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Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Final report on suggestions and recommendations

Consultancy services for analysis of organizational structures, procedures and processes of public agencies at National & State (Uttarakhand) level to effectively combat industrial wastewater pollution

November 2019

Submitted By:

Deloitte Touché Tohmatsu India LLP

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Glossary

Abbreviation	Description
AQM	Air Quality Monitoring
BCM	Billion Cubic. Metre
BOD	Biochemical Oxygen Demand
CAGR	Compounded Annual Growth Rate
CCA	Consolidated Consent and authorization
CEMS	Continuous Effluent/Emission Monitoring system
CEPI	Comprehensive Environmental Pollution Index
CETP	Centralized Effluent Treatment Plant
CGWA	Central Ground Water Authority
CMM	Capability Maturity Model
COD	Chemical Oxygen Demand
COINDS	Comprehensive Industry Document Series
CPA	Critically polluted areas
CPCB	Central Pollution Control Board
CPHEEEO	Central Public Health and Environmental Engineering Organization
DTTILLP	Deloitte Touche Tohmatsu India LLP
EC	Environmental Clearance
EPI	Environmental Performance Index
ETP	Effluent Treatment Plant
ETU	Environmental Training Unit
FY	Financial Year
GDP	Gross Domestic Product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmBH
GPIs	Grossly polluting industries
GST	Goods & Service Tax
GW	Ground water
HAZWAMS	Hazardous Waste Management Series
HPIs	Highly polluting industries
IIT	Indian Institute of Technology
INR	Indian National Rupee
IPC	Industrial Pollution Control
IST	Industry Specific Taskforce
IT	Information Technology
MCC	US Millenium Challenge Corporation
MINAS	Minimum National Standards
MLD	Million Litres per day
MoEFCC	Ministry of Environment, Forest and Climate Change
MSME	Micro, Small and Medium Enterprises
NEA	National Environmental Agency of Singapore

Abbreviation	Description
NEERI	National Environmental Engineering Research Institute
NGT	National Green Tribunal
NPL	National Physical Laboratories
NWMP	National Water Quality Monitoring Program
OCEMS	Online Continuous Effluent/Emission Monitoring system
OPA	Other Polluted Areas
PCC	Pollution Control Committees
PCP	Pollution Control Plan
PI	Pollution Index
PR	Public Relation
SDG(s)	Sustainable Development Goal(s)
SEIP	Sustainable & Environment-Friendly Industrial Production
SIIDCUL	State Industrial Development Corporation of Uttarakhand Ltd.
SIDA	State Industrial Development Authority
SOP	Standard Operating Procedure(s)
SPA	Severely Polluted Areas
SPCB	State Pollution Control Board
SPV	Special Purpose Vehicle
SW	Surface Water
SWOT	Strength Weakness Opportunity Threat
ToR	Terms of Reference
TPA	Third Party Assessors
TPDS	Technology Provider for Data submission
TSS	Total Suspended Solids
UK	United Kingdom
UN	United Nations
UPC	Urban Pollution Control
US	United States
USD	United States Dollar
USEPA	United States Environmental Protection Agency
WM	Waste Management
WQM	Water Quality Monitoring
WQMS	Water Quality Monitoring stations
WQX	Water Quality Exchange
ZLD	Zero Liquid Discharge

I. Introduction

This chapter presents a brief background & context of the study, progress of the consultancy services, purpose and structure of this report.

A. Background to the study

India's vision to promote manufacturing sector's contribution to GDP

India's development is shaped by the industry sector, which contributes to almost 30 per cent of the nation's Gross Domestic Product. With the launch of the **Make in India** initiative, the Government of India aims to increase the share of the manufacturing sector to the gross domestic product (GDP) to 25 per cent by 2022, from ~17 per cent, and to create 100 million new jobs by 2022.

Need for "Sustainable & Environment-Friendly Industrial Production" (SEIP)

With increasing industrial development, there is also substantial increase in the environment related risks such as increasing pollution levels, overuse of natural resources, increasing amounts of waste and wastewater leading to endangerment of ecosystems. To combat this, both the central and the state governments, are keen on adopting modern processes for sustainable industrial production. To aid the government in undertaking such initiatives, project "Sustainable & Environment-Friendly Industrial Production" (SEIP) was conceived as a joint project of Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India, within the framework of the Indo-German technical cooperation.

Context of the engagement, to strengthen the strategic and operational governance structures to effectively combat pollution from industrial wastewater

The second phase of this SEIP project now aims to promote sustainable industrial development by **reducing and regulating pollution from industrial wastewater through strengthening of strategic and operational governance structures** at both national and state level. In lieu of this, GIZ has appointed Deloitte Touche Tohmatsu India LLP (DTTILLP) as the consultant for "Analysis of organizational structures, procedures and processes of public agencies at National & State (Uttarakhand) level to effectively combat industrial wastewater pollution – Output II" ("Project") under SEIP Phase II.

B. Progress of the Consultancy Services

Following the signing of the contract in July, Deloitte Touche Tohmatsu India LLP mobilized a study team and commenced the consultancy engagement. A preliminary kick-off meeting was organized on 17th July 2019, which was attended by representatives from GIZ and the study team.

Post the kick-off meeting, the study team conducted preliminary discussions with the concerned national and state level stakeholders (officials from MoEFCC, CPCB, UEPPCB, SIIDCUL, SIDA, etc.) to understand the key concerns from an organization structure and process perspective from these stakeholders. Based on these discussions and subsequent primary/secondary research undertaken by the study team, a 'Gap Analysis and Needs Assessment report' with sections on diagnostic review of the organizations and the key institutional gaps was drafted.

Select key suggestions/ recommendations were identified and discussed with CPCB officials in the workshop held on 01st November, 2019 and with UEPPCB officials on 22nd October, 2019. The key emerging suggestions based on these stakeholder discussions have been drafted in detail in this **"Final suggestions/recommendations report"** The progress of the consultancy services, with the status on key deliverables is tabulated below:

Key Deliverable	Contents	Status
Deliverable 1	Inception Report	Completed
Deliverable 2	Draft Report on Gap Analysis/Need Analysis	Completed
Deliverable 3	Report on the stakeholder workshop and TWG meetings on Gap Analysis	Completed
Deliverable 4	Final report on Gap Analysis	Completed
Deliverable 5	Draft report on suggestions/ recommendations	Completed
Deliverable 6	Report on the stakeholder workshop and TWG meetings on draft report on suggestions/ recommendations	Completed
Deliverable 7	Final report on suggestions/ recommendations	This report
Deliverable 8	Report on consultancy services	In Progress

C. Scope and Structure of this Report

As per the ToR, the "Final Report on suggestions/ recommendations" shall detail out the key suggestions for improving the existing organizational structures, procedures and processes, possible tools and enhancing the cooperation with various involved stakeholders, strategic partnerships, at both national & state level related to industrial wastewater management.

Accordingly, this ""Final Report on suggestions/ recommendations" consists of separate sections/ parts, each focusing on a specific organization selected for the study, as below:

- "Part A" in the context of the National agency – Central Pollution Control Board
- "Part B" in the context of the State agency – Uttarakhand State Pollution Control Board
- "Part C" in the context of the State industrial development agency – SIIDCUL & SIDA

This report contains the chapters as presented in table below:

Introduction	**Chapter I**
Part A – Central Pollution Control Board	**Chapter II**
Brief overview of the baseline assessment	**Section 1**
Detailed suggestions/ recommendations	**Section 2**
Summary & way forward	**Section 3**
Detailed relevant Case studies	**Annexure -1**
Part B – Uttarakhand Environment Protection Pollution Control Board	**Chapter III**
Brief overview of the baseline assessment	**Section 1**
Detailed suggestions/ recommendations	**Section 2**
Summary & way forward	**Section 3**
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Part C – Uttarakhand's SIIDCUL and SIDA	**Chapter IV**
Brief overview of the baseline assessment	**Section 1**
Detailed suggestions/ recommendations	**Section 2**
Summary & way forward	**Section 3**
Detailed relevant Case studies	**Annexure -1**
Way Forward	**Chapter V**

II. PART A – Central Pollution Control Board

1. Brief overview of the Baseline Assessment

The institutional strengthening of CPCB is being envisaged as part of the overarching mission of GIZ to strengthen organizational structure and processes. both at the national and state level, in the industrial wastewater context. This chapter presents a brief background of the works undertaken thus far, as part of the study and the methodology adopted for detailing the solutions.

1.1 An overview of CPCB

The Central Pollution Control Board (CPCB), established in September 1974, is a statutory organization of Ministry of Environment, Forest & Climate Change (MoEFCC) at National Level for prevention and control of pollution with its head office at New Delhi, and seven (7) zonal offices.

The key **statutory functions** of CPCB are as follows**:**

- As per Section 16 of **Water (Prevention and Control of Pollution) Act**, 1974 and **Air (Prevention and Control of Pollution) Act**, 1981 – *16 functions*
- Issue directions to SPCBs under Section 18, and can take over functions of SPCB, when needed
- Issuing directions (directly) to industries under Section 5 of **Environment (Protection) Act**, 1986
- Coordinating role as per the Rules framed under EPA

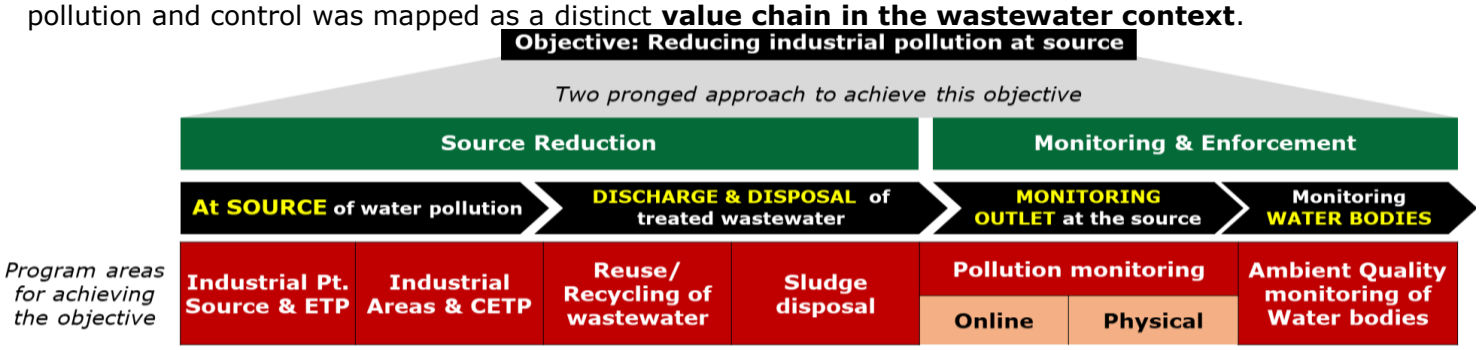
In addition to these statutory functions, CPCB also undertakes these additional activities:

- **Technical support to judiciary** (NGT), as per directions, on matters pertaining to abatement of pollution
- Coordination under bilateral/**multi-lateral agreements**
- coordinating with **research institutes** and setting up research committees for R&D works
- **Laboratory services** – advance labs and regular QA/QC for SPCBs, proficiency test, etc.

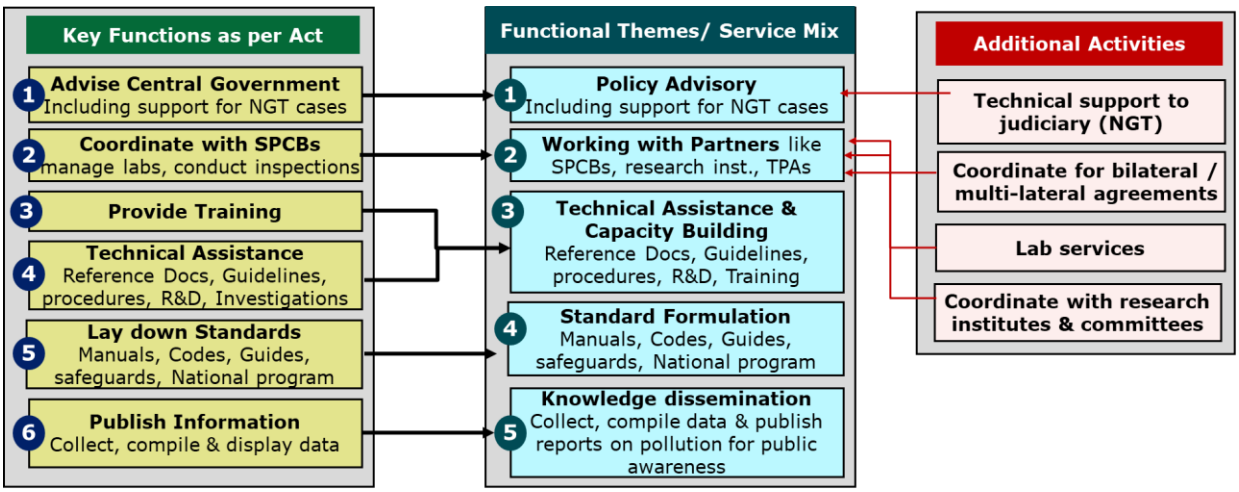
1.2 Key activities undertaken in our baseline assessment

(1) Mapping the roles & functions of CPCB

As a first step of our baseline assessment, the key role of CPCB as a national regulator for environmental pollution and control was mapped as a distinct **value chain in the wastewater context**.

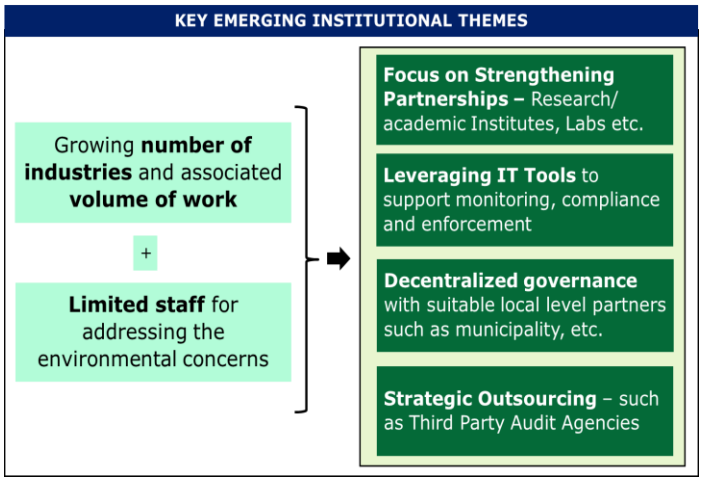


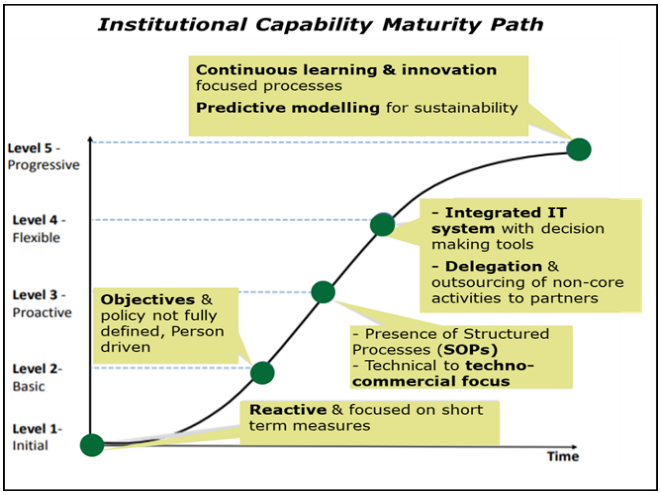
Additionally, the emerging functions from the key governing acts, and other functions performed by CPCB were mapped as **functional themes**.



(2) Study of the organization and governance structure

Secondly, the horizontal, vertical and office structure of CPCB, along with the manpower alignment in each of these aspects were studied in detail. The study tried to understand the various functions that are to be performed by CPCB against the available staff for undertaking these activities. Based on the organizational studies undertaken, the following key implications emerged for CPCB's organization and governance structure





(3) Process gap analysis and needs assessment

With the future institutional maturity path and the above key themes in mind, the key processes for each element in the value chain was assessed in terms of their suitability to the various functional themes of CPCB as shown below.

Approach to identify gaps	1 Industrial Pt. Source & ETP	2 Industrial Areas & CETP	3 Reuse/ Recycling	4 Sludge disposal	5 Pollution monitoring: Online	5 Pollution monitoring: Physical	6 Ambient Water Quality Monitoring

Thrust areas for achieving the objective

Functional Themes

1. **Policy Advisory** Incl. support for court cases
2. **Working with Partners**
3. **Technical Assistance & Capacity Building** Reference Docs, Guidelines, procedures, R&D, Training
4. **Standard Formulation** Manuals, Codes, Guides, safeguards, National program
5. **Knowledge dissemination** Collect, compile & display data to generate public awareness

Key Function as per the Acts

For each Thrust Area along (X-axis), following will be done

Gap Analysis			Needs Assessment	
Current state	**Desired state**	**Identified Gap**	**Gap due to structure/ process/ skill**	**Evidence for the need**
What is currently happening?	What should be happening?	Difference	Underlying root cause for the current state	Evidence to validate that the gap exists
• Understanding existing status, processes & tools • Mapping to functional themes (Y axis)	Using key features of the desired level identified for functional themes in 5.6	Difference in current & desired state	Improvement areas in terms of structure, process, and partnership	Suitable examples and evidence to prove the need for improvement

1.3 Key emerging suggestions based on baseline assessment

The detailed institutional gap analysis was done both from an organizational standpoint and the key process improvements that need to be undertaken. Of the various emerging improvement areas, select focus suggestions were identified in discussion with various stakeholders, in the workshop conducted on 1st November, 2019.

The following table summarizes some of the **key emerging solutions/recommendations** for CPCB for improving the existing organizational structure, procedures and processes and enhancing the cooperation aspects with various strategic partners.

Type of intervention	Emerging Thrust Areas for CPCB	Key suggestions and recommendations
Tools / System interventions	**Pollution Monitoring Tools**	• **Integrated Industry Portal** – an inventory of all industries at one place with **linking NIC codes**
Process Interventions	**Enabling delegation and a decentralized governance structure & processes**	• Developing a "**Pollution Audit Policy**" - for enabling deployment of Third Party Agencies (TPAs) for monitoring and compliance reporting - empanelment, technical guidelines for TPAs, and commercial guideline on different payment modes
	Reuse and Recycling of treated industrial wastewater	• Developing **technical standards** for reuse/recycling • Enabling a legal **Policy framework** on reuse and recycling of treated industry wastewater • **Guidelines** for enabling reuse- technical, commercial & institutional aspects
	Guidelines for developing and managing Environmental Infrastructure – CETP & Sludge disposal	• Guidebook on CETP development – covering aspects on technology, business model, techno-commercial guidelines etc
		• Guidebook on sludge disposal – covering technology, business model, techno-commercial guidelines etc
Structural interventions	**Strengthening the organization structure in the context of industrial wastewater**	• Explore the possibility to have a **functional oriented structuring** rather than a sectoral approach with three sub-functional divisions • (i) ***standard formulation***, • *(ii)* ***monitoring & compliance*** *and* • *(iii)* ***technical & financial assistance***

2. Detailed suggestions/ recommendations for CPCB

This chapter details the select structural, process and system interventions for CPCB, identified and agreed from the baseline gap analysis and needs assessment studies undertaken by the study team.

2.1 Methodology adopted for detailing the solutions

We understand, from the Terms of Reference and stakeholder discussions, that the key purpose of this report is to **detail out the suggestions/recommendations for CPCB to implement the same, given their current structure and manpower constraints.**

Therefore, accordingly, the detailing of each suggestion, covers the following aspects:

(1) **What is the solution?** – its objective and scope
(2) **Need and Impact for the solution** – strategic institutional need for the solution, benefits and beneficiaries, possible advantages for implementing the solution and the complexity involved in implementation, if any
(3) **Has this been attempted earlier?** – any past global/ local experiences with key learnings
(4) **Adapting the solution for CPCB context** –
   a. key features of the solution
   b. who can take this work in CPCB?
   c. What are the current works done by the particular division
   d. Need for strategic outsourcing/ partnerships/ role delegations
(5) **How to implement the solution**? –
   a. listing the steering structure for implementing the solution
   b. role of various stakeholders,
   c. competency/skills required for each stakeholder,
   d. manpower required for each stakeholder
   e. divisional staff alignment for undertaking the solution
   f. suitable partnerships for enabling the solution and their skill/competency

To tackle the growing number of environmental concerns with its limited workforce, it is imperative for CPCB to have a suitably aligned organization structure supported by standardized procedures and tools. Keeping these in mind, this chapter details out some of the possible interventions that may be considered by CPCB, for improving its existing organizational structure, procedure and processes.

2.2 Integrated Industry Portal – linked with NIC Code

(a) Objective and Scope of the solution

Objective: One place for all industry data in the country that can be developed with multi-users and accessed by multiple beneficiaries for taking actions on improved industrial pollution control and management.

Scope of the solution:

- **Data from multi-users:** MoSPI, CEMS instruments, Industrial self-monitoring reports, empanelled inspection bodies, SPCB & CPCB
- **Linking NIC code to CPCB categorization**, therefore using Annual Survey of Industries data to inventorize all industries by location
- For each industry**, a one-stop portal**, displaying status of consent, category, pollution levels, and monitoring report
- Data can be **searched and downloaded** using search parameters such as Location, Pollutant parameters, SPCBs, Industry by name, industry category/type, and Time.
- **Data alert system** - optimizing alert prioritization using CEPI score of the region, industry category and deviations observed
- **Statistical Reports** on selected/filtered parameters – such as performance of industry, works done by SPCB, etc.
- Downloadable Desktop App for easier analysis of selected data.

(b) Need and Impact for the solution

Need for an inventory of all existing industries in the country: CPCB does not have the data of all industries in the country, by category, which leads to the following issues:

- Difficult to assess the quantum of waste generated from the industries and also monitor the environmental performance of the industries.
- Without the exhaustive list of industries, it is also challenging to understand the status of consent and physical inspection carried out by different SPCBs.
- In several instances, it has been observed that the number of industries reported by the state and that by the PCB differs. For example, in the case of Uttarakhand, in a recent NGT case, the state identified 70 seriously polluting industries, while the NGT with help of PCBs assessed that there may be over 298 seriously polluting industries in the country.

Therefore, there is a clear need for inventorizing the list of industries in the country, though in terms of effort, it is a tedious task, to be carried out by CPCB/ SPCBs alone.

To ease this work, and **to capitalize on the already existing data** of industries in the country, the possibility of linking 'Annual Survey of Industries' conducted by MoSPI may be explored.

Why & How to link the data from NIC:

- The National Industrial Code (NIC), classifies industries based on class, sub-class, etc. providing a unique code for each type of industry. The NIC code has over 21 Sections of industries, each with various divisions, Groups, Class & sub-classes, classifying over **238 groups of industries** and over **1300 sub-classes**.

Level	Description
Section C	Manufacturing
Division 13	Manufacture of textiles
Group 131	Spinning, weaving and finishing of textiles
Class 1311	Preparation and spinning of textile fibres
Sub-Class 13111	Preparation and spinning of cotton fibre including blended cotton

- With such an exhaustive type of industries available, it may be prudent to use the NIC code, and linking it to the industry category of CPCB thereby enabling in creation of an inventory of the industries by various nature of works.

