Case Summary

Rotogravure Industrial Investment Company

Company Information:

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Position:	*Project Manager*
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Sector:	*Private Sector*
Number of labors:	*214*
Project Title:	*Solvent Recovery Plant*
Type of Project:	*Work Environment Improvement*

1. Basic Information:

1.1 Main Product:

No	Main Products	Average Annual production
1	2 layers PP packaging film	5690 Ton/year.
2	1 Layer PP packaging film	650 Ton/year.
3	1 Layer Paper	1100 Ton/year.

1.2 Raw Material:

Raw materials		Current Consumption, t/y	
Ethyl Acetate, EA		1,560	
Inks (includes 50% EA)		840	
Plastic films		8590	
Utilities	**Usage**	**Consumption, m3/y**	**Source**
Water	Total	24,000	Public network
	Type	**Consumption /y**	
Fuel	Mazot (fuel oil), t/y		
	Solar (diesel oil), t/y		
	Natural gas, m3/y	**260,000.**	
	Source	**Consumption**	
Electricity	National Grid	5,700,000 kWh/y	
	Self generated		
Products		**Actual Average Production, t/y**	
2 layers PP packaging film		5690	
1 layer PP packaging film		650	
1 layer paper		1100	
Total		8400	

1.3 Project Location:

6th of October city, 3rd industrial zone, Nr.25

1.4 Project Objectives:

- *Reduce the Ethyl Acetate vapors in work environment to comply with law 9/2009.*
- *Improving the working environment and surrounding area.*
- *Improvement in labor health condition.*

No	Target Pollutant	Average Total Annual Release BEFORE sub-project tons/year	Average Total Annual Release AFTER sub-project tons/year
1	Ethyl Acetate Vapors	3120. ton/year	900. ton/year

1.5 Project Description:

The proposed solvent recovery plant uses activated carbon technology for recovery of organic vapours in conjunction with carbon regeneration using Nitrogen instead of the older steam regeneration technology. Solvent recovery system which consists of a number of processes.

a. Filtration and Cooling

Solvent laden air from the process is drawn into the solvent recovery system with the help of the blower system, is filtered by means of a continuous filtering section and then cooled in a heat exchanger using water. It is then introduced to the adsorption system.

b.Adsorption

Solvent vapours are adsorber by activated carbon while the clean air is discharged to the atmosphere through the final stack.

The adsorption process goes on in the same adsorbers until the solvent concentration in the air directed to the atmosphere reaches the established limit value. The concentration in the cleaned air is continuously monitored by an analyser which indicates the total organic carbon content. Once the established limit value is reached, the adsorber, which has been for the longest time in adsorption, is automatically switched to the regeneration phase by the control system.

c. Regeneration

When an adsorber achieves the maximum of its working capacity the regeneration with nitrogen gas is carried on. The regeneration phase of each adsorber is projected to recover the solvent adsorbed on the activated carbon bed.

d. Liquid phase- Molecular sieves

From the raw ethyl acetate tank, the solvent recovered containing 0.8 to 1.5 % water is sent, through a pump, to an adsorber containing molecular sieves where the content of water is reduced to the 0.1 %. When the sieves are saturated, after emptying the adsorber and stripping it with nitrogen, the regeneration is carried out by means of warm air. At the end of the sieve regeneration, the cooling of the sieves in closed circuit is performed.

E. Distillation

The distillation of the recovered solvent is necessary in order to separate the high boiling components (contained in the inks or formed during the process), alcohols and Ethyl Acetate. There are three columns:

The first column, working at atmospheric pressure, is used for separation of Acetate and alcohols from high boiling (bottom column).
The second column, working at 6 bar pressure, is used for separation of azeotropic mixture consisting of Ethyl Acetate and Alcohol (top column) from N. propyl acetate and Ethyl acetate (bottom column).
The third column, working at vacuum condition, is used for separation of alcohols (bottom column) from azeotropic mixture that is re-circulated to the second column (top column). In this way all the solvent can be reused with exception of the high boiling solvent coming from bottom of the atmospheric column.

Total TSS load reduction: Expected load reduction is 2220 t/y

Productivity Increase: *N/A*

Decrease in Energy: N/A.

1.6 Project Components:

Solvent recovery plant complete with absorption beds, regeneration system, cooling system and distillation columns

1.7 Actual Project Cost:

- *The total cost is US$ 7 million of which Euro 3,683,000 + L.E 1,703,440 financed from EPAP II.*

1.8 EPAP Technical Support:

PMU TA hired a national consultant to assets the company in preparing the following:

- *Tender Document.*
- *Compliance Action plan (CAP).*
- *Environmental assessment*
- *Environmental Impact assessment*

2. Eligibility Criteria

2.1 Environmental:

By installing new solvent recovery plant, it is expected that Ethyl Acetate Vapor will become compliant with Law 4 amendment to law 9/09 for the Environment with an estimated reduction in pollution loads as follows:

Ethyl Acetate measurements from different stacks

Stacks	Concentration (mg/m^3)		Pollution load (t/y)		Polution Load Reduction	% Reduction	Law limit (mg/m^3)
	Before	After	Before	After			
Printing press 1	751.3	30	282	6.7	275.3	97.6%	**100**
Printing press 2	528.6	30	198	6.7	191.3	96.6%	

2.2 Financial aspects:

- *EPAP finance is Euro 3,683,000 + L.E 1,703,440*
- *Loan agreement signed on 2 December 2012.*
- *Payback period is 5.9 Year.*

2.3 Productivity Increase

- The sub-project will not cause any increase in productivity caused by the installation of the SRP.

3. Project Procedures

3.1 Technical Procedures:

Technical Document	Submitted	Approved	Date
Environmental Assessment	y	y	Feb 2012
Compliance Action Plan (CAP)	y	y	Feb 2012
Environmental Impact Assessment (EIA)	y	y	23/9/2012
Technical Agreement	y	y	26/8/2012

3.2 Implementation Procedures:

3.2.1 Procurement Procedures:

- *The company will follow its commercial practice acceptable to co-financer condition to issue (1 stage bidding documents) a commercial competitive practice (CCP) for installing new solvent recovery plant.*

3.2.2 Status of Implementation:

Technical Document	Submitted	Date	
		Achieved	Planned
Credit worthiness certificate	Y	27 Dec 2011	
Financial Agreement	Y	22/11/2012	
Bidding document	Y	May 2012	
Issue Tender	Y	6/7/2012	
Pre-Bid meeting	Y	22/7/2012	
Opening (Envelops A – Technical and financial)	Y	18/10/2012	
Technical and financial Evaluation	Y	2/12/2012	
Awarding and Contracting	Y	15/1/2013	
Installation and Commissioning	N		Jul. 2013
Monitoring: Q1:	N		Oct. 2013
Q2:	N		Jan. 2014
Q3:	N		Apr. 2014
Q4:	N		Jul. 2014

Conclusion:

- *It is clear that the tendering process has gone through proper channels and that the channels and the selection process was fair, unbiased and took into consideration the financial merits. The procurement procedures were according to the company's commercial practice cover EPAP II basic procurement principles Economy, efficiency, fairness and transparency.*