporizhyya); five-series plenary workshops for experts and companies staff in two Ukrainian regions and undertook a number of company visits during the reference period. In total, 10 detailed CP and energy assessments were carried out with the assistance of 11 national CP consultants and international one. Within its program the CP Centre in collaboration with the Ukrainian League of Industrialist and Entrepreneurs (ULIE) organized two regional conferences on "*Achieved results on the CP program in Vinnitsya and Zaporizhyya regions*". Approximately 230 companies, organizations, mass media, local government, and university representatives attended conferences.

The CPC activities in 2009-2011 were focused on following specific tasks:

- to increase the competitiveness of the Ukrainian industry;
- to assist business operators to analyze their operations and products, develop and implement CP program;
- to establish a platform for two regional CP sub-centers;
- to increase the awareness of people regarding the concept and application of Cleaner Production;
- to achieve financial and ecological benefits for companies;
- to minimize waste and pollutions.

During the reference period, the CPC team was supervising the following activities: in-plant assessments, technical assistance, professional trainings, raising awareness and information dissemination, establishing a new partner contacts.

In addition to above, the CPC team published two articles in ecological magazines, adapted and published the Toolkit textbooks Part 2 in Ukrainian and textbooks with brief description of main CP steps (Manual in CP) in Russian. In February 2010, the CPC team launched its own website (www.cpc-ua.org).

The CPC team counts four members:

- 1). Mr. Valeriy Pavshuk - Ph.D., National Project Coordinator
- 2). Mr. Igor Shylovykh - Ph.D., Deputy Project Coordinator, Director of the CPC
- 3). Ms. Irina Fedorchuk - Master of Ch. Engineering, Administrative Assistant
- 4). Mrs. Larisa Khashcheyka - Accountant

Following UNIDO recommendations, two regions were selected for CP project: Vinnytsia and Zaporizhyya regions.

- Agro industry was represented by Vinnytsia region. This sector has a considerable potential in terms of resources available but the productivity is very low. The country's agricultural sector is dominated by fields of wheat, rye, corn, sugar beet, flax, sunflower seeds, and vegetables. The region has the very fertile soil. The cultivated land area covers 32.9 million ha.
- Metallurgic industry was represented by Zaporizhyya region. This region is one of the largest industrial centers of Ukraine, located in the eastern part of Ukraine on the Dnipro River. The main branch of this Ukrainian industry is steel production. Currently, Ukraine has a powerful heavy and machine construction industry.

The following table provides overall results of the CP projects in both regions.

Location	Vinnytsia	Zaporizhyya
Sectors	- Food processing - Construction materials - Metal processing	- Metallurgic - Construction materials - Metal processing
Companies involved	- 'Mario' production enterprise (stainless steel radiators) - Vinnytsia Grain Mill Factory - Gaisyn Dairy Ltd. - LLC Decor Concrete (artificial stones, exposed concrete) - Gaisyn Sugar Mill - LLC Podillya reinforced concrete	- BIAS JSC - Zaporizhyya Ferroalloy plant JSC - Kran Ltd. - Public corporation Steel-Rolling Plant
Trained in CP	- 10 experts	- 9 experts
Completed IPAs	- 6	- 4
Achieved results (savings and benefits)	Annual savings, euro: ~ 8404199; Reduction of electricity consumption: ~ 1373 MWh; Reduction of water consumption: ~ 91200 m3; Reduction of natural gas consumption: ~ 15405800 m3; Reducing CO2 emissions: ~ 24259 tons	Annual savings, euro: ~723940; Reduction of electricity consumption: ~ 1007 MWh; Reduction of water consumption: ~ 1800 m3 Reduction of natural gas consumption: ~ 1523514 m3 Reducing CO2 emissions: ~10145 tons

It is important to emphasize that the developed CP options for enterprises which are presented on the upcoming pages of this report can lead to environmental improvements only if they are implemented.

2. In-plant assessments (IPAs)

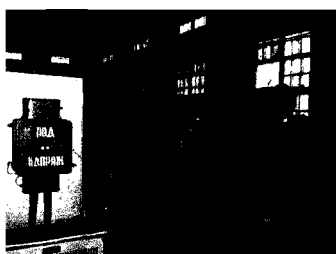
The objective of the IPAs is to show the benefits of Cleaner Production when implemented in regional Ukrainian industries. The in-plant demonstration program has furthermore been used to provide hands-on training for the participants in our train-the-trainer program.

The IPAs started in October 2009 with eleven companies and was completed in December 2010 with ten successful companies. Companies were selected and involved into CP project via regional project coordinators. During the CP project one company and two respective experts withdrew from the project due to the economic hardship within the company.

The following companies were participating in the project:

Zaporizhya region

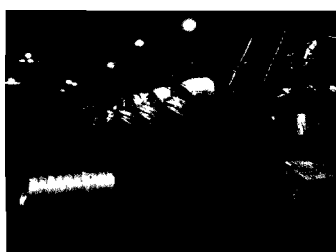
- **Zaporizhya State Titanium Research and Design Institute.**¹ Since 1992, the Titanium Institute is a head institute and a general designer of non-ferrous metallurgy, production of semiconductor and carbon-graphite materials in Ukraine. It consists of three divisions: a research division with an experimental shop, a design division and a pilot plant. It employs 45 people. (¹ postponed participation into the project until better stable economic situation in the company)



Company “Kran LTD” (<http://www.kran.zp.ua>) is a service company for a big concern “ZaporozhKLAN”. The company was founded in 1999 and since then, it has employed 30 workers. The scope of activities of “Kran LTD” is repair and maintenance of electricity distribution and control equipment, repair and maintenance of material handling equipment and machine tools, etc.



Company “Zaporizhya Ferroalloy plant JSC” (<http://www.zfz.com.ua>). The company was founded in 1933. A wide range of assortment of manganese, ferroalloys siliceous and metallic manganese places the plant at the top 100 companies of Ukraine and among one of the Europe’s largest producers of ferroalloys. Company is one of the biggest polluter and inefficient energy consumer in Zaporizhya.



Public Corporation “Steel-rolling plant” (<http://www.metizplant.com>(formerly called Zaporozhye State Metal ware Plant) is one of the city's oldest enterprises. Its official birth date is May 23, 1916. At the moment company employs more than 800 people. In 2009, company employed 1200 people. The company assortment includes: steel wire, low-carbon cold-worked and annealed wire, zinc-coated or uncoated, welding wire of SV08, SV08A, SV08G2S types, steel welding wire with copper coating, SV08G2S type, wire for reinforced concrete structures, VR-1 types, aluminum wire, etc.



Company “BIAS JSC” (hot mix asphalt concrete company). The company was founded in 1975. It employs 25 workers and operating one shift per day. Effective capacity of the plant is 55.000 T/year. Last ten years operates with 5.500 T/year.

Vinnitsia region



LLC “Podillya reinforced concrete”
(<http://podillazb.com.ua>)

Company was founded in 1958 and is located in Vinnytsia. The company is a part of large building concern “Podillya” which is the most popular in Vinnytsia. Now employs 150 people. Main products are concrete products, concrete box units, concrete ceiling blocks etc. Products are sold at domestic markets for construction works.



LLC Decor Concrete
(www.dekorbeton.com.ua). Company

was founded in 2008 and is located not far from Vinnitsya in Gnivan city (20 kilometres from Vinnytsia). Now it employs 75 peoples.

The company produces a wide range of decorative concrete products - about 300 names, of various sizes, configurations of concrete. One of the priorities is woodworks.



МАРІО[®] ‘Mario’ production enterprise
(<http://www.mario.ua>). Company was

founded in 2000 and is located not far from Vinnitsa in Lityn city (40 kilometres from Vinnytsia). Now, it employs 120 people. Main products are stainless steel heating elements (radiators) made of pipes. Company is certified according to ISO 9001. Products are sold at domestic and foreign markets.



Vinnitsia Grain Mill Factory (<http://www.vkhp2.com.ua>)

The company was founded in 1972 and it has employed 345 workers. The scope of activities of the company is manufacture of grain mill products, wholesale trade in grain and animal feeds manufacture of prepared animal feeds, grain storage facilities; services granulation product, transportation, production of heat.



Company “Gaisyn diary LTD”
(<http://haisyn.uaprom.net>)

Location – Gaisyn city (app. 100 kilometres from Vinnytsia). Now it employs 203 workers. Main areas of the company are milk processing and cheese production. The company works two shifts per day and processes 100T of milk daily.

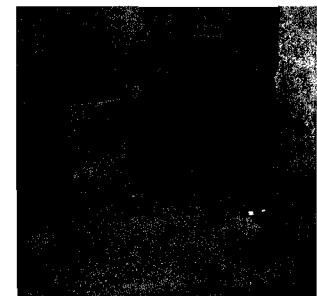
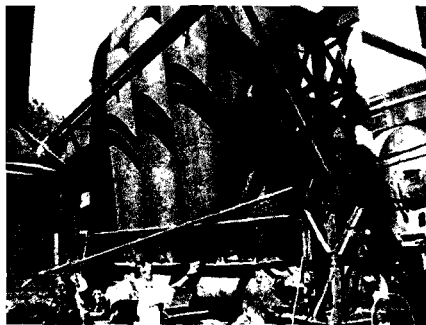


Company “Gaisyn sugar mill plant”. Production in a sugar mill plant is organized seasonally. During the pick of the production process, company employs 472 people. General remount is done in the period of May – September with 240 employees. Production capacity is 360 000 T in 72 days in one shift.

To support implementation of the project, CPC selected and recruited 9 national experts (from NTUU KPI) for conducting monitoring IPAs in both regions – Vinnitsia and Zaporizhyya. At the same time, performing all requirements and tasks, NEs (NTUU KPI) confirmed their certificates’ validation. The NEs visited all regional companies minimum 3 times (3 trips to Vinnitsia and 3 trips to Zaporizhyya). As supervisors, NEs were responsible for:

- Material and energy balance finalization;
- Joint CP options development;
- CP options evaluation

Besides this, NEs analyzed company technological processes, revised reports prepared by potential national experts, took part in final CP evaluation workshop, continuously monitored the process of data collection.



Photos from measurements

The CPC team together with company team members and regional consultants has provided measurements for 6 out of 10 participated companies. All these measurements were provided by technical measurement equipment for more precise data collection.

Thanks to its location in the NTUU KPI, the Centre has close relations with professional departments and experts who serve the industries. During all measurements, the CPC used portable analytical equipment of its host institution for both rapid and in-depth assessment of material and energy consumption in various industrial sectors. The portable equipment includes instruments to measure and analyze boiler efficiency, temperature. The NTUU KPI also provided for the CPC some laboratory researches.

Table 2. Overview of IPAs

Sectors	Metallurgic	Metall processing	Construction materials	Food processing
Location	1 company in Zaporizhya	2 companies in Zaporizhya	1 company in Zaporizhya	
		1 company in Vinnytsia	2 companies in Vinnytsia	3 companies in Vinnitsya
Companies	- Zaporizhya Ferroalloy plant JSC	- Public corporation Steel-Rolling Plant - Kran Ltd. - Private Enterprise Mario Ltd.	- BIAS JSC - LLC Podillya reinforced concrete - LLC Decor Concrete	- Gaisyn Dairy Ltd. - Gaisyn Sugar Mill - Vinnytsia Grain Mill Factory
Products	Ferroalloys	Wires and nets; Metal constructions; Stainless steel radiators	Hot mix asphalt concrete; Reinforced concrete; Exposed concrete, artificial stones	Milk processing and cheese production; Sugar; Flour
Trained in CP	5 team members and trainees	18 team members and trainees	19 team members and trainees	25 team members and trainees

Results

After the first round of CP Assessments the companies in both regions have achieved very positive results. Overall results of the project are outlined below:

Annual savings, euro:	more than 9 mln.
Necessary investments, euro:	more than 30 mln.
Reduction of electricity consumption, MWh/year:	2,375
Reduction of water consumption, m3/year:	93,000
Reduction of natural gas consumption, m3/year:	16,875,314
Reducing CO2 emissions tons/year:	34,404

Most of the proposed options are concerned with savings in terms of energy, water and raw materials.

After the first round of IPAs all participants confirmed once more about the necessity of applying Cleaner Production methodology at their enterprises at company level. The biggest challenge was (it is still continuing to exist) – absence of data base at each enterprise. Most of collected data, as turned out, was different in different company departments. That's why experts have wasted a lot of time collecting data in different departments, comparing it and applying for balances.

So far most of the CP options concern the good housekeeping or better process control measures. To gain the full CP potential, companies must also implement options in the area of technology improvement, new production processes or cleaner technologies in the next years. Only strict, on-going production process optimization will help companies to compete in the future against foreign competitors in a global market.

3. Trainings

Five-series plenary workshops were conducted by CPC team from October 2009 to December 2010 for 19 potential national consultants and representatives from industry. Within the 2010 the CPC organized seven workshops for experts and companies.

These training activities were combined with IPAs activities, so that participants gained practical experience in Cleaner Production Assessments. The total duration of all CP trainings (2009-2010) were 23 days of classroom training (12 - in Zaporizhya and 11- in Vinnitsia) and more than 70 days of practical work in companies.

On March 29, 2010, a meeting between the IE Mr. Mirko Lesnjak, Director of CP Unit (UNIDO) Mrs. Petra Schwager and NEs was held at premises of NTUU KPI. The NEs were represented by A. Tchaykovs'ky, K. Myhalenkov, A. Pomytkin, A. Karvatsky, A. Uzunov, N. Remez who had participated in the CP pilot project in Ukraine. The main purpose of the meeting was to update the ongoing projects in Zaporizhya and Vinnitsya, propose to participate as supervisors for potential NEs and companies in these regions.