NIC linking - sample for Rajkot District MSME 2006-13 (824 Units)

				Employment	No. of Units	Investment in Lakhs	CPCB Category
Division 13 : Manufacture of textiles	Group 131: Spinning, weaving and finishing of textiles	Class 1311: Preparation and spinning of textile fibres	13111	Preparation And Spinning Of Cotton Fiber Including Blended Cotton	228	21	3763.5	White
			13114	Preparation and spinning of man-made fiber including blended* man-mead fiber.	53	9	186.9	
		Class 1312: Weaving of textiles	13121	Weaving Manufacture Of Cotton And Cotton Mixture Fabrics	212	25	1069.9	
			13122	Weaving. Manufacture of silk and silk mixture fabrics	4	2	34	
			13123	Weaving, Manufacture of wool and wool mixure fabrics	4	1	17	
			13124	Weaving Manufacturing of man-made fiber and man-made mixture fabrics	82	5	1294	
		Class 1313: Finishing of textiles	13131	Finishing of cotton and blended cotton textiles	472	52	3363.7	Red Category
			13134	Finishing Of Manmade And Blended Man Made Textiles	10	2	50	
			13135	Finishing of jute, mesta and other vegetable textiles fabrics	2	1	6	
			13136	Activity related to screen printing,	3118	526	11410.6	
			13139	Other activities relating to finishing of textile n.e.c.	27	6	123.8	
	Group 139: Manufacture of other textiles	Class 1391: Manufacture of knitted and crocheted fabrics	13911	Manufacture of knitted and crocheted cotton textiles products	175	6	95	White
			13912	Manufacture of knitted and crocheted woolen textiles products	3	1	44	
			13919	Manufacture of knitted and crocheted textiles products n.e.c	24	1	16.5	
		Class 1392: Manufacture of made-up textile articles, except apparel	13921	Manufacture of curtains, bed covers and furnishings	16	4	40	
			13923	Manufacture of mosquito nets	2	2	9	
			13924	Manufacture of bedding, quilts, pillows,cushios and sleeping bags(manufacture of coir foam mattress	61	4	305	
			13929	Manufacture of other made up textile goods, except apparel n.e.c.	29	3	35.4	
		Class 1393: Manufacture of carpets and rugs	13931	Manufacture of cotton carpets by hand	10	1	5	Green Category
			13935	Manufacture of carpets, rugs and other covering of jute mesta and coir	16	3	15	
			13939	Manufacture of other floor coverings (including felt) of textile. hemp and other kindred fibre	32	5	63	
		Class 1394: Manufacture of cordage, rope, twine and netting	13941	Manufacture of thread, including thread ball making	40	5	180.5	
			13942	Manufacture of jute/hemp rope and cordage	6	2	82	
			13945	Manufacture of knotted netting of twine, cordage or rope (other than mosquito net)	5	1	119	
			13946	Manufacture of tapes, newar and wicks	24	3	73	
			13949	Manufacture of other cordage or rope n.e.c.	8	2	111	
		Class 1399: Manufacture of other textiles n.e.c.	13991	Embroidery work and making of lacas and fringes other than by hand	58	20	449.4	
			13992	Making of other ornamental trimmings by hand, n.e.c.	432	86	1654.1	
			13994	Manufacture of gas mantles	14	3	30	
			13995	Manufacture of made up canvas goods such as tents and sailes etc	3	1	48	
			13997	Manufacture Of Metallised Yarn Or Gimped Yarn Rubber Thread Or Cord Covered With Textile Material Te	60	5	1083.66	
			13999	Manufacture Of Other Textiles/Textile Products	228	16	2397	

- The Annual Survey of Industries (ASI), conducted by the MoSPI has data of all the industries – at national, state, & district level for each type of NIC code → pre-existing geotagged list of industries in each NIC code category
- Linking the NIC code and subsequent the ASI data, will not only **help in getting the location–wise list of industries but will also help in getting the production capacity, investment and other data of the industry which can help in enforcement and monitoring aspects**

Benefits and impact of linking the ASI data with CPCB categorization:

Presently, CPCB has categorized 242 industry sectors into Red, Orange, Green and White categories, based their pollution index, which in turn is used by SPCBs for categorization. However, for linking these categories to the NIC code, there is need for a detailed categorization/ linking of all the 1300-sub-classes of industries in the NIC code, based on their pollution index. In the short term, while this may seem like a tedious task involving research for CPCB, in the long run it will result in the following advantages :

- **Saves time:** For industries not listed in the CPCB categorization, SPCBs presently undertake their own Pollution index assessment and therefore spend considerable time and effort in the process. Having an exhaustive list of all possible industry groups will save this time for SPCBs
- **Improves efficiency:** While SPCBs are responsible for consent management and monitoring the industries, it is often difficult to track if all industries are compliant owing to the huge amount of industries that have to be dealt with, by the limited available staff. With the geo-tagged list of industries available, it is easier to
  (1) monitor compliance of all industries in particular jurisdiction,
  (2) easy to map group of industries for each physical inspection, based on the quantum of water used and type & size of production, etc.
- **Avoiding duplication of efforts:** In the short run, CPCB and SPCBs can benefit from the pre-existing data available. In the long run, using the NIC code right from Environmental Clearance and Consent to Establish stage, will also save effort for MoSPI and provide a common platform for the different ministries to come together
- **Better compliance assessment** against discharge permits, consent management, investigation of pollution incidents and more effective environmental monitoring.
- Processing of industrial effluent/ emission data and **generation of meaningful maps**, graphs interactively and in near real-time.

Beneficiaries: CPCB, SPCBs, Industries, NMCG, SPMGs, State Industrial Development bodies, Research institutions, NGOs and General public

(c) Learnings from global case studies

USEPA's inventory by linking NAICS code: USEPA has adopted a similar approach, wherein the NAICS code for a particular industry is used right from the permit stage, thereby enabling an automated inventory of various industries in the country -

North American Industry Classification System (NAICS)

Comprehensive industry classification system that groups establishments **based on similarity in their production processes** , non market oriented approach

Common industry definitions for Canada, Mexico & US

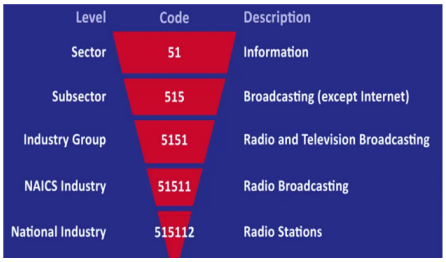
Statistics Canada | **Mexico's INEGI** National Institute of Statistics & Geography

US ECPC U.S. Economic Classification Policy Committee

Chaired by **Bureau of Economic Analysis**, US Dept. of Commerce

Representatives from **Bureau of Census**, US Dept. of Commerce and **Bureau of Labor Statistics**, US Dept. of Labor

20 sectors, 1057 industries in USA



Similar to India, USEPA through states and local bodies provide "Permits", in other words, consent to establish and operate. With this being the first point of contact for the EPA authorities, and also an initial step for establishing an industry, having the NAICS code in this process itself, as part of the application, ensures linking right from the beginning.

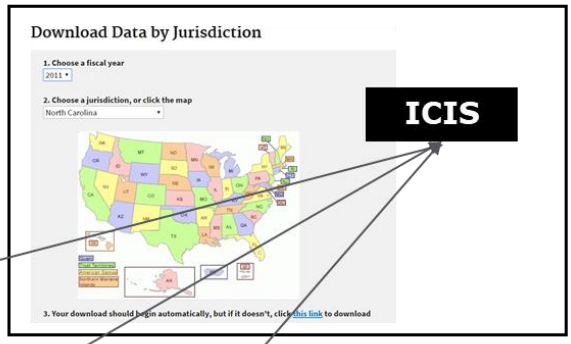
What all does the Permit Application contain?	
A. General Information	**F. Characteristics of Discharge-** pollutant qty, detection method, etc.
B. Business Activity – **NAICS code** production capacity details	**G. Treatment** – technology & process
C. Water Supply –source & uses by category	**H. Facility Operational Characteristics**
D. Sewer information – connection details	**I. Spill prevention**
E. Wastewater discharge info – flow & process	**J. Best management practices**
	K. Non-Discharged Wastes
	L. Authorized Signatures

USEPA's integrated industry portal: In addition to the NAICS linking, USEPA has also adopted a single portal for collating all industrial data – the status of clearances and permit, effluent generated from these indsutries and also monitoring the status of pending enforcement cases and complaints.

Eg: USEPA's Integrated Compliance Information System

Integrated Compliance Information System (ICIS) - national database to track compliance with NPDES permit requirements for major dischargers.

One can review information on
- **when** a permit was issued and its expiry,
- **how** much the company is permitted to discharge,
- actual monitoring data showing **what** was discharged.

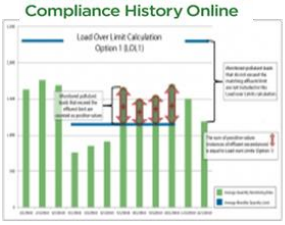


1. Permit & Clearance data

NPDES General Permit Inventory: This tool allows users to search for NPDES general permits by permit number, permit name, state, EPA region, date issued, date expired, or permit category.

2. DMR pollutant Loading tool

To determine who is discharging what pollutants, how much, and where is it being discharged. (ECHO)



Two distinct data acquisition platforms

2A. From Instruments | **2B. Industry's e-signed reports**

3. Enforcement monitoring

Enforcement in the community, existing cases and their status may also be viewed online

(d) Implementing in the CPCB context

Features of the solution, from CPCB's perspective: To implement this Integrated portal for CPCB, it is important to understand the key tasks involved while capitalizing the existing data / portals already in place, so that it is easier and quicker to adopt. Following are some of the tasks that may be considered by CPCB for implementing the solution. It may be noted that CPCB might not choose to do some of these works at their own discretion.

- **Categorizing and linking with NIC code** CPCB has already undertaken categorization of over 240 industrial sectors based on the process and materials used. For linking with NIC code, there is need for a detailed categorization of all the 1300-sub-classes of industries in the NIC code,

based on their pollution index. In the short term, while this may seem like a tedious task involving research for CPCB, in the long run it will save time, improve efficieny and avoid duplication of efforts as detailed in Section (B) above.

- **Digitizing the ASI data** Data from the Annual survey of industries have to be digitized with geo-tagged data featuring all production, investment and employment details
- **Consent Management data** Most states have adopted the Online Consent Management & Monitoring System (OCMMS) developed by MoEFCC to manage their consents, while some states such as Gujarat have adopted the Xtension Green Node (XGN) portal. These data should be mapped with the NIC linked industries to understand their status
- **Linking OCEMS tool** Online real-time emission and effluents monitoring system has been implemented by CPCB for 17 Highly-polluting Industries(HPIs) category, GPIs and CETPs. This can further be linked to the integrated portal using the NIC code and industry number
- **Exchange Network for uploading self-monitoring reports** Developing a separate exchange network where industrial users can upload their digitally signed self-monitoring report data (digitized with line-by-line items) in the portal.
- **Creation of common Integrated Industry portal:** A common industry portal with following features, which is the front face for all the above listed background data
    - **Data from multi-users:** MoSPI, CEMS instruments, Industrial self-monitoring reports, empanelled inspection bodies, SPCB & CPCB - linking to various exchange portals for different data
    - For each industry**, a one-stop portal**, displaying status of consent, category, pollution levels, and monitoring report
    - Data can be **searched and downloaded** using search parameters such as Location, Pollutant parameters, SPCBs, Industry by name, industry category/type, and Time.
    - **Data alert system** - optimizing alert prioritization using CEPI score of the region, industry category and deviations observed
    - **Statistical Reports** on selected/filtered parameters – such as performance of industry, works done by SPCB, etc.

Who can take this work in CPCB? To ensure smooth implementation of this Integrated portal for CPCB, it is important to understand which division within CPCB can take up the responsibility for the same. Based on our institutional baseline assessment, we understand that of the 7 IPC divisions, IPC-VI is presently looking after the following relevant functions.

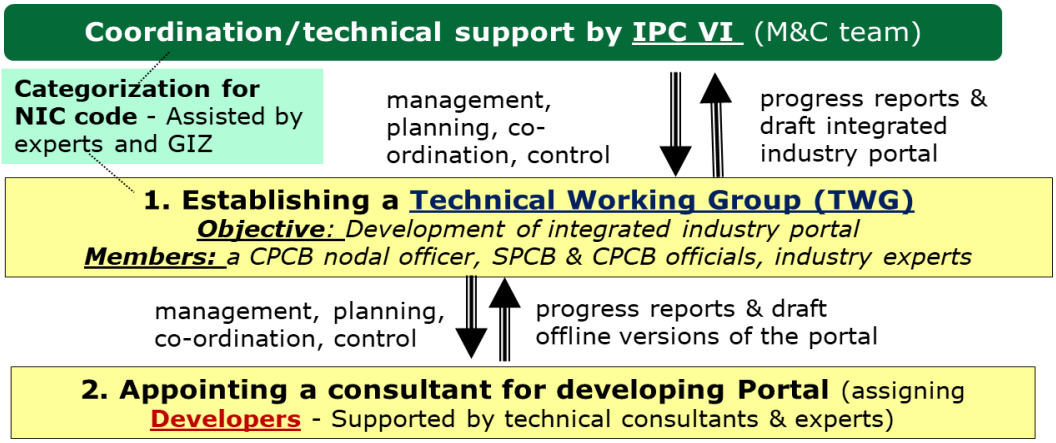
Division	Technical staff nos.	Key functions of the division
IPC- VI Division	**3**	The Industrial Pollution Coordination division is responsible for the following: • General categorization of industries - 17 Categories of Industries • Pollution level related categorization of Industries • Review of Standards • On-line Installations • Grossly Polluting Industries (other than Ganga)

Accordingly, as **IPC-VI** is already looking after industry categorization and on-line installations, it will be prudent if the same division can take up the responsibility of establishing the Integrated Industry portal **with the help of IT division** – which is presently looking after data generated from the OCEMS portal.

However, with the limited staff available at IPC-VI it may not be possible for the small team to undertake all activities featured above. Therefore, considering the limited resource and the expected IT expertise required for carrying out these tasks CPCB may consider deploying consultants for undertaking the same. Further details for implementing the solution has been outlined in the subsequent section of this report

(e) How to implement the solution?

Implementation structure: For enabling the "Integrated Industry Portal" we have adopted the terms and methodology used in the BAT process by EU Nations for implementing specific solutions. Accordingly, we propose the following implementation structure – consisting of a Working group, supported by Developers



Mapping the stakeholder requirements: With an implementation steering structure in place, it is now relevant to understand the specific role, key outcomes, and competency/skill requirement of various

	Developers	TWG	CPCB – Tech. Support
Role of the stakeholder	▪ Develop the portal architecture – key users, data points & outputs ▪ Digitizing ASI data & linking NIC data, OCMMS & OCEMS data basis TWG feedback ▪ Develop the integrarated portal as per agreed scope & architecture ▪ Prepare user manual ▪ Data for TWG meetings	▪ Appoints "Developers" ▪ Review & finalize the portal architecture ▪ Prepares & chairs the TWG meetings ▪ Enable coordination with other stakeholders ▪ Provide data as required ▪ Review the portal	▪ Categorization of Industries basis NIC classification & codes ▪ Appoints TWG & ensures development as per agreed timelines ▪ Orientation & training the TWG/ Developers ▪ Internal knoweldge sharing sessions ▪ Publish the finalized portal on online platform ▪ Interact with industries
Timeline	Develop the portal & handover operations **within 1 year**	Bi-weekly TWG meetings to monitor progress	Monthly meetings with TWG to track progress
Competency/ skills required for the role	• Data enetry operators – for digitizing the data available • Application Developers – for integrating the various portal and developing a common platform	• Regulators with technical knowledge to detail the requirements from the portal • Industry representatives to outline their key challenges/ issues	• Research/ survey capabilities and knowledge of sector for categorizing Industries • Understanding of industry & regulator requirements to outline clear portal expectation
Manpower required for the skills & role	• Data entry operators – 2-3 members for digitizing • Industry & Environment experts – 2 members to translate business needs into IT requirements • Application Developers – 3-5 experienced software professionals	• CPCB – from both IPC divisions, and IT divsion (3 nos.) • SPCB – select SPCB memebrs – 5-7 nos. • Industry experts – 6-10 nos.	• 2-3 member group headed by the divisional head of IPC-VI – supported by external research bodies such as IIT for categorization of industries
Possible alignment – internal/ external	• Externally appointed consultants through a competitive bid	• 15 member working group- defined through a common order by CPCB	• Headed by the divisional head of IPC-VI – supported by research body representative and IT expert

2.3 Developing a "Pollution Audit Policy" for engaging TPA

(a) Objective and Scope of the solution

Objective: A single guidebook with detailed guidelines and framework for engaging TPAs (Third Party Agencies) for monitoring and compliance of industries to emission and effluent standards and also to advise such industries to improve environmental compliances.

Scope of the solution:

- **Define a competency framework** for third party agencies to engage in monitoring and compliance reporting of effluent standards- activity and industry specific assessment
- **Enabling empanelment of TPAs** – promoting research bodies and technical institutes to enlist as empaneled agencies with SPCBs - this could also include classification of such agencies to deal with various categories of industries (red/orange/yellow/green) depending their technical strengths
- Enabling a **legal framework** for involving TPAs by SPCBs with clear chain of command and processes – subsequent steps on TPA reports, SPCB action points, verification mechanism etc.
- **Develop process for randomly assigning TPAs to industries**
    - **Initiation -** Member industries to initiate the TPA monitoring request or also by SPCB for a specific industry as per requirement
    - **Assigning TPAs –** From the empanelled list of SPCBs TPA's and their corresponding competency framework, a suitable TPA is assigned to an Industry randomly – keeping in mind the past visits, deviations observed, etc.
- **Develop monitoring process** for accuracy of third party agencies reports, their calibration process/frequency, measurement techniques etc.
- **Define & direct states for creation of state level fund** (primarily payments from industries for inspection based on defined frequency as per industry category) for payment mechanism to identified third party agencies

(b) Need and Impact for the solution

Need for involving TPAs: SPCB which is the key agency responsible for on-ground monitoring has limited manpower to oversee the huge number of industries.

It is not possible to undertake regular audit of all the industries, as per expected frequency with the limited staff available. For example, in the case of Gujarat, an industry heavy state, there are over 2.5 lakh+ industrial units, while the GPCB deploys only 384 employees (148 engineers & 139 scientist/ analysts)

At the same time, there are growing number of environmental concerns arising due to increased industrialization in the range. The boost in industries should also be well supported by a similar boost in regulation – for ensuring compliance of these industries.

Therefore, there is a need for looking at other reliable options such as Third Party Agencies (TPAs) to act as assessors and for assisting SPCB in undertaking their monitoring works.

Issues with involving TPAs: However, involving TPAs poses two main challenges- (1) ensuring reliability of the reports generated by TPAs and (b) a supporting legal framework for enabling the involvement of TPAs

- ❑ **Auditors often lack incentives to accurately report pollution by industrial plants**: Auditors are generally managed and paid by the company they are monitoring, creating a conflict of interest.
- ❑ **Legal framework for taking action on TPA reports**: The power to take action and issue orders to industries lies with SPCB. SPCB cannot take direct action on the TPA reports, nor can it use it as evidence for court cases presently.

Solution for mitigating these issues TPAs:

- ❑ **Random allotment and payment from common pool:** The objective is to delink the connection between TPAs and industries with creation of a random selection for such monitoring– For instance, to mitigate this, GPCB designed and evaluated a set of reforms in which TPAs are
    - randomly assigned to industrial plants,

- paid from a common pool,
- monitored for accuracy, and
- paid an incentive for accurate monitoring and compliance reports.

Adopting a similar approach, at each state by creating state-level funds and developing a system for random allocation of TPAs is likely to ensure better reporting.

- **To tackle the legal constraints**, a policy/ legal framework outlining the jurisdiction of actions that can arise based on a TPA report, which is further verified by SPCB through a clear process in select cases may be developed by CPCB. Further, an incorrect report submitted by a TPA, if identified may have stricter consequences such as blacklisting of the TPA agency, revoking of its empanelment, etc.

Benefits and impact of involving TPAs in pollution monitoring:

Presently, almost all SPCBs are constrained with staff to handle regular inspection of all industries in their jurisdiction. To involve third party agencies in monitoring and compliance reporting will result in the following advantages:

- **Saves time:** An automated prioritization using the TPA reports data, can be developed which enables SPCB to focus on key issue causing industries on priority
- **Improves efficiency:** While SPCBs are responsible for consent management and monitoring the industries, it is often difficult to track if all industries are compliant to the conditions of CTE/ CTO and also the relevant Act rules. With the involvement of TPAs, it is easier to
  (1) generate quarterly reports of all industries in their jurisdiction
  (2) easy to map/select industries for each physical inspection,
  (3) provide evidences and take immediate action on complaints received and NGT cases using the data from these reports
- **Better compliance assessment** against discharge permits, consent management, investigation of pollution incidents and more effective environmental monitoring.

Beneficiaries: CPCB, SPCBs, Industries, NMCG, SPMGs, Research institutions, NGOs and General public

(c) Learnings from global case studies

USEPA's Project XL for market development: For the successful scaling and uptake of involving TPAs, there is firstly a need for market development. To enable this, USEPA 's Office of Policy, Economics, and Innovation developed the "Project XL" which stands for "eXcellence and Leadership". Under this, private businesses and research agencies are encouraged to develop innovative solutions for achieving superior environmental results and better monitoring of pollution – with lessons and knowledge documents transferred for public & other facilities. EPA began Project XL in 1995 and accepted projects until 2002.

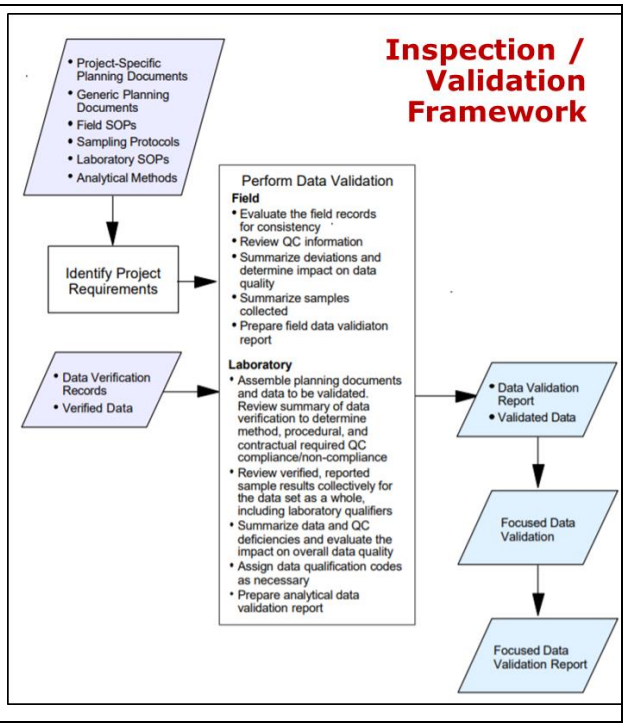
USEPA's defined SOPs for TPAs: Post market development, it is also important to define clear process for the TPAs with specific checklists. With this in mind, USEPA has defined SOPs for Quality Assurance and Validation. These SOPs define the frequency, requirement and process for verification and validation in detail.

All the results from the TPA audits, are uploaded and assessed through a **"Lab Information Management system"**. The LIMS also features a **Data Assessment tool** which has Electronic Pre-programmed calculations that examines the QC data for all analytical results and evaluates them against the appropriate review criteria.

SOPs for verification

Data verification – key steps

Operation	Common Records	Source for Record Specifications
Sample collection	Daily field logs, drilling logs, sample collection logs, COC forms, shipper's copy of air bill, surveys	QA Project Plan or SAP, SOPs for sample collection, pre-printed COC instructions
Sample receipt	COC forms from sampler, receiver's copy of air bill, internal laboratory receipt forms, internal laboratory COC forms, laboratory refrigerator or freezer logs	QA Project Plan or SAP, laboratory SOP for sample receipt, pre-printed COC instructions
Sample preparation	Analytical services requests, internal laboratory receipt forms, internal laboratory COC forms, laboratory refrigerator or freezer logs, preparation logs or bench notes, manufacturer's certificates for standards or solutions	QA Project Plan or SAP, reference method (EPA or other), laboratory SOP for preparation method, pre-printed instructions on internal forms
Sample analysis	Analytical services requests, internal laboratory receipt forms, internal laboratory COC forms, laboratory refrigerator or freezer logs, manufacturer's certificates for standards or solutions, instrument logs or bench notes, instrument readouts (raw data), calculation worksheets, quality control (QC) results	QA Project Plan or SAP, reference method (EPA or other), laboratory SOP for analysis method, pre-printed instructions on internal forms and worksheets
Records review	Internal laboratory checklists	QA Project Plan or SAP, laboratory SOP for analysis method or laboratory QA plan



(d) Implementing in the CPCB context

Features of the solution, from CPCB's perspective: To develop this "Pollution Audit Policy" for CPCB to enable TPA involvement, it is important to understand the key tasks involved while capitalizing the existing data / portals already in place, so that it is easier and quicker to adopt. Following are some of the tasks that may be considered by CPCB for implementing the solution. It may be noted that CPCB might not choose to do some of these works at their own discretion.

- **Developing a competency matrix** CPCB has already developed a Guideline for involving TPAs based on different categories of work, as shown below.

Category – I	Category – II	Category - III
Routine Service	High End Services	Unique Exceptional Services
Routine Monitoring Service for trend assessment	Process knowledge/Domain specific Expertise work	Multiple / Comprehensive Expertise demanding work
Monitoring of Sewage Treatment Plant, CETPs, SW facilities	CEPI Area Monitoring	Source apportionment studies
Monitoring of NAQMS & NWQS	Monitoring of Common facilities (CBMWF, TSDF, Incinerators, MSW	Comprehensive Industrial documents on Environmental issues
Training and Capacity building programs	Inventorisation of polluting sources, pollution load	Episodic environmental accident impact assessment studies
Monitoring of River stretches and Lakes	Performance Evaluation of APCEs / ETPs	Calibration of Online monitoring systems
Monitoring of Inter-state water quality of Rivers	Status & Characterization studies of emission, effluents, solid wastes	Toxicological Studies/Flora/Fauna/Diversity Index related studies
Deepawali Monitoring (Air & Noise)	State / City environmental status reports	R&D project related to pollution assessment, survey, monitoring and control
Groundwater Monitoring	Online Database Management System	Cleaner Technologies in SSI units

Similar to this exercise, specific to pollution audit of industries, a categorization for different type of industries with varying nature of pollutants has to be developed. The minimum TPA category (qualification) required for each of the industry type should also be mapped as below:

- **Empanelment & categorization of TPAs for different requirements** promoting research bodies and technical institutes to enlist as empaneled TPAs for monitoring and compliance reporting with SPCBs - this could also include classification of such agencies to deal with various categories of industries (red/orange/yellow/green). CPCB policy should also define the process of empanelment in detail for ease of SPCBs

- Enabling a **legal framework** for involving TPAs by SPCBs with clear chain of command and processes – subsequent steps on TPA reports, SPCB action points, verification mechanism etc.

