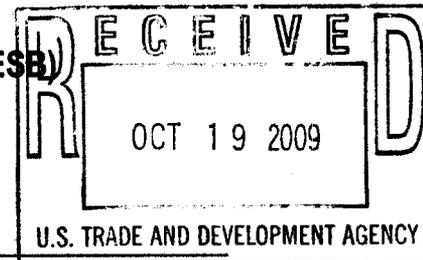


PUBLIC VERSION

# **CETESB Toxic Substance Use Reduction Program Development – Addendum 1, Technical Workshop Documentation**

Client: Companhia de Tecnologia de Saneamento Ambiental (CETESB)



Prepared by: CH2M HILL



**U.S. Trade and Development Agency  
1000 Wilson Boulevard, Suite 1600  
Arlington, Virginia 22209-3901  
USA**

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## Introduction

The Task 9 Technical Seminar was completed in two parts. The first seminar was carried out November 29, 2006, between Task Orders 4 and 5, and was used to review the information gained from the efforts of other countries and to formulate potential methods of the program to reduce toxic chemicals for further analysis. Tasks Orders 5 through 8 were to evaluate these options. The final workshop (Task Order 9) was carried out so that Companhia de Tecnologia de Saneamento Ambiental (CETESB) and the industries could review the program options. During the workshop, the program alternatives were evaluated based on the degree to which the program objectives would be met, including considerations as to technical and operational issues, institutional and legal aspects, financial aspects, and potential impacts to the environment. This workshop was carried out May 15, 2009. The final report then summarized the information from the nine tasks.

## Purpose

The goal of this report is to provide United States Trade and Development Agency (USTDA) with documentation of the completion of Task Order 9 and comprises the following.

- **Proposed Toxic Chemicals Reduction Program Elements**  
This memorandum documents the information covered and the conclusions reached during the first workshop.
- **Toxic Use Reduction Program Description**  
This memorandum outlines the programs proposed during the second workshop.
- **Toxic Chemical Reduction Program Workshop Presentation (May 15, 2009)**  
PowerPoint slides used in the second workshop.
- **List of Participants**  
Sign-in sheet for the second workshop.



## **Proposed Toxic Chemicals Reduction Program Elements**

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## Proposed Toxic Chemicals Reduction Program

PREPARED FOR: Angela de Campos Machado, CETESB

PREPARED BY: Tom Higgins  
Steve Engleman  
Keisha Wilson

DATE: December 13, 2006

### Introduction

Based on the results of the workshop held on November 29, 2006, and subsequent meetings with CETESB, this proposed framework for a Toxic Chemicals Reduction Program for Sao Paulo has been prepared. This is a voluntary program for reduction that is based on inventorying toxic chemicals use through the existing permitting process. This program would include the following elements:

- Toxic chemical use inventory
- Technical assistance to industry sectors
- Program monitoring
- Permit extensions for successful reductions

Based on policy constraints and feasibility of implementation it is recommended that the following elements not be included in a toxics use program:

- Product composition reporting
- Toxic chemicals release inventory or reporting
- Direct technical assistance to individual plants or companies
- Ban on chemicals or their specific uses

The remainder of this technical memorandum expands on the above listed program elements.

### Toxic Chemicals Reduction Program Elements

The overall goals of a toxic chemical reduction program would be to reduce the toxic chemicals in the workplace, the home and the environment. These goals would be accomplished by targeting the reduction of toxic chemicals used by industries. If use is reduced, release to the environment, exposure to the public and workers would be reduced due to less use of toxic chemicals in products and in the workplace.

The framework was developed by evaluating the positives and negatives of each program approach presented during the workshop and is based on what is known about Sao Paulo's emissions data, political/policy constraints, industry preferences and CETESB preferences.

## **Toxic Chemical Use Inventory**

### **Toxic Chemicals Inventory List**

It is recommended that the toxic chemicals inventory include a measurement of total toxicity in addition to the weight of the chemical used. This measurement would be attained by using the toxicity factors developed in the chemical identification portion of the project, and multiply each of the specific chemical toxicity factors by the annual usage of that chemical. Total toxicity would be the sum of the individual chemical toxicities.

It is also recommend that to reduce the number of chemicals that each company needs to inventory, that the lists be specific to each industry sector. This would be derived from the data collected for each industry sector in the US Toxics Release Inventory (TRI) program. The analysis of this data would be used to select the significant chemicals that would be monitored for each CNAE code industry sector. The goal would be that each industry sector report on a maximum of 10 or 20 chemicals.

It is proposed that the data management of the inventory would be linked the current Hewlett database program that is being developed by CETESB.

### **Utilization of the Current Permitting Process**

CETESB currently requests industries to provide chemicals usage and process information as part of the current permit application process. The current requirement allows for use of trade names for products, such as cleaning solvents. It is proposed that the current permit application forms be modified to require reporting of the current annual usage of specific chemicals identified in the toxic chemicals list. While this portion of the program would be mandatory, it does not expand the current requirements of the permit process or require additional authority by CETESB.

It is also recommended that some de minimus annual usage (such as 5,000 kg/year) and concentrations be exempt from reporting (such as chemicals present at less than 0.1 percent). This would result in inventorying significant chemical usage, without the burden of tracking small usages.

In addition to chemical usage, the companies should also provide a level of production volume, with units (such as number of units produced, liters or kilograms of product) to be determined by the company. This would allow chemical usage to be normalized to production volume and would help to determine if reduction per production value is reduced in subsequent permits.

It is also recommended that instructions be provided to the applicants on how to calculate the amount of each chemical used in the products used by their facilities. The applicants should use best engineering judgment in determining the usage along with an explanation of the process or processes the chemical is used for.

### **Permit Extension for Successful Reduction**

Once the program is implemented and after subsequent permit applications have been submitted to CETESB by the applicants, it should be simple to determine if chemical usage has been reduced at a facility. The reduction can be measured relative to production rate

changes between the permits. To meet the goal of reducing overall toxicity, reductions should also be measured based on the reduction of total toxicity, not just total volume of toxic chemicals. This would avoid replacement of chemicals on the list with lower volumes of chemicals that are of higher toxicity.

It is recommended that if a company demonstrates that there has been a reduction in usage (relative to production); they would receive a longer period for the new permit.

### **Technical Assistance to Industry Sectors**

CETESB currently works with FIESP to provide technical assistance materials aimed at specific industry sectors. This involves visiting representative companies to better understand the processes implemented and to better prepare industry sector specific technical assistance documents. It is recommended that this toxics chemical reduction program be used to target industry sectors to encourage and provide helpful information and best management practices that would lead to reduction in toxic chemicals usage. Specific industry sectors would be selected for new technical assistance efforts based on their relative predicted release of toxic chemicals (from the analysis of the US TRI data base).

Sao Paulo companies would like to obtain funding for projects that would improve manufacturing processes and in turn reduce the use of toxic chemicals. International funding agencies, such as World Bank, provide funding for pollution prevention projects. However, many of the proposed projects are not for Pollution Prevention, but are for pollution control equipment.

It is recommended that the technical assistance aspect of the program also include CETESB providing training to industry sectors specific to toxic chemicals reduction, such as how to prepare P2 plans targeted on toxic chemical use reductions. The training would provide tools for preparing plans, such as a document template of a typical P2 plan and a spreadsheet containing a template for preparing payback analysis. Other training sessions could include how to write P2 project proposals for World Bank funding or how to inventory products used and produced by their facilities. To encourage companies to use the provided tools, a priority could be placed on project requests using the tools.

### **Monitoring of the Program**

Two methods are proposed for monitoring the effectiveness of the program. First, the permit applications would report on their current chemical usage. By using a rolling sum of chemicals reported over the period of the permits, it would be possible to track trends in total usage of each chemical by the major users of each chemical by industry sector.

The second method of monitoring would be the use of existing CETESB environmental monitoring programs, such as the Environmental Quality Reports, to monitor the concentrations of the toxic chemicals in the various media that are monitored. The monitoring programs should be evaluated to see if the major toxic chemicals identified in this project are being monitored. If not, then consideration should be made to include the more toxic chemicals in the monitoring programs.

## Elements Not Included In the Program

Elements that could be included in a toxic chemicals reduction program, but not recommended for the Sao Paulo Program, are listed below.

### Product Composition Reporting

While it would be helpful to the companies that need to do chemical use inventories to have composition information required from their suppliers, CETESB does not have the authority to require composition reporting. In addition, such a program is widespread and more difficult to implement than requiring usage information.

### Toxic Chemicals Release Inventory or Reporting

The Toxics Release Inventory (TRI) program has resulted in significant reduction in releases of the listed chemicals to the environment, but much of that reduction has been the result of treatment rather than reduction in use or shipment of chemicals in products. It is also a complicated and expensive program for companies to comply with, as it combines the requirement of inventorying usage with a detailed analysis of all the uses and emissions.

A program based on inventorying and targeting reduction in usage is inherently simpler and less expensive to comply with, and targets the broader exposure pathways of purchase, use in the workplace, release to the environment, and consumer exposure to products containing the chemicals.

### Direct Technical Assistance to Individual Plants or Companies

CETESB staff are required to report violations of permits if found during a technical assistance visit. For this reason, it would be difficult if not impossible for CETESB staff to get the information required to provide meaningful pollution prevention technical assistance to individual plants or companies. Technical assistance can better be provided through training and pollution prevention technical materials to companies across industry sectors.