During the meeting with NEs from NTUU KPI
March 19, 2010

Nine certified by UNIDO during 2007/2008 CP consultants were involved in this project and supervised all participating companies:

- 1). Mr. Igor Shylovych – Ph.D. Faculty of Chemical Engineering;
- 2). Mr. Evgenij Inshekov - Ph.D. Faculty of Energy Management;
- 3). Mr. Anatoly Pomytkin- Ph.D. Faculty of Chemical Engineering;
- 4). Mr. Aleksey Tchaykovs'ky – Ph.D. Faculty of Physical Engineering;
- 5). Mr. Kostyantyn Mykhalenkov - Ph.D. Faculty of Physical Engineering;
- 6). Mr. Anton Karvatsky – Ph.D. Faculty of Chemical Engineering, Centre for Resource Saving Technologies;
- 7). Mr. Alexander Andriiko – Prof. Faculty of Chemical Engineering;
- 8). Mr. Alexander Uzunov – Ph.D. Faculty of Mechanical Engineering;
- 9). Mr. Valeriy Dubrovin – Prof. (National University of life and environmental science of Ukraine, Institute of biotechnologies and bioenergy)

At the end of the five-series training program 19 participants completed the CP course and were nominated as CP consultants. About half of the participants have indicated that they would like to work as CP trainers and/or as CP consultants.

A list of CP consultants is below:

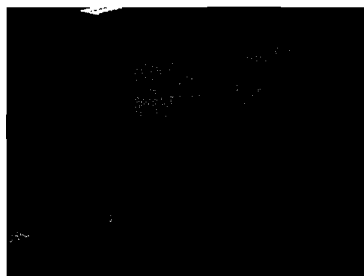
Vinnitsya region	1. Maksim Dovbnya	Mechanical engineer; private entrepreneur (assessment of personal property)
	2. Oksana Ishchenko	Business management, methodologist; Trainer for company management and staff
Igor Marchuk - regional project	3. Igor Marchuk	Mechanical engineer, Business management; Private Company "Marchuk"(owner)
	4. Dmytro Androschuk	Marketing management; Private Company "Marchuk" (deputy director)

coordinator	5. Lidiya Stasyuk	Industrial engineer; Gaisyn Dairy Ltd.
	6. Vladislav Kabachiy	Ph.D., Faculty of Information Technologies; Vinnitsya National technical university, (lecturer)
	7. Valeriy Pavshuk	Ph. D., NTUU KPI, Electrical engineer; CPC (project coordinator)
	8. Irina Fedorchuk	Master of Ch. Engineering NTUU KPI; CPC (administrative assistant)
	9. Viktor Doletsky	Engineer constructor (instrument engineering), Project "REFTIME"
	10. Dmytro Korzhenko	Building engineer, Confectionery "ROSHEN" (engineer)
Zaporizhya region Aleksy Nazarenko - regional project coordinator	11. Konstyantyn Taratuta	Ph.D., Faculty of metallurgical equipment; ZSEA (lecturer)
	12. Alexander Lysak	Assistant, Faculty of heat engineering; ZSEA (lecturer)
	13. Andrey Vlasov	Ph.D., Faculty of metallurgical equipment; ZSEA (lecturer)
	14. Aleksy Nazarenko	Ph.D., Faculty of metallurgical equipment; ZSEA (lecturer)
	15. Karina Belokon'	Postgraduate student of Faculty of Industry Ecology; ZSEA (assistant)
	16. Vladislav Rummyantsev	Ph.D., Faculty of Industry Ecology; ZSEA (lecturer)
	17. Gennady Kozhemyakin	Ph. D., Faculty of Industry Ecology; ZSEA (lecturer, Head of the Faculty)
	18. Oksana Novokshonova	Engineer-metallurgist; ZSEA (assistant lecturer)
	19. Eugenia Yaroshenko	Engineer-metallurgist; ZSEA (assistant lecturer)

3.1. Awareness and first training workshop (WS1) in Vinnytsia on 15-18 March, 2010

The CP training year started from the first training session (WS1) in Vinnytsia on 15-18 of March. 10 potential experts participated in this first workshop. The workshop focused on the CP concept, the organization of the CP team and material and energy balances in the company. Presentations were given by CPC staff and by international expert (UNIDO) – Mirko Lesnjak.

Within the WS1, Project Director Ms. Petra Schwager visited two companies together with the international expert Mr. Mirko Lesnjak, CPC staff, potential experts and regional project coordinator. During these visits the CPC team together with UNIDO representatives showed how to organize the first meeting with management of the enterprise. In this day, the meetings with directors of the enterprises were also held.



Photos from WS1 (Vinnytsia, 15-18 March 2010)

3.2. CP pre-assessment training workshop (WS2) in Vinnytsia on 26-29 April, 2010

The workshop was held at premises of Vinnytsia Club of successful business owners. Lectures of the WS2 were attended by 11 potential NEs, including two new potential NEs that joined to the CP team. The first two days were dedicated to company visits. The main goal of them was to disseminate the information regarding the main CP steps in CP programme implementation. The presentation “CP overview” was performed for workers. During the workshop there were visited 5 enterprises (see photo below).



*LLC Podillya reinforced concrete
Introductory meeting for employees*



*Vinnytsia Grain Mill Factory
Introductory meeting for employees*



*Private Enterprise Mario Ltd.
Introductory meeting for employees*



*Gaisyn Dairy LTD
Introductory meeting for employees*



*Gaisyn Sugar Mill
Introductory meeting for employees*

At the end of each workshop, the companies discussed main CP steps with the experts who would work with them.

The last two days of the workshop were dedicated to the trainings also the CP test was given at the end of the day for 11 potential NEs.

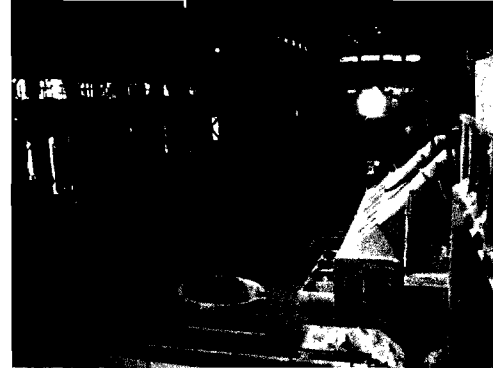


Photo from WS2 session

3.3 CP assessment training workshop for potential national experts (WS3) in Zaporizhyya on 22-25 March, 2010

The workshop was held at premises of Zaporizhyya State Engineering Academy. In total 10 potential national experts attended the workshop. During the workshop main keynote speakers (Mr. I. Shilovich, Mr. V. Pavshuk and Mr. Mirko Lesnjak) presented 2 lectures and some practical examples related to the workshop main toolkit topics: material and energy balance analysis, opportunities for CP measures etc.

During the workshops, CPC team together with IE and potential national experts visited Zaporizhya State Titanium Research and Design Institute, Company “Kran LTD”, Company “Zaporizhya Ferroalloy plant JSC”, Company “BIAS JSC”. The information meetings were held in all of these companies. The aim was to inform as many employees as possible about the Cleaner Production project, its tasks and expected benefits and improvement of the process of data collection. The companies presented teams which will work on the project.

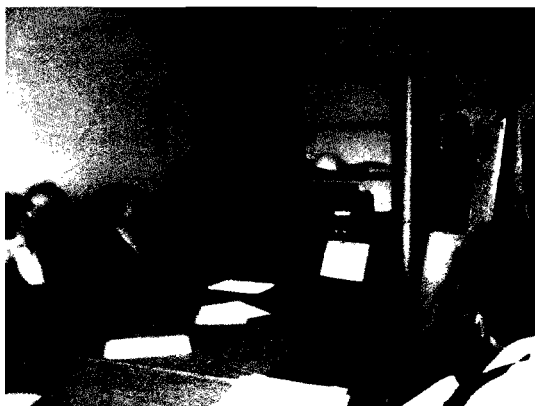


Photos from companies' visits

3.4. CP assessment training workshop for potential national experts (WS3) in Vinnitsya on 31 of May, 2010 – 1st of June, 2010

The two-day workshop in Vinnitsya was oriented toward the company level. During the first day, potential NEs (in total 9 national experts that attended the workshop) discussed the specific problems and future activities related to data collection. The regional project coordinator Mr. Igor Marchuk has organized a meeting with the Director of participated company (LLC “Decor Concrete”) Mr. Aleksey Senylnyk. All together NEs, Ms. I. Fedorchuk and Mr. Mirko Lesnjak discussed the system of employee’s motivation within each enterprise and how to prepare the final assessment report. The CP status in each company was established after the roundtable discussion at the end of the day.

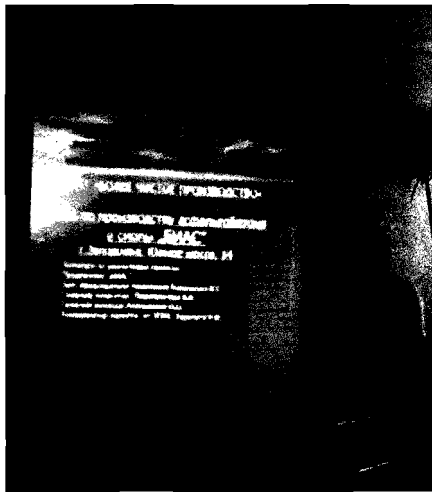
During the next day, Ms. I. Fedorchuk together with the international expert Mr. Mirko Lesnjak, Mr. Igor Marchuk and NEs visited two companies. The first visited company was LLC “Podillya reinforced concrete”, the second one - “Gaisyn diary LTD”. The CP teams from the companies participated actively during these meetings and, together with experts, identified and discussed possible CP options.



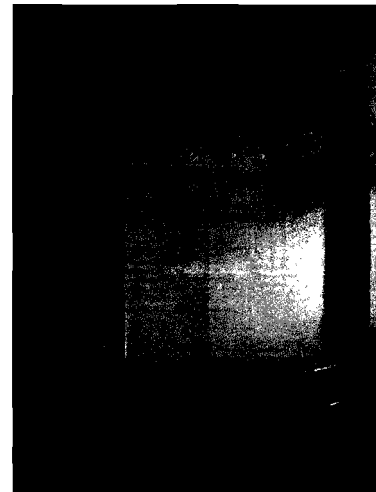
Photos from companies' team work at the LLC “Podillya reinforced concrete» and “Gaisyn diary LTD”.

3.5. Selection of CP opportunities, training workshop for potential national experts and company representatives (WS4) in Zaporizhya on 5-6 July, 2010

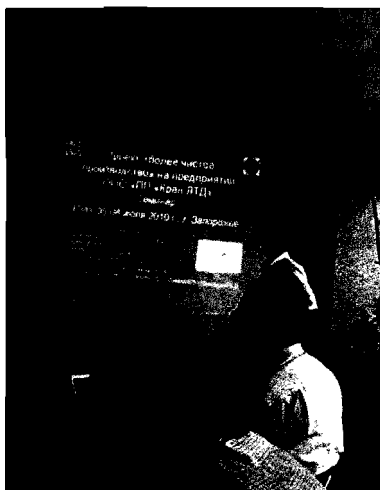
The fourth workshop on Cleaner Production within the framework of the CP project was held at the premises of the Zaporizhya Chamber of Commerce. The main goal of the workshop was to determine the establishment of CP teams, data collection, material and energy balances preparation, as well as the list of CP options preparation. In total 16 participants including company representatives and NEs attended the workshop. Four company representatives and candidates for national experts presented their work to the evaluation committee composed of: Ms. M. Grineva (UNIDO), Mr. M. Lesnjak (IE), Mr. I. Shilovich (CPC director), Mr. Alexey Tchaykovs'ky (NE KPI), Mr. Evgenij Inshekov (NE KPI), Ms. I. Fedorchuk (CPC staff). Four company representatives gave a presentation on the status of the projects, and it could be seen that a list of CP options had been generated in all of the companies. The balances and evaluations, however, had not been carried out. It was agreed that a final and complete balances together with the list of CP options would be communicated to the CP Centre.