- **Develop process for assigning & monitoring TPAs**
  - **Initiation -** Member industries to initiate the TPA monitoring request or also by SPCB for a specific industry as per requirement
  - **Assigning TPAs –** From the empanelled list of SPCBs TPA's and their corresponding competency framework, a suitable TPA is assigned to an Industry randomly – keeping in mind the past visits, deviations observed, etc.
  - **Develop monitoring process** for accuracy of third party agencies reports, their calibration process/frequency, measurement techniques etc.
  - **Define & direct states for creation of state level fund** (primarily payments from industries for inspection based on defined frequency as per industry category) for payment mechanism to identified audit agencies

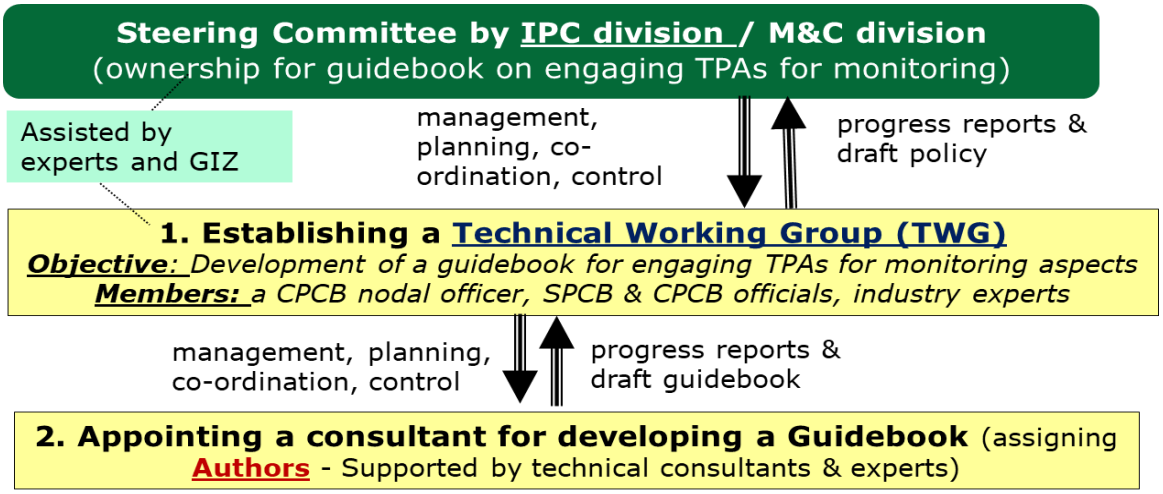
Who can take this work in CPCB? To ensure smooth implementation of this Pollution Audit Policy for CPCB, it is important to understand which division within CPCB can take up the responsibility for the same. Based on our institutional baseline assessment, we understand that of the 7 IPC divisions, all IPC-division are presently looking after the monitoring of their relevant sectors and interact with SPCB/ CPCB ROs on the same.

Accordingly, as **IPC collectively** is already looking after online and physical monitoring, it will be prudent if members of the same division can take up the responsibility of establishing the Pollution Audit Policy **with the help of Legal & Planning division**

However, with the limited staff available at IPC (22 technical staff) and their already accumulated work load, it may not be possible for the small team to undertake all activities featured above. Therefore, considering the limited resource for carrying out these tasks CPCB may consider deploying consultants for undertaking the same. Further details for implementing the solution has been outlined in the subsequent section of this report

(e) How to implement the solution?

Implementation structure: For developing the "Pollution Audit Policy" we have adopted the terms and methodology used in the BAT process by EU Nations for implementing specific solutions. Accordingly, we propose the following implementation structure – consisting of a Working group, supported by Authors (*An Author may be internal/external consultant – representing and individual or group responsible for developing the document)*



Mapping the stakeholder requirements: With an implementation steering structure in place, it is now relevant to understand the specific role, key outcomes, and competency/skill requirement of various

	Authors	TWG	CPCB – Steering Committee
Role of the stakeholder	▪ Develop competency framework linked with various categories of the industries for monitoring in discussion with TWG ▪ Develop the key aspects to be covered in the guidebook – policy framework, technical commercial & institutional guidelines ▪ Develop mechanism for creation of state level fund and payments etc. in discussion with TWG ▪ Prepare for TWG meetings	▪ Appoints "Authors" ▪ Review & finalize the guidebook contents ▪ Enable coordination with other stakeholders ▪ Prepares & chairs the TWG meetings ▪ Provide data as required ▪ Develop policy document using inputs from guidebook	▪ Appoints TWGs & ensures development as per agreed timelines ▪ Orientation & training the TWG/ Developers ▪ Internal knoweldge sharing sessions ▪ Publish the finalized guidebool online ▪ Interact with industries
Timeline	Develop the guidebook within defined timelines with CPCB	Bi-weekly TWG meetings to monitor progress	Monthly meetings with TWG to track progress
Competency/ skills required for the role	• Technical knowledge experts – for defining SOPs of the TPAs • Commercial and Transaction experts – for assessing business models, pricing and competency framework • Legal expert – for legal framework	• Regulators with technical knowledge to detail the SOPs & checklists • Industry reps. to outline their key challenges/ issues faced with TPAs • Current empanelled TPAs to highlight their concerns – IIT, NIT, etc.	• Understanding of industry & regulatory requirements to outline clear policy/ guidebook expectations
Manpower required for the skills & role	• Technical experts –2 members for drafting SOPs • Commercial experts– 4 members • Legal expert – 1 nos.	• CPCB – from IPC divisions(3 nos.) • SPCB – select SPCB members – 5-7 nos. • Industry experts – 3-4 nos. • Research bodies – 3-4 members	• 2-3 member group headed by the divisional head of one of IPC I-V
Possible alignment – internal/ external	• Externally appointed consultants through a competitive bid	• 15 member working group- defined through a common order by CPCB	• Headed by the divisional head of one of IPC I-V – supported by legal expert & planning head

2.4 Guidebook on 'Reuse and Recycling' of industrial wastewater

(a) Objective and Scope of the solution

Objective: A step-by-step policy guide covering all aspects of reuse and recycling of treated wastewater that can be developed with multi-users and accessed by multiple beneficiaries for taking actions on improved water quality management.

Scope of the solution:

- **Technical standards** defining the required quality of the treated industrial waste water for various specific uses
- Enabling a legal **Policy framework** on reuse and recycling of treated industry wastewater
- **Commercial aspects** Trading and pricing options for the treated wastewater – setting tariff, finding suitable off-takers, hierarchy of reuse/recycling, etc.
- **Implementation aspects** – Incentives for using treated waste water - tax rebate, certifications, credit scheme, etc.
- **Institutional aspects** – nodal authority at local, state & central level with their roles, right from conceptualization to continued monitoring of the implemented works

- **Technical Factors evaluation** – local site-specific factors, technological treatment options, quality of treated wastewater, etc.
- **Commercial Factors evaluation** – trading options and water pricing in the region – potential market for using treated wastewater
- **Techno-commercial prioritization framework** for choosing – reuse/ recycling / ZLD options.

(b) Need and Impact for the solution

Need for developing use-specific quality standards: NGT, through its several court orders, has stated the need for industries to use water efficiently and promote re-use and recycle practices within the industry premises. CPCB, in response, along with NMCG as developed several sector specific charters, to enable this along river Ganga. However, with growing focus on industries to re-use the treated industrial wastewater, there is also need for defining the required quality of such treated industrial wastewater for different purposes.

Presently, India has **no national quality standards for using treated wastewater from industries** for various uses (agricultural, landscape, cooling, within industry etc.)

Impact of developing such use-specific quality standards: Central Public Health Engineering and Environment Organization (CPHEEO) has developed standards for using urban wastewater for various uses such agricultural, domestic and industrial. This in-turn has helped several states and municipalities to develop re-use policies for enabling use of treated water from STPs for various purposes. The following table summarizes some of the policies and initiatives undertaken by states building on these standards.

	Haryana | Draft Policy for Reuse of treated Waste Water, 2018	Gujarat | Policy for Reuse of Treated Waste Water, 2018
Institutional arrangements	Responsibility to lie with **Public Health Engineering Department**. HSVP/ULBs will finance construction of STPs.	**State High Power Committee** to oversee implementation, State Technical Committee for project approval & monitoring, **ULBs responsible for implementation**.
Treatment Options	Simple, low cost, and confirm to standards required for reuse (CPCB or HSPCB & CPHEEO)	Effective, simple, low cost, and confirm to standards. Innovative technologies for tertiary treatment if required.
Reuse options	Industrial units, Thermal power plants, Construction work, Dual water supply system in establishments, Agriculture	Industrial units, Thermal power plants, Agriculture, Construction work, parks, Lake rejuvenation, Fire-fighting
O&M	O&M borne entirely by the users.	Agency to be appointed by the SHPC to be responsible.
Pricing	❑ Lower than freshwater, as notified by the Government from time to time. ❑ An escrow account or otherwise shall be maintained by the Local Body	❑ Lower than freshwater. ❑ Pricing based on recovery of capital and O&M costs of distribution network, STP, and tertiary treatment. ❑ Escrow account to be maintained with amounts received for TWW projects.

	Jharkhand | Waste Water Policy, 2017	Karnataka | Policy for Urban WW Reuse, 2017	Punjab | State Treated Waste Water Policy, 2017
Institutional arrangements	**State Urban Development Agency** to develop a wastewater strategy and outline implementation plans for ULBs.	Management Committee to oversee implementation & WW reuse resource center in the **urban development department**.	**Irrigation department** and soil conservation department to prepare reuse plans
Treatment Options	Several options (primary/ secondary treatment, constructed wetlands)	Decentralized options encouraged.	Off-site treatment encouraged.
Reuse options	Irrigation, agriculture, forestry, landscaping, Fish-farming, Industry	Agriculture, Industry, Urban non-potable use, Water-bodies	Agricultural reuse (Priority), Industrial use (including thermal power plants)
O&M	O&M plans should be included at the design stage (reviewed periodically).	Private sector participation for O&M (performance based remuneration).	Management transferred to Private sector through contracts.
Pricing	Full cost recovery through user charges and pricing of TWW.	Generator pays principle to include wastewater treatment costs in water charges.	Full cost recovery through user charges and pricing of TWW.

Therefore, development of standards for re-use of industrial wastewater is necessary for adoption of re-use and thereby, critical for development of suitable state initiatives.

Need for a policy & legal framework: Subsequent to defining the quality standards for re-use it is also important to develop a suitable policy framework for promoting its adoption. As mentioned in the table above, such policy has to cover, **technical treatment options, and commercial aspects – such as re-use options, pricing strategy and business models for development/ operations and also institutional arrangements with clear responsibility**.

Benefits and impact of having a unified guidebook:

Presently, most SPCBs identify and agree with the need for promoting re-use of industrial wastewater. However, with lack of quality standards and clarity on what has to be done? How it has to be done? , they are facing difficulties in imposing the same in their jurisdiction. Though developing this policy and guidebook, may seem like a tedious task now, in the long run it will result in the following advantages:

- ❑ **Avoiding duplication of efforts by different SPCBs** SPCBs mandate, as per the Act, includes 'to evolve economical and reliable methods of treatment and utilization of sewage and trade effluents' which makes SPCB the key party responsible for enabling re-use of industrial wastewater in the state. While select factors may vary from case-to-case, the key parameters to be considered for re-use remain the same, in all technical and commercial aspects.

Having a unified guidebook at national level not only gives a uniform process for the country but also eases any disparity arising between different states, that may require CPCB/NGT intervention in future.

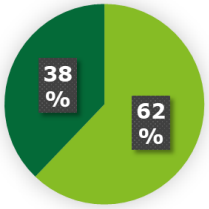
- **Enables Adoption of industrial re-use:** With a comprehensive guidebook in place, several states will be able to follow these guidelines and regulate re-use options in their jurisdiction. It also encourage industries to adopt such efficient practices

Beneficiaries: CPCB, SPCBs, Industries, NMCG, SPMGs, Research institutions, NGOs and General public

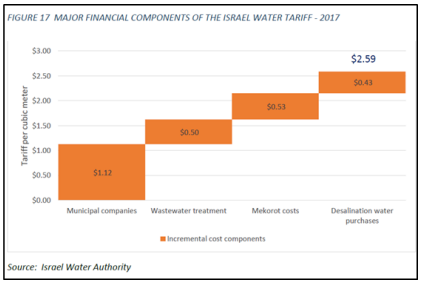
(c) Learnings from global case studies

Israel is one of the leading nations in the world for its re-use and recycling efforts: More than 70% of Israel's treated water is used for irrigation.

- Similar to industries acquiring permits for water extraction, farmers are also required to get permits for re-using effluent water
- To promote this, Wastewater irrigation was included in the National Policy on Sustainable Agriculture and Rural Development (SARD);
- Israel's water tariff and policy reforms are enabling a competitive pricing for re-use water compared to the use of fresh-water.



Of total demand of **1044 MCM/yr**, over **395 MCM/yr** from reuse



- This adoption was possible through three distinct steps taken by Israel
  - Promoting research on wastewater re-use → to develop comprehensive quality standards
  - National policies for promoting industrial wastewater re-use
  - Market support – through competitive water tariff, promoting desalination & treated water, incentive mechanisms etc.

(d) Implementing in the CPCB context

Features of the solution, from CPCB's perspective: Taking cue from the Israel's case study and also from the urban wastewater re-use adoption, this guidebook will involve two key aspects, developed in two phases –(1) Developing quality standards, (2) Legal framework and guidelines for adopting re-use /recycling of treated industrial wastewater. It may be noted that CPCB might not choose to do some of these works at their own discretion.

- **Developing quality standards for different reuse options** CPCB needs to develop a sector and specific-use oriented quality standard -> For example, within agricultral sector, using treated water for different crops, and at different stages, sowing vs. husking, etc.

- Enabling a **legal framework** for covering technical treatment options, commercial aspects – such as re-use options, pricing strategy and business models for development/ operations and also institutional arrangements with clear responsibility

- **Developing guideline for enabling re-use & recycling**
  - **Commercial aspects -** Trading and pricing options for the treated wastewater – setting tariff, finding suitable off-takers, hierarchy of reuse/recycling, etc.
  - **Implementation aspects** – Incentives for using treated waste water - tax rebate, certifications, credit scheme, etc.
  - **Institutional aspects** – nodal authority at local, state & central level with their roles, right from conceptualization to continued monitoring of the implemented works
  - **Technical Factors evaluation** – local site-specific factors, technological treatment options, quality of treated wastewater, etc.
  - **Commercial Factors evaluation** – trading options and water pricing in the region – potential market for using treated wastewater
  - **Techno-commercial prioritization framework** for choosing – reuse/ recycling / ZLD options.

Who can take this work in CPCB? To ensure smooth implementation of this Reuse/Recycling initiatives for CPCB, it is important to understand which division within CPCB can take up the responsibility for the same. Based on our institutional baseline assessment, we understand that of the 7 IPC divisions, all IPC-divisions are individually looking after their sector-specific re-use impositions.

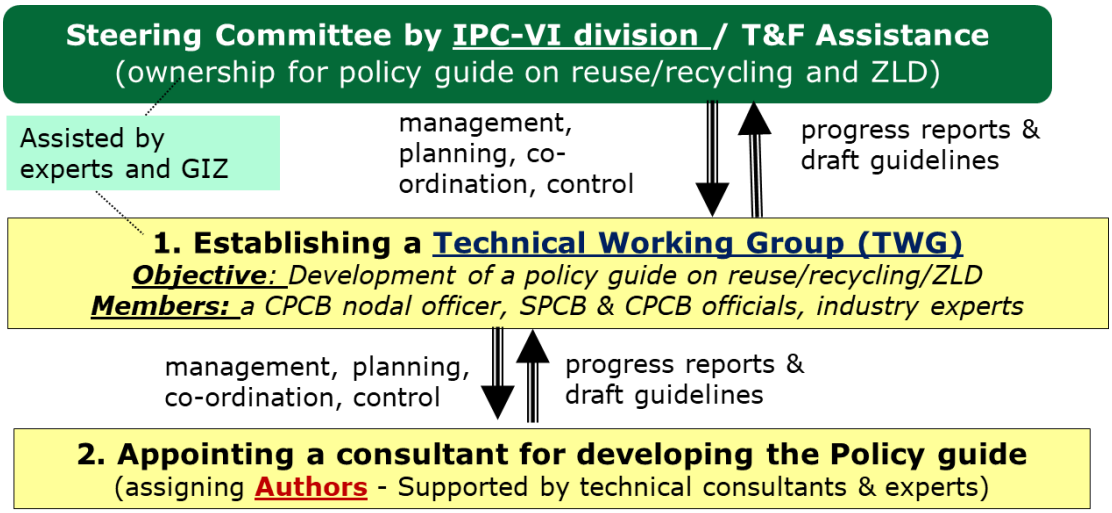
Division	Technical staff nos.	Key functions of the division
IPC- VI Division	**3**	The Industrial Pollution Coordination division is responsible for the following: • General categorization of industries - 17 Categories of Industries • Pollution level related categorization of Industries • Review of Standards • On-line Installations • Grossly Polluting Industries (other than Ganga)

Accordingly, of the 7 IPC divisions, **IPC-VI** which is looking after the general guidelines for other sectors, seems to be more suitable for undertaking these works. Therefore, it will be prudent if the same division can take up the responsibility of developing this guidebook.

However, with the limited staff available at IPC-VI it may not be possible for the small team to undertake all activities featured above. Therefore, considering the limited resource and the expected expertise required for carrying out these tasks CPCB may consider deploying consultants for undertaking the same, under the supervision of IPC-VI. Further details for implementing the solution has been outlined in the subsequent section of this report

(e) How to implement the solution?

Implementation structure: For developing the "Guidebook on Reuse & Recycling of industrial wastewater" we have adopted the terms and methodology used in the BAT process by EU Nations for implementing specific solutions. Accordingly, we propose the following implementation structure – consisting of a Working group, supported by Authors (*An Author may be internal/external consultant – representing and individual or group responsible for developing the document)*



Mapping the stakeholder requirements: With an implementation steering structure in place, it is now relevant to understand the specific role, key outcomes, and competency/skill requirement of various

	Authors	TWG	CPCB – Steering Committee
Role of the stakeholder	▪ Develop the key aspects to be covered in the guidebook – policy framework, technical commercial & institutional guidelines ▪ Priority framework with technical options to be considered,	▪ Appoints "Authors" ▪ Review & finalize the guidebook contents ▪ Prepares & chairs the TWG meetings ▪ Enable coordination with other stakeholders ▪ Provide data as required	▪ Appoints TWGs & ensures development as per agreed timelines ▪ Orientation & training the TWG/ Authors ▪ Internal knowledge sharing sessions ▪ Publish the finalized guidebook online

	Authors	TWG	CPCB – Steering Committee
	▪Assess financial considerations sucha as tariif, trading, etc. ▪Prepare for TWG meetings	▪ Develop policy document and standards using inputs from guidebook	▪ Interact with industries
Timeline	Develop the guidebook as per agreed format **within 8 months**	Bi-weekly TWG meetings to monitor progress	Monthly meetings with TWG to track progress
Competency/ skills required for the role	• Technical knowledge experts – for asssesing quality standard for different reuse options • Commercial and Transaction experts – for assessing business models, pricing and competency framework • Institutional experts – for institutional recommendations	• Regulators with technical knowledge to detail the standards for different uses & challenges to be addressed in guidebook • industry representatives to outline their key challenges/ issues for reuse/recycling	• Research/ survey capabilities and knowledge of sector for various recycle uses • Understanding of industry & regulator requirements to outline clear policy/ guidebook expectations
Manpower required for the skills & role	• Technical experts –4 members for understanding different high-level reuse options • Commercial experts– 3 members • Institutional expert – 1 nos.	• CPCB – from IPC divisions(3 nos.) • SPCB – select SPCB members – 5-7 nos. • Industry experts – 6-10 nos. • Research experts – 5-6 members from CPPRI, etc.	• 2-3 member group headed by the divisional head of one of IPC VI – supported by one representative from IIT Delhi
Possible alignment – internal/ external	• Externally appointed consultants through a competitive bid	• 15 member working group- defined through a common order by CPCB	• Headed by the divisional head of one of IPC VI

2.5 Guidebook for development and management of Environmental Infrastructure – CETP & Sludge management

(a) Objective and Scope of the solution

Objective: One place for all Infrastructure related guidelines that can be used for effective development and operations of any environmental infrastructure by any type of project proponent, thereby enabling improved operations of CETP and sludge handling facilities.

Scope of the solution:

- **Potential Technological options** for CETP & its costs, updated using CETP BREFs every 2-3 years
- **Possible Business Models** for CETP development, operation and maintenance and also development & management of sludge handling/ management facilities
- **Commercial and Institutional options** for each business model, with clear role of stakeholders
- **Techno-commercial feasibility guidelines**
- **Operator Competency Framework** with clear SOPs for selecting CETP operator – min. qualification criteria factoring complexity, technology, business model, etc.
- **Model contract agreement** with its key clauses for different business models.

(b) Need and Impact for the solution

Need for involving TPAs: Though CPCB is not responsible primarily for the performance of CETPs, in recent years there have been growing number of NGT cases requiring CPCB's support and inputs.

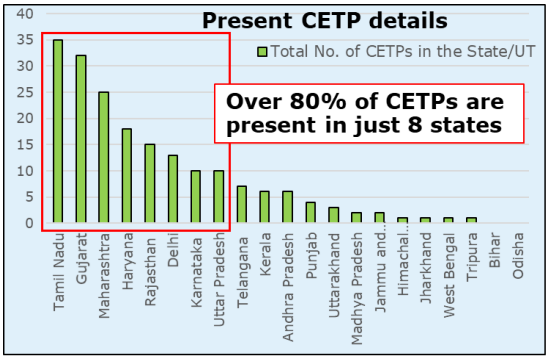
- Several of the CETPs in the country have **failed to perform** recently, as evident from the results of the NGT court case on Vapi CETP - Original Application No. 95/2018, earing dated 13 May 2019. The

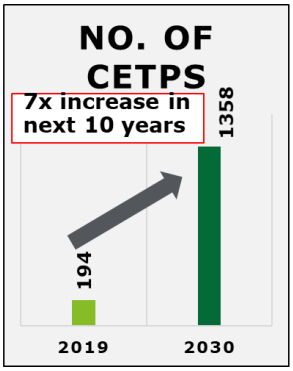
study to understand the performance of CETPs in the country concluded "after referring to several cases considered by the Tribunal, it was held that there was large scale failure of CETP systems in general in the light of observations of the Tribunal, an Expert Committee was required to review the same"

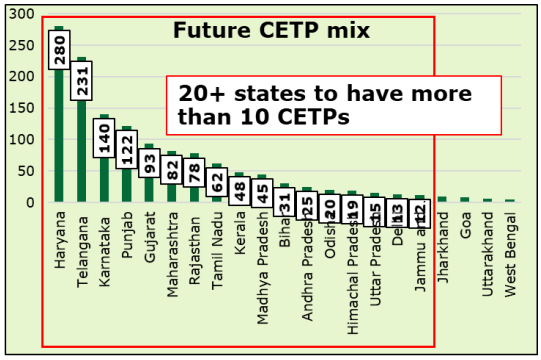
- This failure is due to technical factors such as heterogeneous nature of influent as well as incompetency of the operator to perform the designated task.

This can be mitigated by **undertaking a standardized techno-commercial feasibility in the pre-development phase of CETP,** and using a competency framework for deploying the operators in the development phase.

Growing number of CETPs and the likely impact on CPCB's work load: India presently has 194 CETPs spread across 19 states in the country. Over 80% of these CETPs are presently spread only in the 8 states of TamilNadu, Gujarat, Maharashtra, Haryana, Rajasthan, Delhi, Karnataka and Uttar Pradesh (each of these having >=10 CETPs). However, with growing industrial clusters, there are more CETPs to be developed in the country. Based on the information obtained from the respective SPCB's website, by 2030 the total CETPs in the country will reach over 1300, growing by 7x.







Even within the existing CETPs, there has always been an active focus on ensuring meeting of performance standards by the CETP operator, by undertaking frequent audits post-development.

However, CPCBs have limited role in the pre-development phase – especially in the selection and appointment of operators which has led to many failures in the recent years.

With this growing number of CETPs, there is likely more need for post-development monitoring support from CPCB. Addressing these concerns, by a unified guideline will not only help the states plan their CETP development accordingly but also enable better operations of CETP in future.

Benefits and impact of involving TPAs in pollution monitoring:

As seen from the above graphs, many states are developing several CETPs in the region with limited experience of both developing and managing them. By developing this guidebook, in the long run it will result in the following advantages :

- **Saves time and money by avoiding duplication of efforts:** With the absence of a standard document for selection of operator and a standard model contract, each state had to deploy a separate transaction advisor for the specific works, and undergo similar procedures for both selection and management. With a unified national guidebook, the duplicate individual efforts by state is considerably minimized, thereby saving both time and money.
- Better control over development and operations of CETP/sludge managing facility, thereby **avoiding and addressing the future failure of operators**. – proactive measure
- **Improves efficiency:** While SPCBs are responsible for issuing consents to CETPs and monitoring their performance, SPCBs generally have a limited say in the selection and deployment of operator as these are mostly undertaken by the state's industrial development corporation or private entities. With the development of a guidebook, it is easier to
  (1) map the role of different stakeholder right from the contract stage, thereby ensuring a better say for SPCB.
  (2) with a clear competency framework in place, the selection process will be more aligned with the environmental concerns, generally raised by SPCB at later stages

Beneficiaries: CPCB, SPCBs, Industries, NMCG, SPMGs, Research institutions, NGOs and General public

(c) Learnings from global case studies

Australia's competency framework: Australia has developed a clear framework for selection and deployment of CETP operators based on the system complexity involved, and corresponding competency requirements.