### Ban on Chemicals or Their Specific Uses

CETESB does not have this authority, and it would be difficult to implement. In addition this does not fit with a voluntary program.

## Next Steps

In the next phase of the project, the goal is to investigate the feasibility of implementing various elements of the proposed program in São Paulo from a legal, economic, and environmental point of view. Based on the results of this analysis, an implementation plan for the program can be developed.

While CH2M HILL has many resources and access to a wide body of information regarding toxic chemical reduction programs, it is important to stress that this phase of the project involves understanding the implementation of a toxic chemical reduction program *in São Paulo*. In order to gain a more complete understanding of the legal, economic, and cultural context in São Paulo, it is important to tap into the experience and knowledge of local representatives who have different perspectives (affected community, regulated industry, regulators). Therefore, we expect that the next phases of the project will involve a strong partnership between CH2M HILL and CETESB where information and experience regarding the potential legal, economic, and environmental implications is exchanged freely.

The following sections contain a brief description of the proposed approach during this phase of the project.

### TASK 5 – Review Institutional and Legal Aspects

This task involves the review of laws and the applicable regulatory framework in Brazil and in the State of São Paulo with regard to programs of a similar nature to toxic chemical reduction. The work will include an assessment of the conditions, positive and negative, that will affect implementation of an industrial toxic chemical reduction program in the State of São Paulo.

The research will be focused on the regulations that provide authority to CETESB to gather the information needed to prepare a detailed toxic chemical inventory. It will include an investigation into whether or not CETESB has the authority to conduct other toxic chemical reduction measures such as banning or limiting the use of certain chemicals, requiring the reporting of product composition, requiring the preparation of pollution prevention plans, etc. Other issues to be explored include technical assistance, enforcement discretion, and extension of permit duration. The potential need for additional legislative and/or regulatory action will also be explored.

Research into Brazilian regulations will be required to complete this task. However, because it is expected that toxic chemical inventory data that would be used in the toxic chemical reduction program would be collected using the permitting process, the permitting system used by CETESB must also be researched to fully understand the type of data that can be collected, how CETESB stores this information, and in what format the data is collected. While CH2M HILL will take the lead on this research, it is expected that CETESB personnel will have valuable insight into the permitting process, and the planned changes to the permitting system (and associated database) that will be invaluable in completing this task.

It is expected that CETESB personnel will be available to provide guidance to CH2M HILL regarding current regulations that are relevant to this task. In particular, it is anticipated

that CETESB can provide detailed guidance regarding its permitting and data collection system and the development of its new permitting database. CETESB involvement during this task is expected to include a series of conference calls (2 to 3) where a discussion of the legislative and regulatory framework as well as the CETESB permitting system can be discussed with CH2M HILL personnel.

### **TASK 6 – Review and Recommend Economic Incentives**

Task 6 involves a review of the applicable financial incentive/disincentives, including taxes, grants (capital and operating), and loans in Brazil and the State of São Paulo with regard to programs of a similar nature aimed at toxic chemical reduction.

This review will concentrate on funding for pollution prevention projects through World Bank and other institutions, and provide how this could be used by companies to fund projects that would allow replacement or reduction of toxic chemical use. The review will consider how funding is obtained and what restrictions are placed on its use. The review will also investigate CETESB's current role in reviewing project applications and may make recommendations on what additional roles CETESB can take in this process.

This review will also investigate the potential role that pollution prevention planning can play in requesting funding. This task may also include the development of a template for pollution prevention planning.

Again, it is expected that CETESB can provide valuable information regarding potential funding sources and the processes by which industries can obtain funding. This information can be exchanged via a series of emails in addition to conference calls (1 to 2).

### **TASK 7 – Assess Environmental and Development Impacts**

This task will be a preliminary review of the potential environmental impact of a toxic products reduction program as well as a forecasting of the possible effects of a program of this kind in the state of São Paulo. Potential negative impacts will be identified as well as options to minimize them. Potential development impacts of the Project in the State of São Paulo and Brazil will also be reviewed with an emphasis on economic development. Although short term impacts will be emphasized, additional information regarding spin-off and demonstration effects will also be included where possible.

The analysis of potential benefits will be based upon implementation of similar programs in other countries. While a detailed economic analysis will not be possible during this exercise, available data will be extrapolated to estimate the potential impacts in São Paulo. Potential impacts to the following areas will be evaluated:

- Infrastructure/Industry
- Market-Oriented Reforms
- Human Capacity Building
- Technology Transfer and Productivity Enhancement
- Other - Including Spin-Off or Demonstration Effects

The analysis is likely to include an assessment of the potential long term cost effectiveness associated with capital investments and how funding sources will impact the overall capital

cost to industry. The impacts associated with technical assistance programs will also be emphasized.

This task will be completed by CH2M HILL with occasional queries to CETESB as needed.

### **TASK 8 – Develop Implementation Plan**

The proposed implementation plan will include various options for use in a toxic chemical reduction program. Based on the work completed to date, these options are likely to include:

- Toxic Chemical Use Inventory
- Permit Extension for Successful Reduction
- Technical Assistance to Industry Sectors

It is anticipated that each option could be implemented by itself, but that the implementation of all of the options simultaneously may yield a more comprehensive and effective program.

A budget, manpower estimate, and schedule will be proposed for the first phases of implementation. In addition to describing the actions that CETESB could take to move the toxic reduction to an operational phase, the plan will cover the following topics:

- Program objectives and evaluation criteria
- Technical alternatives
- Institutional/legal aspects for implementation and compliance
- Economic incentives
- Options to finance capital investments
- Options to promote the program to the industry

The potential environmental benefits of the program to the state of São Paulo will be estimated as part of this effort.

Once a proposed program has been developed and preliminary review has been conducted by CETESB, a final workshop will be held to present the proposed program and solicit feedback from the stakeholders (regulated industry, CETESB).

Based upon the feedback received during this workshop, the plan may be revised and CH2M HILL will recommend a strategy best suited to the current situation in the State of São Paulo. The rationale for the recommended approach will take into consideration technical issues, operational issues, cost, and degree of toxic reduction that will be achieved.

It is anticipated that CH2M HILL will meet with CETESB for the two days preceding the workshop to refine the details of the proposed program. It is anticipated that CETESB personnel that will be involved in the implementation of the program will be directly involved in the two days of meetings.

It is critical that CETESB staff from the permitting, emissions inventory, environmental monitoring, and technical assistance areas provide feedback for the proposed implementation plan and participate in the meetings prior to the workshop. Ownership of

the program will critical to the success in implementing a toxic chemical reduction program. Early participation by the affected parties will help build interest, understanding, and support of the proposed program and ensure that the implementation is feasible and cost effective.

## **Toxic Use Reduction Program Description**

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## Toxic Chemical Use Reduction Program Description

PREPARED FOR: Meron Petro Zajac, CETESB

PREPARED BY: Tom Higgins  
Steve Engleman

DATE: April 17, 2009

### Background

The objectives of a toxics chemical use reduction program are to reduce human exposure to these chemicals, and their impact on the environment.

During the first phase of the project, the relative volumes of toxic chemicals released by industry to the air, waters, and lands of São Paulo were estimated. The estimated releases were combined with recognized risk criteria for cancer potency, relative degradability of chemicals, and other known properties to rank each chemical by its relative impacts on human health and the environment.

Information was collected on toxic chemical reduction programs in other countries, to learn from others successes and failures, to devise a program tailored to the conditions of Sao Paulo.

This information was then presented to Federation of Industries of the State of São Paulo (FIESP) and the regulated community of São Paulo in a workshop held in November 2006. Feedback from the workshop was used to develop a tentative list of possible elements for a toxics use reduction program. The institutional environmental, developmental and legal aspects of these elements were reviewed, and possible sources of economic incentives to industries to adopt the program were investigated.

Three different, proven program strategies that could be used by CETESB to institute an effective operational toxics reduction program were developed and are summarized in this memorandum. A workshop will be held on May 15 at CETESB to present and discuss these three alternative programs.

### Program Objectives and Evaluation Criteria

The objectives of establishing a toxics chemical reduction program are to gather data on toxics chemical use, targeted to those chemicals with the highest toxicity and use volume, and to encourage industries to reduce the usage of these target chemicals to reduce impacts on human health and environment due to chemical releases.

During the workshop, the program alternatives presented in this memo will be evaluated based on the degree to which these program objectives will be met, including considerations as to technical and operational issues, institutional and legal aspects, financial aspects, and potential impacts to the environment.

## Toxic Chemical Use Reduction Program Alternatives

The following subsections present the features of the three alternative Program implementation plans developed for a toxics reduction program in São Paulo. These plans identify different, proven strategies that could be used by CETESB to institute an effective operational toxics reduction program.

### Program 1

- Mandatory chemical usage reporting to CETESB
- No usage reduction goal setting
- Voluntary toxics chemical usage reduction planning
- Voluntary reduction of targeted chemicals
- Public disclosure highlighting company successes with permission
- Continued technical assistance (i.e., annual training classes to complete forms, general and industry sector toxics chemical usage reduction classes)
- Incentives for reduction in toxics (i.e., assistance in preparing winning loan applications, reduced regulatory burden, reduced permitting fees for reductions)
- Enforcement based on failure to report chemical usage inventories to CETESB

With the exception of mandatory chemical use reporting, this program is a voluntary program and relatively easy to implement. Under this program, some degree of toxic reduction is expected, as implementation of this program will trigger many companies to inventory their toxics chemical usage for the first time. The degree of toxic reduction, however, is expected to be relatively lower than programs that have the element of public disclosure and associated public pressure (Programs 2 and 3). Although public pressure to reduce toxics is not part of this proposed program, the advantage to industry is that the concern for disclosure of proprietary information is eliminated.