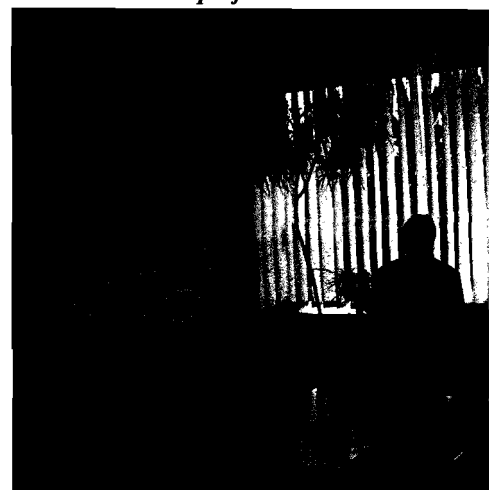
Konstyantyn Taratuta (NE) presented CP activity in "BIAS JSC"



Company "Zaporizhya Ferroalloy plant JSC" (representative from company CP team) presented the CP project status



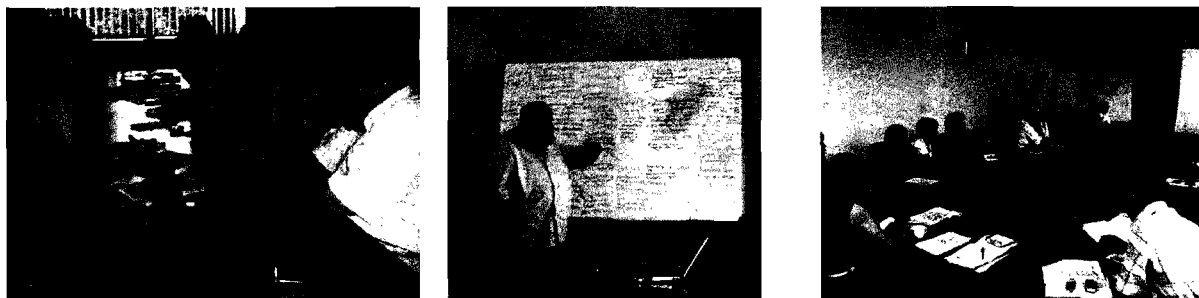
Company "Kran LTD" (representative from company CP team) presented its CP activity



Public Corporation "Steel-rolling plant" (representative from the company CP team) presented its CP status

During the next few days, the keynote speakers presented 4 lectures with 4 practical exercises related to the main workshop toolkit topics. The last day of the workshop was

dedicated to general discussion. CP test was given at the end of the day for 8 potential NEs. Konstyantyn Taratuta was absent and wrote it in September.



Photos from the WS (team work – SWOT analysis)

3.6. Selection of CP opportunities, training workshop for potential national experts and company representatives (WS4) in Vinnytsia on 13-16 July, 2010.

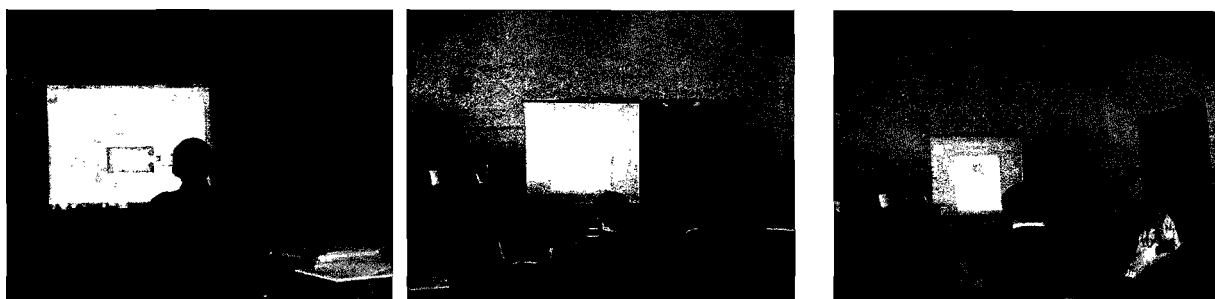
The fourth workshop on Cleaner Production was oriented at company level. Mr. V. Pavshuk (CP project coordinator), Mr. I. Shilovich (CPC director), Ms. Irina Fedorchuk (CPC staff) together with NEs visited all participated enterprises (6 companies). The company representatives gave an overview of CP options identified after all period of work. The CP teams from the companies participated actively in these meetings and, together with experts, discussed further plan of work.

3.7. CP In-plant demonstrations&Final exam (WS5) - in Zaporizhyya 13-14 December, 2010 - in Vinnytsia 15-16 December, 2010

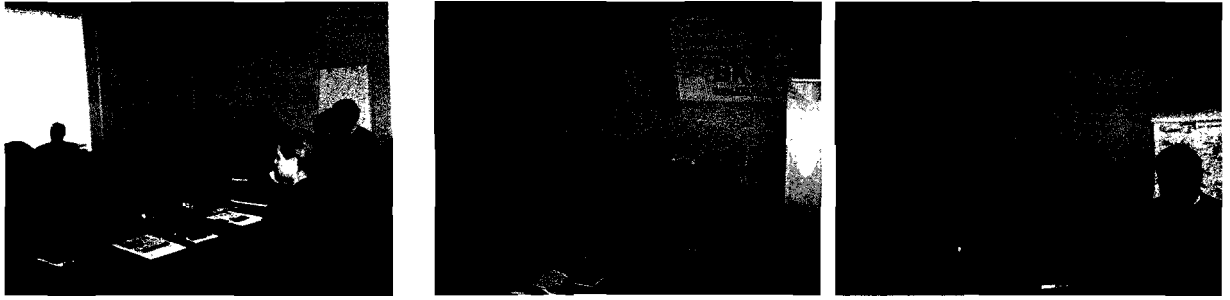
On December 13-14 2010, the candidates for national experts in Zaporizhyya at the premises of ZSEA and on December 15-16 2010 – in Vinnytsia at the premises of the Club (Club of the successful business owners) presented their work to the evaluation committee composed of:

1. Mr. Mirko Lesnjak, IE UNIDO
2. Mr. Igor Shylovykh – Ph.D. Faculty of Chemical Engineering, CPC director, NE;
3. Mr. Evgenij Inshekov - Ph.D. Faculty of Energy Management, NE;
4. Mr. Aleksey Tchaykovs`ky – Ph.D. Faculty of Physical Engineering, NE;
5. Mr. Valeriy Pavshuk – Ph.D., CP national project coordinator;
6. Ms. Irina Fedorchuk – Master of Ch. Engineering, CPC staff.

Every expert had 20 minutes for the presentation and 10 minutes for questions and answers. It was established that all experts should finish reports for companies according to necessary requirements. After the final evaluation and submission of reports, CPC team together with IE would decide whom to award by the UNIDO certificates.



Photos from the evaluation of the CP reports in Zaporizhyya



Photos from the evaluation of the CP reports in Vinnytsyya

In the framework of the workshop, four companies (among them 2 companies in Vinnytsyya and 2 – in Zaporizhyya) were visited with the main goal to present achieved results for top management and to receive the feedback about the CP project running.



Photo from the meeting at the Public corporation Steel-Rolling Plant (Zaporizhyya)



Photo from the meeting at the BIAS JSC (Zaporizhyya)



Photo from the meeting at the LLC Podillya reinforced concrete (Vinnytsyya)

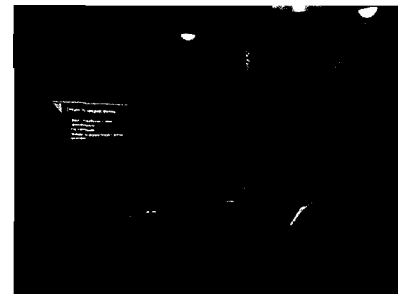


Photo from the meeting at the Vinnytsyya Grain Mill Factory (Vinnytsyya)

Table 1. Overview of the five-series training programme on Cleaner Production.

Series of workshops (Venue)				
1 (Zaporizhya, Vinnitsya)	2 (Zaporizhya, Vinnitsya)	3 (Zaporizhya, Vinnitsya)	4 (Zaporizhya, Vinnitsya)	5 (Zaporizhya, Vinnitsya)
<p>Awareness and first training workshop 5-9 October 2009 (4 days) 10-11 December 2009 (Vinnitsya - 2 days)* 15-18 March 2010 (Vinnitsya - 4 days)</p>	<p>CP pre-assessment 21-25 December 2009 (4 days, including company visits) 26-29 April 2010 (4days, including company visits)</p>	<p>CP Assessment 22-25 March 2010 (3 days) 31 May/1 June 2010 (2 days)</p>	<p>Select CP Opportunities 5-8 July 2010 (3 days, including company visits) 13 - 16 July 2010 (3 days, including company visits)</p>	<p>CP In-plant demonstrations&Final exam 13-14 December 2010 (2 days, including company visits) 15-16 December 2010 (2 days, including company visits)</p>
<ul style="list-style-type: none"> - Introduction to CP; - CP strategy&metodology; - UNIDO/UNEP CP program; - Material and energy balance; - How to start CP project; - Opportunities for CP in regions; - Discussion 	<ul style="list-style-type: none"> - Getting started in an in-plant demonstration unit; - Designate CP team (company representatives together with respective CP consultants); - List process steps, flow sheet; - Walk through in the plant; - Identify and select wasteful process steps and discuss CP opportunities; - Collect data, measurements; - Introduction to energy audit; - Control figures, material and energy balance; - Work plan and next steps: 1. Improve material and energy balance; 2. Assign cost to waste streams 	<ul style="list-style-type: none"> - Presentation of material and energy balance; - Benchmarking system; - Introduction of opportunities for CP measures; - Selection solutions for possible implementation; - How to prepare final assessment report; - CP test performance; - Presentation - Next steps 	<ul style="list-style-type: none"> - Select opportunities for low cost measures; - Assess technical feasibility; - Assess financial feasibility; - Evaluate environmental aspects; - Credit conditions for companies; - CP test performance; - Next steps 	<ul style="list-style-type: none"> - Follow-up of CP Assessment; - Presentation of selected CP measures for top-management; - Constrains for the implementation; - Action plan for further steps; - Presentation of final reports for the valuation committee; - Further steps for follow-up
<p>27 team members and trainees participated in the WS (Zaporizhya) 25 team members and trainees participated in the WS (Vinnitsya)</p>	<p>15 team members and trainees participated in the WS (Zaporizhya) 17 team members and trainees participated in the WS (Vinnitsya)</p>	<p>9 NEs participated in WS (Zaporizhya) 10 NEs participated in WS (Vinnitsya)</p>	<p>16 team members and trainees participated in the WS (Zaporizhya) 42 team members and trainees participated in the WS (Vinnitsya)</p>	<p>24 team members and trainees participated in the WS (Zaporizhya) 28 team members and trainees participated in the WS (Zaporizhya)</p>

*Awareness and first training workshop was held twice in Vinnitsia due to the changing of responsible organization. **Lecturers:** Mr. I. Shilovich, Director NCPC (NTUU KPI), National CP Consultant; Mr. V. Pavshuk, Project Coordinator CP programme (NTUU KPI); Mr. A. Tchaykovs'ky, National CP Consultant (NTUU KPI); Mr. Mirko Lesnjak – International CP Expert, Slovenia (UNIDO)

**3.8. Regional final conferences on CP projects:
- in Vinnytsia 15th of March, 2011;**

The final conference took place at JSC 'Mayak' premises on 15th of March, 2011 in Vinnytsya, and constituted the CP results in this region. The event was organized by CPC NTUU 'KPI' in close cooperation with ULIE. The event was also supported by Vinnytsya Club of successful business owners. The agenda of the event included following:

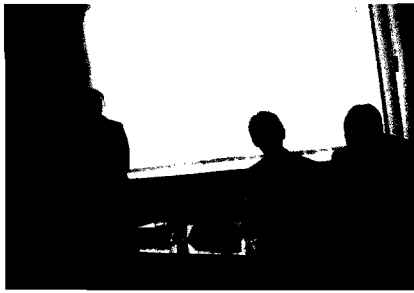
- Welcome speech
- 2 information presentations were given by UNIDO and KPI representatives
- Company reports (general impression and attitude for CP projects)
- Award ceremony

9:00-10:00	Registration of participants Tea, coffee will be served	<i>Organizing committee</i>
10:00-10:20	Welcome address, introduction	<i>Representatives: UNIDO, ULIE, NTUU KPI, local authorities, Vinnytsya Club of successful business owners, etc.</i>
10:20-10:40	Competitiveness of Ukrainian enterprises	<i>Representative of ULIE – Mr. S.Khudobin</i>
10:40-11:00	CP Program in Ukraine, Ukrainian CP network	<i>Ms. Maria Grineva, UNIDO Project Assistant</i>
11:00-11:20	National experience on CP program	<i>Mr. A. Koval, Vice- Rector of NTUU Mr. Igor Marchuk , Regional project coordinator Ms. Oksana Ischenko, National Consultant on CP</i>
11:20-11:40	Coffee-break	
11:40-11:50	Pilot projects in Zaporizhyya region in 2009-2010. Introduction	<i>Director of NCPC - Mr. Igor Shilovich</i>
11:50-13:20	Presentations on CP project results achieved at company level. CP methodology – main priorities, barriers and difficulties on the way of sustainable development and recourse consumption. Questions, discussion.	<i>Company representatives:</i> 1. Private Enterprise Mario Ltd. (stainless steel radiators) 2. Vinnytsya Grain Mill Factory 3. Gaisyn Dairy Ltd. 4. LLC Decor Concrete (artificial stones, exposed concrete) 5. Gaisyn Sugar Mill 6. LLC Podillya reinforced concrete
13:20-13:40	Award ceremony for national consultants and companies. Official closure	<i>Ms. Maria Grineva, UNIDO Project Assistant</i>

The main objective of the conference was to bring together high-level representatives from industry, government and science.

Presentations of recent achievements in CP were made by companies' representatives. Six (6) successful cases were presented in oral form. The event provided the contact between academic knowledge and corporate experience (companies in the industrial and services sectors). The conference was attended by Ms. Maria Grineva – UNIDO, Ms. Svitlana Gryschenko – SECO; Mr. Sergey Khudobin – representative of ULIE, Mr. Alexander Koval – Vice rector of NTUU 'KPI', representative of regional authority and CPC team.