Eg: Australia's Operator Competency Framework

System Complexity Rating

Low Complexity | **High Complexity** | **Recycled Water**

- Automation and level of intervention
- Technology
- Complexity of individual processes
- Interrelatedness of processes
- Size of the facility
- Range of end uses
- Volume of Flow
- Timeliness of response requirements
- Source water quality and variability
- Microbial Risks
- Chemical Risks
- Physical Risks
- Radiological Risks
- Receiving Environment

Competency Requirements

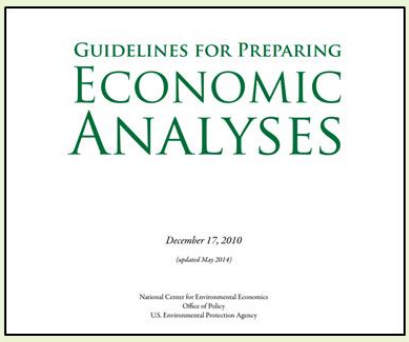
Activities →	Apply the risk mgmt. principles of the water industry	Sample and test wastewater	Apply Environmental & Licensing Procedures	Perform laboratory testing	Fit For Purpose units of competency from the NWP
Low Complex	Optional	Mandatory	Mandatory	Optional	Mandatory
High Complex	Optional	Mandatory	Optional	Mandatory	Mandatory
Recycled Water	Mandatory	Mandatory	Optional	Mandatory	Mandatory

For example, the qualification criteria is determined based on the complexity of system, with operators assessed on different parameters shown in the table above.

USEPA's techno-commercial guidelines : While the above competency framework enable selection of operator, it is important that a suitable business model and agreed price setting is in places for ensuring the financial viability of the project. In line with this, USEPA not only develops the technical standards and lists possible technological options, but also details the commercial aspects as well.

Eg: USEPA's techno-commercial guidelines

Dedicated department under USEPA, Office of Policy - National Center for Environmental Economics.


GUIDELINES FOR PREPARING
ECONOMIC ANALYSES
December 17, 2010
(updated May 2014)
National Center for Environmental Economics
Office of Policy
U.S. Environmental Protection Agency

Water Infrastructure Challenge

- Policy on water infrastructure sustainability
- Infrastructure needs
- Local officials

Building Sustainable Infrastructure

- Water and energy efficiency
- Asset management
- Alternative technologies

Managing Sustainable Utilities

- Effective utility management
- Planning
- Tools
- Pricing and affordability
- Financing

Wastewater management team also looks after Water Infrastructure Finance and Innovation Act (WIFIA). This team also provides guidelines on various aspects of sustainable infrastructure development

(d) Implementing in the CPCB context

Features of the solution, from CPCB's perspective: Taking cue from Australia's competency framework and also from the USEPA's techno-commercial guidelines, this guidebook will involve the following two key aspects. It may be noted that CPCB might not choose to do some of these works at their own discretion.

- **Techno-commercial feasibility guidelines for development & management of CETP/sludge disposal facility**
  - Potential Technological options for CETP & its costs, updated using CETP BREFs every 2-3 years
  - Possible Business Models for CETP development, operation and maintenance and also development & management of sludge handling/ management facilities including payment options, tariff guidelines, etc.
  - Commercial and Institutional options for each business model, with clear role of stakeholders

- **Operator selection and deployment guidelines**
  - **Operator Competency Framework** with clear SOPs for selecting CETP operator/ SDF operator – min. qualification criteria factoring complexity, technology, business model, etc.
  - **Model contract agreement** with its key clauses for different business models.

Who can take this work in CPCB? To ensure smooth implementation of this guidebook for infrastructure development for CPCB, it is important to understand which division within CPCB can take up the responsibility for the same. Based on our institutional baseline assessment, we understand that of the 7 IPC divisions, IPC –VII is the key division presently looking after industrial areas and CETP related works.

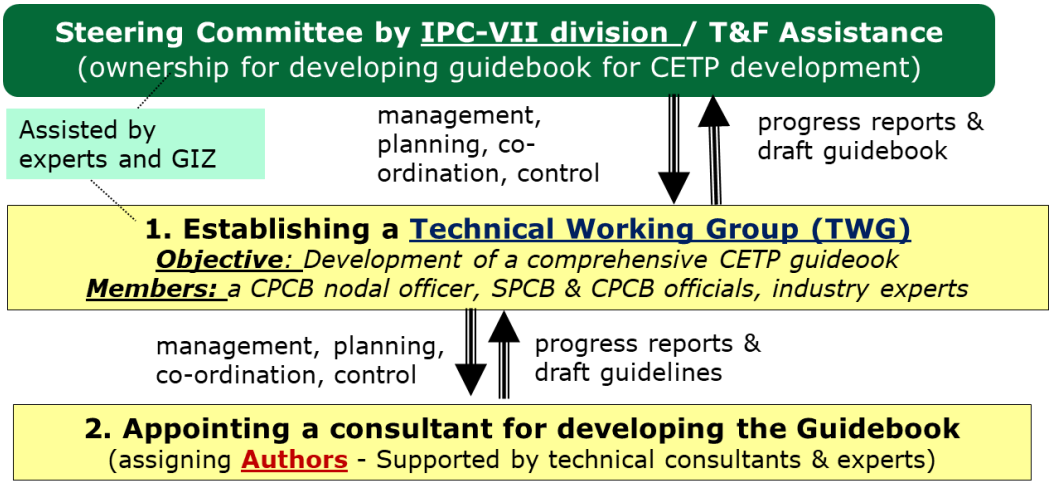
Division	Technical staff nos.	Key functions of the division
IPC- VII Division	**3**	Industrial Clusters and Enforcement division is responsible for the following: • Assessment of Polluted Industrial Areas (PIAs) including Critically Polluted Areas (CPAs) for evaluation of Comprehensive Environmental Pollution Index (CEPI). • Assessment of Common Effluent Treatment Plants (CETPs) in the industrial clusters comprising of Medium and Small Scale Industries. • Environmental Clearance (EC) issued by Ministry of Environment, Forest & Climate Change (MoEF&CC), Government of India.

Accordingly, **IPC-VII** which is looking after CETP related works, will be best suited for leading this initiative of developing this guidebook. Though this is an additional responsibility on the team, this will help in minimizing future problems that may arise due to poor project structuring.

However, with the limited staff available at IPC-VII it may not be possible for the small team to undertake all activities featured above. Therefore, considering the limited resource and the expected expertise required for carrying out these tasks CPCB may consider deploying consultants for undertaking the same, under the supervision of IPC-VII. Further details for implementing the solution has been outlined in the subsequent section of this report

(e) How to implement the solution?

Implementation structure: For developing the "Pollution Audit Policy" we have adopted the terms and methodology used in the BAT process by EU Nations for implementing specific solutions. Accordingly, we propose the following implementation structure – consisting of a Working group, supported by Authors (*An Author may be internal/external consultant – representing and individual or group responsible for developing the document)*



Mapping the stakeholder requirements: With an implementation steering structure in place, it is now relevant to understand the specific role, key outcomes, and competency/skill requirement of various

	Authors	TWG	CPCB – Steering Committee
Role of the stakeholder	▪ Develop the key aspects to be covered in the guidebook – policy framework, technical commercial & institutional aspects as per agreed scope of work ▪ Develop competency framework for assessing operators in discussion with TWG ▪ Prepare model bid documents ▪ Prepare for TWG meetings	▪ Appoints "Authors" ▪ Review & finalize the guidebook contents ▪ Enable coordination with other stakeholders ▪ Prepares & chairs the TWG meetings ▪ Provide data as required	▪ Appoints TWGs & ensures development as per agreed timelines ▪ Orientation & training the TWG/ Developers ▪ Internal knoweldge sharing sessions ▪ Publish the finalized guidebool online ▪ Interact with industries
Timeline	Develop the guidebook as agreed timelines	Bi-weekly TWG meetings to monitor progress	Monthly meetings with TWG to track progress
Competency/ skills required for the role	• Technical knowledge experts – for asssesing technological options, and costs associated and expected operator skills for diffierent systems • Commercial and Transaction experts – for assessing business models, pricing and competency framework, and developing bid document	• Regulators with technical knowledge to detail the standards/ challenges to be addressed in guidebook • Industry development authorities to outline their key challenges/ issues for CETP development • CETP operators to outline their key issues/ challenges	• Research/ survey capabilities and knowledge of sector for various recycle uses • Understanding of industry & regulator requirements to outline clear policy/ guidebook expectations
Manpower required for the skills & role	• Technical experts –3 members for understanding different high-level reuse options • Commercial & Transaction experts– 5 members	• CPCB – from IPC divisions(2 nos.) • SPCB – select SPCB members – 3-4 nos. • CETP operators – 3- 4 nos. • Research experts – 2-3 members from IIT etc. • IDC/ IDA reps – 3-4 nos.	• 2-3 member group headed by the divisional head of one of IPC VII
Possible alignment – internal/ external	• Externally appointed consultants through a competitive bid	• 15 member working group- defined through a common order by CPCB	• Headed by the divisional head of one of IPC I-V – supported by legal expert & planning head

2.6 Adopting a 'functional oriented structuring' within IPC

(a) Objective and Scope of the solution

Objective: A realigned structure for Industrial pollution control that is aligned on the required skill set and functions, rather than a sectoral approach.

Scope of the solution:

- **Re-grouping the subdivisions** of IPC from a sector oriented approach to a functional oriented approach for aligning similar skill sets required
- **Defining the role** of the functional sub-divisions may be considered as follows:
  - Standard Formulation – focussing on developing technical standards for different industries, other roles include developing the BREFs/ COINDs and a rolling plan for development
  - Monitoring and Enforcement – focussing on enable enforcement of EP act
  - Technical and Financial Assistance – focussing on providing other techno-commercial assistance such as general categorization of industries, identifying HPI & GPIs, CEPI index etc.
- **Staff Alignment based on skills** of the following functional sub-divisions may be considered:
  - Standard Formulation –this team may have specific sector experts for focussing on select industries, and may include such skilled sector research experts from the existing IPC I-V divisions
  - Monitoring and Enforcement – focussing on enable enforcement of EP act – key skill sets requiring monitoring capabilities. This may be supported by an IT personnel for enabling online monitoring and a enviro-legal counsel for providing support to NGT cases
  - Technical and Financial Assistance – focussing on providing other techno-commercial assistance needs experts with both technical and commercial knowledge

(b) Need and Impact of the solution

Need for realignment:

- ❑ Presently IPC I-V share responsibilities along with IPC-VI, which has indirectly resulted in lack of ownership. These divisions are also responsible for monitoring pollution levels in these industries, thereby leaving the limited staff with less time to work on standard formulation.
- ❑ Having a designated team for following up on standard formulation activities will help in ensuring the standards are revised from time-to-time
- ❑ Need for a clear standardized periodic review process for standard formulation - In the last 35 years, only 15 standards have been revised more than 5 times, and over 30 of the codes have not been revised at all in the last 35 years.
- ❑ In terms of skill set , physical monitoring requires certain skill set vis-à-vis that of standard formulation involved more sector-specific technical expertise

Therefore, there is a need for exploring a functional oriented structuring rather than a sector approach aligned based on the type and nature of works to be done.

Benefits and impact of enabling a functional structure within IPC:

Presently, IPCs I-V deal with standard formulation and monitoring of specific industry sectors while IPC VII looks after industrial areas. 21 scientific cadre officers are deployed for these works in the division. By realigning the staff to a functional approach in the long run it will result in the following advantages:

- ❑ **Enables a periodic review:** With a deignated team, it is easier to assess the total standards developed in each sector, and accordingly, develop a rolling plan for development of standards. This rolling plan, published every 2/3 years lists existing industry sectors selected for regulatory revisions (once every 2/3 years depending on category) and new industries identified for regulation (dependeing on nature of pollution).
- ❑ **Gives ownership**: Specific persons may be appointed for specific sector's standards formulation and development of BREFs, thereby ensuring quicker and frequent updation of standards. For example, the BREF and COINDS of any standard requiring revision in the next year, based on rolling plan could be revised this year and so on.
- ❑ **Improves efficiency and saves time:** Presently monitoring, compliance and enforcement activities are all done individually by different divisions based on their concerned sectors. However, they all require physical survey, checklist and interaction with industries/ SPCBs/ CPCB ROs. Thereby, the same communication is done by multiple people for different sectors. With the realignment, it is easier to

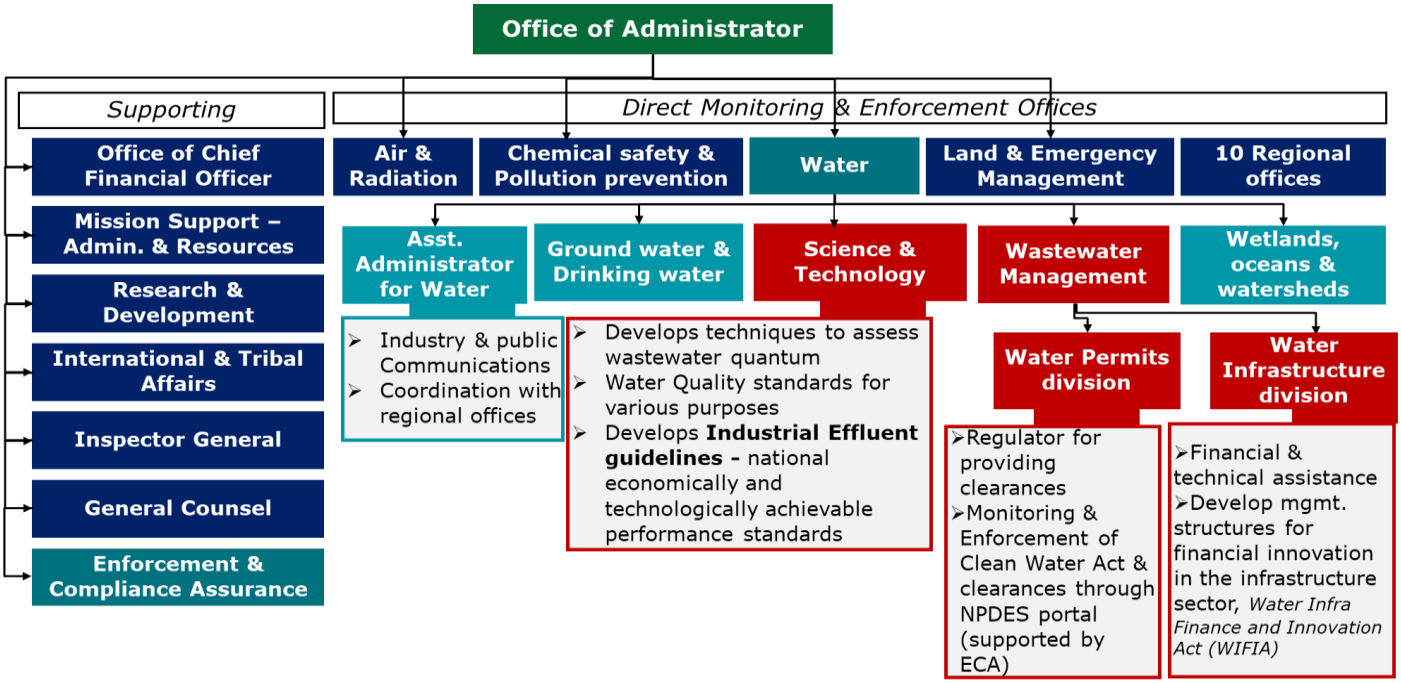
(1) co-ordinate communication to states and CPCB ROs
(2) monitor compliance using online monitoring, track complaints and NGT cases all in one place, for better synergies of efforts

- **Better compliance assessment** against discharge permits, consent management, investigation of pollution incidents and more effective environmental monitoring.

Beneficiaries: CPCB, SPCBs, Industries, NMCG, SPMGs, Research institutions, NGOs and General public

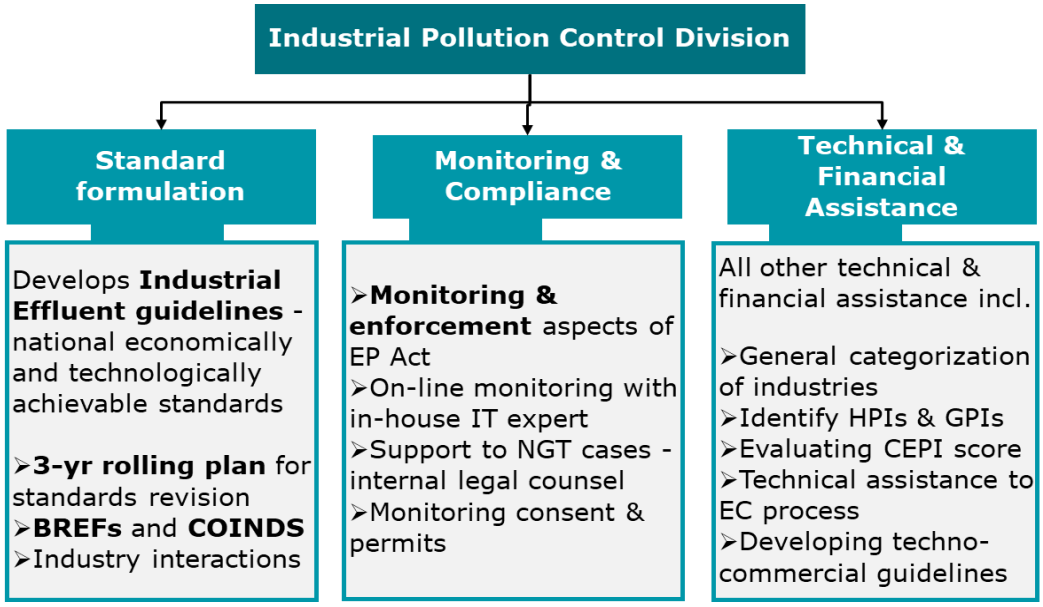
(c) Learnings from global case studies

USEPA's functional organization structure: USEPA has a designated "Science & Technology" division within the Water division, which is responsible for developing effluent guidelines using inputs from the other teams. Additionally, it may be noted that USEPA does not only cater to the technical aspects of the wastewater management but they also deal with the commercial aspects such as business models and innovative payment mechanisms



(d) Implementing in the CPCB context

Features of the solution, in CPCB context: Drawing from USEPA's organization structure, CPCB may also consider a similar grouping of functions within the Industrial Pollution Control division, as depicted below:



Present organization structure of CPCB's IPC division, staff alignment and their roles: To ensure smooth transition to this divisional realignment, it is important to understand the current division and its roles. Based on our institutional baseline assessment, we understand the following about the Industrial Pollution Control divisions.

Division	Technical staff nos.	Key functions of the division	Relevant skill
IPC – I Division	**3**	Development of standards & guidelines and other activities related to selected industries: • Chemical industries - Chlor Alkali, Dyes & Dye Intermediate, Fertilizer, Oil Refineries, Pesticides • Petro-Chemicals, Pharmaceuticals, Paints & Enamel, Industries of Chemical in nature(Organic and In-organic)	- Standard formulation - Monitoring & enforcement
IPC – II Division	**4**	Development of standards & guidelines and other activities related to selected industries: • Metallurgical – Aluminium, Copper, Zinc, Integrated Iron & Steel, Dust (PM) Emitting Industries, Mining, Cement, Thermal Power Plants, Coal Mining, Non-Coal Mining/ Asbestos	- Standard formulation - Monitoring & enforcement
IPC –III Division	**4**	Development of standards & guidelines and other activities related to selected industries: • **Agro Based –** Sugar, Distilleries, Pulp & Paper, Textiles, Food & Beverages, Soft Drinks	- Standard formulation - Monitoring & enforcement
IPC- IV Division	**2**	Development of standards & guidelines and other activities related to selected industries: • **Animal products** - Dairies, Tanneries, Slaughter House	- Standard formulation - Monitoring & enforcement
IPC- V Division	**3**	Development of standards & guidelines and other activities related to selected industries: • **SSI -** Stone Crushers, Foundry and Furnaces, Hot Mix Plants, Brick Kilns, Rice Mills & other Small Scientist Scale Industries, Siting Policies & Technology Development	- Standard formulation - Monitoring & enforcement
IPC- VI Division	**3**	The Industrial Pollution Coordination division is responsible for the following: • General categorization of industries - 17 Categories of Industries • Pollution level related categorization of Industries • Review of Standards • On-line Installations • Grossly Polluting Industries (other than Ganga)	Technical & Financial Assistance
IPC- VII Division	**3**	Industrial Clusters and Enforcement division is responsible for the following: • Assessment of Polluted Industrial Areas (PIAs) including Critically Polluted Areas (CPAs) for evaluation of Comprehensive Environmental Pollution Index (CEPI). • Assessment of Common Effluent Treatment Plants (CETPs) in the industrial clusters comprising of Medium and Small Scale Industries. • Environmental Clearance (EC) issued by Ministry of Environment, Forest & Climate Change (MoEF&CC), Government of India.	Technical & Financial Assistance Monitoring & enforcement

What has to be done? Accordingly, the current staff have to be realigned for their new roles based on their skillset. To do this the following key steps have to be undertaken by CPCB, internally.

- ❑ **Mapping the skill and interest** of the key technical scientific cadre officers and supporting technical staff – at the Head office
- ❑ **Aligning the staff requirement for each division –** Based on internal discussions and expected work load for each division, draft the number of staff required in each division. An indicative assessment could be as follows –

	Standard formulation	Monitoring & Enforcement	Technical & Financial Assistance
Estimating work load **INDICATIVE**	With 200+ indsutry sectors, assuming a maximum 7 year window for renewal – around 30 renewals every years ▪30 BREFs/COINDs ▪20 standards formulated With help of sector experts & industry task force	This includes online, physical monitoring & support to NGT cases NGT disposed 19000 cases in 6 years – averaging 3000 cases per year. Assuming 60% related to IPC, of which another 30% are directed to CPCB for action → ~500 cases per year.	This involves many one-time activities such as issuing techno-commercial guidleines, and revision of select documents from time-to-time **Technical works** – such as reuse/recycling, categorization, CEPI, PIA assessment, Assistance to Env. Clearance
Computing manpower **INDICATIVE**	Assuming 3 BREFs and 2 standards to be overseen by a scientist – this requires 10 scientist staff	Assuming 70 cases per technical staff at HO – Scientist – 10 staff IT support – 1 nos. Legal support – 1 nos. Support tech – 3 nos.	Scientist - 2 nos. Support tech – 2 nos. Techno-commercial experts – 2 nos.

- **Re-aligning and mapping staff for new structure and staff requirement:** In the above indicative alignment, the current 22 scientists have been re-aligned into 10 in standard formulation, 10 in Monitoring & enforcement and 2 in Technical & Financial assistance teams – also with suitable supporting staff. This will enable ease of work allocation in the longer run.

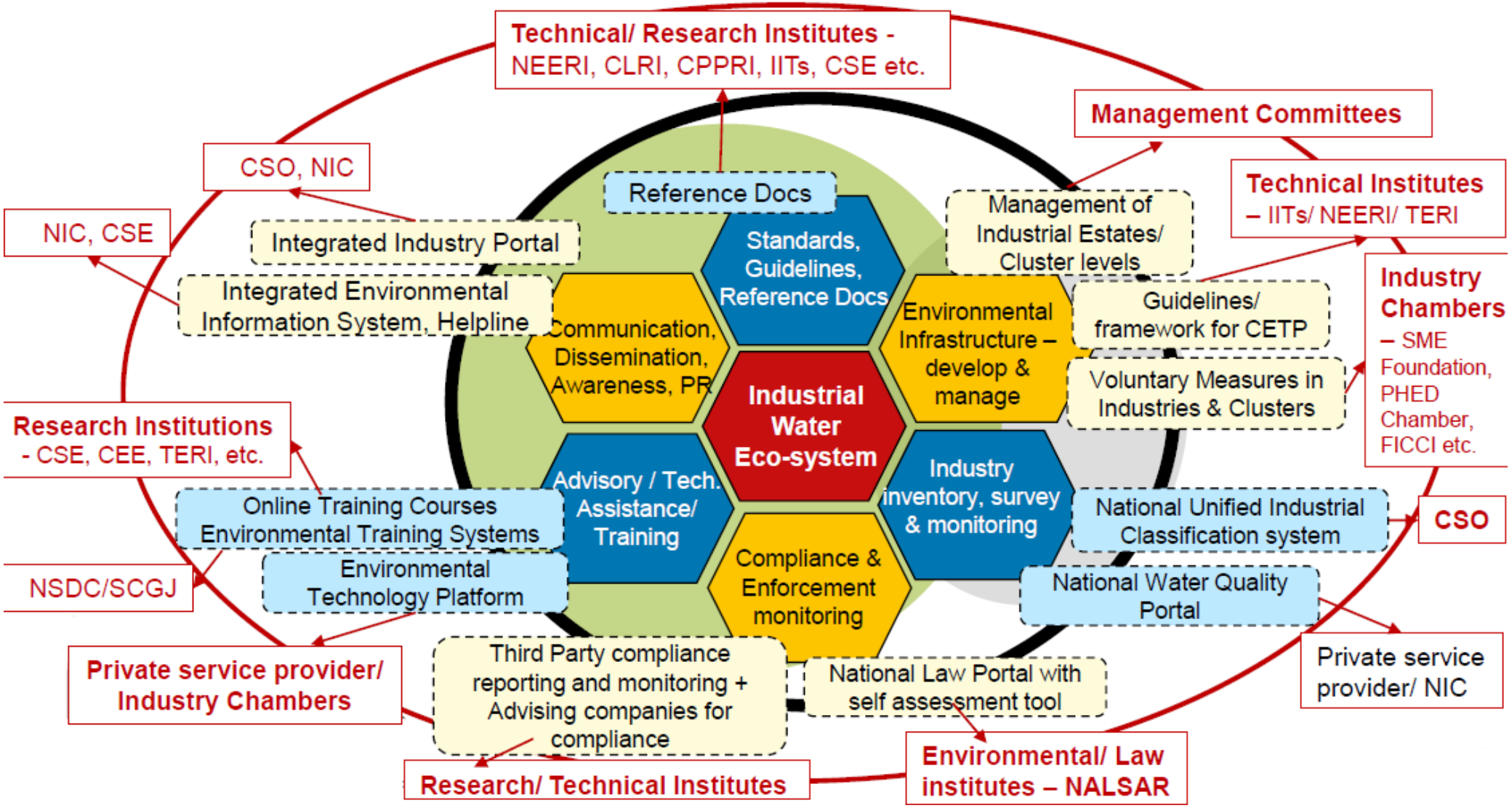
Who will be responsible? The HR personnel along with the Planning Head can be in-charge of undertaking this re-alignment as the key activities, as it involves both skill assessment and work assessment works.

