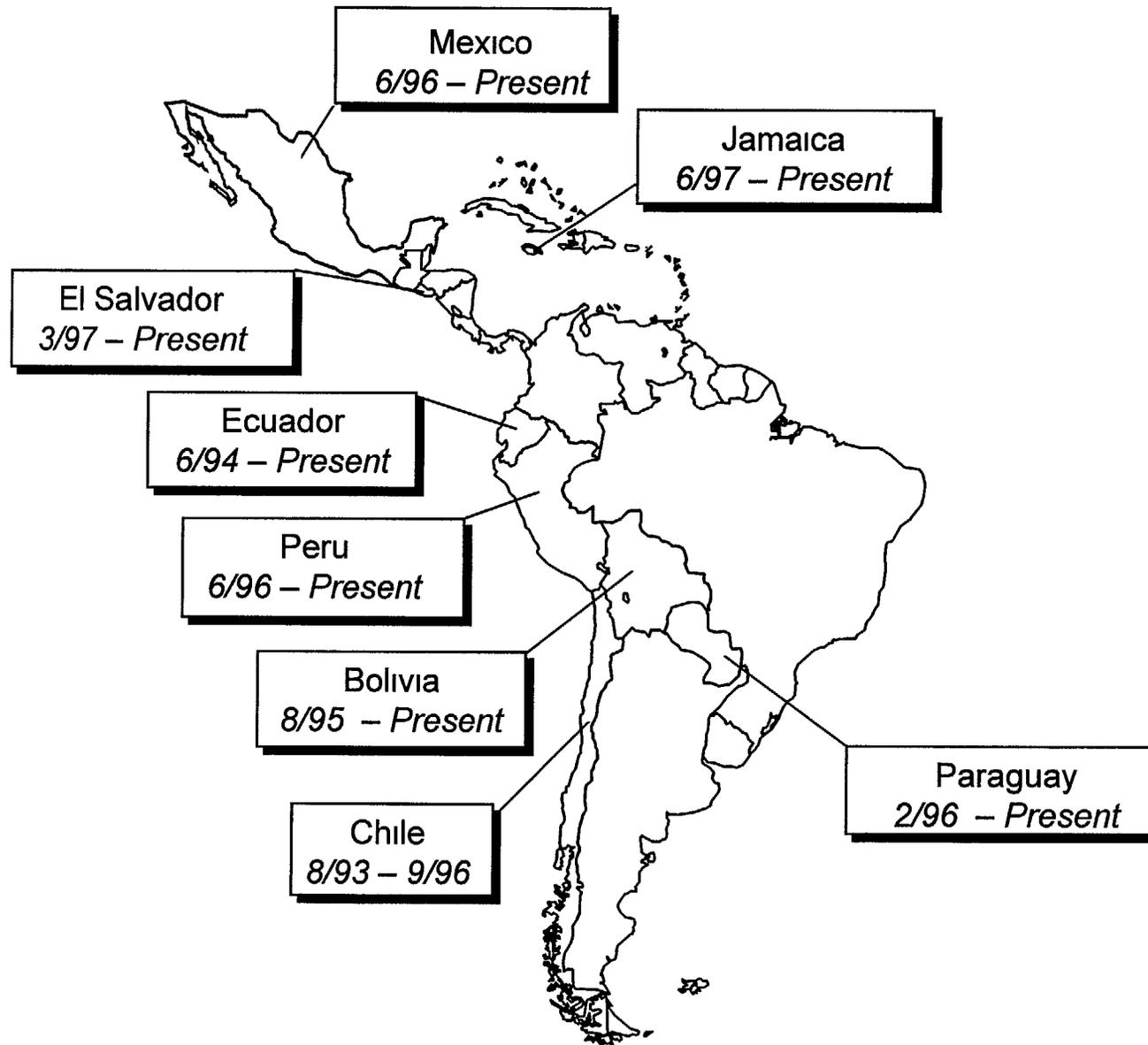


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# Environmental Pollution Prevention Project (EP3) Activities in Latin America and the Caribbean

Presentation by:  
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EP3 Project Director  
Hagler Bailly Services, Inc.