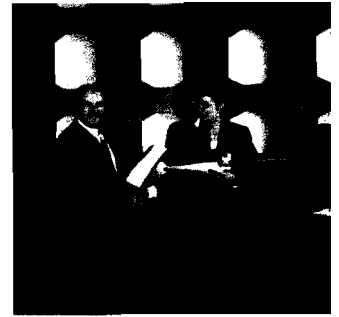
A complete set of materials was designed together with designer comprising a logo of CP centre, poster for companies, CP calendar, agenda together with note space and portfolio and brochures containing general information on CP project results. These sets of materials were delivered to each conference's participant.



Ms. Maria Grineva during presentation



Ms. Maria Grineva, CPC team and national consultants



Award ceremony

Finally, UNIDO certificates were presented to the participating companies and National consultants.

Achievements

- Each speaker was informed about and obtained conference materials.
- Each presentation was preliminary discussed.
- The Agenda of the conference was distributed before the event in electronic version by e-mail for national consultants and companies' representatives (participated into the project). The invitation containing the main objectives of the conference and some details on the organization was also distributed by e-mail.
- Representatives of about 130 companies and organizations, mass media, local government, university officials attended conferences. A lot of participants were informed via mass media: (http://www.youtube.com/watch?v=0pfOj_Mcpug&feature=player_embedded; <http://eco.com.ua/content/UNIDO>)
- The conferences were generally considered as successful and useful by all participants. Also, the balanced and interesting programme of the events was welcomed by participants. Some companies got interested in future participation in CP project.

- in Zaporizhya 18th of March, 2011.

The final conference on Cleaner Production was jointly organized by the National Cleaner Production Centre of Ukraine, ULIE and Zaporizhya State Engineering Academy. In addition, it was supported by the Mayor of Zaporizhya. The event was held at the conference hall of the 'Intourist' hotel in Zaporizhya. The agenda of the event included:

- Welcome speech
- 2 information presentations by UNIDO and KPI representatives
- Company reports (general impression and attitude for CP projects)
- Award ceremony

9:00-10:00	Registration of participants Tea, coffee will be served	<i>Organizing committee</i>
10:00-10:20	Welcome address, introduction	<i>Representatives: UNIDO, ULIE, NTUU KPI, Mayor of Zaporizhyya, local authorities, Zaporizhyya State Engineering Academy, etc.</i>
10:20-10:40	Competitiveness of Ukrainian enterprises	<i>Vice President of ULIE – Mr. Vasyl Krutov President of regional ULIE – Mr. A. Vannat</i>
10:40-11:00	CP Program in Ukraine, Ukrainian CP network	<i>Ms. Petra Schwager, UNIDO Project Director</i>
11:00-11:20	National experience of NTUU KPI on CP program in 2007-2010	<i>Mr. A. Koval, Vice- Rector of NTUU</i>
11:20-11:40	Coffee-break	
11:40-11:50	Pilot projects in Zaporizhyya region in 2009-2010. Introduction	<i>Director of NCPC - Mr. Igor Shilovich</i>
11:50-12:50	Presentations on CP project results achieved at company level. CP methodology – main priorities, barriers and difficulties on the way of sustainable development and recourse consumption. Questions, discussion.	<i>Company representatives:</i> 1. Zaporizhyya steel-rolling plant 2. Kran Ltd 3. Zaporizhyya ferroalloy plant 4. JSC BIAS
12:50-13:10	Award ceremony for national consultants and companies. Official closure	<i>Ms. Petra Schwager, UNIDO Project Director</i>

The main objective of the conference was to bring together high-level representatives from industry, government and science.

Presentations of recent achievements in CP were made by representatives of the companies. Four (4) cases of success were presented in oral form. The event provided the contact between academic knowledge and corporate experience (companies in the industrial and services sectors).

The conference was attended by Ms. Petra Schwager – UNIDO, Mr. Vasyl Krutov – Vice-President of ULIE, Mr. Alexander Koval – Vice rector of NTUU ‘KPI’, Mr. A. Sin – Mayor of Zaporizhyya, representatives of regional authority, Zaporizhyya State Engineering Academy and CPC team.

A complete set of materials was designed together with designer comprising a logo of CP centre, poster for companies, CP calendar, agenda together with note space and portfolio and brochures containing general information on CP project results. These sets of materials were delivered to each conference’s participant.



Participants of regional conference



Mr. A. Sin a Mayor of the city welcomed participants



Ms. Petra Schwager during presentation



National CP consultants during Awarding Ceremony

Achievements

- Each speaker was informed about presentation and obtained conference materials.
- Each presentation was preliminary discussed.
- The Agenda of the conference was distributed before the event in electronic version by e-mail for national consultants and companies' representatives (participated into the project). The invitation containing the main objectives of the conference and some details on the organization was also distributed by e-mail.
- Representatives of about 100 companies and organizations, mass media, local government, university officials attended conferences. A lot of participants were informed via mass media: TV channels, newspapers (<http://reporter.zp.ua/node/77875>)
- The conferences were generally considered as successful and useful by all participants. Also, the balanced and interesting programme of the events was welcomed by participants. Some companies got interested in future participation in CP project.
- The Centre team have already received 2 CVs for potential candidates on a CP consultant position.

2011	01 ЯНУАРИЙ	02 ФЕВРАЛЬ	03 МАРТ	04 АПРЕЛЬ	<p>ЦЕНТР БОЛЕЕ ЧИСТОГО ПРОИЗВОДСТВА Національний та технічний університет України «Київський політехнічний інститут»</p>
	05 МАЙ	06 ІЮНЬ	07 ЛЮЛИЙ	08 АВГУСТ	
	09 СЕРПЕНЬ	10 ОКТЯБРИЙ	11 НОЯБРИЙ	12 ДЕКАБРИЙ	

Програма Організації Об'єднаних Націй
 за промислового розвитку «Більше чистого виробництва» (БЧП)

Ця програма є складовою частиною стратегії розвитку України, спрямованої на підвищення конкурентоспроможності української економіки шляхом впровадження передових технологій та підвищення енергоефективності.

Програма охоплює такі напрями діяльності:

- Підвищення енергоефективності та енергозбереження.
- Впровадження передових технологій та інновацій.
- Підвищення якості продукції та відповідності міжнародним стандартам.
- Підвищення безпеки виробництва.
- Підвищення екологічності виробництва.

ОПЫТ ВНЕДРЕНИЯ ПРОЕКТОВ ПО БОЛЕЕ ЧИСТОМУ ПРОИЗВОДСТВУ НА ПРЕДПРИЯТИЯХ, ВИНОГРАДАХ И ВИНОДЕЛЬНИЦАХ ОБЛАСТИ

Категорія: проєкти з рівнем високим програми БЧП. Інформаційні ресурси: Українська програма БЧП. Національний технічний університет України «Київський політехнічний інститут».

Співфінансує: **ВКУПІ** (Всесвітній фонд природи)



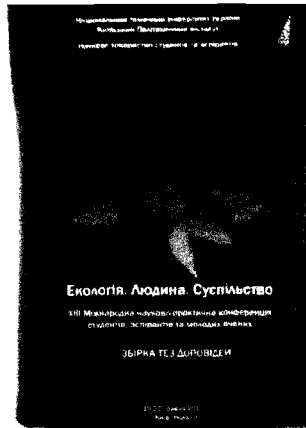
A complete set of conference materials

Cleaner Production Centre KPI, local organisers, is proud to receive many outstanding comments about the success of the event.

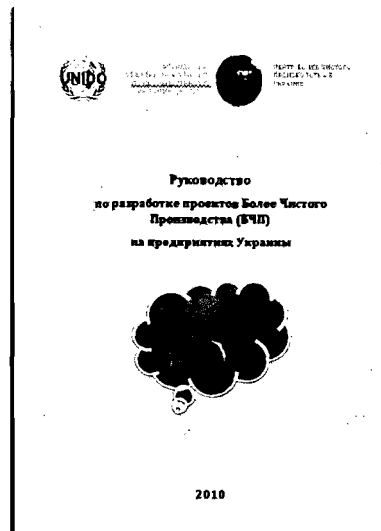
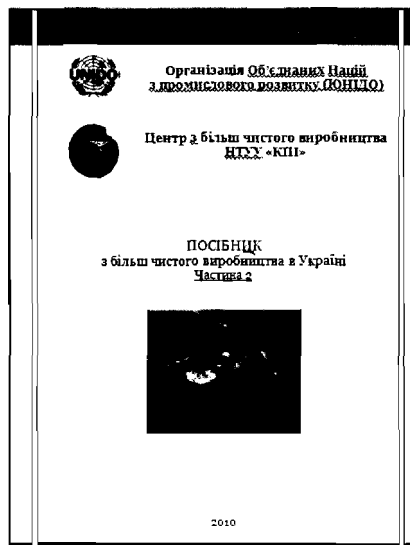
4. Awareness raising activities

The purpose of these activities is to share the achievements and experiences of our activities with industries, government agencies and universities so that we can join hands toward sustainable industrial development.

In 2010, the Ukrainian Cleaner Production Centre has published 2 articles in the national journals (Journal of XIII International scientific conference of students, post-graduates and young scientists "Ecology. Human. Society" (<http://www.ecology.ssa.org.ua/en/participation>) and Journal of VI All-Ukrainian Scientific Conference "Environmental Protection as a platform for sustainable development").



The Mini-Guide on Cleaner Production Assessment was edited and is now available in Russian.



CPC staff (Ms. Irina Fedorchuk) participated in the international conference called "Ecology. Human. Society". It took place in Kyiv NTUU KPI, Ukraine, on May 13-14 2010.

CPC staff has also participated in the international conference called "From applied research to entrepreneurship: promoting innovation-driven start-ups and academic spin-offs". It took place in Kyiv NTUU KPI, Ukraine, on November 9-11 2010. Mr. Igor Shilovich gave the presentation speech about Implementation of Cleaner Production program in Ukraine, on behalf of CPC.

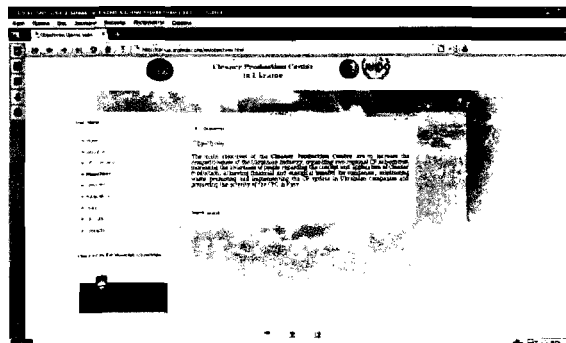
On May 18, 2010, upon invitation of the Ministry of Environment protection of Ukraine and Association ZHYVA PLANETA (Live Planet), Mr. Igor Shilovich (CPC director) gave a

presentation speech about “The implementation of the cleaner production pilot project of the United Nations Industrial Development Organization (UNIDO) on the enterprises of Kiev and Kiev region”, on behalf of CPC. “Eco management and business efficiency” was a scientific and practical conference (<http://ecolabel.org.ua/>).



Photos from the conference in Kyiv 10 May, 2010

The Centre has published its web site at: <http://www.cpc-ua.org>.



4.1. Development of cooperation

Ukrainian CPC tries to coordinate the different activities to create as much synergy as possible. It is important to strengthen the different inputs and to build up an efficient coordination among different organization related with CP and environmental protection.

The CPC during the period of reference established contacts and held acquaintance meeting with following organizations:

- ▶ **UNDP-GEF Dnipro River Ecological Program**
Mr. Dmytro Rushchak, Chief Technical Advisor
≈ During the meeting, interest was expressed in possible assistance of NEs (from KPI) that the CPC could provide via participation in GEF project in related regions. It was achieved that CPC and UNDP-GEF program could cooperate in future. Negotiations are ongoing on signing a cooperation agreement and developing one joint CP “Product” – to consolidate resources for joint implementation of CP related activities.

- ▶ **TEKNA (Norwegian Society of Graduate Technical and Scientific Professionals)**
Mrs. Elena Berstad, Coordinator of Program: Cleaner Production in Ukraine
≈ The meeting held as bilateral presentation of goals and possibilities of each organization. The CPC highlighted the concept of CP as well as technical possibilities of the trained specialists. CPC team demonstrated to TEKNA the high-qualified assessment at the enterprise “Prommetiz Ltd.” which participated in TEKNA project.

- ▶ **EMBASSY OF NORWAY IN UA**
Mr. Olav Berstad, Ambassador of Norway to Ukraine
≈ the meeting held within the framework of NTUU KPI and Norway the CPC presented the concept of CP as well as technical possibilities of the trained specialists.

- ▶ SECO (The State Secretariat for Economic Affairs, Switzerland)
Mr. Manuel Etter, Country Director, Swiss Cooperation Office Ukraine; Mr. Victor Shutkevich, Deputy Director; Ms. Svitlana Gryshenko – Coordinator of energy efficient projects.

≈ the meeting held as presentation of CP project on-going status for SECO. Both organizations discussed further steps and plans into CP program till 2015.

- ▶ International Finance Cooperation (IFC) UKRAINE
Ms. Sophia Lynn, Business Advisor

≈ The meeting held with the main aim in investigating financial possibilities of recourse saving projects in Ukraine.

- ▶ Nordic Environment Finance Corporation (NEFCO) UKRAINE
Ms. Julia Shevchuk, Business Advisor

≈ The meeting held with the main aim in investigating financial possibilities of recourse saving projects in Ukraine.