One incentive for toxics chemical use reduction will be a reduction in regulatory burdens (e.g., elimination of some of the administrative burden of reporting). Facilities that eliminate or substantially reduce toxics chemical use below de minimis thresholds for reporting can avoid or minimize some of their requirements for reporting.

### Program 2

- Mandatory chemical usage reporting to CETESB
- Mandatory establishment of individual goals for toxics chemical use reduction by each company
- Mandatory preparation of a detailed Chemical Usage Reduction Plan

- The detailed plan would be kept onsite and available to a CETESB inspector on demand.
- A Summary of the Plan would be submitted to CETESB.
- Both the detailed Plan and the associated Summary will document progress in meeting goals from the previous reporting period, and set goals for the next reporting period.
- Establishment of a toxic chemical usage fee
  - CETESB would assign a unit price per kilogram (kg) usage for each chemical based on the toxicity factor for that chemical. Fees would thus be proportional to toxicity times usage.
  - The usage fee to CETESB for each company would consist of the sum of the usage fees for each chemical used during the reporting period.
- Public Disclosure
  - Public disclosure highlighting company successes with permission
  - Mandatory public disclosure of chemical usage inventories and Chemical Usage Reduction Plan Summaries
- Technical assistance (i.e., nonregulatory public institution and/or university that would provide innovative and creative solutions to industries seeking assistance with toxics chemical usage reductions at their facilities)
- Incentives for reduction in toxics (i.e., assistance in preparing winning loan applications, reduced regulatory burden, and reduced permitting and emissions fees for reductions)
- Enforcement would be based on failure to report chemical usage inventories to CETESB, failure to submit Summary reduction plans that meet established requirements to CETESB, and failure to have the detailed Plan onsite

Specifically, in addition to mandatory chemical use reporting (as under Program option 1), this option includes the mandatory development of Chemical Usage Reduction Plans. The Chemical Usage Reduction Plan itself would be kept at the facility, and could be inspected by agency officials during site visits. A summary of this plan will be submitted to CETESB. The requirement for companies to develop a Chemical Usage Reduction Plan would force companies to evaluate their usage of toxics chemicals, and prioritize chemical usage reduction planning. Reduction goals are established by each individual company, not by CETESB.

A second component of this program is a market-based program, which does not set limits per se, but rather uses economic incentives to encourage toxic chemical usage reduction. By setting a "fee for use" which is based on individual chemical toxicity and volume, there is an incentive to reduce usage, utilizing process changes or chemical usage changes that are cost effective. This type of program harnesses the power of the marketplace.

Public disclosure of both the chemical usage inventory and Chemical Usage Reduction Plan Summary and established goals makes the data available to the public. This public

disclosure can be used as a public relations tool. Public disclosure also provides public pressure to reduce toxics to a greater degree than a voluntary program with no public disclosure requirements (as under Program option 1).

The technical assistance element by an outside organization (i.e., non-regulatory public institution and/or university) leads to a fresh look and an unbiased viewpoint for the facilities in the program.

### Program 3

- Mandatory chemical usage reporting to CETESB
- Establishment of company-by-company goals for toxics chemical use reduction by CETESB
- Preparation of a detailed Chemical Usage Reduction Plan by each company
  - The detailed plan would be kept onsite and available to a CETESB inspector on demand.
  - A Summary of the Plan would be submitted to CETESB.
  - Both the detailed Plan and the associated Summary would document progress in meeting goals from the previous reporting period, and set goals for the next reporting period.
- Establishment of a toxic chemical usage fee
  - CETESB would assign a unit price per kg usage for each chemical based on the toxicity factor for that chemical. Fees would thus be proportional to toxicity times usage.
  - The usage fee to CETESB for each company would consist of the sum of the usage fees for each chemical used during the reporting period.
- Public Disclosure
  - Public disclosure highlighting company successes with permission
  - Public disclosure of chemical usage inventories and Chemical Usage Reduction Plan Summaries
- Technical assistance (i.e., nonregulatory public institution and/or university that would provide innovative and creative solutions to industries seeking assistance with toxics chemical usage reductions at their facilities)
- Support for reduction in toxics (i.e., assistance in preparing winning loan applications, access to loans, reduced regulatory burden, and reduced permitting and emissions fees for reductions)
- Enforcement based on failure to report chemical usage inventories to CETESB, failure to submit Summary reduction plans that meet established requirements to CETESB, failure to have the detailed Plan onsite, and failure to meet CETESB-established usage reduction goals

Specifically, this program includes mandatory reporting of chemical usage and a Chemical Usage Reduction Plan Summary and associated reductions. It also includes the element of public disclosure and associated pressure, as under Program option 2, but additionally includes CETESB-established and mandatory company-by-company goals (vs. companies establishing their own individual goals). Following submittal of the first phase of chemical usage inventories, goal setting will be based on the chemical usage inventories as well as toxicity information and knowledge of media-specific impacts from the targeted chemicals. CETESB would need to understand each company in order to assign a goal, which would be resource-intensive.

As under Program option 2, Program 3 provides for technical assistance by an outside organization (i.e., nonregulatory public institution and/or university). This assistance leads to a fresh look and an unbiased viewpoint for the facilities in the program.

**Toxic Chemical Reduction Program Workshop Presentation**  
**(May 15, 2009)**

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Toxic Chemicals*

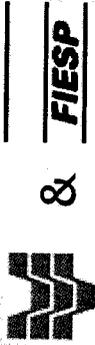


# Toxic Chemical Reduction Program Workshop

**Tom Higgins, PE, PhD  
Stephen Engleman, PE**



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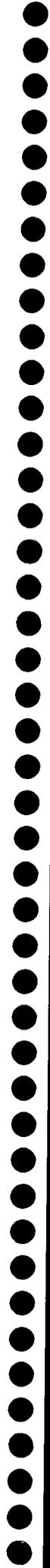
# Workshop Agenda

- Program Goals
- Identify Toxic Chemicals
- Other Governments Programs
- Toxics Use Reduction Options
- Toxics Use Reduction Program Alternatives
- Discussion



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# The Goal is to Strike a Balance

## Reduce Toxic Chemical Exposure

 To workers

 To the environment

 To consumers

## Minimize Regulatory Burden



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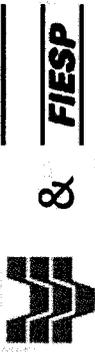


# Participate

-  Ask questions
-  Provide your opinions
-  Provide comments
-  Respond later to the program



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# Workshop Agenda

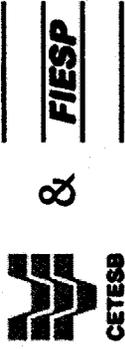
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# What is Meant by Toxic Chemical

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Toxic Chemicals

 Specific Chemical or Compound  
for Example:

 Lead

 Mercury

 Trichloroethylene

 Not a Product, Such as

 Paint

 Solvent



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# Target Chemicals Based on Toxicity, Persistence and Usage

## Toxicity

-  Cancer potency
-  Worker exposure limits
-  Drinking water standards
-  Contaminated site standards
-  Persistence
-  Compounds that stay in the environment
-  Not readily degradable
-  Usage - Target:
  -  High toxicity - High use
  -  High toxicity - Medium use
  -  Medium toxicity - High use





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# Usage Estimates

- Data on chemical usage or release not available for Sao Paulo
- Estimated usage and release based on US Toxics Release Inventory (TRI)
  - ▼ Annual report by Industries in certain industrial categories
  - ▼ Usage of 600+ chemical is calculated
  - ▼ Releases to air, water and the land calculated and reported
- US Releases Used
- Normalized to Sao Paulo Industries by Industrial Category and Value of Products



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# Toxic Chemical Impact

• Toxicity Impact =

• Toxicity Factor X

• Estimated Releases X

• Persistence

• Of the ~650 Chemicals

• 144 are used in Sao Paulo industries

• 122 are persistent

• 5 cause 80% of Toxic Impact

• 10 cause 90% of Toxic Impact

• 15 cause 97% of Toxic Impact



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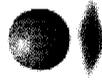
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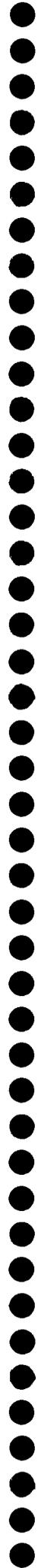
# Toxics Release Inventory

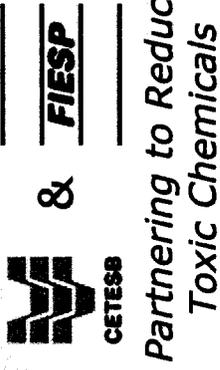
- In Response to Methyl Isocyanate Release in Bhopal, India
- Originally to Include 100 Chemicals
- Congress added 100, including  $\text{Na}_2\text{SO}_4$
- Now includes ~650 chemicals
- Companies Calculate Usage
  - Component % x Annual Usage



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# Usage Exemptions

## De Minimis

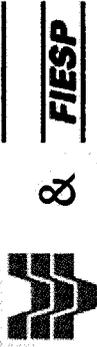
- ✔ 10 or fewer employees
- ✔ Composition less than 1% of product used