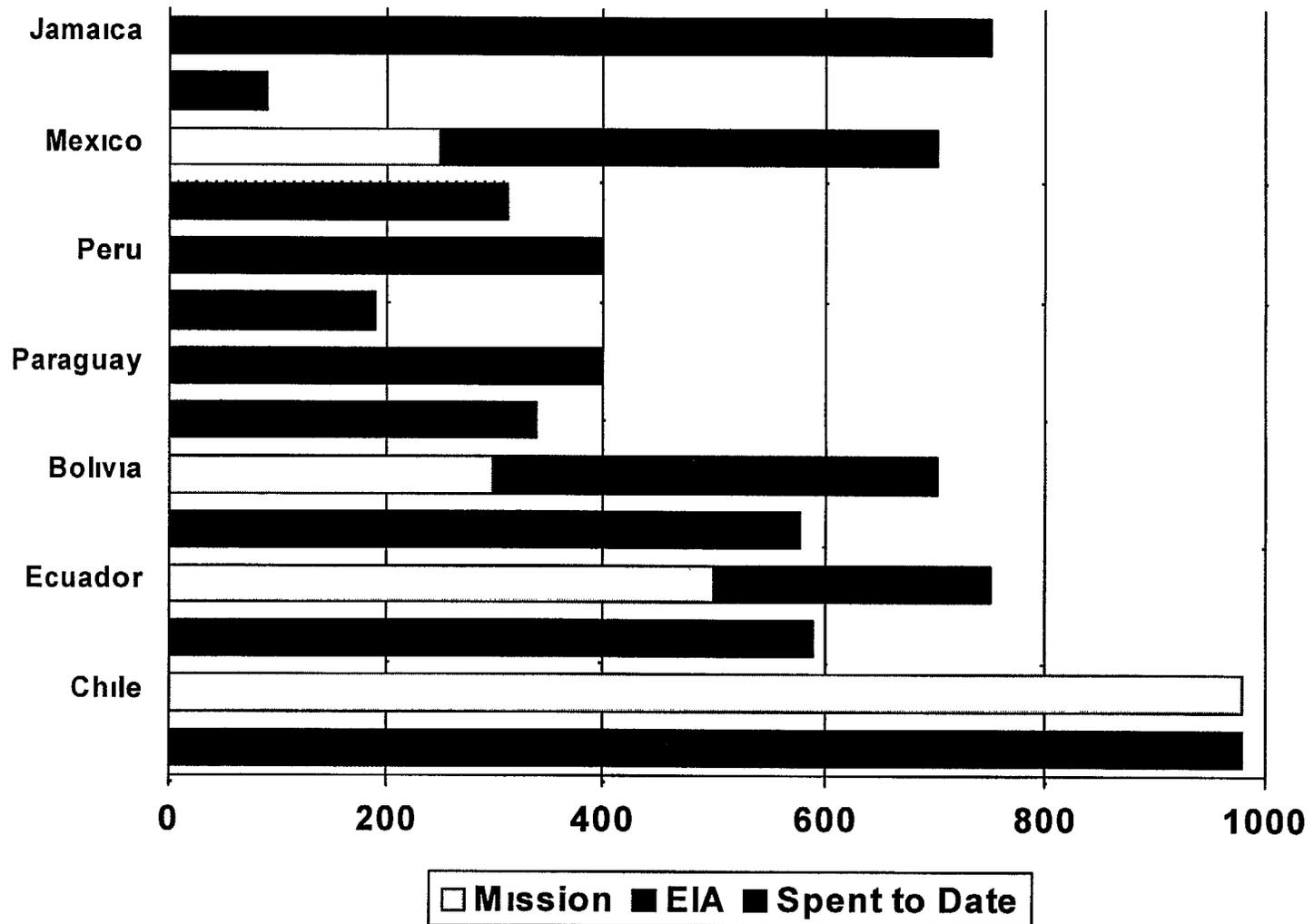
# LAC Countries Where EP3 Has Worked



# Complementary Activities

- HFTE Trade Initiative
- HFTE Mining
- USTIES Drinking Water Demonstration Project in Ecuador
- USTIES Training Initiative in Chile
- USTIES Clean Technology Demonstration (Mexico or Chile)
- Sustainable Cities Project in Cuenca, Ecuador

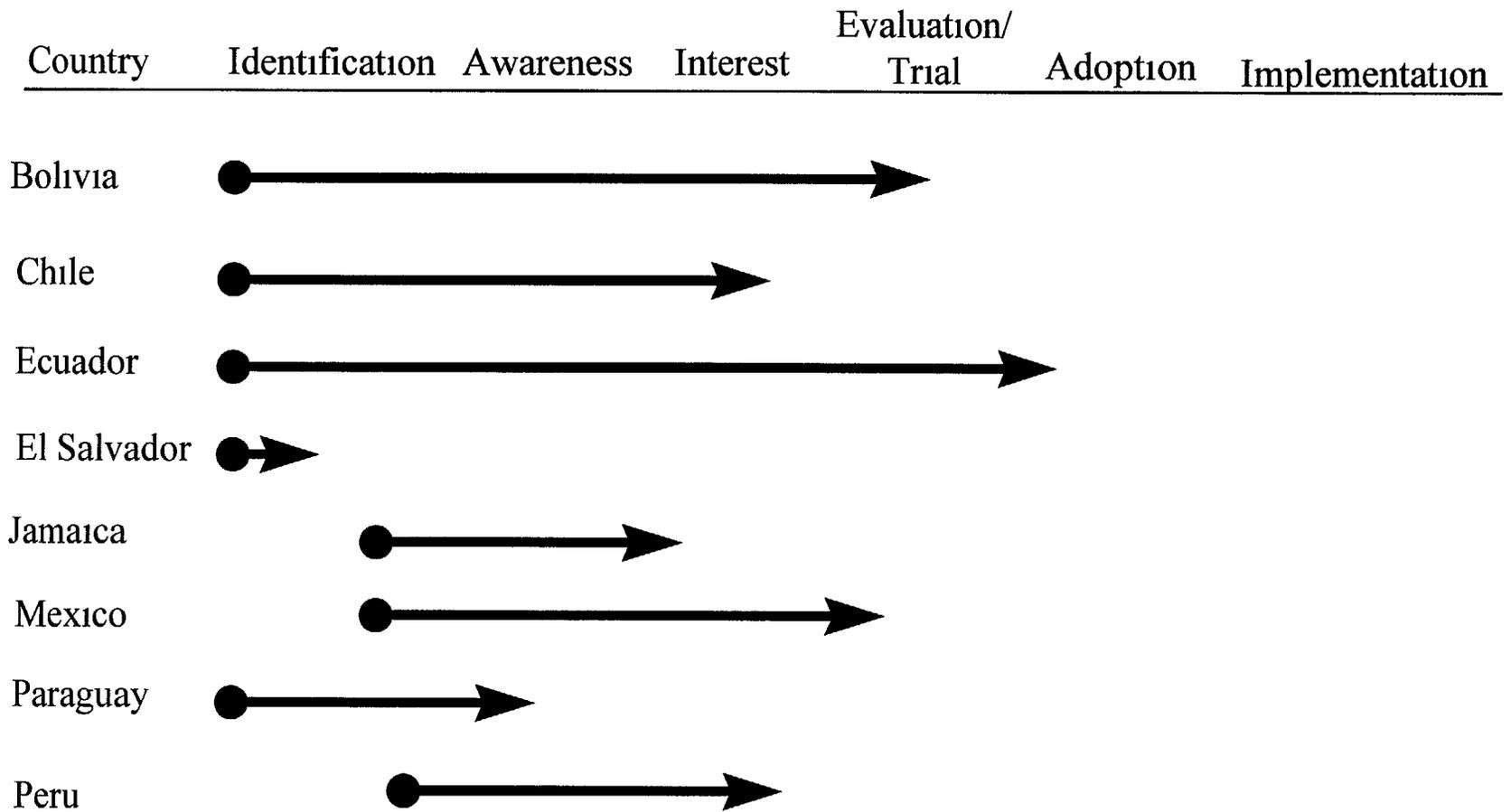
# Funds Allocated & Spent To Date



# Goals of EP3

- Introduce cleaner production concepts and demonstrate the benefits of a preventative approach through pilot projects and training
- Empower industry to play a role in the cleaner production policy debate
- Educate governments on the advantages of a cleaner production approach to environmental management
- Establish sustainable institutions that can provide cleaner production services after EP3 ends