2.7 Establishing industrial wastewater eco-system of various agencies

As described in earlier sections, there are various roles and functions of pollution control board as per The Water Act, The Air Act, and The Environment (Protection) Act. Most of these functions can be categorised in six broad categories of; (i) standard formulation, (ii) guidelines, norms, SOPs on developing and managing environmental infrastructure; (iii) industry inventory and monitoring, (iv) compliance and enforcement monitoring; (v) advisory and technical assistance, and (vi) knowledge dissemination and awareness.

With increased industrialisation and growing volume of work and constraint of limited staff there is need to have focus on strengthening partnerships. Since most of the partnerships are already in practice to perform various functions, however there is a need to formalise these partnerships and have a structured approach in terms of clearly identifying the right set of agencies and the nature of formal engagements with such partnership. The chart below presents an indicative list of various agencies aligned with various functions of the pollution control board that could potentially be engaged and partnered for performing and supporting various activities in the context of industrial wastewater. Some of the indicative formal arrangements to be developed include (i) engaging technical and research institutions for inputs in having structured approach to standards formulation and revisions such as involvement in development of brief reference/ technical papers, industry specific technology advancement etc., (ii) having third party agencies for monitoring and compliance reporting and also they could advise member industries on how to achieve better compliances etc., (iii) having formal management committees to look into matters related to environment infrastructure development and its management such as CETPs, Sludge management, (iv) collaborations with other ministries such as MoSPI to have Inventorisation of industries with linking of pollution index, (v) for various IT portals to identify agencies such as NALSAR for managing environmental law portal, NIC for national water quality portal, and industry associations for managing portal and knowledge platforms on wastewater technology etc., and (vi) for knowledge dissemination and awareness to involve relevant research agencies to develop online training course etc.

The structured and formal arrangement with such competent agencies will lead to utilising their core expertise in performing various functions and also assist pollution control board to focus and prioritize their involvement to effectively manage industrial wastewater pollution prevention and control.



Annexure – 1: Select Global case studies

I. United States Environment Protection Agency (USEPA) – A study of effluent standard formulation process

Context

To combat pollution form industries, United States Environment Protection Agency (USEPA) was formed in United States in the year 1970 for the protection of the environment with a mission – 'To Protect Human Health and the Environment'. Key functions of USEPA are:

- Development and enforcement of regulations (standards);
- Provide grants to state government programmes, non-profits, education institutions, and others for scientific studies and research;
- Conduct research and development on environmental issues, which form the basis of the policies, actions, and decisions. This is done through the national network of laboratories;
- Form partnerships on specific environmental issues/ causes with businesses, non-profit organizations, and state and local governments;
- Awareness generation on issues of environmental pollution; and
- Information collection and knowledge dissemination.

'Development and enforcement of regulations' is one of the key functions of USEPA. This case-study specifically focuses on the process of development of effluent guideline regulations for industries and commercial facilities by USEPA, which is presented as a best-practice.

Key issue/s addresses

Key issues addressed through this case are:

(a) Development of Effluent standards/ regulations are often not at pace with evolution of the technology in the sector; and
(b) The standards and regulations are not updated at required regular intervals.

Key initiatives – How were the issues addressed?

Preparation of an 'Effluent Guideline Program Plan': Development and regular updation of effluent guidelines regulations is done through preparation of the 'Effluent Guidelines Program Plan' – which is published every two years. The plan identifies the following:

- Existing industries selected for regulatory revisions, and
- New industries identified for regulation.

The Plan provides a rulemaking schedule for any such activities. Based on this Plan, the EPA published updates the Effluent Guidelines every two years. Factors considered for possible revision of the ELGs are given below:

(a) Adequacy of performance: The performance of applicable and demonstrated wastewater treatment technologies, process changes, and pollution prevention strategies to reduce pollutants in an industrial category's wastewater;

(b) Economic viability: The costs (economic achievability) of demonstrated wastewater treatment technologies, process changes, and pollution prevention alternatives;

(c) Pollution level: The amount and types of pollutants in an industrial category's discharge. EPA has identified 65 pollutants and classes of pollutants as "toxic pollutants", of which 126 specific substances have been designated "priority" toxic pollutants. All other pollutants are considered to be "non-conventional." However, the pollutant list has not been updated since 1977; and

(d) Potential technological Innovation: The opportunity to promote technological innovation or to eliminate inefficiencies or impediments to pollution prevention. This is achieved through the following decision support framework:

Type of Sites Regulated	BPT	BCT	BAT	NSPS	PSES	PSNS
Existing Direct Dischargers	●	●	●			

New Direct Dischargers				●		
Existing Indirect Dischargers					●	
New Indirect Dischargers						●

Pollutants Regulated	BPT	BCT	BAT	NSPS	PSES	PSNS
Priority Pollutants	●		●	●	●	●
Conventional Pollutants	●	●		●		
Nonconventional Pollutants	●		●	●	●	●

BPT - Best Practicable Control Technology Currently Available, BCT - Best Conventional Pollutant Control Technology, BAT - Best Available Technology Economically Achievable, NSPS - New Source Performance Standards, PSES - , PSNS - Pretreatment Standards for New Sources.

Review, Updation and Development of New Effluent Limitation Guidelines (Regulations): The Effluent Limitation Guidelines are nationally-applicable water pollution regulations for industrial and commercial facilities. ELGs are technology-based regulations, and are intended to represent the greatest pollutant reductions that are economically achievable for an industry. These are regularly updated based on the 'Effluent Guideline Program Plan' prepared every two years. To date, EPA has issued ELGs for 59 industrial categories.

The ELG planning process is guided by the following factors:

(a) Restore and maintain the chemical, physical, and biological integrity of the nation's waters; and
(b) Provide transparent decision making and involve stakeholders early and often during the planning process.

The process for development of ELGs in briefly presented below:

(a) **Step 1: Extensive Research -** USEPA conducts extensive research study on industry practices, discharge characteristics, technologies used to treat discharge and economics feasibility;
(b) **Step 2: Identification of Best Available Technology (BAT)** - From the research, USEPA identifies Best Available Technology (BAT) economically achievable to every industry;
(c) **Step 3: Draft Regulation Formulation -** Sets regulatory requirements based on performance of that industry and develop a draft document for industry;
(d) **Step 4: Stakeholder consultation -** Conduct extensive consultations with various stakeholders - like industries, research and education institutions, NGOs, consumers
(e) **Step 5: Preparation of the Final Effluent Guideline Regulation -** Based on the comments received from all the stakeholders, prepare the final guideline regulations.

Outcome

1. Development of research on industrial pollution and pollutants and regular updating of technology compendium;
2. Involvement of all stakeholders in the sector related to industrial pollution, such as industries, state government, local governments, educational institutions, research institutions, NGOs and general public etc, leading to development of guidelines which has consensus of the stakeholders and are more practical;
3. Availability of resource material, guidelines, manuals and other material for technology options – existing and new, which is most economically to industries.
4. Regular and frequent review of effluent standards from industries and regular updates.

Key learnings for CPCB

1. Preparation of effluent guideline plan which takes into consideration – economic viability, pollution level, relevant technology option etc;
2. Established process of regular updation of effluent guidelines regulations;
3. Extensive involvement of stakeholders in the effluent guideline regulation preparation process - industries, state government, local governments, educational institutions, research institutions, NGOs and general public etc;

Other observations

Pollutant list is not updated since 1977. They should be updated at required intervals.

Context

In order to ensure pollution monitoring and preventions, USEPA have collaborated with third party agencies for validating pollution control measures, laboratory certification, Quality assurance based on their capabilities and competencies.

Key issue/s addresses

The key issue addressed is given below:

- Lack of manpower to manage vast industrial cover
- Requirement of Certification by outside agency for quality assurance and checks
- Lack of quality assurance

Key initiatives – How were the issues addressed?

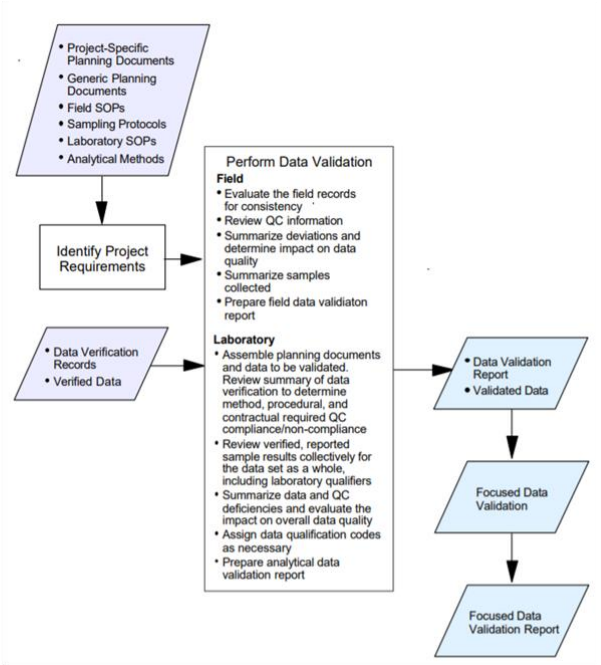
To address the issues identified, the USEPA collaborated with different third party agencies for quality assurance and validation. These agencies are recognized by EPA to provide certification services to different process to pollution monitoring and control. This helped the USEPA in minimizing the risk of non-compliance and ensuring the quality and quantity.

USEPA has defined SOPs for Quality Assurance and Validation under which these third party agencies perform the work. These SOPs define the frequency, requirement and detailed process for verification and validation. These processes are done by the USEPA Labs, which are subsequently connected to Laboratory Information Management System (LIMS). In addition, there is a Data Assessment tool which has Electronic Pre-programmed calculations that examines the QC data for all analytical results and evaluates them against the appropriate review criteria.

SOPs for verification

Operation	Common Records	Source for Record Specifications
Sample collection	Daily field logs, drilling logs, sample collection logs, COC forms, shipper's copy of air bill, surveys	QA Project Plan or SAP, SOPs for sample collection, pre-printed COC instructions
Sample receipt	COC forms from sampler, receiver's copy of air bill, internal laboratory receipt forms, internal laboratory COC forms, laboratory refrigerator or freezer logs	QA Project Plan or SAP, laboratory SOP for sample receipt, pre-printed COC instructions
Sample preparation	Analytical services requests, internal laboratory receipt forms, internal laboratory COC forms, laboratory refrigerator or freezer logs, preparation logs or bench notes, manufacturer's certificates for standards or solutions	QA Project Plan or SAP, reference method (EPA or other), laboratory SOP for preparation method, pre-printed instructions on internal forms
Sample analysis	Analytical services requests, internal laboratory receipt forms, internal laboratory COC forms, laboratory refrigerator or freezer logs, manufacturer's certificates for standards or solutions, instrument logs or bench notes, instrument readouts (raw data), calculation worksheets, quality control (QC) results	QA Project Plan or SAP, reference method (EPA or other), laboratory SOP for analysis method, pre-printed instructions on internal forms and worksheets
Records review	Internal laboratory checklists	QA Project Plan or SAP, laboratory SOP for analysis method or laboratory QA plan

Inspection / Validation Framework



Outcome

Key outcomes include:

1. Compliance of standards by industries for pollution control
2. Regular update of verified data which help in data validation and analytics
3. Streamlined process due to availability of SOPs
4. More control on industries

Key learnings for CPCB

1. Streamlined process for compliance of pollution standards
2. More verified data into the system
3. Better decision-making process.
4. Delegation of work to external agencies helped USEPA to focus management
5. Promotes the concept of real-time risk management and information system authorization through the implementation of validated third party monitoring processes

II. Australia – Certification Framework for CETP Operators

Context
The Certification Framework for Operators within Wastewater and Recycled Water Treatment Systems (the Certification Framework) was developed to ensure that the environment and public health are protected, and that wastewater and recycled water that is provided to end users is safe and fit for purpose. Certification provides an assurance to regulators, communities and the users of recycled water that Operators are competent to manage wastewater and recycled water quality, as well as being capable of identifying and responding to wastewater and recycled water quality risks and incidents.
Key issue/s addresses
Operators managing the wastewater disposal and recycled water provision may not be competent to operate and maintain the treatment works, which may lead to release of harmful pollutants which may be harmful for the environment and public health.
Key initiatives – How were the issues addressed?
The framework introduces a minimum level of competency for Certified Operators across all states and territories by aligning skills, knowledge and competency requirements to national Vocational Education and Training (VET) standards. Further, the Certification Framework ensures that there is a requirement for the on-going maintenance/development of skills and knowledge. Certification is based on the requirement of a wastewater or recycled water treatment Operator to: (a) Achieve the necessary competencies specified in the National Water Training Package (NWP, NWP07, NWP01 and future revised versions) for operating, controlling or optimising wastewater and/or recycled water treatment processes; (b) Demonstrate capability within the workplace through industry experience; and (c) Continue to develop knowledge and skills, as well as maintain currency of industry experience. The complexity of each Wastewater or Recycled Water Treatment System forms the basis for determining the competency and capability required of the Certified Operator. The methodology for the Certification Framework is described below: **Step 1: System Competency Risk Rating -** The competencies and capabilities required of Operators are defined at different levels dependent upon the complexity of the system, either risk/ sensitivity of receiving and complexity added by reuse activities. These can be classified as: • Low complexity – wastewater: These include the systems where low technology wastewater treatment processes are utilised, such as lagoons, trickling filters, rotating biological contactors, Imhoff tanks or small package treatment plants; • High complexity – wastewater: These include higher technology treatment processes are utilised, such as intermittent aeration/oxidation ditches, membrane bioreactors, biological nutrient removal and dissolved air flotation etc. • Recycled water: Will include a recycled water treatment plant where higher technology treatment processes are utilised specifically to provide an end product fit for use for some higher-end purpose, such as membrane bioreactors, desalination processes, chemical or biological nutrient removal, dissolved air flotation etc. Few factors which impact upon the competency and capability requirement of the operator include - automation and level of intervention, technology, complexity of individual processes, interrelatedness of processes, size of the facility, range of end uses, volume of flow, timeliness of response requirements, source water quality and variability, microbial risks, chemical risks, physical risks, radiological risks and receiving environment etc. **Step 2: Competency Requirement -** Competency is attained by the operators through the completion of fit for purpose units of competency contained within the National Water Training Package. The training package contains various training units which are required for the operator to undertake in order to operate the facilities effectively and efficiently. Competency of the operator is crucial, as treated wastewater or recycled water have a direct impact on the environment or pose a public health risk to communities.

Training units ➲ Complexity ⏻	Apply the risk management principles of the water industry standards, guidelines & legislation	Sample and test wastewater	Apply Environmental & Licensing Procedures	Apply Environmental & Licensing Procedures	Perform laboratory testing	Fit For Purpose units of competency from the NWP
Low Complexity	Optional	Mandatory	Mandatory	Optional	Optional	Mandatory
High Complexity	Optional	Mandatory	Optional	Mandatory	Mandatory	Mandatory
Recycled Water	Mandatory	Mandatory	Optional	Mandatory	Mandatory	Mandatory

In case the operator does not meet the training requirement, the operator is recommended to gain the necessary qualification and re-apply for evaluation. Once the operator has obtained all the certifications, the operator is approved.

Step 3: Capability Assessment – In order to provide additional assurance to Customers, regulators and employers that the Operator shall be able to perform under changing, and sometimes challenging, conditions. The required capability is attained through direct exposure to workplace conditions and by application of relevant skills and knowledge to the satisfaction of the Wastewater Authority or Recycled Water Supplier. It is expected to be attained through participating in the operational setting unique to the Wastewater or Recycled Water Treatment System for a specified period of time, which is as recommended below:

- Low - 12 months inclusive of training;
- High - 12 months inclusive of training; and
- Recycle water – To be decided.

In case the time period is not met, the operator is requested to re-apply after the condition is fulfilled.

Step 4: Award of the Certificate – Once the competency and capability is assessed for the operator, the operator is awarded the certificate. The certification is valid for 5 years.

Extension of certification: After 5 years, if the operator wishes to extend the validity of the certification, the operator can do so upon request to the certifying authority. The following steps are followed by the auditor, in order to re-issue the certificate:

Step 1: Analysis of current tasks - Be currently undertaking treatment tasks aligned to their Certification status in an operational role.

Step 2: Audit of the operator - Participation in the Continuing Professional Development Program (CPDP) and attain the minimum required points for qualification; or undertake a Certification audit within three (3) months of the expiry of their Certification to demonstrate current competency. In case the operator is falls short in meeting the requirements, a 3 month provisional extension is provided, wherein the operator is expected to take necessary steps to meet the requirement. If the requirement is not met within 3 months, the certifacion becomes 'Inactive'.

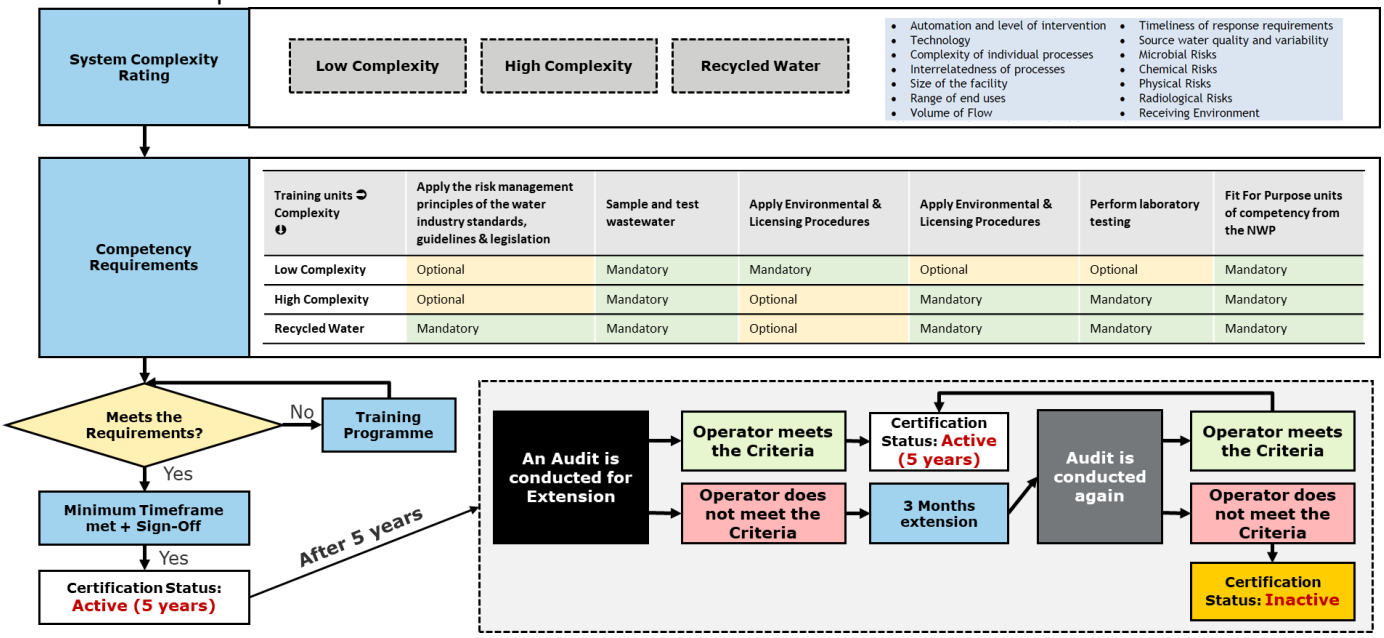
Step 3: Training for any new processes - The operators must complete training for any new treatment processes added after they were last certified, to ensure that the competencies held (as required in Part Four) remain directly relevant to the wastewater or recycled water treatment processes that are used within the system.

Management and Maintenance of the framework: The framework is designed to be managed and maintained by an independent third party entity (the Framework Owner) in accordance with the direction set from consultation with industry stakeholders, including regulators. The Framework owner is also responsible for appointing an independent Certifying Body and recognising the role of Framework Coordinators.

Review and Continuous Improvement: The Framework Owner initiates and facilitates a periodic review of the framework to ensure competency, capability and development requirements defined in the framework remain valid and appropriate to the industry. As a minimum, the framework is reviewed every 5 years; however, legislative

changes, new wastewater or recycled water treatment technologies, or significant regulatory revisions or changes to the National Water Training Package provide triggers for an earlier review, in order to ensure that the framework remains current and reflects good industry practice.

The framework is presented in the schematic below:



Outcome

1. Establishment of a transparent mechanism of certification of operators for wastewater treatment and recycling;
2. A database established and regularly updated for certified operators for wastewater treatment and recycling.
3. Operation and maintenance of the wastewater and recycling facilities by credible operators.

Key learnings for CPCB

1. Establishment of a similar certification framework for CETP operators by CPCB/ SPCBs and deployment of certified operators only for the operation of CETPs. This will ensure O&M of CETP is conducted by qualified professionals.
2. Availability of certified operators will help government agencies authorities to select an appropriate operator for their treatment/ recycling systems.

III. Israel – Supporting National Policy Framework and Focused Research & Development Efforts

Context

Israel is a water-deficient country with desert covering 70% of its landscape. In the past, Israel faced a constant challenge to look for sustainable water sources. Increasing population, droughts, urbanization and industrialization is creating more water stress in the country.

Over the last decade, Israeli water sector has adopted the water circularity principle, wherein 95% of water is retained in the system through efficient use, improved and effective production, desalination, reuse and recycling. Israel is constantly innovating new sustainable technologies, practices and long-term plans in water reuse and recycling through initiatives such as research and development, educating the citizens, developing modern infrastructure and utilizing IT solutions in water and wastewater operations and management. At present, about one-third of irrigation water in Israel now originates from reused wastewater treated at more than 150 plants.

Key issue/s addresses

The water sector in Israel was facing a number of challenges. These are listed below:

- Lack of sustainable water sources and reserves for the country, with the country experiencing consecutive for 4 years – from 2005 to 2008;
- Population growth and the rising standard of living increasing water demand;
- Over-utilization of its renewable water sources
- Low allocation of water to agricultural sector causing reduction in productivity; and
- Pollution to natural water system.

Key initiatives – How were the issues addressed?

Israel addressed the severe issue of water scarcity by identifying and taking actions on the two thrust areas - Policy and Technology (Research and Development).

Few of the key policy interventions taken up at the national level are:

(a) National Policy of Sustainable Agriculture and Rural Development included wastewater irrigation as potential irrigation source:
(b) Ministry of Agriculture and Ministry of Environment work closely to formulate strategies on sustainable agriculture;
(c) Formulation of an Inter-Ministerial Committee (Inbar), which developed regulations on water quality; and
(d) Mandatory requirement of permits for farmers who wish to utilize effluent water for irrigation.

The policy reforms were proposed on the sound base of research and development in the sector. For example – research on water sector planning for short- and long-term effects of wastewater irrigation on crops and the environment. A government extension service was also developed for transferring the knowledge from research and development activities directly to the farmers for practical applications through training courses.

The Israeli water industry is recognized as a global leader, which is due to its innovations in desalination, drip irrigation, water recycling, and water network security. The research is supported by the Policy Research Institute established at Jerusalem. Which is an independent policy think tank facilitating research with aim to facilitate eases applying sophisticated methods in agricultural branches; and (b) technological advancement, new irrigation techniques & innovative agro-mech equipment. Moreover, Israel's R&D programs, its expertise in advanced technologies, and its traditional strengths in water management and agriculture have resulted in a vibrant export enterprise. Israel is constantly driving new technologies in conveyance, cleaning, treatment, measurement and monitoring. The use of information technologies is one of the most significant and important components of the water sector in the country. The IT solutions are built on the solutions developed in other sectors, including cyber-security, automation, and measurement. They are further supported by a robust system of government incentives in research and development, new technology start-ups in related sectors such as agritech, water technology, and energy and cleantech. These incentives considered important for overcoming adoption risk and compensating for sunk legacy costs in old water systems.