## Usage Thresholds (by chemical)

- ✔ Most Chemicals – 10,000 Kg/year
- ✔ Persistent, bioaccumulative – 2,000 kg/yr
- ✔ Lead – 40 Kg/year
- ✔ Mercury – 4 kg/year
- ✔ Dioxin – 0.1 g/year



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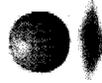
&

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# Annual Report For Each Chemical

- Release to Air, Water or Land
- Reported to Public
- Resulted in Significant Reduction in Use
  - To avoid the regulatory reporting cost
  - To reduce public pressure



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# 33/50 Program

## Voluntary Reduction Program

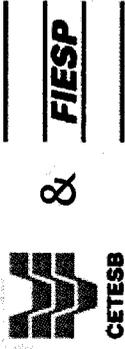
 Met Goal of Reducing 17 Chemicals 50% in 5 Years

Benzene  
Cadmium  
Carbon  
tetrachloride  
Chloroform  
Chromium  
Cyanide  
Dichloromethane  
Lead

Methyl isobutyl ketone  
Mercury  
Nickel  
Tetrachloroethylene  
Toluene  
1,1,1-Trichloroethane  
Trichloroethylene  
Xylenes



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# Toxics Use Reduction Programs

- US States – WA, MA, NJ, CA
- Require Use Reporting
- Require Reporting on Product Composition
- Require Reduction Goal Setting
- Require Pollution Prevention Plans



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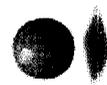
**Partnering to Reduce  
Toxic Chemicals**



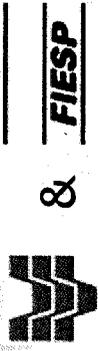
# EU REACH

## **Registration, Evaluation and Authorisation of Chemicals**

-  Requires product composition reporting
-  Regulates use in manufacturing of products for sale in EU, even if use is in Brazil and does not end up in product



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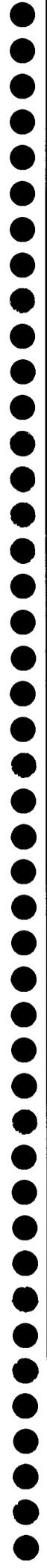
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- Program Goals
- Identify Toxic Chemicals
- Other Governments Programs
- Toxics Use Reduction Options
- Toxics Use Reduction Program Alternatives
- Discussion



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# The Goal is to Strike a Balance

 Use Proven Programs

 Reduce Toxic Chemical Exposure

 To workers

 To the environment

 To consumers

 Minimize Regulatory Burden



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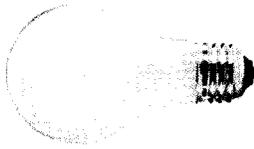
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# Chemical Reduction Case Study

## Lighting Alternatives - U.S. Example

Incandescent



Compact Fluorescent (CF)

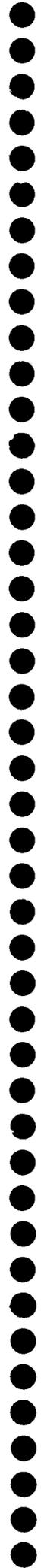


Light Emitting Diode (LED)



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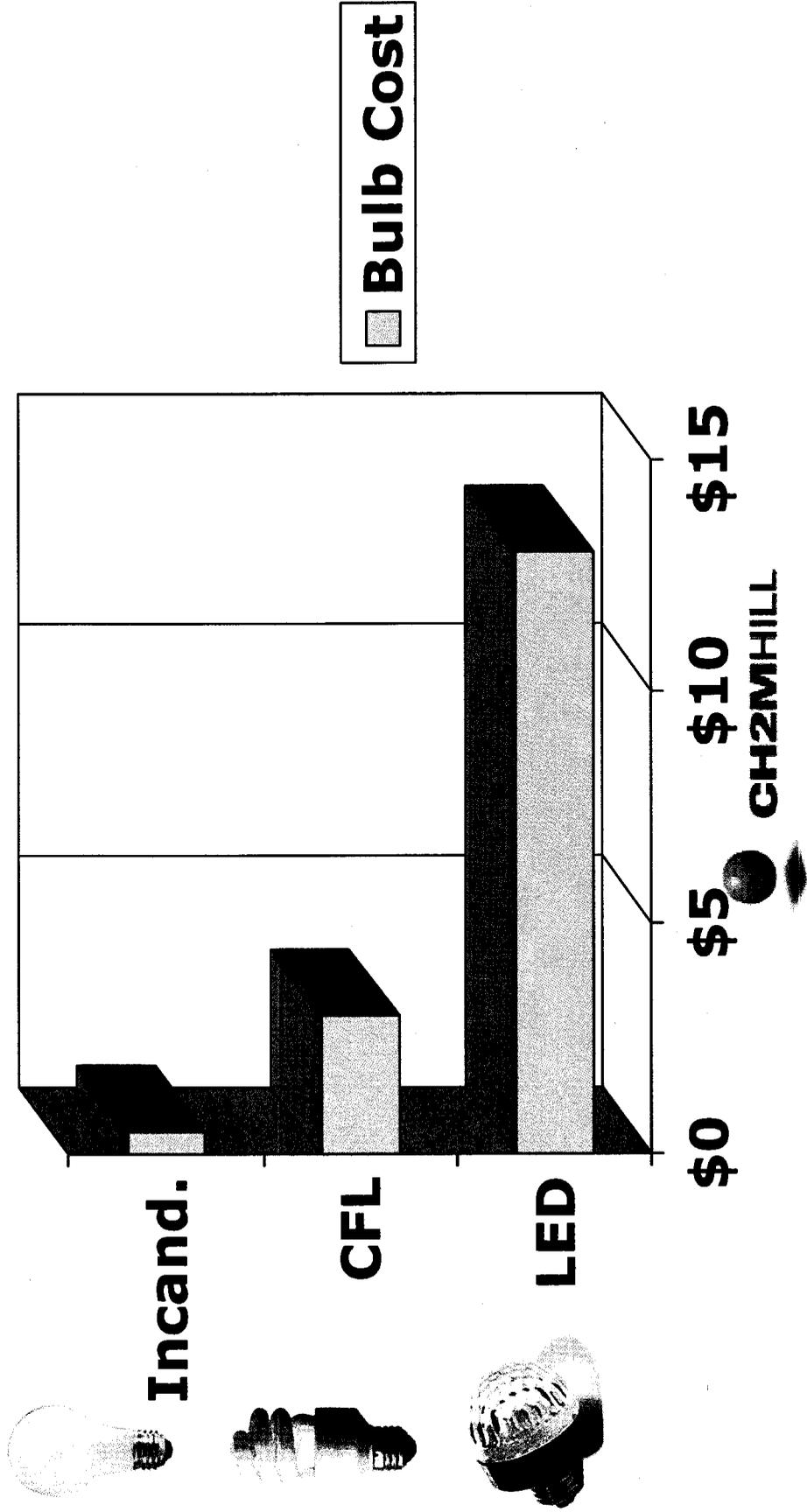
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# Cost Comparison

## Cost for Single Bulb





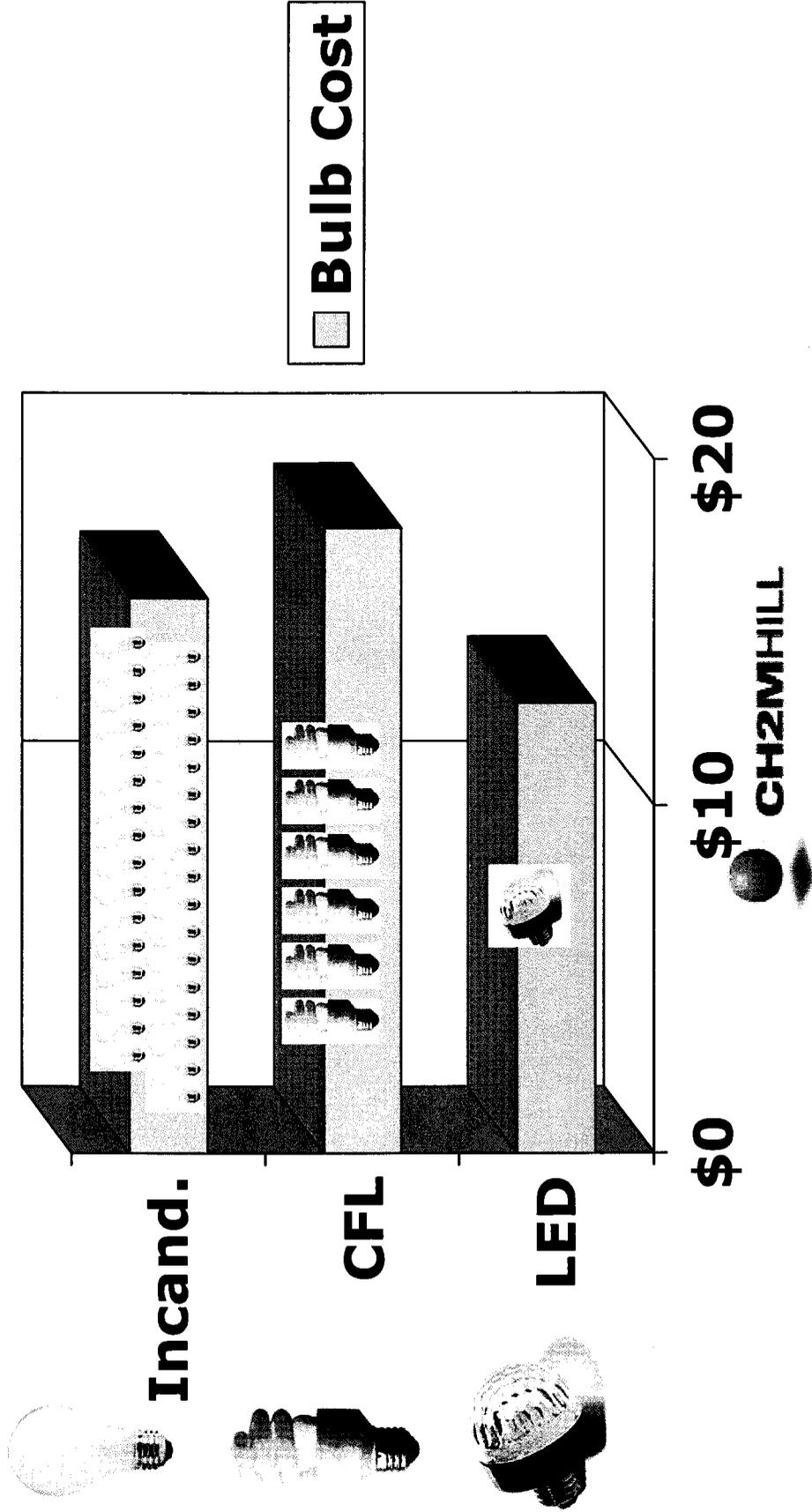
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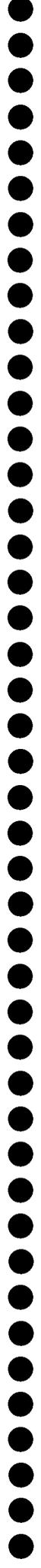
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# Cost Comparison