# Cleaner Production Continuum



# Results

## Increased Awareness and Support for the Approach

- Trade associations actively promoting clean technology and pollution prevention (Bolivia, Paraguay, Ecuador, Mexico)
- Companies are implementing EP3's recommendations (and going beyond)
- National and municipal governments are revising policies and regulations to incorporate pollution prevention (Chile, Peru, Bolivia, City of Quito)
- Cadre of consultants selling pollution prevention services: audits, technical assistance and training

# Results

- Sustainability
  - ◆ IDB in Paraguay
  - ◆ WB and DANIDA in Bolivia
  - ◆ UNIDO in Mexico and other LAC
- EP3 programs (Jamaica, Ecuador, Chile, and Bolivia) are charging for certain services
  - ◆ Hotels and selected other sectors are willing to pay for services

# BOLIVIA - Highlights

## Activities Completed

- Worked in 9 industrial sectors
- Inter-institutional committee formed (Chamber of Industry, NGOs, Universities)
- Training to GOB, consultants, academics, NGOs, industrial sector on P2 and ISO 14000

## Planned Activities

- Introduce incentive mechanisms in policy framework to adopt P2
- Dissemination of results through local champions
- Creation of Center for the Promotion of EE & P2 with national and international organizations

# Selected Results

## Textile Plant - Universaltext

- 40% of recommendations implemented
- Water usage reduced from 0.25 m<sup>3</sup>/kg per unit finished product to 0.12 m<sup>3</sup>/kg (\$130,000/year)
- Reduction in cost of treatment plant from US\$923,000 to US\$450,000

## Tannery Plant - CURMA

- 50% of recommendations implemented
- 20% reduction in use of dehairing solution
- Savings of 1,400 m<sup>3</sup>/yr water by reusing delimiting solution
- 8.5% reduction in use of chrome salts through recycling

# ECUADOR - Highlights

## Activities Completed

- Worked in 7 industrial sectors
- Multi-plant demonstration projects in textiles and tanneries
- Conducted university course in P2
- ISO 14000 concepts taught to industry, GOE

## Planned Activities

- Follow-up for textiles and tanneries
- Policy analysis of barriers and recommendations to support adoption of P2
- P2 champions workshops to disseminate results
- Support to OIKOS to develop sustainable P2 program