- ▶ Ukrainian League of Industrialist and Entrepreneurs (ULIE)
Mr. V. Krutov, Vice-President

≈ The meeting held with the main aim of possible future cooperation

- ▶ CHAMBERS OF COMMERCE: Ukraine, Vinnytsia, Zaporizhya
Ms. Elena Podoleva, Vice President of the Ukrainian Chamber of Commerce and Rector of the International Academy of Commerce and Investment

Ms. Kristina Artemenko, Head of International Project Department, ChC

Mr. Vladimir Shamilov, President of Zaporizhya ChC

Mr. Damir Bikulov, Vice President of Zaporizhya ChC

Mr. Dmytro Antonyuk, Chief of the Department of External Economic Relations, Zaporizhya ChC

Mr. Stepan Lypkan, Vice President of Vinnytsia ChC

Mr. Igor Shevchenko, Chief of the Department of External Economic Relations, Vinnitsia ChC

≈ All these meetings afforded the CPC the opportunity to introduce the CP program and Centre activities to the regions. The meetings were also aimed at determining the scope of possible future cooperation.

- ▶ Municipal Council Office of Ecology in Zaporizhya
Mr. Igor Broyde, Head of Department

≈ The Center's objectives and its importance for Zaporizhya region were highlighted. This meeting also afforded the Centre the opportunity to establish good relations with municipalities.

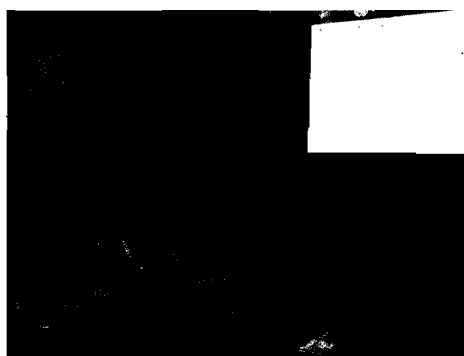
- ▶ The First Deputy Mayor of Vinnitsia City Council
Mr. Ivan Mykhailuk

≈ the meeting was aimed to explore possible City Council contributions to the CP project and look into the possibilities of cooperation between the two sides.

5. National stakeholders meetings

On 3 June 2010 took place “Stakeholder Consultation Workshop on the Sustainable Application and Promotion of Cleaner Production (CP) in Ukraine” in the Great Conference Hall of the National Academy of Sciences of Ukraine (1030 Kiev, Volodymyrska Street 55). Potential partners, donors of future National CPC, representatives of government and non-government organizations and others keynote persons attended the workshop.

The main aim of the workshop was to create a strategic vision of on-going program “Establishment and operation of the National Cleaner Production Program in Ukraine” and establish a dialogue among the participants (main stakeholders). The Workshop also provided a good opportunity for interaction and for the sharing of ideas amongst the various national, international organizations and CP centers. See photos below.



Mrs. Petra Schwager, Project Director of Cleaner Production Unit, UNIDO during presentations



During the workshop running

In general, there were positive feedbacks and commitment to join hands and consolidate efforts for application and promotion of resource efficient and cleaner production in Ukraine. It was agreed that project document would be developed in close cooperation with the Swiss and Ukrainian Governments and taking into considerations proposals and comments of participants from the workshop.

On July 20, 2010, the “Meeting on the organizational, administrative and legal set-up of the National Cleaner Production Centre (NCPC)” was held at premises of NTUU KPI.

Participants:

Mr. Zgurovsky Michael, Rector, National Technical University of Ukraine “Kyiv Polytechnic Institute” (KPI)

Mrs. Podoleva Elena, Vice President of the Ukrainian Chamber of Commerce and Industry,

Mr. Risukhin Vladimir, CEO of the group of companies “Metipol”,

Mr. Chernovolov Gennadiy, Director of the Company “Nature Technologies”,

Mr. Kamayev Victor, General Director of the Science Park “Kyivska Polytechnika”,

Mr. Kologrylov Yaroslav, Executive Director of the company “UkraineMade”,

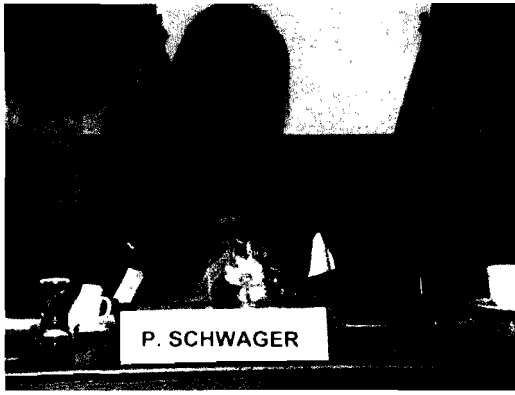
Mrs. Schwager Petra, Project Director, UNIDO

Mr. Bogonos, Lawyer

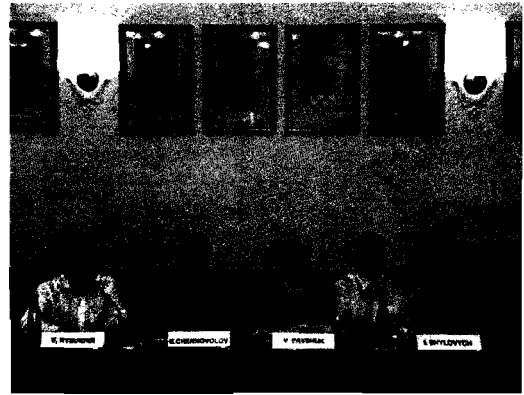
Mr. Shilovich Igor and Mr. Pavshuk Valery, Staff of the NCPC

Mr. Slobodjan Leonid, Mr. Voronov Sergei, Vice Rectors of KPI

The main aim of the meeting was to present the bilateral vision on the set-up of the future Centre and its organizational structure, learn more about the companies “Nature Technologies”, “Ukraine Made” which are partners of the Science Park and expressed interest in joining the NCPC Founders Board and reach an agreement on the NCPC Founders Board.



Mrs. P. Schwager during the meeting at KPI



Participants during the meeting at the KPI

On 10 December, 2010 took place Stakeholder Consultation Workshop on UNIDO project “Promoting the adaptation and adoption of Resource Efficient and Cleaner Production through the establishment and operation of a Cleaner Production Centre (CPC) in Ukraine” took place in premises of UNDP (1 Klovsky Uzviz).

Participants

UNIDO

Heinz Leuenberger, Director of the Environmental Management Branch

Petra Schwager, Project Coordinator, Cleaner Production Unit

Grineva Maria, Project Assistant

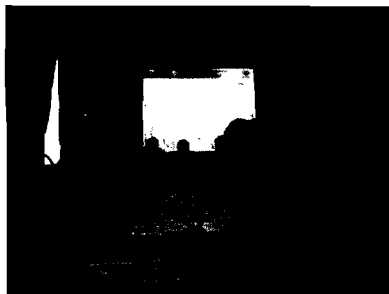
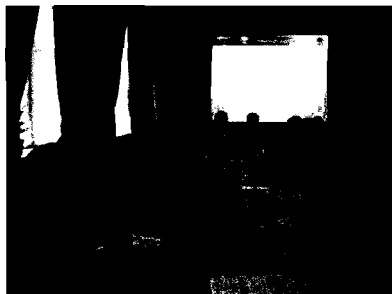
SECO - Viktor Shutkevich, Deputy Country Director, Svitlana Gryshchenko, National Expert

National Technical University of Ukraine: “KPI” - Michael Zgurovsky, Rector, Igor Shilovich, CPC Director

Representatives from:

- Ministry of Economy
- Ministry of Regional Development and Construction of Ukraine
- Ministry of Ecology and Natural Resources
- Ministry of Industrial Policy
- Ministry of Education and Science
- Ukrainian League of Industrialists and Entrepreneurs (ULIE)
- Ukrainian Chamber of Commerce and Industry

Main goal of the workshop was to discuss: phase II of Cleaner Production (CP) work from UNIDO in Ukraine that has started in 2007, legal and organization status of future National CPC and regional focal points, presented the main elements of the up-coming project.



*Photos from the workshop
Kyiv 10 December, 2010*

6. Other activities

6.1. Participation in international workshops

UNIDO/UNEP provided study tour for the representative of NCPC staff to attend the international workshop. The study tour was carried out in October 2010 (in Austria, Vienna, 4 days). Participation of staff at seminars and workshops abroad is a useful tool to upgrade knowledge and enhance motivation of staff. The principal aim of the workshop was to see, learn, discuss and develop opportunities for thematic and sector-based regional cooperation, networking and knowledge management. The main thematic modules were:

- Thematic presentations on Low Carbon Production;
- Thematic presentations on RECP in tourism and associated sectors;
- Enterprise-Level Indicators for recourse productivity and pollution intensity;
- Presentations of the new tools for training at small and medium enterprises level (SMEs).

On March 29-31, 2011 upon invitation of the State Committee of Ukraine on Technical Regulation and Consumer Policy (DSSU) - Ms. Irina Fedorchuk, Administrative Assistant participated in three-day regional workshop on ISO 14040-Life Cycle Assessment and obtained a certificate in LCA. The workshop was one of a series of a seminars organized under the ISO Action Plan for Developing Countries in different regions of a developing world. The financial support of this event came from SECO.

This training will be useful for new project training sessions.

6.2. Policy regulation and cooperation

The government is striving for the further integration of Ukraine into European economic and social structures. In this context, the Ministry of the Environment, and the EU, are working on introduction of the National Environmental Policy of Ukraine to cover the period up to 2020. Among other things, this policy should increase the public awareness of the environmental matters, improve the integration of environmental policy, raise the environmental security and foster the sustainable use of natural resources. The introduction and development of cleaner technologies and Cleaner Production will be integrated into the policy document.

Taking into consideration the importance of activities which could encourage CP policy in the country, CPC befriended with the Ukrainian League of Industrialists and Entrepreneurs (ULIE). The ULIE works in close cooperation with the legislative and executive governmental bodies.

- Ukrainian League of Industrialists and Entrepreneurs (ULIE). The Ukrainian League of Industrialists and Entrepreneurs, was established in 1992. ULIE is a non-state, public non-profit organization uniting 38,000 enterprises and companies from nearly all sectors of the national economy. Its members are representatives of large industrial corporations as well as small businesses, domestic exporters, high-tech companies, etc. ULIE members produce 84% of the national GDP. The League has representations in all regions of Ukraine and in 20 countries worldwide.

7. Conclusions

a. Achieved results

Location	Vinnitsya	Zaporizhyya
Trained in CP	- 10 experts	- 9 experts
Completed IPAs	- 6	- 4
Achieved results (savings and benefits)	Annual savings, euro: ~ 8404199; Reduction of electricity consumption: ~ 1373 MWh; Reduction of water consumption: ~ 91200 m3; Reduction of natural gas consumption: ~ 15405800 m3; Reducing CO2 emissions: ~ 24259 tons	Annual savings, euro: ~723940; Reduction of electricity consumption: ~ 1007 MWh; Reduction of water consumption: ~ 1800 m3 Reduction of natural gas consumption: ~ 1523514 m3 Reducing CO2 emissions: ~ 10145 tons

b. Finalisation of the project

The pilot project have been successfully implemented in Vinnitsya and Zaporizhyya. After the first round of CP Assessments the companies in both regions have achieved very positive results. Overall results of the project are outlined below:

Annual savings, euro:	more than 9 mln.
Necessary investments, euro:	more than 30 mln.
Reduction of electricity consumption, MWh/year:	2,375
Reduction of water consumption, m3/year:	93,000
Reduction of natural gas consumption, m3/year:	16,875,314
Reducing CO2 emissions tons/year:	34,404

Most of the proposed options are concerned with savings in terms of energy, water and raw materials. The implementation time was quite long for both regional projects. But now there is a potential for dissemination and further implementation of future projects which might be established in a shorter period of time.

In general, there are quite significant obstacles to the implementation of Cleaner Production in Ukrainian regions. A major problem is the short-term orientation of company management which allows little space for long-term process optimization and customer-supplier relations.

c. Lessons learned

A great need and potential for the introduction of CP were observed during the last three years when many industrial processes were obsolete and inefficient. However, there is still a lack of understanding along with misunderstanding of the CP concept. The CP terminology should be further developed and updated in Ukrainian and Russian.

Companies still lack trust in external consultants and are not willing to share their internal production and process data. Therefore, we recommend that work should be carried out with regional experts, local CP competence should be built up and close collaboration is supposed to be developed with the regional governments. In this way a slow start of activities can be avoided,

which is mainly caused by a lack of regional partners, knowledge about companies and the local business mentality.

Limited access to funding reinforced with instable economic situation is affecting the interest and/or companies' opportunities to engage in CP activities. The existence of CP incentive schemes, financial sources and favorable political conditions are important drivers for Cleaner Production and should be further developed in Ukraine.

On the other hand, companies which successfully participated in previous CP assessments have stated their openness towards further engagement in CP and payment for the services obtained. It can be expected that one third of the assessment costs can be covered by income from companies. A dynamic price scheme for CPC services should be elaborated which takes into consideration the size and specific situation of each company.

d. Steps forward


As were mentioned before, the Ukrainian industries are looking up to the high potential, which can benefit them in the long run. The introduction of the financial institutions, like NEFKO, is a promising support to companies to pursue more environmentally friendly solutions, considering the fact that the development of most of Ukrainian companies is hindered by financial constraints.

The mission of the Centre will mainly focus its activities on building the capacity of national experts with regard to RECP, implementing RECP assessments and supporting RECP technology projects in companies from the selected priority sectors and regions. It is planned to start-up two new regional focal points (Lviv, Lugansk) in the nearest future. A number of specific training and pilot projects on Chemical Leasing will be carried out in Ukraine to promote regional cooperation. The service based business model of Chemical Leasing will be mainly applied to the sound production, management and application of chemicals.