## Cost for Bulbs Over 30,000 Hours



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# Cost Comparison

## Cost for Bulbs/Electricity 30,000 Hours



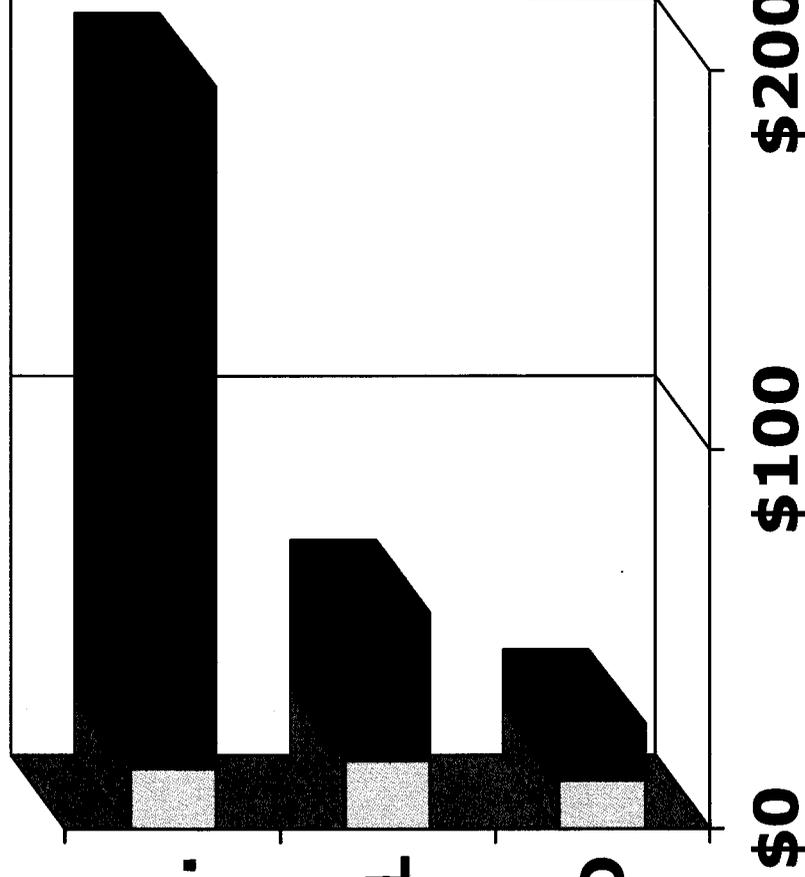
**Incand.**



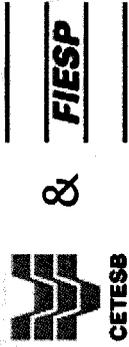
**CFL**



**LED**



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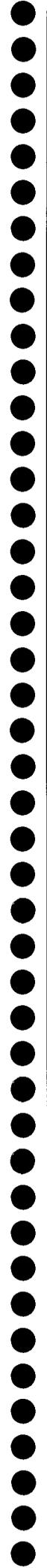
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# Chemical Releases

## What About Mercury?



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# Mercury Release

## Mercury in Bulbs



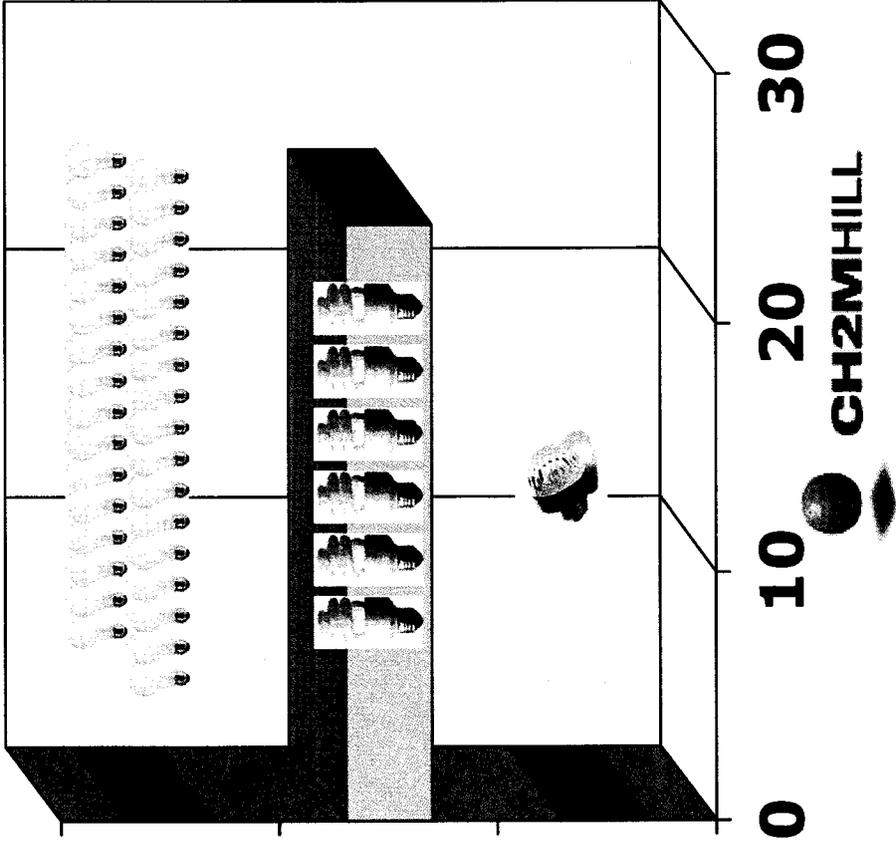
Incand.



CFL



LED



Mercury in  
Bulbs (mg)