# MEXICO - Highlights

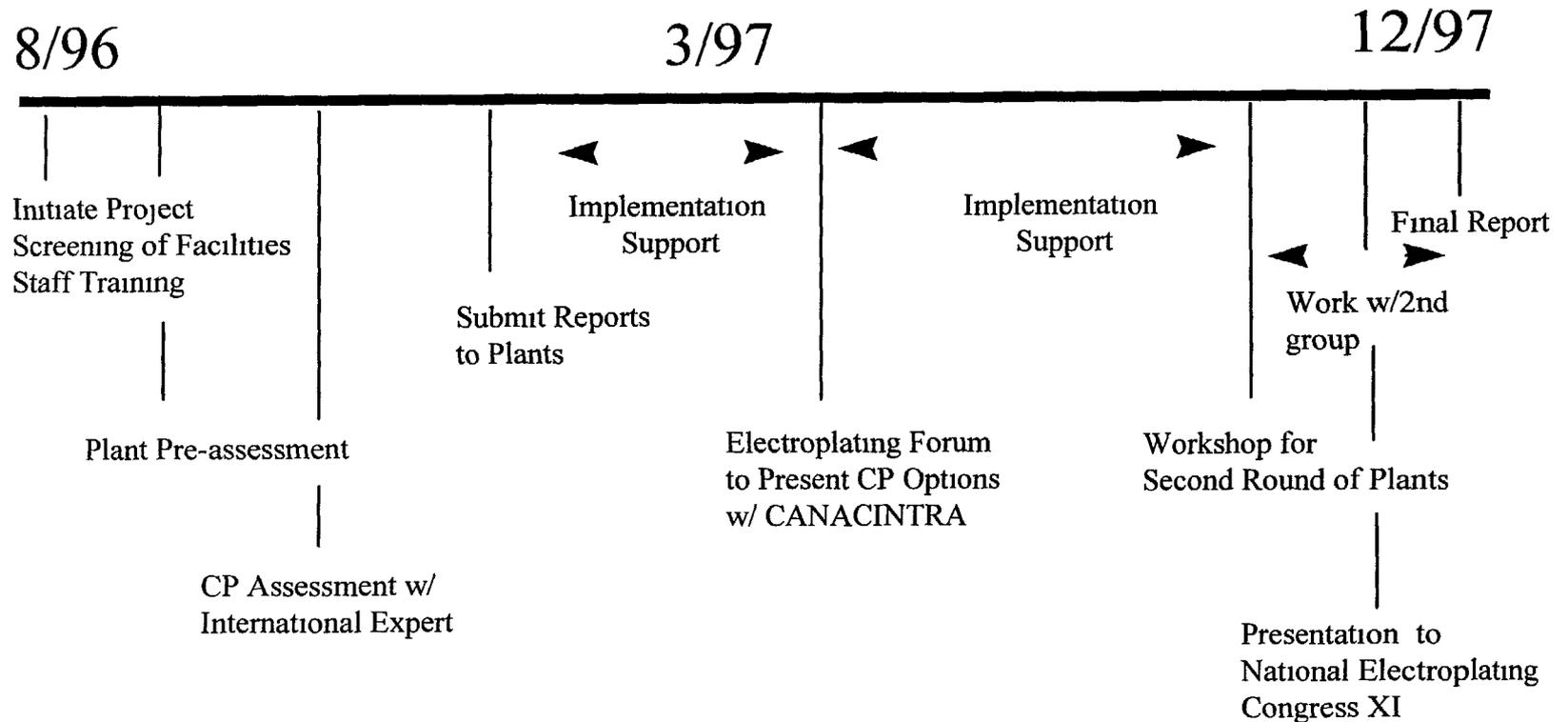
## Activities Completed

- 3-module training course/technical assistance program (on the Border)
- Multi-plant electroplating demonstration project in Mexico City
- Support to the UNIDO Cleaner Production Center
- Integration of pollution prevention and energy efficiency

## Planned Activities

- Continued support to the Center
- Multi-plant demonstration project in the chemical sector
- Policy analysis for promoting cleaner production
- Evaluation of financing options under FIPREV and other mechanisms

# Time Line for Electroplating Project



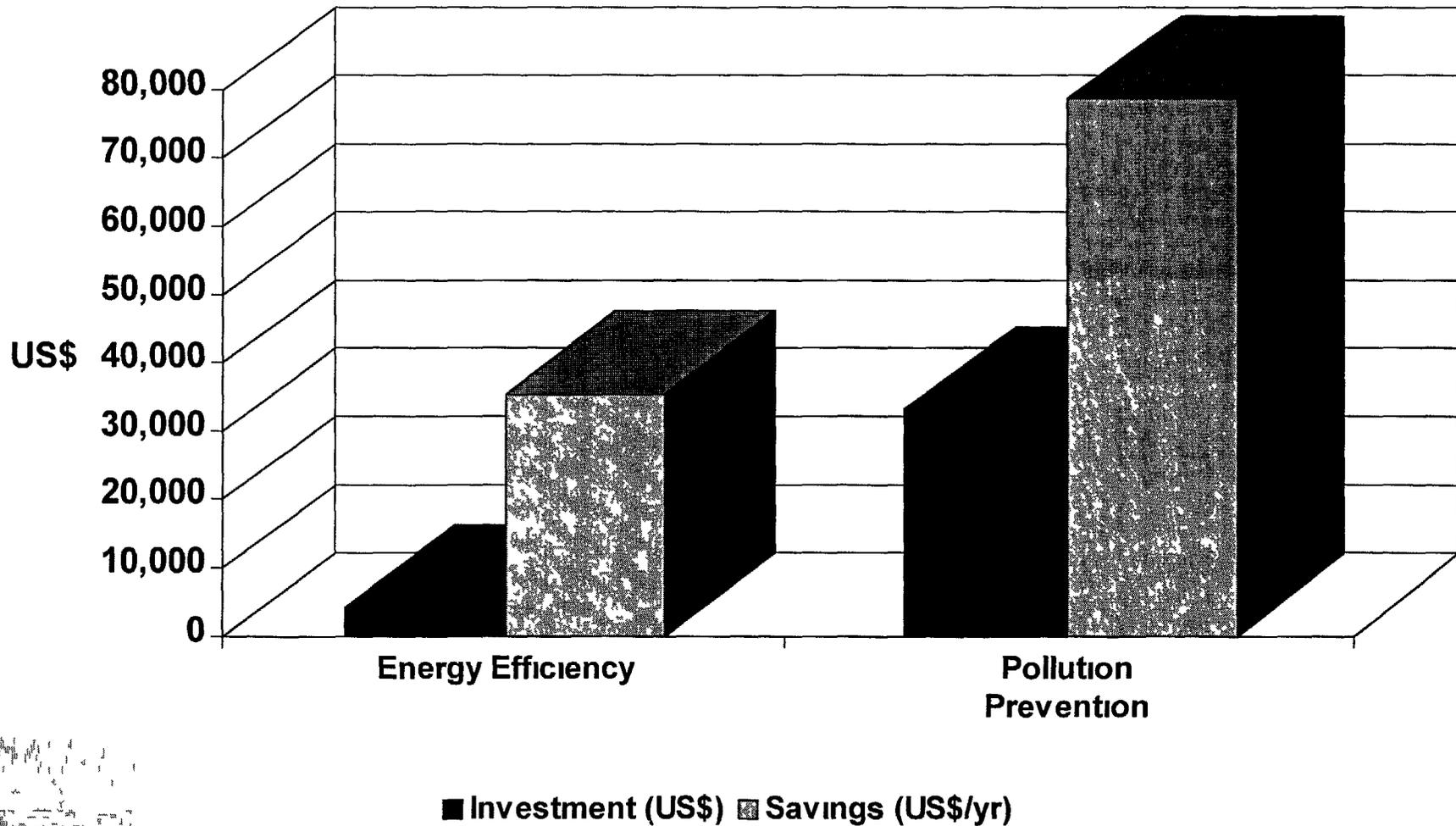
Plants Participating: 6 (1 micro, 4 small, 1 medium)