8. Annexes

8.1. Results of CP IPAs

ZAPORIZHYA REGION

<p>Company "Kran LTD"</p> 	<p>69015, Ukraine, Zaporizhya, 16a Kijashko Street e-mail: ooo.pp.kran.ltd@mail.ru web: www.kran-ltd.at.ua, www.kran.zp.ua</p>
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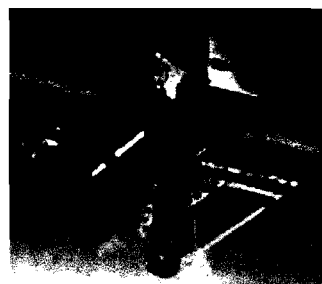
Company profile

Limited Liability Company 'Kran Ltd' is a service company for JSC Zaporozhkran, which is part of the concern Konecranes. The company was founded in 1999 and employs 30 people. The scope of activities of "Kran LTD" is repair and maintenance of electricity distribution and control equipment, repair and maintenance of material handling equipment and machine tools, etc.

- Company produce 4750 tons of metal constructions per year.
- Electricity consumption (together with JSC 'Zaporozhkran') - 5256018 kWh per year;
- Natural gas consumption (together with JSC 'Zaporozhkran') – 1740930 m³ per year.

The CP project in the company was aimed to establish more efficient use of raw materials and energy, the exclusion of toxic and hazardous materials, and prevention of waste and pollution at source, improving the competitiveness of this enterprise on the market.

Within the CP project, several employees went for training, a team for cleaner production was established in the enterprise and the Director has given his full support to the project. With the assistance provided by the Centre's experts, data for material, water and energy balances was collected and list of options was made. The issues of energy and heat were the focus of attention, because this enterprise has a common boiler house and air compressor with JSC 'Zaporozhkran'. So, the greatest potential for involvement lies in these fields.



CP option	Investments, €	Saving €/year	Return of investment	Environmental impact
OPTION 1 Reduction of natural gas consumption due to installation of a new boiler house	Installation of the new boiler house ~ 30 000	~ 400000	Less than a year	Reduction of CO ₂ emissions by 2949,9 ton per year
OPTION 2 Installation of a new air compressor station	Installation of the new air compressor ~ 82 000	~ 72 000	1,5 years	Reduction of CO ₂ emissions by 919 ton per year

Public Corporation "Steel-rolling plant"

69600, Ukraine, Zaporizhya, ГЦП-1086
e-mail: metizy@zspz.net
web: <http://www.metizplant.com>

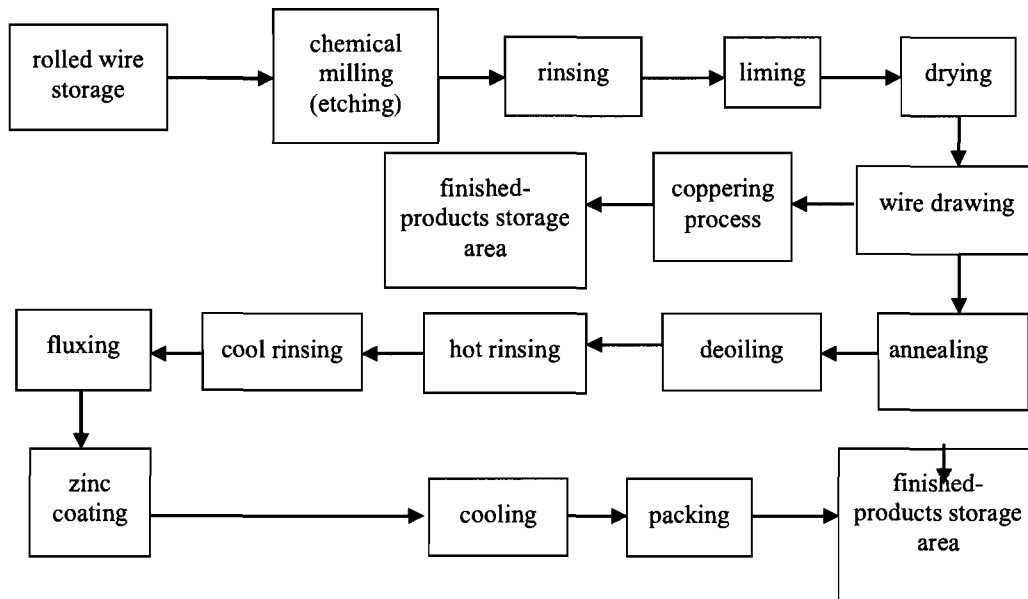
Company profile

Open Joint-Stock Company Zaporizhya Steel-Rolling Plant (formerly called Zaporozhye State Metal ware Plant) is one of the city's oldest enterprises. Its official birth date is May 23, 1916. At the moment company employs more than 800 people. In 2009, company employed 1200 people. The company assortment including:

- Steel wire
- Low-carbon cold-worked and annealed wire, zinc-coated or uncoated;
- Welding wire of SV08, SV08A, SV08G2S types;
- Steel welding wire with copper coating, SV08G2S type;
- Wire for reinforced concrete structures, VR-1 types;
- Carbon structural wires St.10, St.20;
- Carbon steel wire for cold upsetting;
- Steel wire core, St.60;
- Wire of bearing steel for cold upsetting;
- One strand barbed wire.
- Aluminum wire;
- Wire netting: welded, twisted, woven and wicked;
- Nails of following types: construction, tare, roofing, clout, slate; molding pins;
- Non-insulated wires of A, AS and PS types for aerial power lines;

Company production is certified by Ukrainian Committee of Standardization, Metrology and Certification.

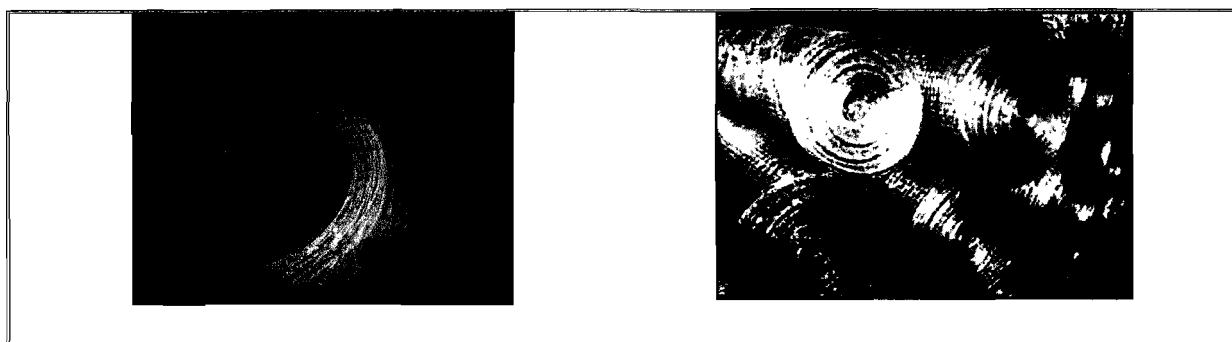
Every each type of production has its technological process. The basic technological process for wire production with main operations is shown here in a simplified process flow chart:



Problem orientation

1. Energy consumption
2. Wastes minimization
3. Water consumption

As a result, computer simulation of the process was performed by KPI consultants. Five CP options were identified and proposed for implementation:



CP option	Investments, €	Saving €/year	Return of investment	Environmental impact
OPTION 1 Reduction of zinc wastes due to capsulation and providing a shielding gas feed system under the furnace unit	Reconstruction of the furnace ~ 20 000	~ 108000	Less than 3 months	Reduction of zinc wastes by 60,4 ton per year
OPTION 2 Replacing the existing method of sulfuric acid etching via the installation of dry scale breaker	Dry scale breaker costs 87 000	Reduction of chemicals consumption and disposal costs of wastes by 27 000	3, 1 years	Reduction of waste water and liquid wastes containing acids
OPTION 3 Changing the automatic control schedule of bell-type furnace	no	Reduction of electricity consumption for heating by 12 240 €	Since implementation (was already tested)	Reduction of heat losses into the environment, reduction of electricity consumption
OPTION 4 Reconstruction of the existing bell-type furnaces	34 000	Reduction of electricity consumption for heating by 36 700 €	Less than 6 months	Reduction of heat losses into the environment, reduction of electricity consumption
OPTION 5 Installation of SCADA-system for electricity control	35 000	Reducing of electricity losses by 10%	More than a year	Reduction of electricity consumption

Company "Zaporizhya
Ferroalloy plant JSC"

69035, Ukraine, Zaporizhya, 11 Diagonalna Street
e-mail: ooo.pp.kran.ltd@mail.ru
web: <http://www.zfz.com.ua>

Company profile

Joint Stock Company " Zaporizhya Ferroalloy Plant " is one of the largest producers of ferro alloys in Europe. World volume of manganese ferroalloys production constitutes 5,7 % . The prospects of the plant are secured with proximity of Predneproviye raw material and energy bases together with well developed transport network. All this along with extensive business ties with national and foreign partners enable the plant to produce hundred thousand tons of silicon and manganese alloys. The smelting is performed in powerful thermal and electric arc furnaces.

Environmentally the plant is relatively friendly because all furnaces are equipped with gas cleaning facilities, providing collecting of gases and dust on the level above 99,9%. After reconstruction of smelting workshop № 4, which is planned to be fulfilled during 2008-2011, the enterprise will be one of the ecologically cleanest plant in the metallurgical industry. Development of slag dump with implementation of crushing-and-sorting complexes and techniques allowed in 2008 to process 100% of slags formation and reduce the volumes of previously located slags.



The water supply system is closed-type system. The bays of dust palletizing and waste utilization are processing. Offgases are used for lime burning instead of natural gas.

Reliable level of technology as well as high quality of products are ensured with precise measuring, monitoring and data processing equipment controlled by well qualified personal. Various casting methods provide regular element distribution inside the ingots, while crush screening facilities enable to get products of definite sizes and meet the consumers' requirements.

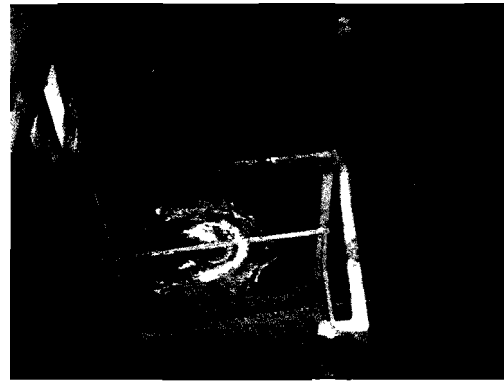
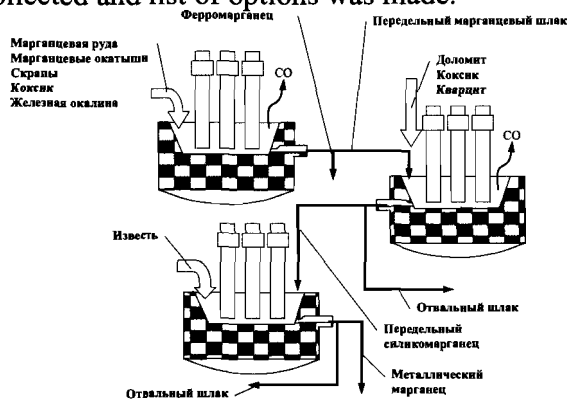
The main products of the plant are various ferroalloys: ferrosilicomanganese, ferrosilicon, ferromanganese, manganese metal. Moreover the plant produces metallurgical lime, sells ferro alloy slags, which are used predominantly in construction and building. Our ferro alloys are well known in CIS as well as in the whole world. Their quality is confirmed with the International quality standard ISO 9001.

The main countries of export: CIS (Russia, Uzbekistan, Kazakhstan, Belarus, Moldova), EU (Poland, Germany, Greece, Great Britain, Italy, Czech Republic), Turkey, Japan, Korea, and Egypt.

The CP project in the company was aimed to more efficient use of raw materials, water and energy.

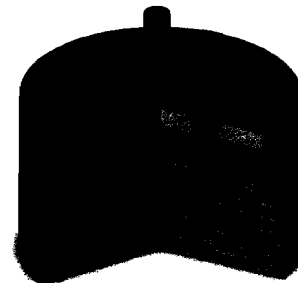
Within the CP project, several employees went for training, a team for cleaner production was established in the enterprise and the Director has given his full support to the project. With the

assistance provided by the Centre's experts, data for material, water and energy balances was collected and list of options was made.



Experimental measurement investigation and mathematical simulation

On the ferroalloy furnace № 2, experimental measurements were carried out. The measurements were concentrated on cooling water flow, temperature of external furnace surfaces. The measurements were carried out by IR-pyrometer "Agema" (portable), low-inertia thermocouples, ultrasonic flow meter.



Mathematic simulation of the furnace work

CP option	Investments, €	Saving €/year	Return of investment	Environmental impact
OPTION 1 Reducing the consumption of cooling water current supply elements furnace № 21	no	~ 13 000 her one furnace	-	Reducing the water, reducing power consumption for the drive feed pumps

Company "BIAS JSC" (hot mix asphalt concrete company)

Ukraine, Zaporizhya, 14 Severnaya Ave
Number of employees – 25
Operated since 1975

Company profile

The enterprise for hot mix asphalt concrete production was founded in 1975 under the name of 'Zaporozhstroydetal'. Later (in 2001) it was transformed into the Joint Stock Company – "BIAS".