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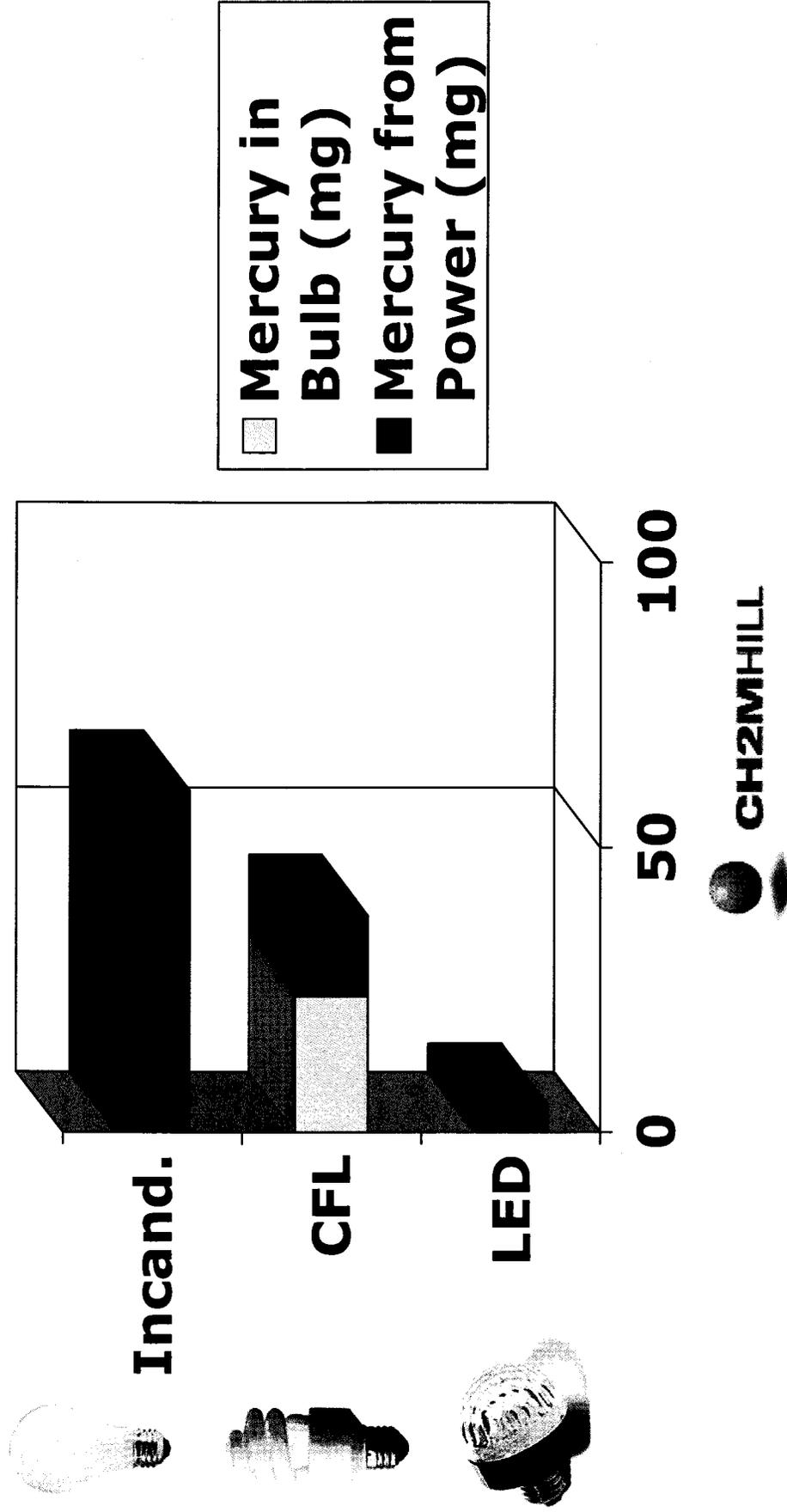
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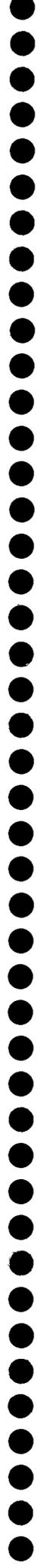
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# Mercury Release

## Mercury from Bulbs/Electricity 30,000 Hrs



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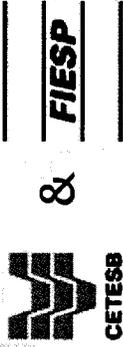
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# Lighting in Brazil

- Incandescent bulb production prohibited in 2010
- Increased use of compact fluorescent
- Mercury recycling needed



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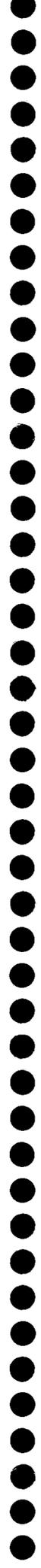
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Toxic Chemicals

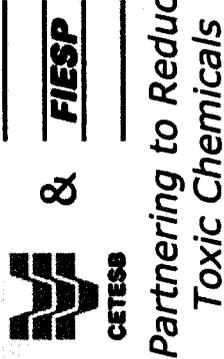
# Program Options

- Chemical Usage Reporting
- Technical Assistance
- Chemical Usage Reduction Planning
- Public Disclosure
- Toxic Chemical Usage Fee
- Usage Reduction Targets
- Incentives



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# Program Options

- Chemical Usage Reporting
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# How to Report Chemical Usage

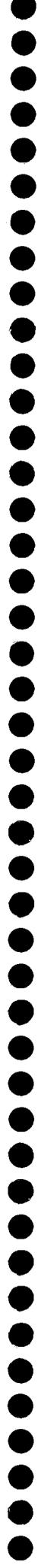
 Use Current Permitting Forms

-  Targeted chemicals only
-  Greater than de minimis thresholds
-  Report amount of each chemical used



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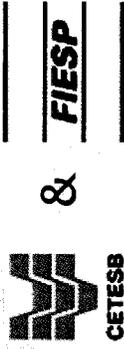
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# Determination of Chemical Usage

- Quantity of Product Used
- Concentration of Chemical in Product
- Use Best Information Available
  - ▼ Engineering calculation



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# Chemical Usage Reporting - Issues

## Targeted Chemical List

-  Based on toxicity factors
-  How many and which chemicals?
-  Reporting Frequency



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# Chemical Usage Reporting - Issues

## De Minimis Thresholds

-  Number of employees
-  Annual company revenue
-  Concentration of compound in chemical
-  Total quantity of compound used

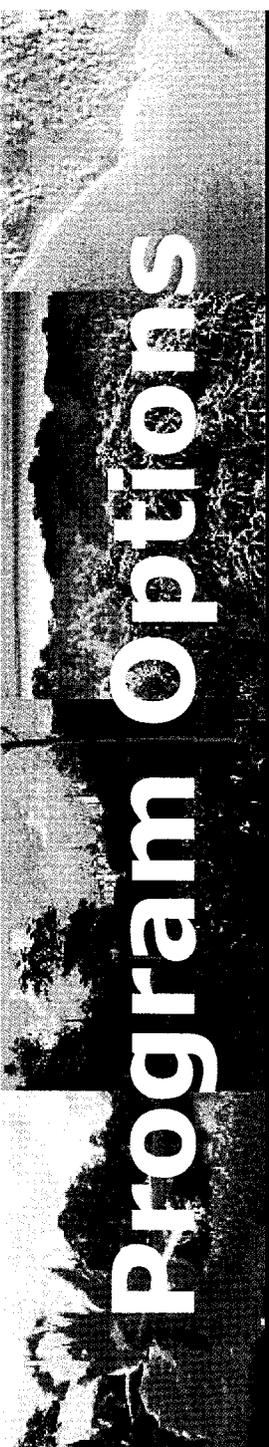


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# Program Options

- Chemical Usage Reporting
- Technical Assistance
- Chemical Usage Reduction Planning
- Public Disclosure
- Toxic Chemical Usage Fee
- Usage Reduction Targets
- Incentives



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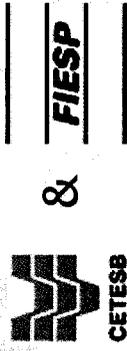
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# Regulatory Technical Assistance

- Chemical Use Inventory Preparation
- Toxic Use Reduction Planning



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# Process Specific Technical Assistance

-  Industry Sector Chemical Reduction
-  Site-Specific Assistance
-  Focused Research



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# Technical Assistance - Issues

- CETESB vs. Non-Regulatory
- Industry vs. Site-Specific Assistance
- Funding



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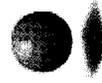


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# Program Options

- Chemical Usage Reporting
- Technical Assistance
- Chemical Usage Reduction Planning
- Public Disclosure
- Toxic Chemical Usage Fee
- Usage Reduction Targets
- Incentives



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# Chemical Reduction Planning

## Plan Content

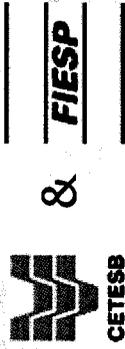
-  Identify reduction opportunities
-  Identify cost-effective projects
-  Set chemical reduction goals
-  Document progress meeting goals

## Full Plan On-Site

## Summary to CETESB



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# Issues Related to Planning

- Level of Detail in Plans
- Targets for Goal Setting
- Regulatory Involvement



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# Program Options

- Chemical Usage Reporting
- Technical Assistance
- Chemical Usage Reduction Planning
- Public Disclosure
- Toxic Chemical Usage Fee
- Usage Reduction Targets
- Incentives



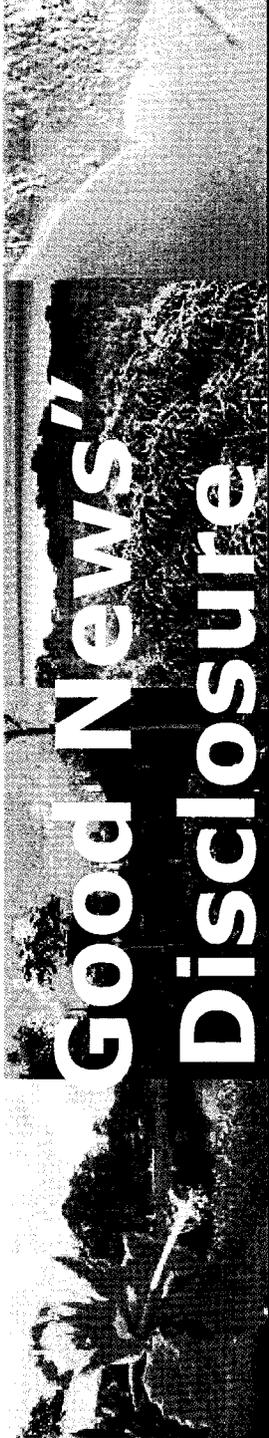


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-  Publish Successful Reduction Projects
-  Generate Positive Public Perception



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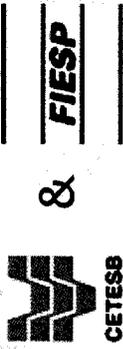
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# Chemical Use Inventory Disclosure

-  Publish Chemical Use on Internet
-  Similar to US Toxic Release Inventory
-  Public can identify highest emitters
-  Incentivizes Chemical Use Reduction
-  Chemical reduction publicized by company
-  Avoid being top emitter



