

National CTC Phase-out Plan

# Meeting the Challenge

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THE INDUSTRY'S GUIDE  
TO TECHNICAL  
ASSISTANCE

## GTZ-Proklima's implementation partners include:

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All India Industrial Gases  
Manufacturers' Association (AIIGMA)



Bengal Chamber of Commerce  
and Industry (BCCI)



Electrochemical Society  
of India (ECSI)



Indian Chemical Merchants' and  
Manufacturers' Association (ICMMA)



Karnataka Small Scale  
Industries Association (KASSIA)

Office of the Textile  
Commissioner



Textiles Committee

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## CONTENTS

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What's the Problem with CTC?.....	1
The Challenge Ahead .....	2
How We Assist You .....	3
Industries Affected.....	4
Publications for You.....	7
Sneak Preview: Solvent Alternatives.....	8
GTZ's Portfolio in a Nutshell .....	10



# WHAT'S THE PROBLEM WITH CTC?

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**THE PROBLEM:** Carbon tetrachloride (CTC), a common solvent, poses a health risk and endangers life on Earth. Occupational exposure affects the central nervous system (CNS) causing dizziness, headache and vomiting. Moreover it is rated as a possible human cancer hazard.

Once evaporated, CTC rises up to the atmosphere where it destroys the ozone layer. This allows more ultraviolet (UV) rays to pass through the ozone shield that protects our Earth. UV rays contribute to eye cataract and skin cancer, besides endangering plants and aquatic life.

Thus the impacts of CTC are felt at the local workplace as well as on our planet as a whole.

**THE SOLUTION:** To protect our health and environment we need to stop using CTC and other substances that destroy the ozone layer.



**THE RESOLUTION:** India along with 190 other signatories to the Montreal Protocol on Substances that Deplete the Ozone Layer, has resolved to remove ozone depleting substances from its markets. CTC supplies were drastically reduced in 2005 and this trend is expected to continue until complete phase-out in December 2009.

# THE CHALLENGE AHEAD

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**DECLINE IN CTC SUPPLY:** The phase-out schedule has resulted in a sharp decline of production and supplies of CTC. As the supply falls below the demand, prices are rising sharply. Industries continuing to use CTC will find procurement increasingly difficult. Therefore, it is imperative to identify suitable alternatives rapidly. However, there being no ban on CTC, it will be available until December 2009.

**DIVERSITY OF USE:** CTC has applications across a wide range of industry segments. It is typically used as a cleaning agent; the materials cleaned range from solids such as metal, glass and rubber to delicate fabric and photographic films. Contaminants removed by CTC are equally varied and include grease, oils, dust, carbon, inks and gums.

**SELECTION OF ALTERNATIVES:** It has become evident that there is no universal substitute for CTC. A host of alternative options do exist but there is a need to identify for each industry segment the alternatives that suit it best.



***Making the right pick***  
*A section of cleaning agents ready at hand*

# HOW WE ASSIST YOU

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**EVALUATION OF REQUIREMENTS:** In consultation with affected industries, GTZ evaluates the requirements of processes currently involving CTC. In order to understand the technical and economical dimensions of these processes, GTZ relies on close interaction with the industries.

**SUBSTITUTE IDENTIFICATION:** The process of identifying suitable substitutes for affected industries is in full swing. For most industry segments one or more alternative products have already been identified. In many cases GTZ learns from the experience of industries that have already switched to alternative products.

**SUBSTITUTE ASSESSMENT:** In order to assess critical parameters such as performance, cost, and health and safety risks of alternatives, GTZ conducts tests on candidate alternatives in the laboratory and/or in the industry. The aim is to establish and provide a holistic set of reliable indicators so as to enable industry to take informed decisions.

**TECHNICAL ASSISTANCE:** Information on substitutes is shared with industries, free of charge. GTZ's outreach programme includes technical seminars for affected industries and capacity building wherever required. Information dissemination is further enhanced through publications, articles in industry specific journals and through its website.

# INDUSTRIES AFFECTED

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From among the industries currently using CTC, the largest users affected by the CTC phase-out are the textile and metal industries. Others such as the general manufacturing and capital goods servicing industries too are affected. The following three pages summarise industries that are affected or likely to be affected by the phase-out of CTC.

<b>Textile, Offset and Film</b>	
<b>Film distributors</b>	- <i>Film cleaning</i>
<b>Offset printing</b>	- <i>Film cleaning</i>
<b>Textile industry</b>	- <i>Fabric stain removal</i> - <i>Wool scouring</i>
<b>Yarn spinning mills</b>	- <i>Cot cleaning</i>



**Yarn spinning mills**  
Rubber cots are cleaned at regular intervals

**Engineering**  
Metal  
degreasing  
often relies on  
solvents such  
as CTC



### **RAC**

*Servicing requires solvents.  
CTC is a popular cleaning  
agent for circuitry coils*