At the moment, there is only one asphalt-mixing plant with capacity of 100t/h. Full capacity of asphalt production is 40 000 tons/year. In 2009 its production amounted only to 5,500 t.

Many minerals are used for the process, they have no harmful effects on the environment. This - rubble and sifting. Astringent component for the production of asphalt concrete is - bitumen.

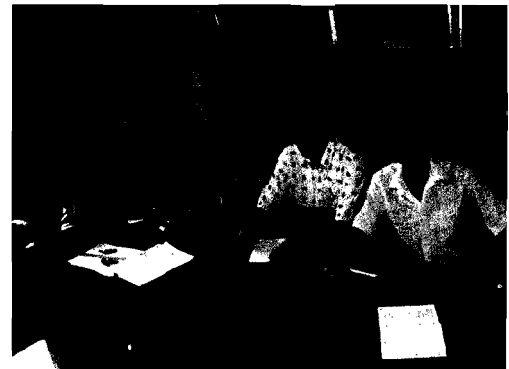
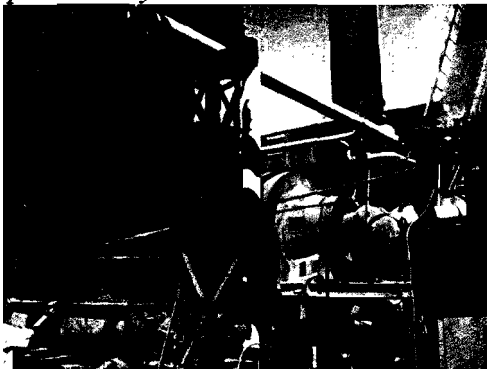
Preliminary assessment showed that the use of heat had a low efficiency. Heat loss is the main energy loss at the plant. Its related to: the low efficiency of drum dried, with high humidity raw materials, poor insulation of pipelines, bins, drum-dried and bitum heating boilers.

One of the key problems is the increased consumption of gas during the intermittent production associated with the need to maintain the asphalt in a heated condition constantly.

The highest gas consumption in the process relates to the drying of crushed stone materials and largely depends on the moisture of raw materials and efficiency of the dryer drum.

Top management of the company is ready to implement technical solutions to save energy. Solutions can be divided into the following sectors:

- Technological: research for optimal heating of bitumen;
- Engineering: the introduction of automated system for measuring and recording information on the use of natural gas, the use of exhaust gases from bitumonagrevatel'nogo boiler for heating oil transportation system of bitumen.



In order to present the project to the employees, a meeting was held, the goals were set and the CP team were formed. Data for material and energy balance was collected and a list of options were made.

In project development greatest attention was paid to the energy issue, because the team has assessed that this field had the greatest capacities for improvement, and during the project development significant savings and positive environment impact were achieved.

CP option	Investments, €	Saving €/year	Return of investment	Environmental impact
OPTION 1 Heated hoppers feedstock outgoing hot gases	~ 18 000	~ 10% of natural gas consumption	Depends on operating capacity of the company	Reducing by 10% of CO2 emissions
OPTION 2 Reducing natural gas consumption per ton of production by reducing heat loss from the outer surface of the hoppers hot drop-out and the drying drum	~ 2100	~ 2580	Less than a year	Reduction of natural gas consumption by 9900 m3
OPTION 3 The protective shelter storage for bulk materials	no	~ 20% of natural gas consumption	-	Reducing by 15% of CO2 emissions

VINNYTSIA REGION

‘Mario’ production enterprise	22300, Sosonskoe Shosse 4-V Vinnitsa region, Litin City E-mail: info@mario.ua Skype: info_vp_mario Web: www.mario.ua
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Company profile

‘Mario’ production enterprise is the leading Ukrainian producer of design-radiators from stainless steel for more than 10 years. Design-radiators ‘Mario’ are in a large demand all over Ukraine, and also are exported to the European countries. The production complex ‘Mario’ is located in Litin city, Vinnitsa area and is about 10 thousand square meters of occupied territory.

More than 100 employees work on an enterprise, each of them has a great authority on the field. In addition, the department of personnel creates training inside the company, which allows not only teaching necessary abilities and skills but also constantly promoting qualification of experimental specialists.

High-quality stainless steel materials from the leading European producers are used in the production process, mostly in heating systems. Some of the producers are - ‘ILTA INOX’, Italy and the Ukrainian manufacturer of stainless steel pipes – ‘Compo’ which buys the metal from OUTOKUMPU Company, Finland; ACERINOX, Spain. The sort of the metal that is used for the production is AISI 304, which corresponds to grade 08X18Í10 (GOST). It is an austenitic steel, with low carbon. It is stable to intercrystalline corrosion with high strength at low temperature. In the welding process company uses technologies of TIG (“tig welded joint”) also, laser welded joint is used, which allows to obtain the greatest solidity factor. All products of the ‘Mario’ company correspond to the European terms and requirements in compliance to the standard EN 442.

Starting in 2009 the enterprise took course on the workflow automation and integration of international quality control system of producible products manufacturing. The effective system of quality control for the products starts with pipe arrival at the factory, and then all stages of production process are controlled. Every finished product passes a test pressure 2,2 atmospheres and marks with a logo against the fake before packing. Distinguishing features of ‘Mario’ products are reliability and elegance. On this basis, a company constantly strives to the improvement of products quality and new product line.



Production company ‘Mario’ has joined the national CP project by signing the Contract with the Center for Cleaner Production

Within the CP project, several employees went for training, a team for cleaner production was established in the enterprise and the Director has given his full support to the project. With the assistance provided by the Centre’s experts, data for material, water and energy balances was collected and list of options was made.

Problem orientation:

- Company has a huge electricity consumption. One of the main consumer of electricity is a

section where every finished product before packing passes a test pressure 2,2 atmospheres. Company uses powerful air compressors.

- In order to clarify the problem with chemicals used in technological process, chemical analyses of 2 solutions from 'Mario' were carried out by the specialists from chemical technology department of NTUU 'KPI':

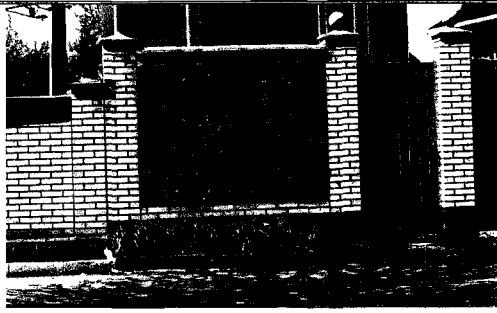
- 1) Condensate of the volatile components of the electro polishing electrolyte;
- 2) Disposed electrolyte from the electro polishing bath.

The CP options regarding these issues were proposed.

It is important to point out that this enterprise is very modern.

CP option	Investments, €	Saving €/year	Return of investment	Environmental impact
OPTION 1 Development and application of the new device 'step-by-step pressure release to the test items' during the passage of test pressure	~ 1 000	~ 7530	1,3 years	Reducing of CO2 emissions by 10 tons per year
OPTION 2 Installation of the neutralization unit for the disposed electrolyte by means of the calcium hydroxide (lime). In this case, the metal cations will form the insoluble hydroxides, which deposit in the slag containing also insoluble calcium sulphate CaSO4*2H2O. After drying, such slag could be used as a raw material for the production of metals (Cr, Ni) at a metallurgical plant.	-	~ 45 000	-	Elimination of the harmful effect of the disposed chemicals for the environment

'LLC Decor Concrete' (artificial stones, exposed concrete)	21036, Maksymovycha, 10; Vinnitsya E-mail: sich@svitonline.com Web: www.dekorbeton.com.ua
Company profile	
<p>The production complex 'LLC Décor Beton' is located in Gnivan city, Vinnitsa region. Its assortment includes: fences; sidewalk tiles; plates and fences to roofs and pillars; face tile facade; small concrete architectural forms; decorative gypsum face tile; featured natural stone (sandstone); wooden pergolas, decorative arches, swings, garden furniture etc.</p> <p>More than 75 employees work at this enterprise. Minerals such as sand (oxide of silicon), cement, gravel are used in the production process. They have no harmful effects on the environment. Rebars are used as reinforcement.</p> <p>Apparent loss of input materials for production due to a number of several reasons:</p> <ul style="list-style-type: none"> - No input control. Products are made according to the incoming documents, without taking into account the possible losses during handling and transportation. It is possible mismatch of the claimed amount of the actual materials. - The loss of cement during loading of the bunker. This gives rise to dust, as part of the cement into the atmosphere. - The loss of cement during transportation to the shops. Cement is transported in open containers. - The loss of sand in storage. The sand is stored in bulk, in which case, the precipitation, some of it is washed off with water and spreads over the territory, while a strong wind carried away part of the territory and the nearby countryside. 	



The project has analyzed the main flows of raw materials, water and energy. The important point is the understanding and support of project management. Several options have been implemented during the project running. The company has got an understanding of both: the methodology recognizing and the needless for continued support of the project. The CP team received the necessary skills. Developed and adopted the environmental policy of the company. Identified a number of problems and suggested ways to solve them. For some items were made some specific calculations.

CP option	Investments, €	Saving €/year	Return of investment	Environmental impact
OPTION 1 Using a strain-gauge balance to measure the weight of incoming materials (cement) and flow control in the enterprise	~ 2 400- 4 000 (depending on the required accuracy)	~ 3600	1,3 years	Reduction of dust all over the production and the surrounding area
OPTION 2 Replacement of electrical heaters in the area of steaming products in the steam generator operating on solid fuel	~ 2 400	~ 5 740	Less than a year	Reducing of CO2 emissions by 38,3 tons per year
OPTION 3 Utilization of products in Class II and used fiberglass forms	~ 1 950	~ 1 200	One production season	Solving the problem of partial waste recycling
OPTION 4 Modernization of section tacking products out from the forms and using of steam as a the coolant	No	~ 990	Since implementation	Reducing of CO2 emissions by 8,4 tons per year

LLC "Podillya reinforced concrete"	21022, Tarnagorodskogo, 14a; Vinnitsya E-mail: pod_ZB@meta.ua Web: http://podillazb.com.ua
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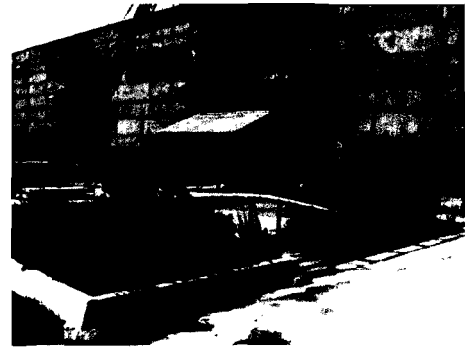
Company profile

LLC "Podillya reinforced concrete" is situated in Vinnitsya city. The enterprise for reinforced concrete production was founded in 1958. In 2001, LLC "Podillya reinforced concrete" was joined to the concern 'Podillya'.

More than 150 employees work at this enterprise. Cement 15200 t/y, crushed stone 34500 t/y, concrete reinforced bar 9900t/y, and sand 22950t/y are used in the production process. The energy flow analysis showed that company uses electricity, natural gas and diesel. Natural gas consumption amounts of 60, 26% of all energy; the electricity consumption - 24.07%, and diesel and petrol consumption ~6% each.

The water consumption is 12400 m³ per year (water meter data). Mainly water is used in technology and for some personnel needs.

Within the CP project, several employees went for training, a team for cleaner production was established in the enterprise and the Director has given his full support to the project. With the assistance provided by the Centre's experts, data for material, water and energy balances was collected and list of options was made.



In order to clarify the heat balances for drying cells the specific measurements were provided by CP centre team. The complete heat balance was analysed and options were also developed.

<i>CP option</i>	<i>Investments, €</i>	<i>Saving €/year</i>	<i>Return of investment</i>	<i>Environmental impact</i>
OPTION 1 Reducing natural gas consumption by changing the ratio of 'gas-air'	No	~ 120 per one drying cell	Since implementation	Reducing of CO ₂ emissions by 0,3 tons per one drying cell in a year
OPTION 2 Installation of heat-shielding panels for drying cells	~ 830	~ 245 per one drying cell monthly	Half a year	Reducing of CO ₂ emissions by 1,2 tons per one cell monthly
OPTION 3 Implementation of the system for monitoring and metering electricity consumption	~ 35 000	~ 20 000	1,7 year	Reducing of CO ₂ emissions by 39,5 tons per year
OPTION 4 Construction of rainwater system	~28 000	~ 4 500	6, 2 years	Reducing of water consumption by 50% per year

Vinnitsya Grain Mill Factory

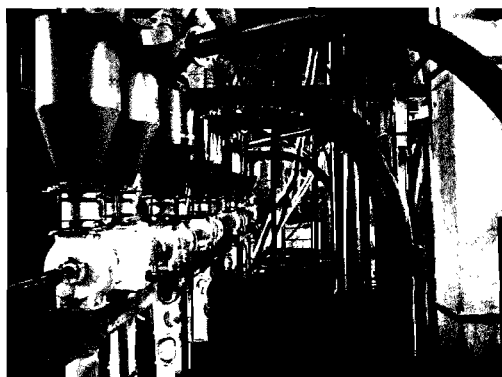
23240, Gagarina Str. 6
Vinnitsa region, Desna City
E-mail: vkhp2@vinnitsa.com
Web: www.vkhp2.com.ua

Company profile

The main activities of the enterprise are the production of wheat flour, semolina and full-feed for livestock, fish, poultry (bulk, pellets and grit).