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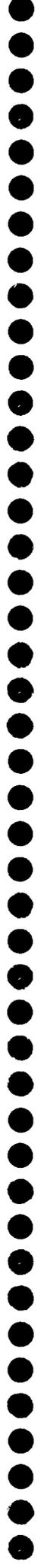
# Public Disclosure - How

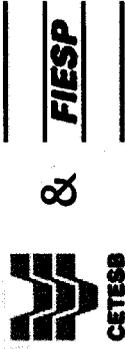
-  **Chemical Reduction Planning**
-  **Publish summary of plan**
-  **Provides accountability to public**



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# Public Disclosure - Issues

 Industry Concerns

 Trade Secret Data

 Public Misperception

 Level of Detail to Publish



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# Program Options

- Chemical Usage Reporting
- Technical Assistance
- Chemical Usage Reduction Planning
- Public Disclosure
- Toxic Chemical Usage Fee
- Usage Reduction Targets
- Incentives



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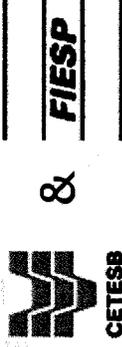
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# Fee Based on Toxicity

- Usage \* Toxicity Factor
- Higher Toxicity – Higher Fee
- Economic Incentive for Reduction





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# Toxic Chemical Usage Fee - Issues

## How Will CETESB Use Fee

-  Program administration
-  Technical assistance
-  Chemical use reduction research
-  Loan program

## Level of Fee

## Incentives for Reduction

-  Fee discount if toxics are reduced



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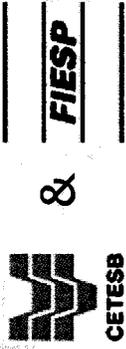


# Program Options

- Chemical Usage Reporting
- Technical Assistance
- Chemical Usage Reduction Planning
- Public Disclosure
- Toxic Chemical Usage Fee
- Usage Reduction Targets
- Incentives



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# Goals Set by Individual Companies

- Overall Percent Toxicity Reduction or
- Based on Cost-Effective Projects



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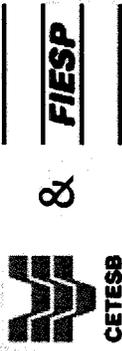
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# Goals Set by CETESB (Cap & Trade)

- Target Small List of Chemicals
- Cap Industry-Wide Use
- Lower Cap Over Time
- Purchase credits from others who reduced use



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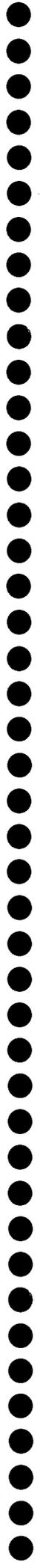
# Chemical Reduction Targets - Issues

- Voluntary vs. Mandatory Chemical Reduction Goal Setting
- Voluntary vs. Mandatory Compliance with Chemical Reduction Goals
- Set by Industry vs. Set by CETESB
- Credit for More Efficient Facilities
- Production-based standard



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# Program Options

- Chemical Usage Reporting
- Technical Assistance
- Chemical Usage Reduction Planning
- Public Disclosure
- Toxic Chemical Usage Fee
- Usage Reduction Targets
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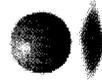
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# Extension of Permit Term

- Length of permit term relative to toxic reduction
- Could reduce costs related to applications over time
- If fee program is selected, could use fees for grants or loans to implement use reduction technologies



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# Expedited Permit

- Faster Permit Processing for
- ▶ Targeted chemical reduction projects
- ▶ Companies that show toxic chemical reductions





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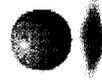
# Incentives - Issues

## Permit Extension

- Level of reduction required
- Amount of extension granted

## Expedited Permits

What would be useful to you?



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# Workshop Overview

- Program Goals
- Identify Toxic Chemicals
- Other Governments Programs
- Toxics Use Reduction Options
- Toxics Use Reduction Program Alternatives
- Discussion



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# Program Options

- Chemical Usage Reporting
- Technical Assistance
- Chemical Usage Reduction Planning
- Public Disclosure
- Toxic Chemical Usage Fee
- Usage Reduction Targets
- Incentives





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Program	1	2	3
Chemical Usage Reporting	X		
Technical Assistance			
Chemical Reduction Planning			
Public Disclosure			
Toxic Chemical Usage Fee			
Usage Reduction Goals			
Mandatory Chemical Use Reduction			



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## Program

Chemical Usage Reporting

Technical Assistance

Chemical Reduction Planning

Public Disclosure

Toxic Chemical Usage Fee

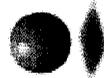
Usage Reduction Goals

Mandatory Chemical Use Reduction

1 2 3

X

X



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# Program 1 Timeline

Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year
1	2	3	4	5	6	7	8	9	10	11	12
<b>Program Setup</b>											
<b>Chemical Inventory</b>											
<b>Disclosure</b>											
<b>Evaluate List</b>											
<b>Program Evaluation</b>											



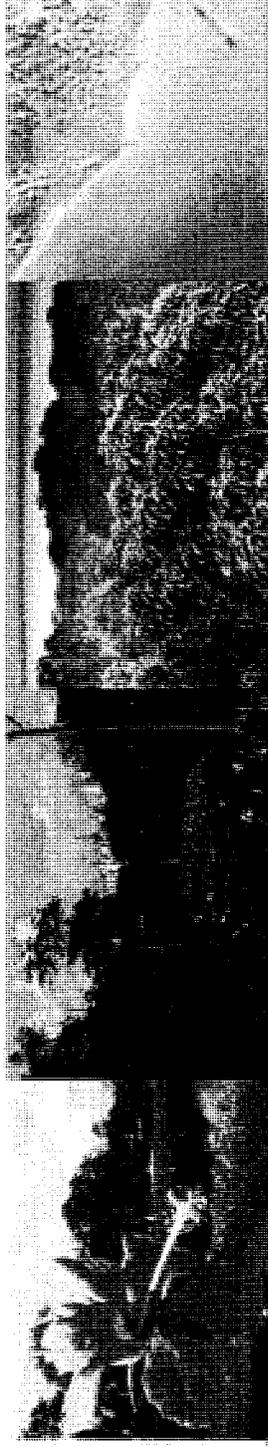
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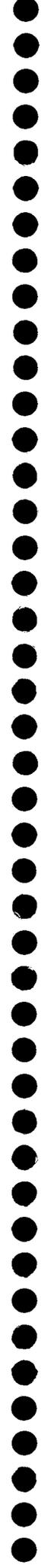


## Program

	1	2	3
Chemical Usage Reporting	X	X	
Technical Assistance	X	X	
Chemical Reduction Planning			
Public Disclosure			
Toxic Chemical Usage Fee			
Usage Reduction Goals			
Mandatory Chemical Use Reduction			



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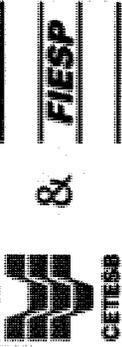


## Program

	1	2	3
Chemical Usage Reporting	X	X	
Technical Assistance	X	X	
Chemical Reduction Planning		X	
Public Disclosure			
Toxic Chemical Usage Fee			
Usage Reduction Goals			
Mandatory Chemical Use Reduction			



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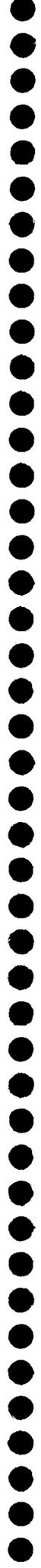
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Program	1	2	3
Chemical Usage Reporting	X	X	
Technical Assistance	X	X	
Chemical Reduction Planning		X	
Public Disclosure		X	
Toxic Chemical Usage Fee			
Usage Reduction Goals			
Mandatory Chemical Use Reduction			



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Program	1	2	3
Chemical Usage Reporting	X	X	
Technical Assistance	X	X	
Chemical Reduction Planning		X	
Public Disclosure		X	
Toxic Chemical Usage Fee		X	
Usage Reduction Goals			
Mandatory Chemical Use Reduction			



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Program	1	2	3
Chemical Usage Reporting	X	X	
Technical Assistance	X	X	
Chemical Reduction Planning		X	
Public Disclosure		X	
Toxic Chemical Usage Fee		X	
Usage Reduction Goals		X	
Mandatory Chemical Use Reduction			





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# Program 2 Timelines

Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year
1	2	3	4	5	6	7	8	9	10	11	12	12
<b>Program Setup</b>												
<b>Chemical Inventory</b>												
<b>Fee Program</b>												
<b>Disclosure</b>												
<b>Goal Setting, Reduction Planning</b>												
<b>Fee Collection</b>												
<b>Disclosure</b>												
<b>Evaluate List</b>												
<b>Re-do Plan</b>												
<b>Program Evaluation</b>												



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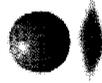
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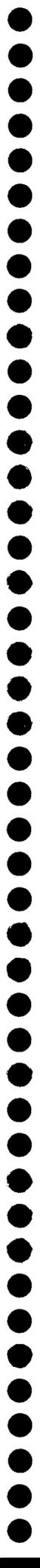


## Program

	1	2	3
Chemical Usage Reporting	X	X	X
Technical Assistance	X	X	X
Chemical Reduction Planning		X	X
Public Disclosure		X	X
Toxic Chemical Usage Fee		X	X
Usage Reduction Goals		X	X
Mandatory Chemical Use Reduction			