Plants Participating in 2nd Round: 7

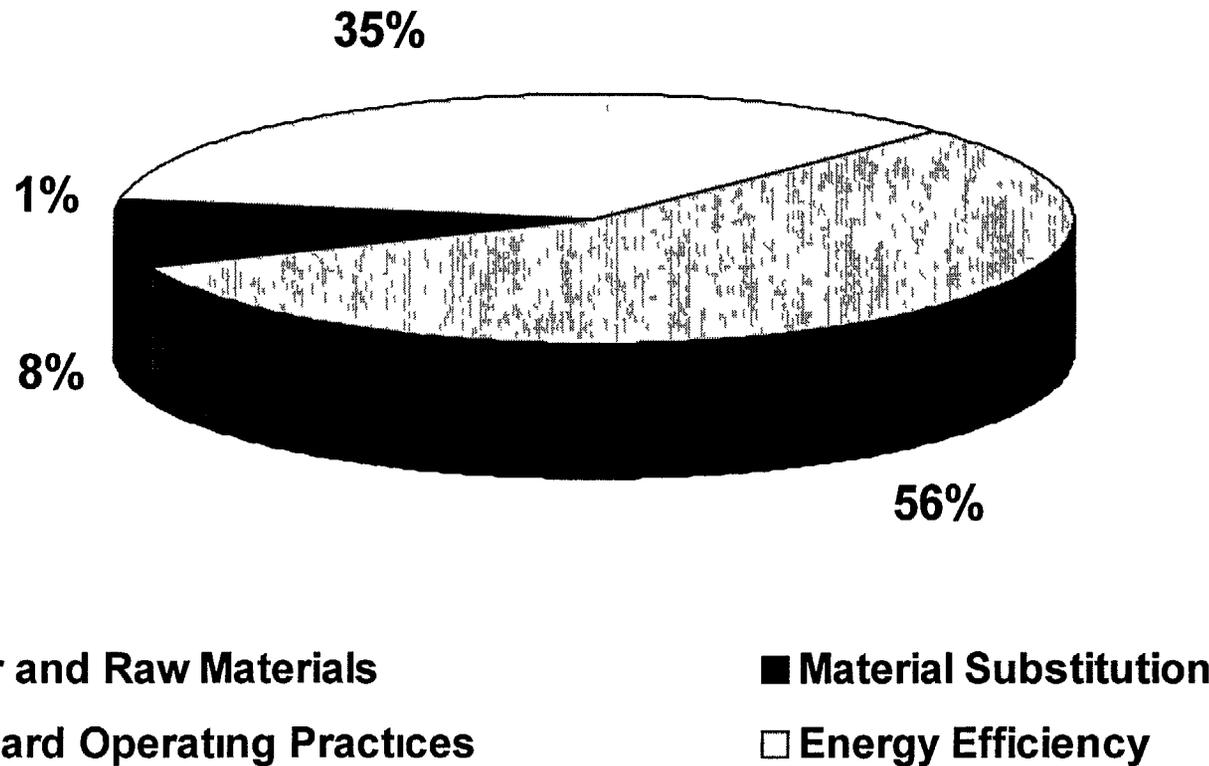
# Cleaner Production Techniques in the Electroplating Industry

- Reduce drag-out of process solutions
- Reduce water consumption
- Substitute cyanide and hexavalent chromium with non-toxic chemicals
- Reduce heat losses from tanks and pipes
- Reduce energy consumption
- Optimize process controls (e.g., temperature, concentrations)

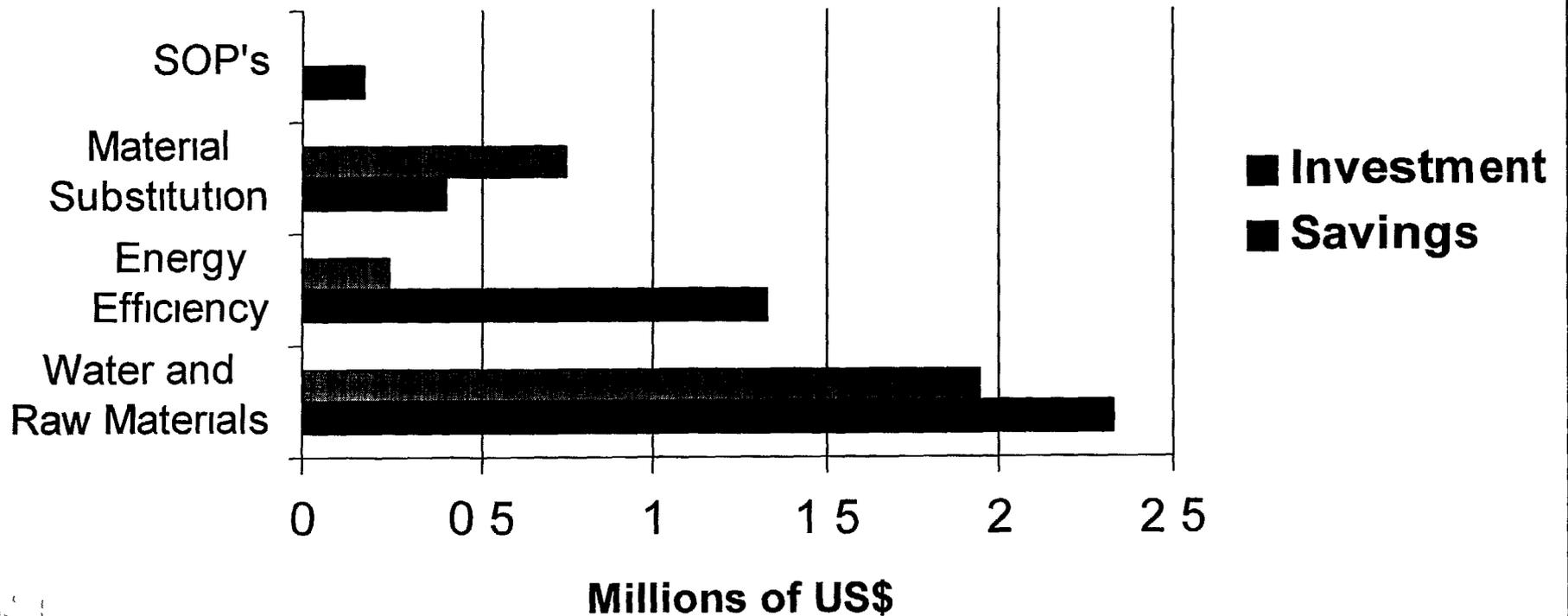
# Investment/Savings Ratio in the Mexican Electroplating Industry