Outcome

1. Establishment of supporting policy framework at the national level for recycling and reuse of wastewater in agriculture;
2. Availability of national research institutions to undertake research and development in wastewater reuse and recycling and be aware of the latest technology development around the world;
3. Favourable environment and incentives for entrepreneurs/ start-ups and opportunity for innovation in TIT technology in water and wastewater sectors;

Key learnings for CPCB

1. Establishment of a policy framework at the national and state level for wastewater reuse and recycling;
2. Increased thrust towards research and development in wastewater treatment and reuse technologies; and
3. Encouraging private sector players to innovate wastewater reuse and recycling – along with making it a profitable business option.

IV. Sweden – Sludge Management

Context

Sweden is a water-abundant country and has experienced rapid industrialization and urbanization. It is leading to increase in generation of domestic and industrial wastewater. To address the issue, a number of wastewater treatments plants came up throughout Sweden, thus causing increase in generation of sludge. In the 1960s, sludge was directly used in agriculture, making it an easy option for disposal at a low cost. In the 1980s, it was discovered through research programmes that the sludge contains high quantities of certain metals, which are harmful for human health. It resulted in a boycott from the Federation of Swedish Farmers in using sludge for agricultural purposes. As a result, Sweden had to find innovative approached for addressing the issue of sludge management.

Key issue/s addresses

The key issue addressed is given below:

- Sludge from the treatment plants was not treated before disposal; and
- Unscientific disposal of sludge in the environment through direct use in agriculture sector.

Key initiatives – How were the issues addressed?

Institutional Arrangement with Clear Division of Responsibilities: Sweden has a clear division of responsibility for waste management, which has made long-term planning & investment easier. The Waste Ordinance in Sweden imposes physical, economic and legal responsibility for various stakeholders. They are presented in the table below

Waste owners	• Responsible for ensuring the waste is managed as per regulations, sort & disposing
Producers	• Producers of certain goods are responsible for them when they become waste • They establish JVs for waste management
Municipalities	• Responsible for household waste, waste planning and enforcement • Impose tariffs on landfill waste based on rate of tax.
County Administration boards	• Act as regulators and issue permits • Guide municipalities on issues & responsible for regional waste planning
Swedish EPA	• Takes initiative & implements waste policy • Monitors progress to ensure efficiency
Environmental Courts	• Issue permits for large facilities • The Environmental Court of Appeal decides appeals/complaints

Cooperation among the key stakeholders – National Sludge Agreement: The Federation of Swedish Farmers (LRF), Swedish Environmental Protection Agency (SEPA) and Swedish Water & Wastewater Association (SEPA) started working together to address the issues related to the sludge management. This resulted in formulation of National Sludge Agreement in the year 1994 which set out the rules for using sludge in the future, as was set to ve evaluated in the year 2003.

Formulation of National Group on Sludge Consultation: the national group deals with national issues relating to sludge management in Sweden. It also regulates use of sludge. For instance - establishment of special sludge policy/ rules for spreading sludge as fertilizer, limiting its use in pastureland or for vegetables.

Stringent regulations: Sweden has a taken a stand that it will not accept any sludge at its landfill sites since 2005. With this regulation, there were limited alternative solution for treatment of the sludge. This step had forced the national government to come up with a long-term solution for sludge management.

Outcome

Key outcomes include:

1. Identification and clear division of roles and responsibilities among various stakeholders;
2. Formulation for a national group to deal with sludge management issues; and
3. Formulation and revision of the regulations on sludge management.

Key learnings for CPCB

1. Clear division of roles and responsibilities across stakeholders – National Government, State Government, Other national and stale level agencies, Local Governments, Waste Generators (Industries etc.), Private Operators;
2. Creation of a national group/ committee on disposal of sludge generated from industries;
3. Development of national policy and state level policies and regulations on sludge disposal from industrial establishment.

V. USEPA – Pollution Monitoring Tools

Context

In order to comply with the Clean Water Act and Safe Drinking Water Act in United States, USEPA has developed certain pollution monitoring tools. These tools are develop with a context to:

(a) Pinpoint any changes or trends that appear in water bodies over a period of time;
(b) Regularly monitor water quality to identifying any existing problems, or any issues that could emerge in the future;
(c) Designing and developing pollution prevention and management strategies; and
(d) Developing emergency strategies.

Key issue/s addresses

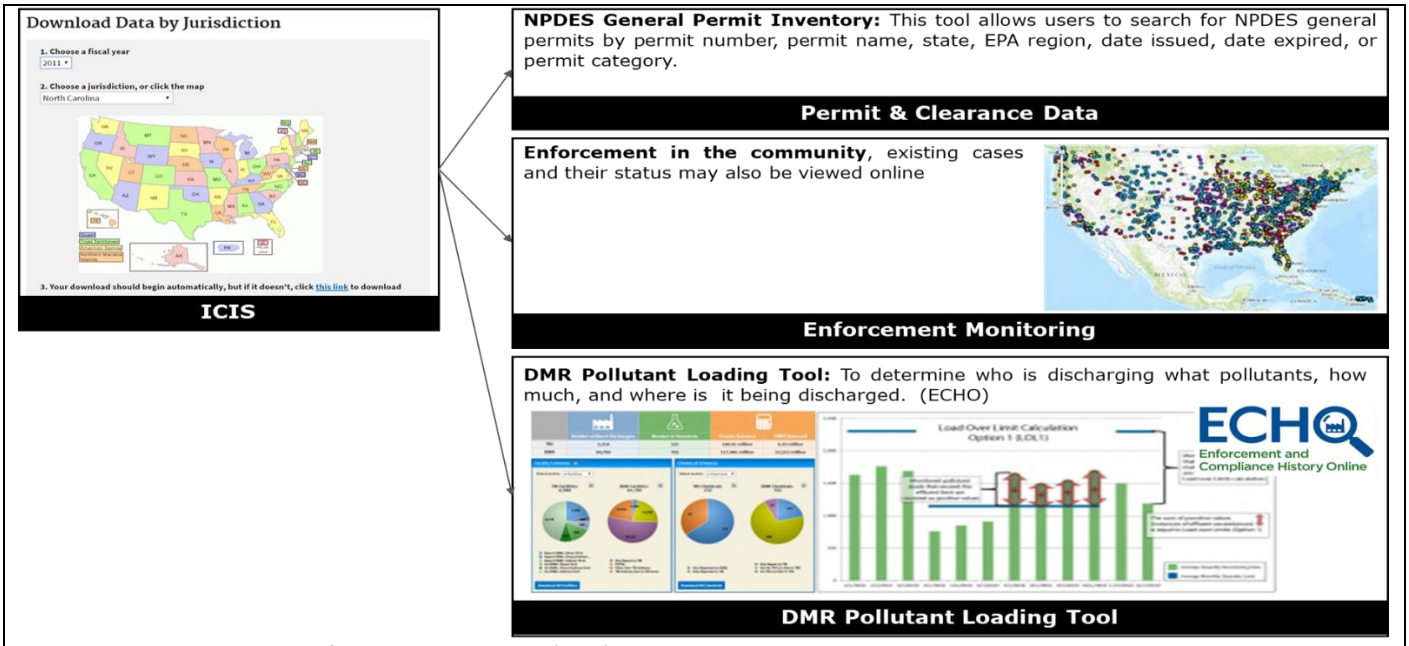
The key issue addressed is given below:

- Lack of adequate environmental pollution monitoring;
- Lack of environmental pollution monitoring tools;
- Lack of consistency in physical data collection regime;
- Limited data collection points for periodic monitoring; and
- Insufficient and fragmented data limiting the USEPA to perform a comprehensive trend analysis.

Key initiatives – How were the issues addressed?

To address the issues identified, the USEPA developed online instruments for real time measurement of water quality. The online instrument developed had an integrated system for compliance, monitoring and enforcement called ICIS (Integrated Compliance Information System) in USEPA under NPDES (National Pollutant Discharge Elimination System). NPDES permit program authorizes the state governments to perform permitting, administrative, and enforcement responsibilities for control of pollution. Compliance monitoring under the NPDES Program takes place largely at the State Level. EPA has authorized all but four states to implement their own NDPES programs to control water pollution. EPA oversees authorized state programs and has direct implementation responsibilities for the unauthorized states as well as federal facilities. NPDES program regulates point sources that discharge pollutants into water body of United States and provides different techniques & tools to manage compliance of its permit limit for controlling discharges of pollutants to receiving waters. This tool/ instrument is discussed in the section below:

Online Monitoring Tools:

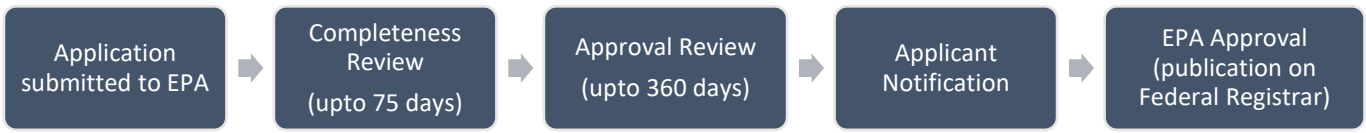


Integrated Compliance Information System (ICIS) - ICIS is the national database to track compliance with NPDES permit requirements for major dischargers. From the system one can review information on

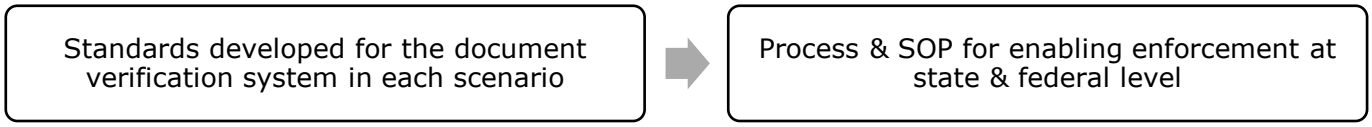
- When a permit was issued and its expiry?
- How much the company is permitted to discharge? and
- The actual monitoring data showing what was discharged.

ICIS-NPDES integrates data from several separate data systems. These systems are presented below:

Physical Monitoring Tools: Cross-Media Electronic Reporting Rule (CROMERR) - EPA's Cross-Media Electronic Reporting Rule (CROMERR), started in 2005, provides the legal framework for electronic reporting under EPA's regulatory programs. The Rule sets performance-based, technology-neutral system standards and provides a streamlined, uniform process for Agency review and approval of electronic reporting. This framework helped the EPA to streamline the physical monitoring data into the electronic system and gave them the opportunity to reproduce the document when needed. CROMERR process is presented in the figure below:



EPA has classified Partner reports as Priority & non-priority reports. The CROMERR requirements for determining the identity of someone submitting an electronic report are different for **Priority** (e-signature Mandatory) **and Non-Priority reports** (only identity info collected).



Quality Assurance and Verification: USEPA has defined SOPs for Quality Assurance and Validation. These SOPs define the frequency, requirement and detailed process for verification and validation. These processes are done by the USEPA Labs, which are subsequently connected to Laboratory Information Management System (LIMS). In addition, there is a Data Assessment tool which has Electronic Pre-programmed calculations that examines the QC data for all analytical results and evaluates them against the appropriate review criteria.

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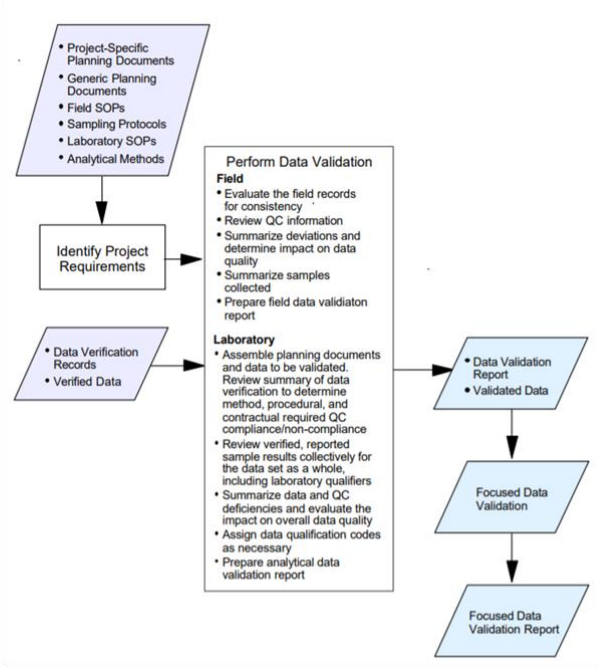
Inspection / Validation Framework



Outcome

Key outcomes include:

5. Availability of comprehensive data on pollution levels;
6. Analysis of data for development of pollution prevention and management strategies;
7. Real time and/ or regular tracking of pollution levels;
8. Database available for scientific research and regulatory decision making process; and
9. Standardization of water quality monitoring procedures by development of Standard Operating Procedures (SOPs).

Key learnings for CPCB

6. Strengthening the existing physical data collection system by revised SOPs and guidelines;
7. Strengthening the online pollution monitoring and control tools by capturing information of effluent discharged, permits and other regulatory information. This can be dome through improvement of instrumentation for data capturing and development of IT enabled tools;
8. Publishing of relevant information on pollution levels at regular intervals online; and
9. Improvement of the system efficiency for timely detection of non-compliance and taking-up of the appropriate actions.

VI. OECD – Self Monitoring Framework

Context

The region of Eastern Europe, Caucasus, and Central Asia (EECCA) countries faces the challenge to engage stakeholders towards shared responsibility of environment protection. As a solution to the challenge faced, a framework was develop which requiring the industries to monitor its environmental performance and report environmental compliance data to public authorities. The framework was developed with an aim to achieve the goal, and to promote environmentally-sound behaviour among industrial operators.

Key issue/s addresses

Key issues addressed are detailed below:

- In absence of real time emission data on industry;
- Data reported by industries was not reliable
- Data available to the public authorities was inconsistent, and was not comprehensive in order to make policy and regulatory decisions; and

- High cost of pollution monitoring.

Key initiatives – How were the issues addressed?

OECD prepared a guideline framework for involving industries to monitor its environment performance and report environment compliance data. This guide was prepared based on good international practice; it also suggests actions and processes need to be performed/ taken up by the industries for effective self-monitoring. It suggested benchmarks for long term development of environment, such as self-monitoring, emission monitoring, operations and impact monitoring etc. for industries. The schematic for the self monitoring process is presented in the figure below:

Key roles and responsibilities of the key stakeholders in presented below:

Operators:

- Conduct and document self-monitoring;
- Follow Quality Control & Assurance of procedures;
- Follow required safety precautions;
- Commission monitoring to a third party, if needed;
- Evaluate the performance of methods of implementation;
- Provide pollution inspectors with access to data and facility; and
- Submit self-monitored data to competent Authority.

Third-party:

Monitor & verify self-monitored data through inspections, when needed.

Competent Authority:

- Establish compliance objectives;
- Check if operators comply with relevant legislations and permits; and
- Assessing, endorsing, and checking the correct implementation of the self-monitoring programs.

The process is detailed in the schematic below:

PROCESS OF SELF-MONITORING DEVELOPMENT	
General Considerations for Self-monitoring:	**Data Production Chain: General Considerations**
•Scope and groups of parameters subject to self-monitoring; •Duration and validity of self-monitoring programmes; •Direct and indirect monitoring approaches; •Determination of the timing requirements; •Time when samples and/or measurements are taken; •Frequency; •Criteria to set the regime of self-monitoring; •Dealing with uncertainties; and •Monitoring points.	•Flow/volume measurement; •Sampling; •Sample storage, transport, and preservation; •Sample treatment; •Sample analysis; •Data Processing; and •Reporting.
Compliance Assessment and Enforcement	**Reporting and Record Keeping**
•Approaches to assessing compliance; •Self-inspecting the technical state of facilities; •Inspection by the competent authorities; and •Inspection follow up.	•Types of data that must be recorded; •Reporting types and frequency; •Data collection; •Reporting Protocols; and •Record keeping and data management.

Outcome

1. Self-monitoring of pollution by industries;
2. Comprehensive and consistent data collection on pollution-levels and effluent quality by industries;
3. Availability of reliable and comprehensive data to the public authorities for effective decision making;
4. Self-monitoring ensured the earliest possible response to any environmental problem; and
5. It reduced public spending on governmental compliance monitoring.

Key learnings for CPCB

1. Establish/ strengthen the self-monitoring framework for CPCB/ SPCBs.

PART B – Uttarakhand Environment Protection & Pollution Control Board (UEPPCB)

III. PART B – Uttarakhand Environmental Protection & Pollution Control Board

1. Brief overview of the Baseline Assessment

The institutional strengthening of UEPPCB is being envisaged as part of the overarching mission of GIZ to strengthen organizational structure and processes both at the national and state level. This chapter presents a brief background of the works undertaken thus far, as part of the study and the methodology adopted for detailing the solutions.

1.1 An overview of UEPPCB

The Uttarakhand Environment Protection and Pollution Control Board (UEPPCB), established in May 2002, is a statutory organization constituted under Section 4 of Water (Prevention and Control of Pollution) Act, 1974 to implement Environmental laws and rules within the jurisdiction of Uttarakhand. It has its head office in Dehradun, and four (4) regional offices in Dehradun, Roorkee, Haldwani & Kashipur.

The key **statutory functions** of UEPPCB are as per the following acts:

- Water (Prevention and Control of Pollution) Act 1974;
- Air (Prevention and Control Of Pollution) Act, 1981; and
- Environment Protection Act, 1986.

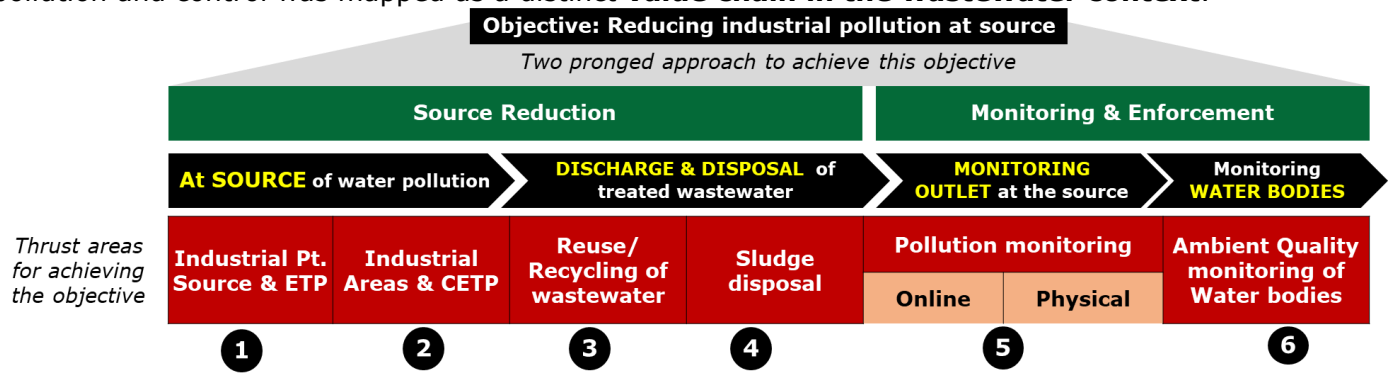
Key functions of UEPPCB in regard to the industrial wastewater management will be included in the Water Act 1974 and Environment Protection Act, 1986. These are detailed in the following section. In addition to these statutory functions, UEPPCB also undertakes these additional activities:

- **Technical support to judiciary** (NGT), as per directions, on matters pertaining to abatement of pollution
- Coordinating with **research institutes** and setting up research committees for R&D works and NGT related orders; and
- Coordinating with other state department for industrial pollution control and monitoring.

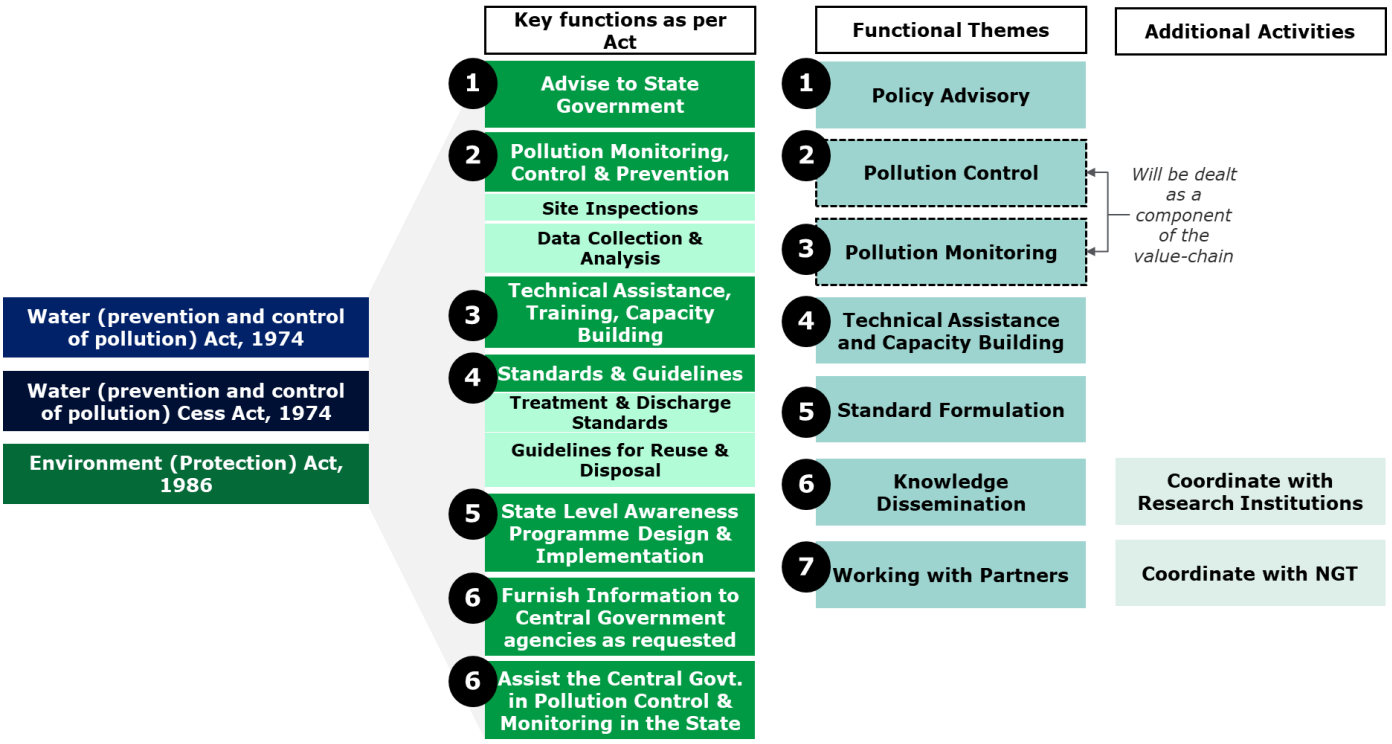
1.2 Key activities undertaken in our baseline assessment

(1) Mapping the roles & functions of UEPPCB

As a first step of our baseline assessment, the key role of UEPPCB as a state regulator for environmental pollution and control was mapped as a distinct **value chain in the wastewater context**.

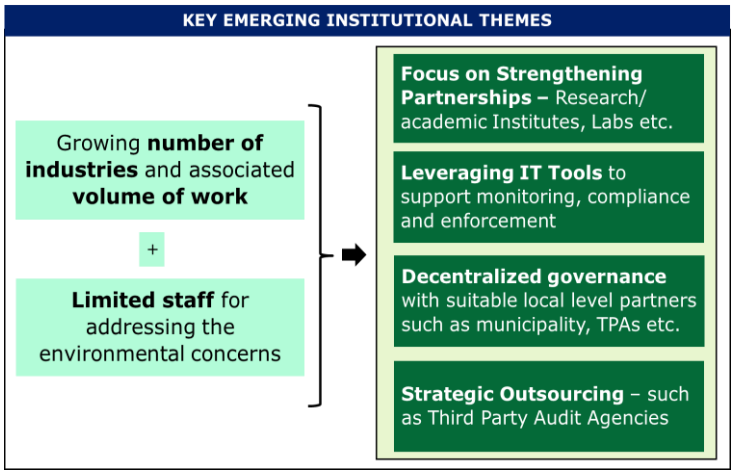


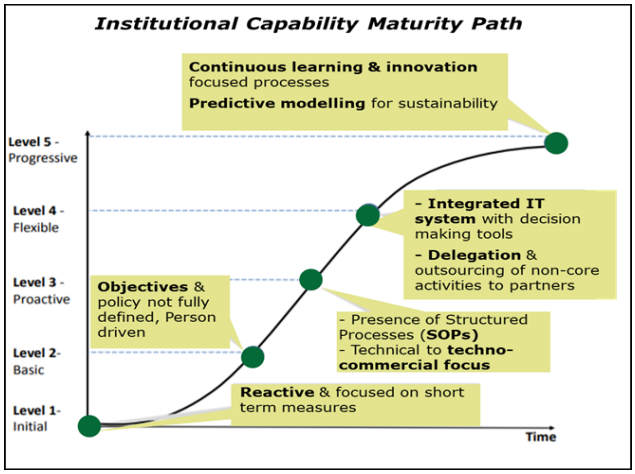
Additionally, the emerging functions from the key governing acts, and other functions performed by UEPPCB were mapped as **functional themes**.