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Program	1	2	3
Chemical Usage Reporting	X	X	X
Technical Assistance	X	X	X
Chemical Reduction Planning		X	X
Public Disclosure		X	X
Toxic Chemical Usage Fee		X	X
Usage Reduction Goals		X	X
Mandatory Chemical Use Reduction			X



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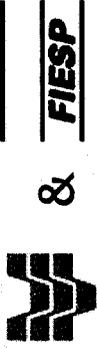
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# Program 3 Timeline

Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	
1	2	3	4	5	6	7	8	9	10	11	12
<b>Program Setup</b>											
Chemical Inventory											
CETESB Set Reduction Goals											
Implement Chemical Reductions											
Public Disclosure											
Evaluate Chemical List											
Re-do Plans											
Disclosure Program Evaluation											



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# Workshop Overview

- Program Goals
- Identify Toxic Chemicals
- Other Governments Programs
- Toxics Use Reduction Options
- Toxics Use Reduction Program Alternatives
- Discussion



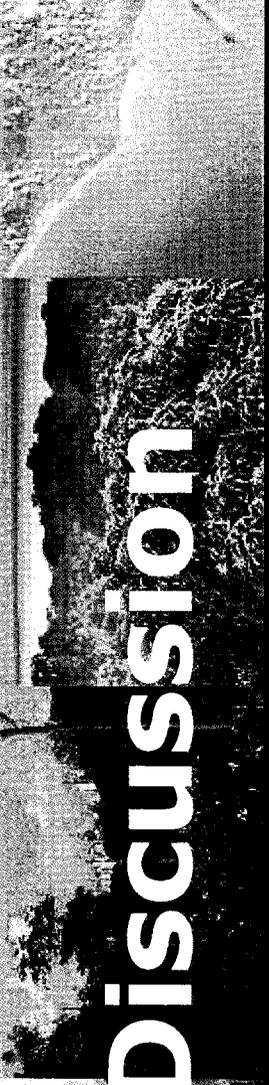
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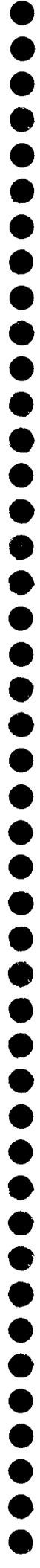


# Discussion

- Share experiences
- Improve understanding of approaches
- Discuss what approaches would best be used in your program
- Provide written comments
- Work through existing communication channels



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# Chemical Usage Reporting - Issues

## Targeted Chemical List

-  Based on toxicity factors
-  How many and which chemicals?
-  Reporting Frequency



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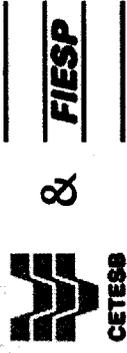
# Chemical Usage Reporting - Issues

## De Minimis Thresholds

-  Number of employees
-  Annual company revenue
-  Concentration of compound in chemical
-  Total quantity of compound used



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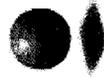
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# Technical Assistance - Issues

- CETESB vs. Non-Regulatory
- Industry vs. Site-Specific Assistance
- Funding



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# Issues Related to Planning

- Level of Detail in Plans
- Targets for Goal Setting
- Regulatory Involvement



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# Public Disclosure - Issues

 Industry Concerns

 Trade Secret Data

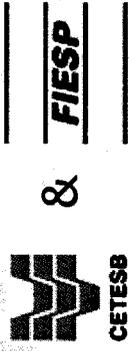
 Public Misperception

 Level of Detail to Publish



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# Toxic Chemical Usage Fee - Issues

## How Will CETESB Use Fee

-  Program administration
-  Technical assistance
-  Chemical use reduction research
-  Loan program

## Level of Fee

## Incentives for Reduction

-  Fee discount if toxics are reduced



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# Chemical Reduction Targets - Issues

- Voluntary vs. Mandatory Chemical Reduction Goal Setting
- Voluntary vs. Mandatory Compliance with Chemical Reduction Goals
- Set by Industry vs. Set by CETESB
- Credit for More Efficient Facilities
- Production-based standard



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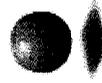
# Incentives - Issues

## Permit Extension

-  Level of reduction required
-  Amount of extension granted

## Expedited Permits

 What would be useful to you?



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# Discussion

- Share experiences
- Improve understanding of approaches
- Discuss what approaches would best be used in your program
- Provide written comments
- Work through existing communication channels



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## List of Participants

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# Programa de Redução de Substâncias Tóxicas

Workshop FIESP - dia 29 de novembro

## LISTA DE PRESENÇA

NOME	EMPRESA	TELEFONE	EMAIL	VISTO
Edson Arapiraca	Air Products	71-3523-2732	ARAPIRACA@AIRPRODUCTS.COM	<input checked="" type="checkbox"/>
M. Z. Fátima S. de Melo	Simpaguma/PAU	(11) 44781513	Fatima@simpaguma.com.br	<input checked="" type="checkbox"/>
Edson Santos	CETESB	(11) 3133-1711	edson@cetebnet.sp.gov.br	<input checked="" type="checkbox"/>
Ives Alcazar	CETESB	(11) 3133-3448	ivesa@cetebnet.sp.gov.br	<input checked="" type="checkbox"/>
Flavio Ribeiro	CETESB	(11) 3133-3497	flavio@cetebnet.sp.gov.br	<input checked="" type="checkbox"/>
Helio Yurvanoff	CETESB	(11) 3133-3495	helioy@cetebnet.sp.gov.br	<input checked="" type="checkbox"/>
Edson Basso Otti	Suzano	(11) 3583-5655	edson.otti@suzano.com.br	<input checked="" type="checkbox"/>
Miriam Peter Zepi	CETESB	(11) 3133-3501	miriam@cetebnet.sp.gov.br	<input checked="" type="checkbox"/>
Jorge Luiz N. Goulart	CETESB	(11) 3133-3493	jorgeg@cetebnet.sp.gov.br	<input checked="" type="checkbox"/>
Sara Peeler	W.A. State	360-467-6666	sara.peeler@wastate.gov	<input checked="" type="checkbox"/>
André Luis SARAINA	ATIUEE	9989 4985	andreluis@atiuee.org.br	<input checked="" type="checkbox"/>
Morw A. Barbieri	FIESP	9974 1869	morw@wabybor.com.br	<input checked="" type="checkbox"/>
Verônica M. Horner Hoe	ABIPLA/SIPLA	3816-3405	regulatorio@abipla.org.br	<input checked="" type="checkbox"/>
Maria Cecília Oliveira	CETESB	3133 3743	cecilia@cetebnet.sp.gov.br	<input checked="" type="checkbox"/>
Carlos E. Komatsu	CETESB	3133-3068	carbst@cetebnet.sp.gov.br	<input checked="" type="checkbox"/>
Edison da S. Campa	ABTCP/FIND. CEN. CEN. CEN.	38742227	edison@abtcp.org.br	<input checked="" type="checkbox"/>
Gabriela Fernanda Tomarelli	CETESB	31333128	gabrielaf@cetebnet.sp.gov.br	<input checked="" type="checkbox"/>
Lizyete J. Passari	Ceteb	3133 3050	lizyete@cetebnet.sp.gov.br	<input checked="" type="checkbox"/>
Angela Machado	Ceteb	3133 3581	el@cetebnet.sp.gov.br	<input checked="" type="checkbox"/>
Luizano Coelho	DMA/FIESP	35494677	luizano@fiesp.org.br	<input checked="" type="checkbox"/>
Luís Carlos V. GULIN	CIERE ACQUIS	(13) 33628032	luiscarlos@ciere.com.br	<input checked="" type="checkbox"/>
Teodoro C. Pavao	Carbocloro	(13) 3362-8034	teodoropavao@carbocloro.com.br	<input checked="" type="checkbox"/>
Obdulio	ABTD/DM	2146-4720	obdulio@abtd.org.br	<input checked="" type="checkbox"/>
REGIS NIETO	CETESB	3133 3134	REGISN@CETESBNET.SP.GOV.BR	<input checked="" type="checkbox"/>
Pedro P. Castanho	CETESB	3133 3551	pedro@cetebnet.sp.gov.br	<input checked="" type="checkbox"/>
Aniela A.B. Pio	DMA/FIESP	35494253	abpio@fiesp.org.br	<input checked="" type="checkbox"/>
Ricardo L. Garcia	FIESP	3549 4365	RLGARCIA@FIESP.ORG.BR	<input checked="" type="checkbox"/>
DARIO F. ZOTIÇA	CETESB	3133 3565	dario@cetebnet.sp.gov.br	<input checked="" type="checkbox"/>
Edson M. Oliveira	CETESB	3133 3070	edson@cetebnet.sp.gov.br	<input checked="" type="checkbox"/>

NOME	EMPRESA	TELEFONE	EMAIL	VISTO
Boelha Figueira	CASTESB	3133-4075	boelha@castesb.sp.gov.br	
Marcelo Mirella	CETAB	3133-3493	marcelo@castesb.sp.gov.br	
Deschael De Merio	SIMEFRE	3285-5166	simex@simex.sp.gov.br	
Rui Alves de Oliveira	Ficsp	3549-9479	ruiloliveira@ficsp.sp.gov.br	
Maria Marta T. Vaz	FIESP	3549-4546	mmarta@ficsp.org.br	
Nilton Forcassari F	FIESP/AN 4	3549-4491	nffilho@ficsp.org.br	
MARCELO KOS	ABIGNIM	8196-3804	marcelo@abignim.org.br	