# Savings Opportunities by Category



# Potential Savings in the Electroplating Industry - Metropolitan Mexico City



**Total Investment: US\$ 2,932,361 (one time)**

**Total Savings: US\$ 4,229,820 /yr**

# JAMAICA - Highlights

## Activities Completed

- Established EMS Protocol for Hotel Audits
- Conducted baseline survey of Negril hotels
- Completed 4 pilot audits
- Assessed green hotel certification options

## Planned Activities

- Training for hotel managers and audit practitioners
- ISO 14001 for manufacturing industries
- Regulatory assistance in environmental licensing
- Additional +/- 20 hotel EMS audits

# Lessons Learned

- Best to work through industry associations rather than operate independently
- Best to focus on specific industry sectors rather than attempt to reach many different sectors
- Focus efforts at sectors targeted for enforcement, subject to increased competition (internal or external), strategically important to the country
- Sell P2 on its economic merits not its environmental benefits
- Keys to success: Supportive AID rep; industry-oriented counterpart; strong in-country EP3 staff

# Next Steps

To capitalize on results achieved to date, AID could:

- Sponsor South American Cleaner Production Roundtable to promote partnerships/networks and enable AID to take credit for achievements to date
- Work with development banks on joint projects to assist industry/governments to overcome cleaner production financing barriers
- Promote adoption of Environmental Management Systems (both industry and municipal). Future efforts should focus on integrating ISO 14000 certification and regulatory requirements (e.g., Jamaica)

## ENVIRONMENTAL POLLUTION PREVENTION PROJECT

The Environmental Pollution Prevention Project (EP3) provides technical assistance and policy support to the public and private sectors in countries where the U S Agency for International Development (USAID) is active. The project's activities focus in three areas:

***Improving Industry Practices*** In partnership with developing country institutions, the project provides technical assistance, training, and information services to improve environmental management practices in both private and public sector companies. The project uses demonstration projects to build awareness and create demand for clean technology and environmental services and provides training and institutional support to build local capacity to deliver these services.

***Strengthening Government Policies and Institutions*** The project assists municipal and national governments to develop and implement policies and regulations that promote cleaner production and remove biases that favor end-of-pipe treatment over pollution prevention options.

***Building Partnerships to Ensure Sustainability*** The project develops partnerships with key institutions to ensure the continuous distribution and access to cleaner production information, services, technologies and tools.

## I BOLIVIA

### INDUSTRY BEHAVIOR AND OUTREACH

- ▶ Eight hundred dollars collected by the Camara Nacional de Industrias (CNI) for each EP3 assessment
- ▶ Regular column published in CNI's magazine, *Industria*
- ▶ Pollution prevention awareness heightened and opportunities highlighted at three pollution prevention seminars and ten presentations to local industry groups, NGOs, government officials and local press in La Paz, Cochabamba, and Santa Cruz
- ▶ Selected facilities in the tannery, textile, paint manufacturing, bottling plants, foundry, galvanizing, and poultry processing sectors to serve as demonstration projects Examples
  - Textile - with 40% of EP3 recommendations implemented, UNIVERSALTEX is saving over \$130,000/yr in water
  - Slaughterhouse -- Frigorifico Oriente was able to reduce its BOD loadings by 60%, converting the waste blood to 140 tons of sellable product, and generated a net income of US \$29,000/yr
  - Tannery -- with 50% of EP3 recommendations implemented, CURMA recycles solutions lowering the use of sodium sulfur in 20% and sodium hydroxide in 23%, reduced the use of chromium by 8.5% and saves 1,400 m<sup>3</sup> of water/yr
  - Brewery -- with 20% of EP3 recommendations implemented, CBN saves \$50,000/yr in water and 3,100kg/yr of NaOH
  - Poultry processing plant -- with 50% of EP3 recommendations implemented, VASCAL is saving 50,000 m<sup>3</sup> of water/yr and the wastewater treatment plant construction cost was reduced by \$35,000

### POLICY CHANGE

- ▶ Inter-institutional committee formed to support CP in Bolivia through planning and follow-up activities, and to address pollution prevention issues. Committee provides forum for planning activities with the Government. Members include EP3/Bolivia, the Bolivian Sub-Secretary of the Environment, the Secretary of Industry, CNI, local USAID program staff, and industry representatives
- ▶ Options of regulatory and economic incentives for industrial pollution prevention developed. This will serve as the basis for the introduction of incentive mechanisms in policy framework

## **PARTNERSHIPS AND CAPACITY BUILDING**

- ▶ Partnership with CNI established to disseminate information to industry and encourage implementation of CP opportunities among its members
- ▶ Partnership with the Liga de Defensa al Medio Ambiente (LIDEMA) established to disseminate information on CP
- ▶ Partnerships with the Under Secretary of Energy and the World Bank established to conduct work in energy efficiency
- ▶ Partnership with the University of Bolivia School of Industrial Engineering established to teach university students to identify and implement P2/CP opportunities
- ▶ Collaboration established with the Fundacion para el Desarrollo Sostenible (FUNDES) to avoid duplication of efforts and to cooperate in certain sectors (e g , tanneries)
- ▶ Partnership with the Instituto para el Desarrollo de Empresarios y Administradores (IDEA) established for conducting seminars and workshops
- ▶ EP3 office established as the basis for the future Center for the Promotion of Energy Efficiency and Pollution Prevention, to be created with the collaboration of Bolivian organizations (Vice-Ministry of the Environment, National Environmental Fund, Chamber of Industries, San Andres University) and bi- and multi-lateral organizations (USAID/Bolivia, The World Bank, the Dutch, Swiss and Danish international technical cooperation agencies)
- ▶ EP3/Bolivia staff trained at US pollution prevention training facility (WRITAR)
- ▶ EP3/Bolivia staff technical skills improved through on-the-job training with US consultants during in-country pollution prevention demonstration projects
- ▶ Five local consultants trained on how to identify and analyze pollution prevention opportunities in preparation for a PPDA
- ▶ Thirty-six tanners introduced to pollution prevention concepts and applications at a workshop held in Cochabamba
- ▶ EP3/Bolivia staff provides technical advice to university students on research projects and theses based on knowledge and experience gained from participating in EP3
- ▶ Twenty-eight industry representatives and government decision-makers introduced to pollution prevention concepts at one-day workshop delivered by EP3/Washington, EP3/Bolivia, and WEF staff
- ▶ Four Bolivian champions, of different industrial sectors, presented the results of their efforts to implement cleaner production approaches to industry and GOB representatives in a conference in Santa Cruz