(2) Study of the organization and governance structure

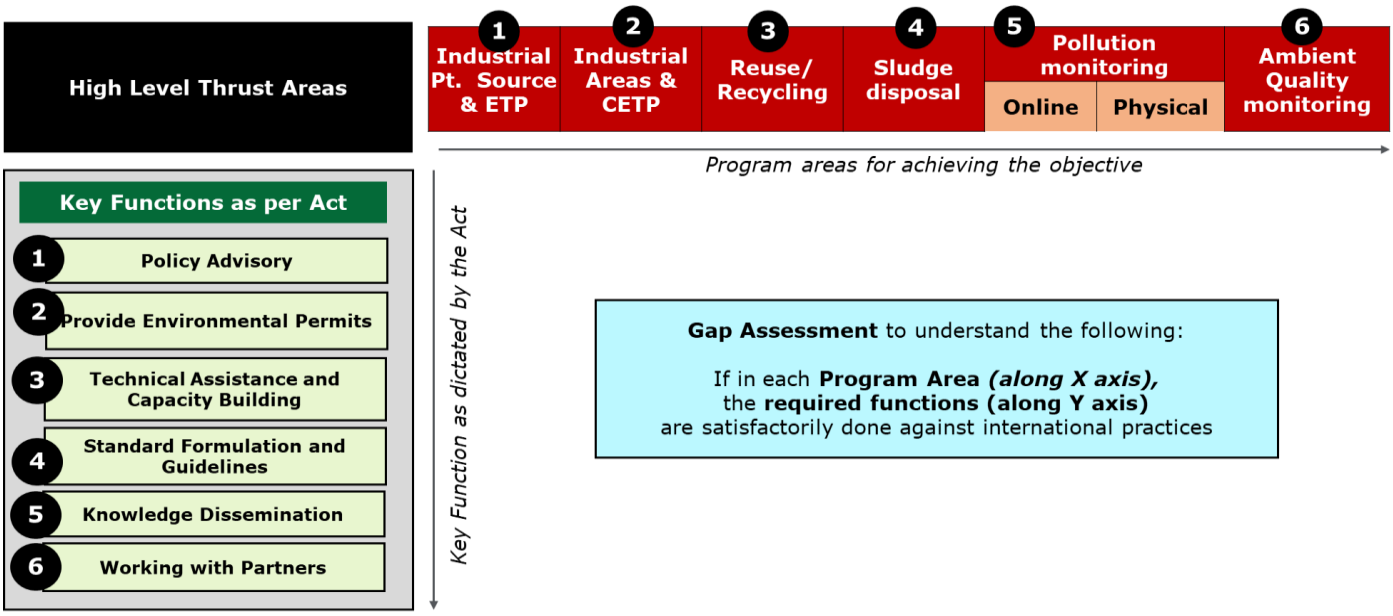
Secondly, the organization and office structure of UEPPCB, along with the manpower alignment in each of these aspects were studied in detail. The study tried to understand the various functions that are to be performed by UEPPCB against the available staff for undertaking these activities. Based on the organizational studies undertaken, the following key implications emerged for UEPPCB's organization and governance structure





(3) Process gap analysis and needs assessment

With the future institutional maturity path and the above key themes in mind, the key processes for each element in the value chain was assessed in terms of their suitability to the various functional themes of UEPPCB as shown below.



1.3 Key emerging suggestions based on baseline assessment

The detailed institutional gap analysis was done both from an organizational standpoint and the key process improvements that need to be undertaken. Of the various emerging improvement areas, select focus suggestions were identified in discussion with various stakeholders, in the workshop conducted on November, 2019.

The following table summarizes some of the **key emerging solutions/recommendations** for UEPPCB for improving the existing organizational structure, procedures and processes and enhancing the cooperation aspects with various strategic partners.

Type of intervention	Emerging Thrust Areas for UEPPCB	Key suggestions and recommendations
Structural Interventions	**Strengthening the organization structure –** At present technical staff spend time on legal, complaint management, etc.	Need for **dedicated supporting divisions** with following clear responsibilities – ***(1) dedicated cell to deal with enviro-legal concerns*** ***(2) complaint management cell*** ***(3) Procurement & contracts division*** ***(4) IT division*** ***(5) Complaint management cell***
Process Interventions	**Third Party Environmental Audit**	Developing a "**Third Party Environmental Audit Policy**" - for enabling deployment of Third Party Audit Agencies - empanelment, technical guidelines for TPAs, and commercial guideline on different payment modes
Tools / System interventions	**Strengthening OCMMS**	For inventorization of industries, complete online process, in line with a 3-tier approval system
	Lab Information Management System (LIMS)	For assigning TPAs and monitoring the works done by the designated TPAs – in support of Pollution Audit Policy

2. Detailed recommendations

This chapter details the select interventions – structural, processes and tools/ systems for UEPPCB. These interventions are identified and agreed from the baseline gap analysis, needs assessment studies,

stakeholder consultations and workshops undertaken by the study team over the course of the engagement.

2.1 Functional Strengthening the Organizational Structure

The key purpose of this report is to **detail out the suggestions/recommendations for UEPPCB to implement the same, given their current structure and manpower constraints.**

Therefore, accordingly, the detailing of each suggestion, covers the following aspects:

(1) **What is the solution?** – its objective and scope
(2) **Has this been attempted earlier, and its implications for UEPPCB?** – any past global/ local experiences with key learnings
(3) **How to implement the solution**? –
   a. listing the steering structure for implementing the solution
   b. role of various stakeholders,
   c. competency/skills required for each stakeholder,
   d. manpower required for each stakeholder
   e. divisional staff alignment for undertaking the solution
   f. suitable partnerships for enabling the solution and their skill/competency
(4) **Impact of the solution –** possible advantages for implementing the solution and the complexity involved in implementation, if any

2.2 Functional Strengthening the Organizational Structure

To tackle the growing number of environmental concerns with its limited workforce, it is imperative for UEPPCB to have a suitably aligned organization, which is in response to the functions UEPPCB is expected to perform. Based on the discussions with UEPPCB, stakeholders and as detailed in the Needs Assessment Report prepared for UEPPCB, the need for the following was identified:

(1) Enviro-Legal Cell;
(2) Procurement & Contracts Division;
(3) IT Division; and
(4) Complaint Management Cell.

These are further detailed in the section below.

(a) Objective and Scope of the solution

Objective: The objective of thus intervention is to arrive at an organizational structure which is as per the functional responsibilities of the organization – clearly identifying the support functions and core functions and identifies specific division/ cell responsible for a specific function of the organization.

Scope of the solution:

- **Identifying the functions and structure (Divisions):** Identifying key functions of the organizations, which includes – (1) Core functions, and (2) Support Functions. Based on the functions identified, structuring of the organization as per the functions identified into Divisions with the perspective of industrial wastewater management, including the grouping, sub-grouping and clubbing of the functions. The following functions/ divisions may be considered – environmental permits, pollution monitoring, enviro-legal cell, procurement division, IT division and complaint management;
- **Defining the role**: Defining the roles of the identified Divisions. These may be defined as follows:
  - Environmental permits – focusing on granting & renewal of environmental permits;
  - Pollution monitoring – focusing on monitoring of wastewater pollution from industries;
  - Enviro-legal Cell – focusing on legal issues/ cases by NGT and others;
  - Procurement Division – focusing on procurement of items and equipment for the Board. It can be structure into two sub-divisions – (1) Procurement and (2) Contracts;
  - IT Division – focusing on use of information technology and IT systems of the UEPPCB for internal management, pollution monitoring and data management & analysis. This division will also strengthen the existing OCMMS system of the UEPPCB. The division will essentially consist of the following sub divisions (1) Software Support and (2) Infrastructure (Hardware);

- Complaint Management – focusing on efficient and effective management of complaints received by UEPPCB at the head office and regional offices.

- **Staff alignment and manpower recruitment:** UEPPCB faces a staff crunch, as a result of which its organizational structure has evolved to be a matrix form – a combination of functional and divisional roles, where one staff is mapped to multiple functions. In addition, responsibilities for legal enquiries by NGT and management of complaints take most of the time of staff, leaving them with limited time to focus on the core functions of the department. Therefore, there is a need for staff alignment and strategic recruitment of staff for UEPPCB. The following may be considered for UEPPCB:
  - Mapping of existing staff to the functional divisions: The existing staff to be mapped against each functions, and outline a vertical structure of the organization. In the process map the additional positions needed for the divisions to function.
  - Identifying functions for strategic outsourcing: All the functions to be assessed from the point of view of 'strategic outsourcing', wherein the functions which are not core, critical and have a potential merit for outsourcing, may be outsourced to other agencies – public or private. The functions which may be considered for outsourcing are:
    - Pollution audit for environmental permits/ permit renewal, pollution monitoring and inspection (in response to NGT Orders), mainly for Green and Orange category industries; and
    - Development, operation & maintenance of Information Technology (IT) tools and systems, including strengthening the complaint management system.

    The above mentioned task of mapping identification of outsourcing simultaneously for identification of manpower requirement of the Board.

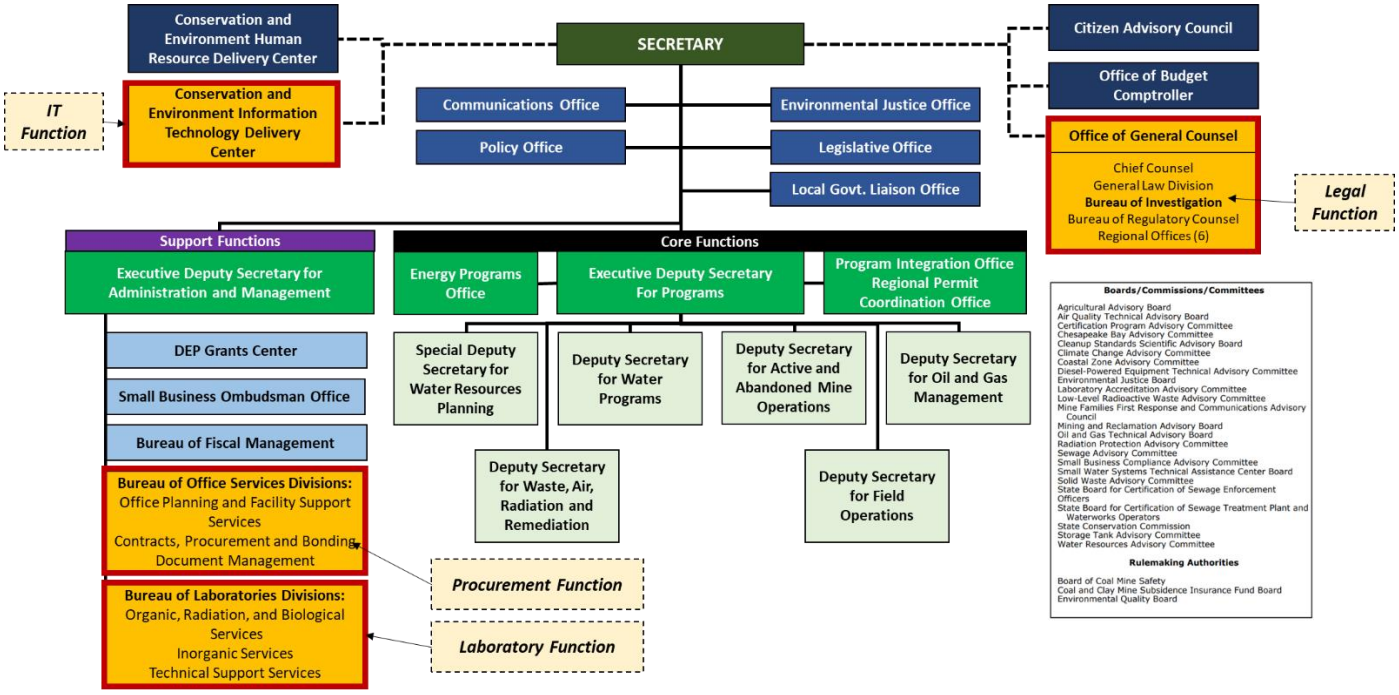
  - Identification of skills and recruitment needs: based on the above mentioned tasks manpower requirement for divisions and required skillsets board will be identified. They may be:
    - **Environmental Permits –** This division to include Environmental Engineers (EE) and Scientific Officers (SO), along the vertical structure, for EEs - Chief EE, Sr. EE, EE, Dy. EE & Asst. EE and for SOs - Chief SO, Sr. SO, SO, Dy. SO & Asst. SO; Skill sets of the staff to include bachelors/ masters in environmental engineering and environmental sciences;
    - **Pollution monitoring –** This division to include Environmental Engineers (EE) and Scientific Officers (SO), along the vertical structure, for EEs - Chief EE, Sr. EE, EE, Dy. EE & Asst. EE and for SOs - Chief SO, Sr. SO, SO, Dy. SO & Asst. SO; Skill sets of the staff to include bachelors/ masters in environmental engineering and environmental sciences;
    - **Enviro-legal Cell –** This Cell to include Environmental Engineers, Scientific Officers and Law Officers, along the vertical structure, for EEs - Chief EE, Sr. EE, EE, Dy. EE & Asst. EE, SOs- Chief SO, Sr. SO, SO, Dy. SO & Asst. SO and LOs- Sr. LO, LO, Dy. LO and Asst. SO;
    - **Procurement Division –** Procurement Division may have a combination of individuals Environmental Engineers and Contract Specialists. To start with, the division can have 1 EE and 1 Contracts Specialist. EE will essentially be an Environmental Engineer and Contract Specialist may have bachelors/ masters Business Administration with experience in contracts;
    - **IT Division –** IT Division should have a team of IT Engineers, along the vertical structure. However, to start with it is proposed to have – 1 Sr. IT Engineer and 1 Asst. IT Engineer. The staff is shall have bachelors/ master's degree in IT; and
    - **Complaint Management Cell –** The Complaint Management Cell shall be headed by a designated person, and be supported by a team of Data Operators for interpretation, analysis, prioritization, allocation and tracking of complaints received. At present, it is suggested to have an Environmental Engineer to head the CMC, with the support of 2 Data Operators.

(b) Learnings from case studies

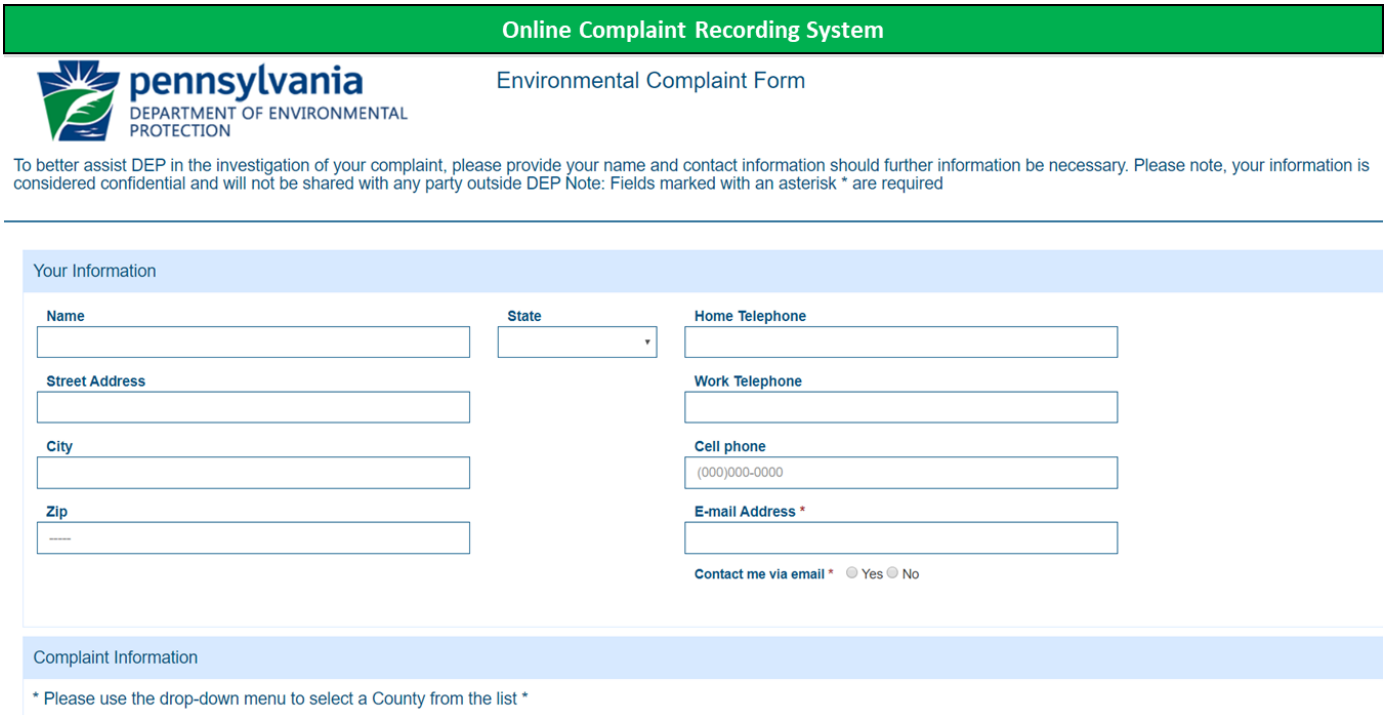
The Institutional frameworks of US sates – Florida, California, Pennsylvania and South Carolina was studied is detail. The study of these cases suggested that state level Environmental Protection Department clearly identified core functions and support functions. It is observed that these organizations have the following clearly identified support functions:

- Dedicated Legal Cell to deal with legal issues raised at the state level and USEPA.
- Procurement and contracts units grouped under 'Office Services'
- Laboretories Division, supporting the core functions
- IT Center and a central unit supporting the organization.

The institutional frameworks for Pennsylvania Department of Environmental Protection is presented below:



Complaint management is done online trough a complain registering system. It is presented below:



Few of the cases at the national level were also studied. State including Punjab, Andhra Pradesh and Goa are observed to have a legal cell, looking after enviro legal concerns of the organization. A brief on PCBs of other states is presented below:

Punjab Pollution Control Board Legal Cell

In Punjab Pollution Control Board (PPCB), besides basic organization Structure, the Board has set up various cells for the functioning of PPCB. These cells include:

Hazardous Waste Management Cell	Bio-Medical Waste management Cell	Environment Protection Squad
Consent Management Cell	Planning & Computerization Cell	Legal Cell
Scientific Cell	Construction Cell	Administration Cell

Function of Legal Cell:

- To maintain records and progress of all prosecutions approved by the Board
- To submit progress report of the prosecution to the Ministry of Environment and Forests, Government of India and Central Pollution Control Board, New Delhi.
- To assist the Regional Offices in conducting prosecution cases.
- To deal with the legal notices, and legal cases in Hon'ble Supreme Court, High Courts , National Human Rights Commission etc.

Andhra Pradesh Pollution Control Board Legal Cell

In Andhra Pradesh Pollution Control Board (APPCB), the Board has appointed Standing Counsels representing the Board in the cases filed in various courts like Hon'ble Supreme Court, National Green Tribunal, Hon'ble High court, Hon'ble Appellate Authority.
To co-ordinate the work related to court cases, a Legal cell is made under the organization structure headed by Senior Officer

Key Functions of Legal Cell:

- Co-ordination with the Standing Counsels regarding Court cases.
- Examination of the writ petitions, applications, appeals filed in the Courts, wherein the APPCB is one of the Respondents.
- Obtaining reports from the concerned officers of Board Office / Zonal Office / Regional Offices and examining the reports.
- Communication of court Order to the concerned Officers of Board for implementation with particular emphasis on timely action.
- To maintain database on the status of pending court cases.

Goa Pollution Control Board Legal Cell

Goa Pollution Control Board has made Legal cell a part of Organization structure.
The Legal section handles all the legal / Court matters related to the functions of the Board. The matters are filed before the Hon'ble Supreme Court, the Hon'ble High Court, the National Green Tribunal, the Administrative Tribunal the Appellate Authority under the Air Act and the Water Act and other lower courts.

Key Functions of Legal Cell:

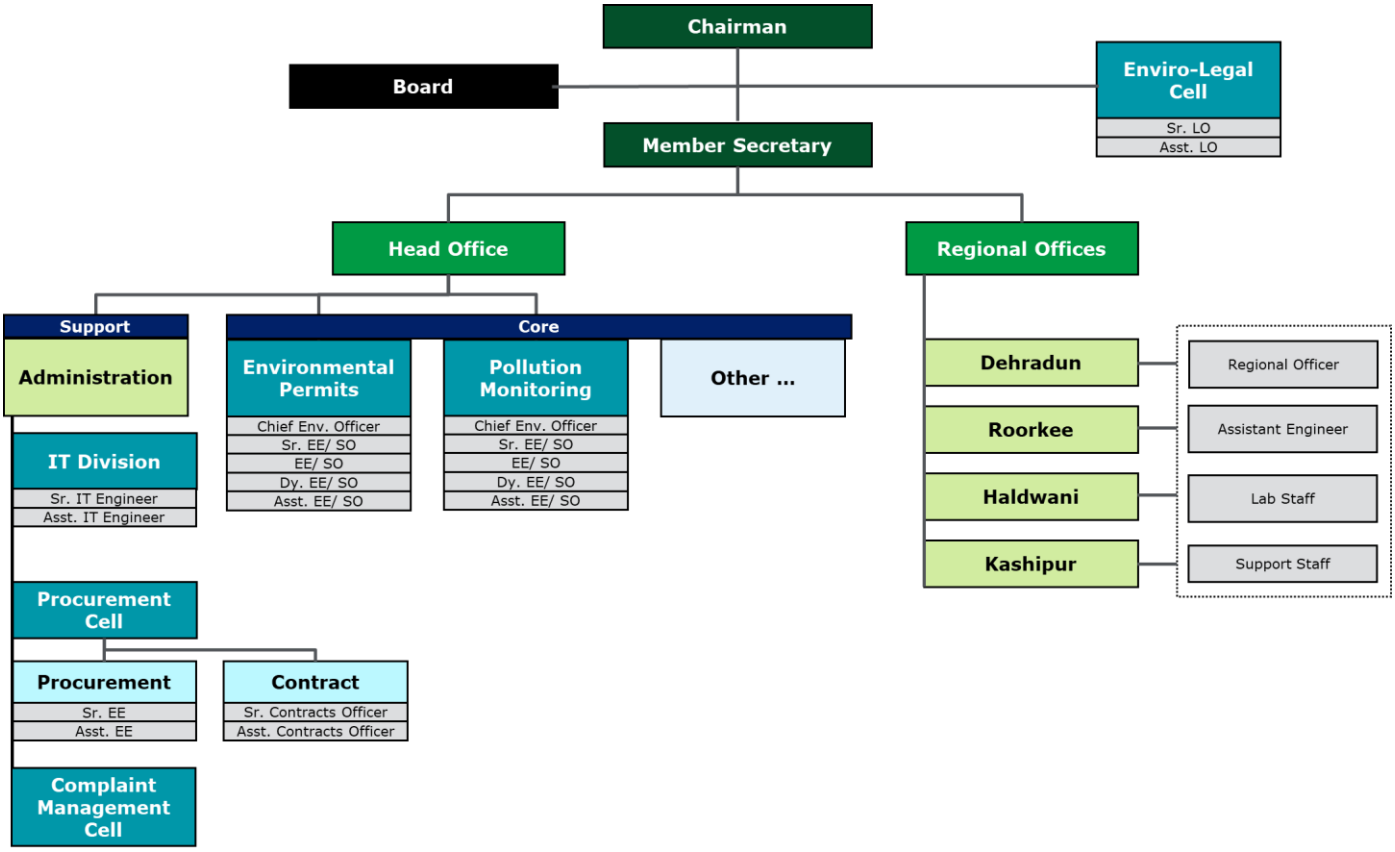
- Scrutinizing and examining complaints before initiating action
- Issuing Notices/directions/clarifications to the defaulting units under the Environment (Protection) Act, 1986 i.e. Municipal Solid Waste Rules, Hazardous Wastes Rules, Bio-Medical Rules, E- Waste management Rules, Noise Pollution Rules etc. whenever required to seek compliance.

Key learnings for UEPPCB from the case studies:

(1) Clear demarcation of core and support functions;
   a. IT Division, Procurement Cell and Complaint Management Cell as key support functions;
   b. Environmental Permits and Pollution Monitoring as support division; and
   c. Enviro-Legal Cell supporting the Chairman deal with legal issues – NGT cases and others.