## **Iron and Steel**

### **Engineering and electroplating**

- Metal degreasing;
- Precision cleaning;
- Stainless steel forging

### **Foundries**

- Investment casting;
- Millipore test

### **Refrigeration and air-conditioning (RAC)**

- Circuitry cleaning

### **Ship yards**

- Machine maintenance

### **Steel plants**

- Motor cleaning;
- Vessel cleaning

## Miscellaneous industries

<b>Fire extinguisher manufacturers</b>	- <i>Fire extinguishing agent</i>
<b>Jewellery industry</b>	- <i>Investment casting;</i> - <i>Diamond cleaning</i>
<b>Manufacturing and service industry</b> (in general)	- <i>Contact cleaning;</i> - <i>Motor cleaning;</i> - <i>Machine cleaning</i>
<b>Oil refineries</b>	- <i>Analysis of refined oil</i>
<b>Oxygen manufacturing</b>	- <i>Pipeline, valve and cylinder nozzle cleaning</i>
<b>Power plants and utilities</b>	- <i>Contact cleaning;</i> - <i>Generator cleaning</i>



**Across industry sectors**  
Contacts and motors are cleaned with CTC

## PUBLICATIONS FOR YOU

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A sizeable number of industries have adopted a range of alternative cleaning agents. GTZ has published a compilation of these alternatives in use for the entire range of known CTC applications.

***Solvent Alternatives*** provides detailed information on other solvents. It profiles 19 products available in the market along with prices, properties and occupational health risks. Every solvent has limitations. An understanding of strengths and weaknesses is essential for taking informed decisions. See a preview of features of this publication overleaf.



Printed copies of GTZ's publications are available on request, free-of-charge to CTC users. Additionally these may also be downloaded from our website [www.ctc-phaseout.org](http://www.ctc-phaseout.org).



**Further uses in the cross-section of industries**

*Browse the spectrum of special uses*

adhesives, varnishes, typewriter spot removers and disinfectants.

- **Further uses** as dye lubricant in casting and stamping; as heat transfer agent; as refrigerant; as drying agent for metal, glass, wood and food; as freezing point depressant and as fumigant.

**Health concerns**

TCE causes tumours and leukaemia in animals and is **probably carcinogenic** for humans. Pregnant women should avoid exposure since it may cause heart problems in the offspring. TCE has been found in drinking water supplies as a result of groundwater contamination through industrial discharges.

**Short-term exposure** causes central nervous system (CNS) depression with symptoms of drowsiness, headache and loss of coordination. High concentrations may also affect the heart.

High concentrations may cause nose and throat irritation, numbness and facial pain, loss of eyesight, unconsciousness and death.

**Long-term exposure** causes altered memory of memory and inability to concentrate or sleep. It can cause liver damage. Visual disturbances including blurred, double or tunnel vision and poor eyesight have occasionally been reported.

**Skin:** TCE is a severe skin irritant. It can cause redness, irritation and blister formation.

**Occupational health concerns**

*Understand critical issues to help safeguarding workers' health*

# GTZ'S PORTFOLIO IN A NUTSHELL

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**THE MANDATE:** Under the framework of the Multilateral Fund of the Montreal Protocol, Germany and France have mandated GTZ-Proklima to provide technical assistance to affected small and medium scale industries in India. These activities are being undertaken with consent of the Ozone Cell of the Indian Ministry of Environment and Forest.

**THE OFFER:** GTZ offers technical assistance to industries currently using up to 10 metric tons or 6,250 litres of CTC per year. In close interaction with industries, GTZ identifies viable alternatives for known uses of CTC. GTZ's free-of-charge services aim to provide competent guidance in identifying CTC substitutes that do not compromise on quality and competitiveness of the industry.

**THE ACHIEVEMENTS:** Since 2004 GTZ has been providing support to the textile industry where CTC is used as a fabric stain remover. In cooperation with Textiles Committee, 30 alternative stain removers have been tested and their performance and cost effectiveness has been assessed in the laboratory. The results confirm that a number of suitable substitutes exist, many of which costing less than CTC.



***Vanishing stains***  
*Experienced hands at work*

While detergent based solutions have emerged as the most viable alternatives for stain removal from garments, solvents have been identified as the best options in the case of powerlooms.

GTZ's current efforts are focussed on performance evaluation of alternatives in the industry environment and on making stain removing equipment more affordable for small-scale industries.

***Building  
capacity  
Training  
of trainers,  
Tirupur***



GTZ's support to the textile industry comes in the form of technical seminars and tailor-made publications. A training package aimed at reorienting industry staff in adopting good practices with alternatives is currently being launched in Tirupur, Tamil Nadu.





**Ozone Cell**, Ministry of Environment and Forests, Government of India, is the central agency coordinating the phase-out of CTC. The cell has established the regulatory framework and national phase-out plan. It ensures that domestic CTC production and import progressively decrease in compliance with national targets.

**Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ)** is a German development assistance organisation mandated by the German Ministry for Economic Cooperation and Development (BMZ). GTZ implements bilateral and multilateral projects, assisting partner countries in fulfilling their obligations to international conventions. Germany is one of the largest bilateral partners of the Multilateral Fund and BMZ has mandated GTZ to assist developing countries in the implementation of the Montreal Protocol with its sectoral programme Proklima. In the current project GTZ holds an additional mandate from Agence Française de Développement (AFD) on behalf of France who provides financial support through Fonds Française pour l'Environnement Mondial (FFEM).

## National CTC Phase-out Plan

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*Engage us!  
Free of charge.*

No conditions apply