The enterprise has highly skilled team. The company employs over 300 peoples. The company is one of the leading companies on a fairly saturated market of food industry products, particularly flour production. Guarantee of high quality and product safety is achieved through the introduction and implementation of quality control and food safety systems in accordance with ISO 9001-2001 and ISO 22000:2007. Production of the enterprise does not contain GMO.

Flour milling plant was constructed near Vinnytsia in 1967. In 1972, the first phase of building was completed - the elevator, mills, flour warehouse, boiler room, administrative building, auxiliary building, weight and fire station. Refurbishment was completed in 1987. It was financed by loans from the State Bank. As a result of that - quality of flour went up to 20%. In 1991 was completed reconstruction of the boiler house.



By signing the Contract with the Center for Cleaner Production, the production company has joined the national CP project.

Within the CP project, several employees went for training, a team for cleaner production was established in the enterprise and the Director has given his full support to the project. With the assistance provided by the Centre's experts, data for material, water and energy balances was collected and list of options was made.

Problem orientation:

- Company has a huge water consumption.
- Company has huge electricity and heat consumption.

The CP options regarding these issues were proposed. In order to clarify the heat balances for boiler house the specific measurements were provided by CP centre team. The complete heat balance was analysed and options were also developed.

Some samples of chaff were also analyzed by NTUU 'KPI' specialists.

<i>CP option</i>	<i>Investments, €</i>	<i>Saving €/year</i>	<i>Return of investment</i>	<i>Environmental impact</i>
OPTION 1 Replacement of water pipelines which were damaged by corrosion	~ 20 000	~ 27 000	Less than a year	Reducing of water consumption by 85000 m3 per year
OPTION 2 Full phasing-in the control system of electricity metering and reactive power compensation	~27 500	~ 30 530	Half a year	Reducing of CO2 emissions by 568 tons per year
OPTION 3 Using of chaff as a soil fertilizer	No	~ 2 800	Since implementation	Soil clean fertilizer
OPTION 4 Using ejected from the mill shop air for space heating and hot water	~ needs additional investigations	~ 41 000	1 year	Reducing of CO2 emissions by 365 tons per year

Production company 'Zorya Podillya' (Gaisyn Sugar Mill Plant)	23700, Plehanova Str., 150 Vinnitsa region, Gaisyn City E-mail: office@pkzp.com.ua
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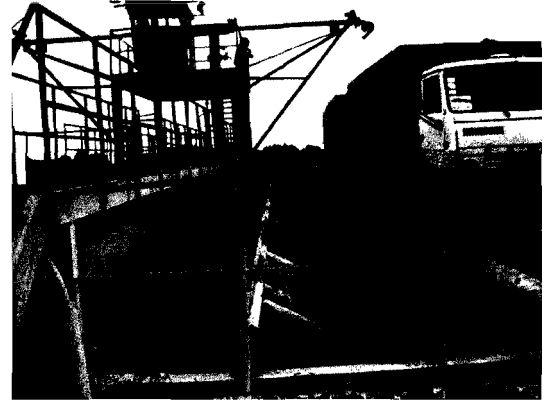
Company profile

The company was founded in 1899 and now employs 472 people during the production season. The objective of beet processing in sugar factories is to extract the sucrose stored in the beet cells and transform it into sugar crystals. The process used for this is based on the fundamental processing steps. In environmental terms, it is important to note that all parts of the beet are used and converted into valuable products without waste. It is important to point out that the process is quite complicated and seasonal. In greater detail, the following process steps take place during sugar production:

1. *Beet preparation.* After delivery, the sugar beet (which for the most part has been pre-cleaned directly in the fields) is transported via conveyor belts or water channels into the beet washing installation. There the remaining adhering soil is removed and the leaves and stones are separated. The cleaned beet is cut up into slices, called 'cossettes', ready for sugar extraction.
2. *Sugar extraction.* The sugar in the cossettes is then extracted. It is dissolved from the cossettes with warm water, to form a roughly 15 % sugar solution – the so-called 'diffusion juice'. The exhausted beet cossettes are then pressed and dried to produce a high energy and top quality animal feed.
3. *Juice purification.* Apart from sugar, diffusion juice also contains other components (e.g. proteins) derived from the crop. These are removed in a purification process involving the addition of lime. The lime is then filtered and dried for use as a soil conditioning agent in agriculture. The resultant clear solution of sugar is called "thin juice".
4. *Juice concentration/evaporation.* In the evaporation station, water is removed by evaporation from the thin juice in a series of successive evaporating vessels until a syrup with a concentration of around 70 percent dry matter is obtained. This 'thick juice' is viscous, golden yellow and clear.
5. *Crystallization.* The thick juice is first further evaporated in specially designed pans, until sugar crystals form. The crystals and accompanying final syrup are then centrifuged to

separate the two components. The final syrup, which still contains 50% sugar, is called molasses and is used in a variety of market applications. The centrifuged sugar is dried and stored in silos, before being sieved and packaged to the highest quality customer standards.

- Company produces 52 720 tons of sugar per year;
- Electricity consumption - 13025000 kWh per year;
- Natural gas consumption- 14980000 m3 per year.



By signing the Contract with the Center for Cleaner Production, the production company has joined the national CP project. Within the CP project, several employees went for training, a team for cleaner production was established at the enterprise and the Director gave his full support to the project. With the assistance provided by the Centre's experts, data for material, water and energy balances was collected and list of options was made.

Problem orientation:

- Company has a huge water consumption.
- Company has huge natural gas consumption as they produce electricity by themselves.

The CP options regarding these issues were proposed.

Thus sugar beet has the highest bio-fuel potential of all crops, over 5 t of bio-ethanol can be produced from one hectare per year. This issue was also taken into consideration.

CP option	Investments, €	Saving €/year	Return of investment	Environmental impact
OPTION 1 Replacement of gas burners in the boilers with more modern and efficient	~ 1 962 38	~ 1 500 00	Less than a year	Reducing of CO2 emissions by 1363 tons per year
OPTION 2 Reducing amount the defective beet during unloading	No	~ 7 000	Half a year	-
OPTION 3 Full phasing-in the control system of electricity metering and reactive power compensation	~ 10 000	~ 31 430	2 months	Reducing of CO2 emissions by 584 tons per year
OPTION 4 Installation and use of biogas (bio-ethanol) installation	~ 30 000 000	~ 8 000 000	4-5 years	Full recycling of wastes

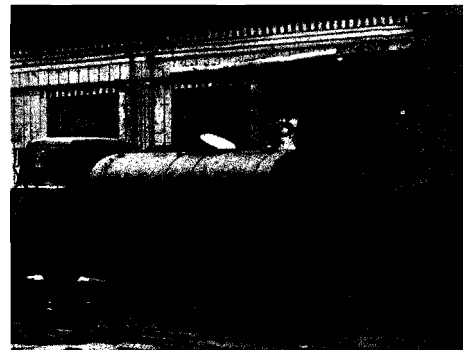
Gaisyn Dairy Ltd.

23700, Plehanova Str., 45
Vinnitsa region, Gaisyn City
E-mail: haisyn_sekretar@mail.ru
Web: <http://haisyn.uaprom.net/>

Company profile

Gaisyn Dairy Ltd. is a regional leader of dairy industry. Company exists since 1932. It was transformed to a limited liability company in 2006. Now it employs 472 people. Dairy produces a wide range of hard cheeses, spreads, Sweet, sweet butter peasant, cheese rennet, margarines. Except for rennet cheese, all products are certified. Products are being sold on the territory of Ukraine and neighbouring countries (Moldova, Georgia).

- Company produces more than 1154 tons of butter, 680 tons of cheeses and other production;
- Electricity consumption - 1210000 kWh per year;
- Natural gas consumption– 360000 m3 per year.



By signing the Contract with the Center for Cleaner Production, the production company has joined the national CP project. Within the CP project, several employees went for training, a team for cleaner production was established in the enterprise and the Director has given his full support to the project. With the assistance provided by the Centre's experts, data for material, water and energy balances was collected and list of options was made.

Problem orientation:

- Company has a huge water consumption.
- Company has huge natural gas consumption due to the steam production.

The CP options regarding these issues were proposed. Some options have been already implemented during the project. It is important to point out that in parallel with project implementation, the plant was carrying out significant renovation of production facilities and modernization of production lines, which sometimes hampered the timely implementation stages of CP project.

<i>CP option</i>	<i>Investments, €</i>	<i>Saving €/year</i>	<i>Return of investment</i>	<i>Environmental impact</i>
OPTION 1 Replacement of gas burners in the boilers with more modern and efficient	~ 7 800	~ 1 900	2,4 years	Reducing of CO2 emissions by 112 tons per year
OPTION 2 Transport logistics via GPS	~ 9 600	~ 16 200	Less than a year	Reducing of CO2 emissions by 7,2 tons per year
OPTION 3 Insulation of steam pipelines	~ 2 800	~ 3 500	Less than a year	Reducing of CO2 emissions by 5,6 tons per year
OPTION 4 Reducing the temperature difference during the milk pasteurization at 5 ° C	No	~ 154	Since implementation	Reducing of CO2 emissions by 0,5 tons per proceed ton of milk

8.2. Contact information

The following list provides more detailed information on the NEs (NTUU KPI, certified by UNIDO in 2007/2008) who participated in CP project running

Name	Contact details
Mr. Igor Shylovych	Cell: +380674052325 e-mail: shil@rst.kiev.ua
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Mr. Valeriy Dubrovin	Cell: +380973871436 e-mail: dubrovin.valeriy@gmail.com

ZAPORIZHYA REGION

National Project Coordinator of Zaporizhya region - Aleksey Nazarenko

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	Genadiy Kozemyakin Cell: +380964859015 e-mail: cpe@ukr.net

*** Withdrawn from the project together with company 'State Titanium and Design Institute' due to economic hardship within the company. After the election process the company had a lot of state control of work done and lot of staff has changed. That is why V. Pavlov postponed his own participation and company participation into the project until better stable situation.

VINNITSIA REGION

National Project Coordinator of Zaporizhya region – Igor Marchuk

Private Enterprise - Mario Ltd (stainless steel radiators)	Maksim Dovbnya, Cell: +380679635083 e-mail: maksym.dovbnya@gmail.com Oksana Ischenko Cell: +380963074087 e-mail: oksana_eschenko@meta.ua
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The Gaisyn sugar mill plant	Valeriy Pavshuk, Cell: +380503100499 e-mail: pav-valeriy@ukr.net Irina Fedorchuk Cell: +380979419051

	e-mail: ira_fedorchuk@ukr.net
LLC “Decor Concrete” (artificial stone, exposed concrete)	Oleg Scherbakov****
LLC “Podillya reinforced concrete”	Viktor Doletsky, Cell: +380631417602 e-mail: dviktora@rambler.ru Dmytro Korzhenko Cell: +380674314321 e-mail: korz100879@mail.ru

**** Withdrawn from the project due to disorganization and lack of seriousness. The Company is still continuing CP project with other respective CP consultant - **Oksana Ischenko**.

8.3. FINANCIAL REPORT

Period: July – December 2009

Date of payment	Sum (EUR)
September 28, 2009	6,800.00
December 15, 2009	17,200.00
Total	24,000.00

No	Expense Item	Description	Sum	
1	Staff (according the contract)	Fee for working period (July-December)	96,430.00	8,519.00
2	Zaporizhya State Engineering Academy, Vinnytsia State Agrarian University	Financial support for seminars (workshops)	23,384.00	2,066.00
3	Awareness seminar	Awareness seminar at NTUU KPI 23/09/09	1,308.00	106.00
4	Travelling (CP team and price for IE personnel tickets in both directions)	Trips to Zaporizhya and Vinnytsia	5,519.00	488.00
5	Internal payment	Telephone, internet	1,114.00	98.00
		Office equipment, stamp of the NCPC	952.00	84.00
6	Supporting missions of UNIDO experts		4,739.00	419.00
7	Interpreter		2,000.00	177.00
8	Sending reports to the UNIDO office	UPS (United Parcel Service of Ukraine)	1,293.00	114.00
Total			136,739.00	12,079.00

Period: January 2010 – March 2011

Date of payment	Sum (EUR)
account balance on 01/01/2010	11,921.00
March 22, 2010	17,200.00
August 26, 2010	17,200.00
Total	46,341.00

No.	Expense Item	Description	Sum	
1	Staff	Fee to cover: <ul style="list-style-type: none"> Salaries, CP Award for consultants Web-site creation 	356,768.28	35,046.00
2	Zaporizhya State Engineering Academy, Vinnytsia Club of Successful Business Owners	Organization of seminars (workshops)	95,997.40	9,430.00
3	ULIE	Organization of final conference in Zaporizhya	30,540.00	3,000.00
4	Polygraph company 'EKMO'	Publishing of conference materials	22,396.00	2,200.00
5	Travelling (CP team and price for IE personnel tickets in both directions)	Trips to Zaporizhya and Vinnytsia	52,630.60	5,170.00
6	Internal payment	Telephone, internet Office equipment, software for accountancy (extension of license validity)	6,515.20 5,324.14	640.00 523.00
7	Supporting missions of UNIDO representatives to the NTUU KPI		4,713.34	463.00
8	Sending reports to the UNIDO office	UPS (United Parcel Service of Ukraine)	1,924.02	189.00
			526,800.98	56,661.00

Temporary Director of the NCPC

I. Shylovykh