## II ECUADOR

### INDUSTRY BEHAVIOR AND OUTREACH

- ▶ Sixteen Pollution Prevention Diagnostic Assessments conducted Implementation of identified P2 opportunities ranges from 24-50% Approximately US\$1 5 million has been invested in pollution prevention measures and technologies with a first year savings of US\$1 9 million, additional investments are planned for 1998
- ▶ Plant personnel at 22 textile companies trained to identify and implement P2, CP and E2 opportunities This training activity took place over a period of five months and included a series of three workshops, monthly rounds of plant visits by P2 and textile experts, and continuous support from local consultants
- ▶ Plant personnel at 10 leather tanneries are trained to identify and implement P2 and E2 opportunities
- ▶ Drinking water treatment technologies installed in Manta and Montecuro and drinking water treatment system operators trained to operate technologies
- ▶ EP3/Paraguay staff trained by EP3/Ecuador staff in pre-assessment methods at a Coca Cola plant in Asuncion
- ▶ Quarterly newsletter, case studies and other information on CP opportunities published by OIKOS and distributed to 550 entities on OIKOS mailing list
- ▶ Understanding increased between textile association and Quito's Municipality through OIKOS' facilitation of discussions between these entities
- ▶ EP3/Ecuador information center established at OIKOS Ability to fulfill information center requests enhanced through cataloguing of EP3 clearinghouse into OIKOS information center

### POLICY CHANGE

- ▶ OIKOS serving as unofficial advisor to seven municipalities in Ecuador and to the Presidential Environmental Commission (CAAM) on pollution prevention issues and policies The biggest changes have occurred in Cuenca, where the importance of environmental issues is widely recognized OIKOS is disseminating lessons learned in Cuenca to other parts of the country
- ▶ Verbal support expressed by Director of Environment for Quito for EP3's activities as the proper first step for achieving compliance with environmental requirements
- ▶ Cleaner Production Policy Initiative launched to evaluate obstacles to cleaner production within current regulatory framework

24

and identify policy options for promoting cleaner production

#### **PARTNERSHIPS AND CAPACITY BUILDING**

- ▶ Partnership with the Chamber of Industry established to disseminate information to industry and encourage implementation of CP opportunities among Chamber members Chambers of Industry of Pichincha, Cuenca, and Tungurahua involved
- ▶ Partnership with the Ecuadorian-American Chamber of Commerce established to market P2 opportunities
- ▶ Technical assistance provided to the IDB for one project in Quito and one in Guayaquil
- ▶ Three local consultants hired as pollution prevention professionals to offer pollution prevention services to Ecuadoran industries
- ▶ Two junior engineers at OIKOS exposed to P2 principles to enable them to consult in future
- ▶ OIKOS personnel able to train others in concepts of CP/E2 by attending train-the-trainer course in Chile
- ▶ Technical expertise of two EP3/Ecuador staff expanded by participating in pollution prevention information systems training
- ▶ Agreement for Sustainable Cities signed by RUDO/SA and Mayor of Cuenca to launch program to promote sustainable development
- ▶ Sustainable Cities Citizens' Committee established by Mayor of Cuenca to promote public participation in developing an environmental agenda for the city Committee consists of 14 people from industry, NGOs, women's groups, neighborhood associations, local universities, media, and religious groups
- ▶ Technical expertise of two EP3/Ecuador staff increased through participation in co-generation and energy efficiency course in Las Vegas

25

### III JAMAICA

#### INDUSTRY BEHAVIOR AND OUTREACH

- ▶ Conducted survey of hotels in Negril to gather baseline information on their environmental practices and performance
- ▶ Developed and pilot-tested audit protocol designed to assist hotels
  - Conserve water, energy, chemicals and raw materials
  - Minimize their impact on the environment
  - Establish environmental management systems (EMS) based on the principles of ISO 14000
- ▶ Met with owners of the properties to review results and recommendations of the initial audits Implementation of low-cost recommendations was immediate in most cases

#### POLICY CHANGE

- ▶ Working group established to ensure that EP3's EMS compliance approach meshes with the GOJ's planned discharge requirements for hotels
- ▶ Working group established to develop a "green" certification program for Jamaican hotels

#### PARTNERSHIPS AND CAPACITY BUILDING

- ▶ With the Negril Area Environmental Protection Trust, established a working group in the local chapter of the Jamaican Hotel and Tourism Association (JHTA) to organize a recycling and green waste composting program for all Negril properties
- ▶ Participation of two local consultants and one representative of the Jamaica Bureau of Standards in initial audits
- ▶ Established program within the JHTA to publicize activities and disseminate results

## IV MEXICO

### INDUSTRY BEHAVIOR AND OUTREACH

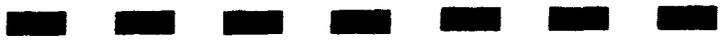
- ▶ Through the Mexican Border Project, cleaner production (CP)/energy efficiency (E2) programs implemented at ten maquiladora facilities and one hotel in Reynosa and Matamoros
- ▶ One-day conference held in Reynosa entitled *Benefitting from Pollution Prevention and Energy Efficiency Experiences of the Maquiladora Industry in Reynosa and Matamoros*. Plants that participated in the pollution prevention programs of EP3, the Texas Natural Resources Conservation Commission (TNRCC), and the Environmental Defense Fund (EDF) shared their experiences with other facilities. A total of 81 representatives from 59 maquiladoras, along with three major industry associations attended the conference
- ▶ Six electroplating plants in Mexico City ranging in size from micro to medium-sized have implemented CP/E2 measures based on outcome of CP/E2 assessments in facilities and participation in electroplating demonstration project
- ▶ Results from electroplating demonstration project disseminated at meeting hosted by CANACINTRA's electroplating section to over 80 industry representatives, government officials, and other interested parties
- ▶ Follow-on technical assistance and training program initiated to second round of electroplating facilities in Mexico City
- ▶ Energy efficiency diagnostics incorporated into foundry demonstration project conducted by the Mexican Center for Cleaner Production (MCPC)
- ▶ Manual on Cleaner Production and Energy Efficiency Opportunities in the Electroplating Sector Published by EP3 and the MCPC

### PARTNERSHIPS AND CAPACITY BUILDING

- ▶ Information on CP and E2 disseminated and implementation of CP and E2 measures encouraged through partnerships with the Maquila Associations of Reynosa and Matamoros
- ▶ Linkages established with UNIDO through support of Mexican NCPC
- ▶ Information on CP disseminated and implementation of CP measures encouraged in Mexico City through an alliance with CANACINTRA (Chamber of Industries), partnership established with CANACINTRA through the Mexican NCPC
- ▶ Approximately 30 consultants trained in CP techniques in the electroplating industry at joint EP3/NCPC course
- ▶ Linkages established with FIPREV, a pollution prevention fund supported by the NAFTA Commission for Environmental

- ▶ Cooperation to financing the implementation of P2 and E2 measures
- ▶ Partnership established with the National Chemical Manufacturers Association (ANIQ) to jointly develop a cleaner production demonstration project in the chemical sector

88



## V PARAGUAY

### INDUSTRY BEHAVIOR AND OUTREACH

- ▶ One slaughterhouse selected to demonstrate pollution prevention opportunities to other facilities savings at this facility estimated at \$740,000 per year for a capital investment of \$225,000, solid releases reduced by 625,000 pounds/year, BOD discharges reduced by 258,000 pounds/year, and water consumption reduced by 115,500 m<sup>3</sup>/year
- ▶ One tannery selected to demonstrate pollution prevention opportunities to other facilities Savings at this tannery estimated at \$142,000 per year in operating costs and \$33,000 in capital costs for an initial investment of \$61,000, chemical compounds reduced by 531,000 pounds/year, BOD discharges reduced by 151,000 pounds/year, and water consumption reduced by 27,400 m<sup>3</sup>/year
- ▶ At least 15 articles and other program information published in national newspapers
- ▶ Two articles published in technical journals to disseminate information regarding P2 applications and methods
- ▶ Information center established at the UIP

### POLICY CHANGE

- ▶ Efforts underway to encourage SENASA to incorporate pollution prevention and cleaner production into the country's future environmental policies

### PARTNERSHIPS AND CAPACITY BUILDING

- ▶ MOU signed with the Paraguayan Board of Industries (UIP) outlining responsibilities of UIP and EP3 regarding P2 program
- ▶ Fifty industry representatives and government decision-makers introduced to pollution prevention concepts at one-day workshop delivered by EP3/Washington, EP3/Paraguay, and WEF
- ▶ Solid understanding of principles of pollution prevention gained by 55 representatives from 42 companies through attendance at seminars, workshops and presentations
- ▶ EP3/Paraguay staff trained in US at WRITAR on how to identify and evaluate pollution prevention opportunities
- ▶ Technical expertise of EP3/Paraguay staff advanced by interaction with US consultants during in-country pollution prevention

demonstration projects

- ▶ Technical expertise of EP3/Paraguay staff advanced by attending conferences and visiting facilities in the US to compare working conditions with those in Paraguay and to increase knowledge regarding potential pollution prevention opportunities
- ▶ Eight tannery and five slaughterhouse representatives trained in how to identify and implement pollution prevention opportunities



## VI PERU

### INDUSTRY BEHAVIOR AND OUTREACH

- ▶ Two companies in the fishmeal sector (120 plants total) have agreed to install ground breaking technologies as part of USAID sponsored demonstration project
- ▶ As a result of cleaner production technical assistance to the fishmeal industry in Paracas
  - Agreement by fishmeal plants in Paracas to strive to reduce pumpwater volumes by 50% by the end of the year
  - New understanding of how to measure raw material losses accurately
  - Recognition on part of plants of importance of preserving fish quality to reduce raw material losses and maintain high quality fishmeal
  - 1,000 MT of fish oil recovered per month by four plants
  - Five plants have switched to more efficient pumps, reducing discharges by 1.5 million cubic meters annually
  - Five plants have installed dissolved air flotation systems and are now recovering 25,000 MT of raw material annually
  - One plant added screens to recover 4,000 MT of raw material annually
  - Total value of fishmeal being produced due to recovered raw material exceeds US\$ 3.0 million annually
- ▶ The project is working to introduce US equipment manufacturers to opportunities in the Peruvian fishmeal industry. Several million dollars of US equipment has already been sold to fishmeal plants, partly as a result of the project. This number is expected to increase significantly after completion of the demonstration project.

### POLICY CHANGE

- ▶ Policy and regulatory assistance provided by the Environmental Law Institute to assist the Ministry of Industry (MITINCI) in developing a framework regulation covering industrial pollution that stresses preventive approaches to waste management. The regulation was promulgated in June and is the first of its kind to be implemented in Latin America.
- ▶ The Project is advising the Minister of Fisheries on the current state of technology being used by the fishmeal industry and is exploring preventative approaches to regulating environmental performance of the industry.

**PARTNERSHIPS AND CAPACITY BUILDING**

- ▶ Consortium of representatives from USAID, NGOs and the fishmeal industry formed to assist selected fishmeal processors interested in serving as pilot projects for cleaner technologies