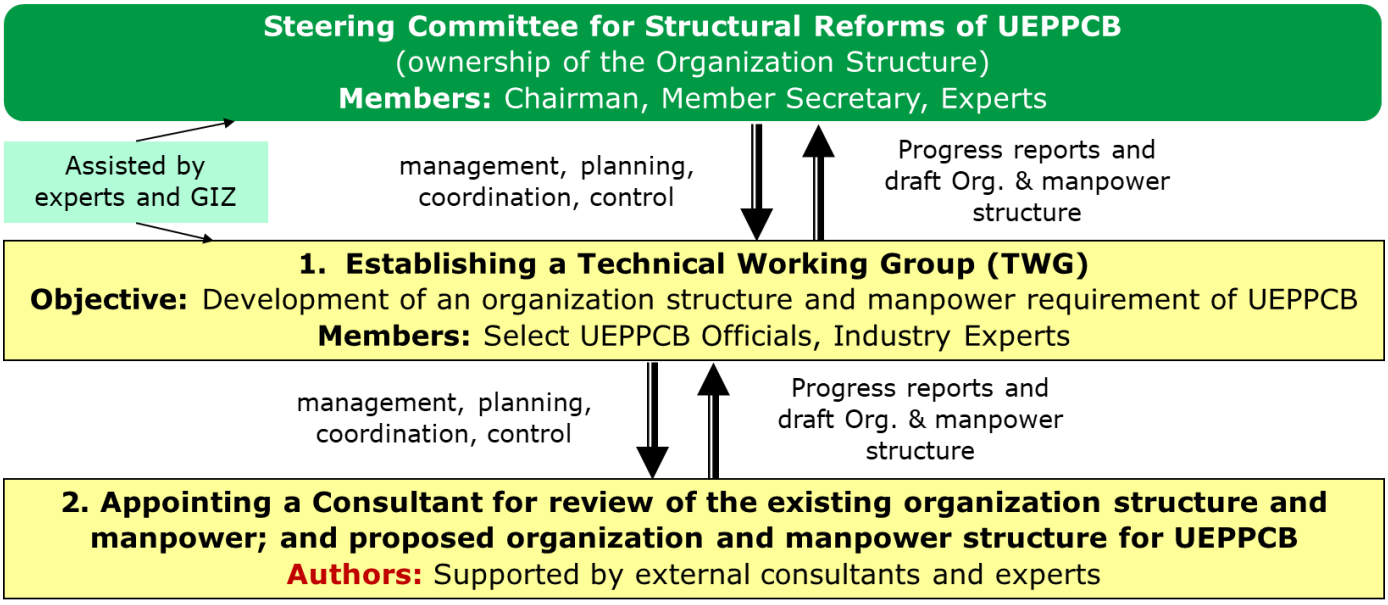
(c) Implementing in the UEPPCB context

The structure of UEPPCB will be modified to accommodate the proposed suggestion. An indicative structure of the Board including the proposed suggestions is presented in the figure below:



(d) How to implement the solution?

Implementation structure: Implementation structure for the proposed solution is as follows:



Mapping the stakeholder requirements:

	Authority	TWG	Authors
Role of the stakeholder	• Establish the steering committee – including identification of the external experts to be	• Appointment of Authors • Working closely with the Authors and	• Conduct existing situation assessment and Gap Analysis for the existing

	Authority	TWG	Authors
	the members of the committee • Steering committee to identification of the detailed scope of work – inclusions, exclusions, deliverables, budget and timelines	elaborating on expected deliverables • Providing guidance on existing situation • Review and comments on deliverables etc. • Approving the final deliverables	organization structure and manpower • Proposed an Organizational Structure and Manpower plan • Outlining the detailed roles and responsibilities of each division and staff engaged in the division
Possible alignment (internal/external)	• Internal & External	• Internal & External	• Not Applicale
If internal, UEPPCB divisional alignment	• Engagement of Chairman and Member Secretary	• Alignment with Chief Environmental Officers (at HO) and Regional Officers (from regional offices)	• Not Applicale
If external, possible partners	• External Experts on Pollution monitoring, Institutional development and structuring	• External Experts on Pollution monitoring, Institutional development and structuring	• Not Applicale

(e) Impact of the solution?

Key impacts of the proposed recommendations are:

(1) **Accountability for each functions:** Dedicated staff for critical functions related to industrial wastewater pollution management - environmental permits, pollution monitoring, enviro-legal cell, procurement division, IT division and complaint management. With specific divisions addressing each core and support functions of the organization, resulting into accountability;

(2) **Enhanced efficiency through IT integration:** Integrating IT into key functions will result in automation of the processes which need minimal manual interventions and prevent manual errors. It will was also result into optimization of staffing of UEPPCB, enabling the staff to focus on critical tasks;

(3) **Strategic staffing:** With IT integration and strategic outsourcing, UEPPCB will staff the organization in areas where required and achieve the best performance of the existing staff and recruitment of the necessary staff.

2.3 Third Party Environmental Audit Policy

UEPPCB does not have the manpower to efficiently conduct the environmental audits for permits & renewals, followed by regular monitoring of pollution levels from the industries, which is red category → 3 months, orange category → 6 months and green category → 12 months. With 30+ staff having a mandated to monitor 25,000+ industries, it is challenging for the staff to perform its duties to the best possible extent. UEPPCB is in a process to strengthen the environmental permits and renewal framework for green and orange category industries by engagement of Third Party Agencies (TPA) for environmental audit of the agencies. Red category industries still continue to be monitored directly by UEPPCB. It if further recommended to strengthen the structure by outlining a clear

(1) Policy for empanelment of the TPAs;
(2) Guidelines for the TPAs to perform environmental audits; and
(3) Development of a financial and incentive framework for the TPAs for true reporting.

These are further detailed in the section below.

(a) Objective and Scope of the solution

Objective: The objective of this intervention is to engage TPAs in environmental audits for less polluting industries (green and orange), so as to reduce the work load on the UEPPCB staff enabling them for focus on high polluting industries which are a major threat to the environment.

Scope of the solution:

- **Policy on engagement of TPAs:** To outline the key aspects for engagement of TPAs, such as
  - Defining the components: to define the constitution, scope and boundaries of an environmental audit;
  - Environmental Audit Committee: to establish an EAC at UEPPCB level, monitor the TPAs and audits performed by them, including visits to TPA labs, random verification of TPA reports etc. Members of the committee main include selected UEPPCB staff and external experts and institutions;
  - Qualification of Auditors: to detail the required qualification of the agencies interested to enlist as TPAs, including the their categorization & eligibility, qualification of firm, team requirements, staff requirements, and qualifications of team members;
  - Regulations: to detail regulations such as registration/ recognition by UEPPCB, maximum audits allowed, lab space & instrumentation required, time schedule, fee structure;
  - Actions for UEPPCB: to include key steps for UEPPCB to take, based on the auditor's report.
  - Actions on non-filing of report by industries: to include a set of actions which can be taken against the industries, in case industries fail to file the audit reports on time;
  - Other: Schedule of industries for reference and other related details;

- **Guidelines for the TPAs:** to perform environmental audits, UEPPCB to provide the TPAs with a guidelines on conducting the audit including
  - Process to be followed: to detail the process to be followed
  - Forms and Formats: For inspection and data recording;
  - Audit report structure: Including the key section on general industry details, product details, water pollution monitoring, air pollution monitoring, hazardous waste, site plan, resource recovery details, health & safety, remedial measures etc;
  - Certificate formats: for the auditors to grant to the industries and submit to UEPPCB;

- **Development of an incentive framework for the TPAs for true reporting:** When the auditors are paid by the industries for conducting industry audit, they may lack incentive for correct reporting. Incentive frameworks need to be developed to ensure accurate reporting by the TPAs. It may done as follows:
  - Random allocation of auditors to industries: Allocation of auditors randomly to the industries, instead of industries identifying the auditors. This may be integrating the list of auditors in the existing system;
  - Payment of auditors from a common pool: A common funding pool may be created by contribution of industries, which may done during process of granting permits to new industries and additional payments for existing industries. This pool may be utilized for payment of auditors by UEPPCB;
  - Monitoring of auditors: An Environmental Audit Committee may be formulated for oversight of the audit consisting of selected UEPPCB staff and external experts and institutions which may perform regular validation checks of the audit reports and lab inspections; and
  - Additional incentives for accurate reporting: Additional bonus may be designed for the auditors for accurate reporting of pollution level, which may be correlated with the values reported and on field observations.

(b) Learnings from case studies and implementations for UEPPCB

Gujarat's Environmental Audit Scheme: The state of Gujarat has a high level of industrial growth. This growth is accompanied with high levels of industrial pollution. In 1996, the state sought to strengthen its environmental regulatory framework by introducing the first third-party environmental audit system in India. The initial system, however, was thought to produce unreliable information about pollution. Recognizing this problem, GPCB sought out researchers to help reform the audit market in 2009.

As per the traditional intervention the audit firms were chosen and paid by the industry they are auditing, creating a conflict of interest. GPCB altered the traditional structure, and as per the new intervention the auditors were randomly assigned to industries, paid from a common pool, monitored for accuracy, and paid a bonus for accurate reports. The scheme is summarized below:

Environment Audit Scheme:

An outcome of the landmark judgment of Hon'ble High Court of Gujarat in SCA 770/95

- Need was felt for strengthening of the environmental monitoring and environmental infrastructure
- Difficulties in regular monitoring of thousands of industries scattered over the entire state due to shortage of man-power and infrastructure
- Environment Audit scheme - modification of Rule 14 of the Environment (Protection) Rules 1986

OBJECTIVE

The scheme was introduced with a view to:

- Enforcing discipline amongst the industries
- Arming GPCB as well as the Associations of industries in the concerned areas with the necessary information and,
- Doing regular monitoring of different industries scattered in the entire State of Gujarat with a perspective of environmental protection, & sustainable development.

Legal Framework for Environmental Audit

- To have modified version of the Gujarat Scheme under the Rule 14 of Environment (Protection) Rules by integrating and subsuming the concept of the Environmental Statement Or
- To have separate Rules under Environment (Protection) Act in lines with the EIA Notification – Auditors to be registered like the EIA consultants which are recognized by QCI or in line with Chartered Accountants

SALIENT FEATURES OF EA SCHEME

- Classified industries in to two schedules (I & II) according to their pollution potential - Industries with more pollution potential classified in schedule I
- The industries are audited by the auditors recognized by the Board as per the qualifications and experience prescribed
- Scheme applies to all industries manufacturing and/or processing any one or more of the products mentioned in the Schedule- I or Schedule-II
- Schedule-I industry shall carry out EA through Schedule-I Auditors and Schedule-II industry shall carry out EA through Schedule-II Auditors recognized by the GPCB

Eligibility Criteria Defined for Auditors

In addition to adequate laboratory facilities, the Auditors must have at least 4 technical team members. Each team of auditors shall comprise of :

A person possessing a degree in

- Environmental Engineering or a degree in Civil Engineering with specialization in Environmental engineering
- Chemical Engineering/Technology
- Chemistry or Environmental Science
- Micro Biology/Bio-Chemistry
- Provisions of levy of scrutiny fee
- Provisions of random back checks

Incentive framework

With properly aligned incentives, auditors provide statistically accurate information on plant pollution level → random allotment of auditors, paid through a common pool, which

- Increase auditor independence from firms
- Broaden regulatory scrutiny
- Strengthen other channels for regulatory information

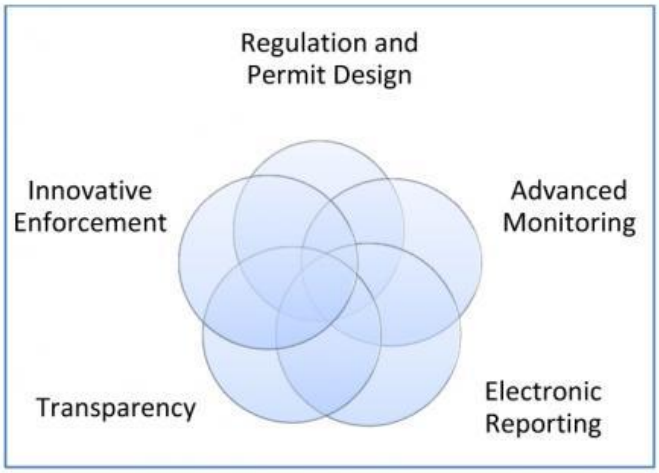
Policy Implications

The pollution concentrations are substantially lower in the modified system than in the standard system

- Plants subject to independent audits reduced pollution
- Water pollution is reduced more drastically than air pollution
- Pollution reduction is concentrated amongst the most polluting plants

USEPA's Next Generation Compliance: Since 1970's, various programs have been initiated by USEPA, which encouraged TPA environmental audits for pollution monitoring and control. In line to this, EPA started a national pilot program called **Project XL** in 1995 to help business, state and local governments, and federal facilities work with EPA to develop and test innovative approaches to achieve better and more cost-effective environmental and public health protection. On the similar lines, the **National Environmental Performance Track program** was also introduced in June 2000. To further improve the environment standards compliance, **Next Generation Compliance initiative** was also introduced by USEPA addressing the need of third party verification and advanced monitoring including both point source monitoring and ambient monitoring. The Next Generation Compliance initiative was introduced by Environment Protection Agency to increase compliance with environmental regulations by using advances in pollutant monitoring and information technology combined with a focus on designing more effective regulations and permits to reduce pollution. Its tenets included,

- **Advanced monitoring**, including both point source emission/discharge monitoring and ambient monitoring (e.g., fence-line monitoring of air pollution at the border of a facility),
- **Independent third party verification** of a settling party's compliance with settlement obligations,
- **Electronic reporting**, and
- **Public accountability** through increased transparency of compliance data
- Develop and use **innovative enforcement** approaches (e.g., data analytics and targeting) to achieve more widespread compliance

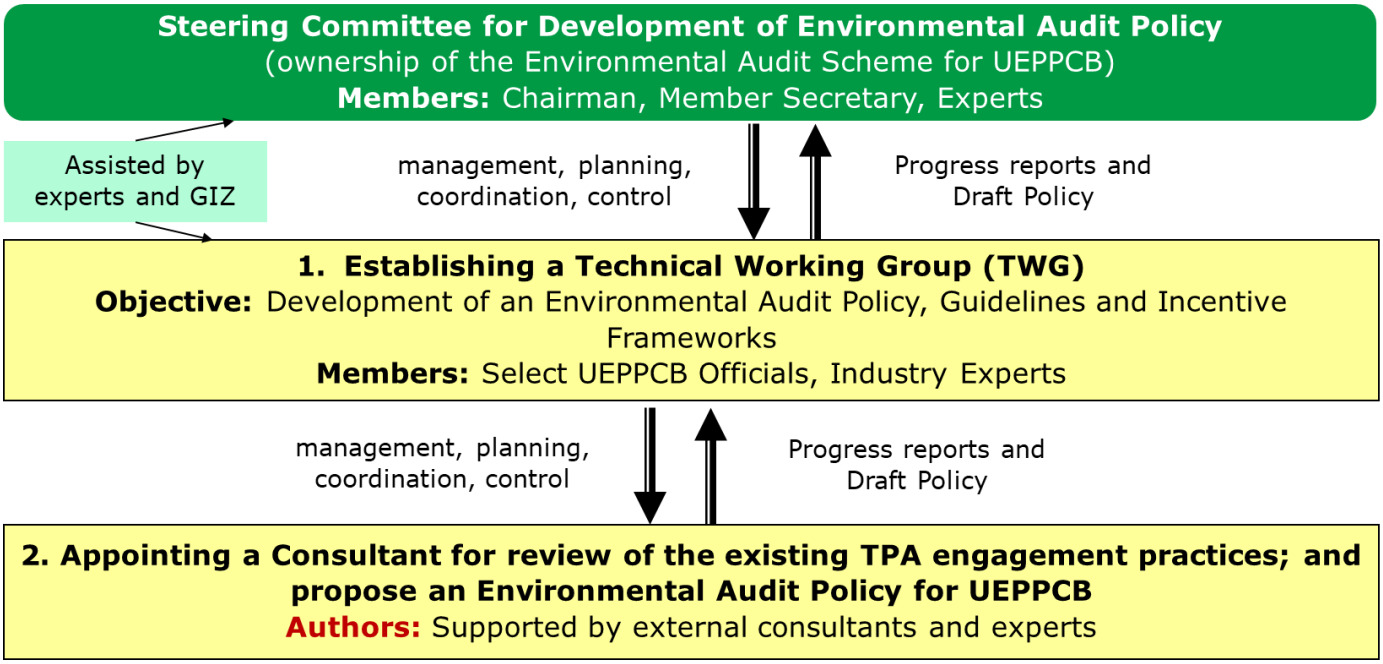


For regulatory flexibility, a continuous improvement in process change was done involving the use of third party independent auditors rather than government regulators to monitor that system and transparency. These Third party verifiers were required to provide their findings and reports to the EPA at the same time as they provide them to the settling party, and the agency then exercised its discretion to determine whether the defendant is in compliance with the settlement obligations.

Based on the review of the above mentioned cases, it is recommended to develop a Environmental Audit Policy for Uttarakhand which includes the policy on empanelment of auditors, guidelines for the auditors and an incentive framework.

(c) How to implement the solution?

Implementation structure: Implementation structure for the proposed solution is as follows:



Mapping the stakeholder requirements:

	Authority	TWG	Authors
Role of the stakeholder	• Establish the steering committee – including identification of the external experts to be the members of the committee • Steering committee to identification of the detailed scope of work – inclusions, exclusions, deliverables, budget and timelines	• Appointment of Authors • Working closely with the Authors and elaborations on expected deliverables • Providing guidance on existing situation and processes for TPA engagement in Uttarakhand • Review and comments on deliverables – Environmental Audit Policy, Guidelines for TPA and Incentive Framework • Coordinating with external stakeholders – industry associations and industries	• Assessment of the existing provisions of TPA in UEPPCB • Outlining the gaps in details for the existing system • Proposed an a suitable Environmental Audit Policy for the state detaining – system of TPA engagement, guidelines and incentive framework • Participating in the stakeholder consultations on the policy and accomodate suggestions • Conduct exposure visits to successful states - Gujarat

	Authority	TWG	Authors
		• Approving the final deliverables	
Possible alignment (internal/external)	• Internal & External	• Internal & External	• Not Applicale
If internal, UEPPCB divisional alignment	• Engagement of Chairman and Member Secretary	• Alignment with Chief Environmental Officers (at HO) and Regional Officers (from regional offices)	• Not Applicale
If external, possible partners	• External Experts and institutiinal partnerships on Pollution monitoring and experience with TPA for environmental audit	• External Experts and institutiinal partnerships on Pollution monitoring and experience with TPA for environmental audit	• Not Applicale

(d) Impact of the solution

Key impacts of the proposed recommendations are:

(1) Staff to focus on core functions and HPIs: Engagement of the TPA will shift the substantial work of pollution monitoring of the industries from UEPPCB to the TPA, enabling them to focus on critical areas such as HPIs, development of state specific standards, and taking actions on non-compliance etc.

(2) Regular pollution monitoring of industries: Engagement of TPA will result in identification of audit agencies for pollution monitoring in industries, who will be randomly allocated to the industries. These industries will be paid via a common pool of funds collected from industries. This will ensure that the audits are performed for all the industries;

(3) Minimum financial implications for UEPPCB: As the payment for the TPAs is recommended through the common pool of fund collected from the industries for environmental audits, UEPPCB will not spend on the audits. UEPPCB has to bare the costs for the Environmental Audit Committee and additional inspections for the HPIs; and

(4) Role shift to monitoring and validating: These recommendations will shift the role of the UEPPCB from conducting the pollution audits to monitoring and validating of the audits. UEPPCB will monitor and regulate the TPAs, focus more on the HPIs in the state and other core functions such as formulation of state specific standard and guideline formulation, development of a state level pollution abatement programme, etc. As a result of this intervention, UEPPCB will be able to perform it mandated of ensuring monitoring of pollution from all the industries in the state, which is practically not possible given the staff constraints.

2.4 Optimization of OCMMS

UEPPCB is presently using 2 online consent management systems: Ganga - Xtension Green Node (XGN) and Online Consent Management and Monitoring System (OCMMS). The historic records for the industries are maintained in the XGN Portal and the new industries are being recorded in the OCMMS system. UEPPCB is in the process of transition between the two systems. The OCMMS system is new and is being customized as UEPPCB needs. It is recommended that the needs of the system are outlined clearly and the system in updated accordingly. These may include

(1) Migration of legacy data on industries from XGN to OCMMS (ongoing);
(2) Development of standard SOPs for - environmental pollution consent provision, consent renewal, pollution monitoring/ inspections, including hazardous waste pollution monitoring and TPA audits;
(3) Integration of the SOPs for UEPPCB & TPAs with the OCMMS;
(4) Integration inventorization of hazardous waste into OCMMS.

These are further detailed in the section below.

(a) Objective and Scope of the solution

Objective: The objective of this intervention is to upgrade the OCMMS, such that it is in line with the core pollution monitoring and control related processes and procedures of UEPPCB, enabling UEPPCB to perform its core function efficiently.

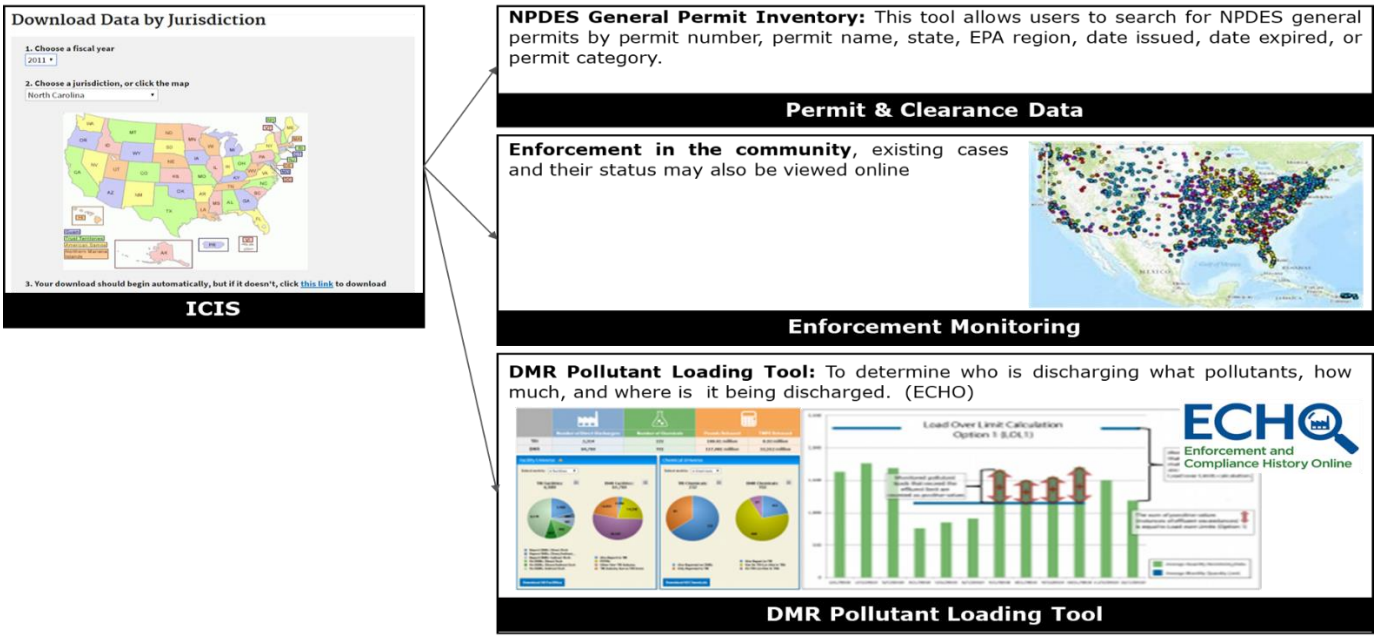
Scope of the solution:

- **Full migration to OCMMS:** The legacy data of XGN shall be migrated to the new OCMMS system. The migration of data should be such that the legacy data is in sync with the OCMMS for historic data tracking and analysis. This is already being implemented by UEPPCB;
- **Development of SOPs:** Need for development of standard SOPs for the following may be developed:
  - Pollution audit (for consent) for each industry type;
  - Renewal of consent for each industry type;
  - Environmental audit in response to notice – show cause, closure etc.
  - Pollution monitoring via TPAs – development of a TPA portal for OCMMS, registration etc.
- **OCMMS:** The OCMMS system developed for UEPPCB should be upgraded on lines with the SOPs developed for pollution control and monitoring at UEPPCB, to put the OCMMS in line with the processes and procedures of UEPPCB;
- **Inventorization of hazardous waste:** OCMMS to be integrated with a tool for inventorization of hazardous waste in the state. This can be linked to the pollution monitoring of the industries, which can feed in the information on the hazardous waste generated by the industries and an inventory of waste can be generated. Linking of this can be made with the monitoring of the hazardous waste management site.

(b) Learnings from case studies and implementations for UEPPCB

USEPA's Pollution Monitoring Tool – Integrated Compliance Information System: In order to comply with the Clean Water Act and Safe Drinking Water Act in United States, USEPA has developed certain pollution monitoring tools. These tools are develop with a context to (a) Pinpoint any changes or trends that appear in water bodies over a period of time, (b) Regularly monitor water quality to identifying any existing problems, or any issues that could emerge in the future, (c) Designing and developing pollution prevention and management strategies and (d) Developing emergency strategies.

The USEPA developed online instruments for real time measurement of water quality. The online instrument developed had an integrated system for compliance, monitoring and enforcement called ICIS (Integrated Compliance Information System) in USEPA under NPDES (National Pollutant Discharge Elimination System). NPDES permit program authorizes the state governments to perform permitting, administrative, and enforcement responsibilities for control of pollution. Compliance monitoring under the NPDES Program takes place largely at the State Level. EPA has authorized all but four states to implement their own NDPES programs to control water pollution. EPA oversees authorized state programs and has direct implementation responsibilities for the unauthorized states as well as federal facilities. NPDES program regulates point sources that discharge pollutants into water body of United States and provides different techniques & tools to manage compliance of its permit limit for controlling discharges of pollutants to receiving waters. This tool/ instrument is discussed in the section below:



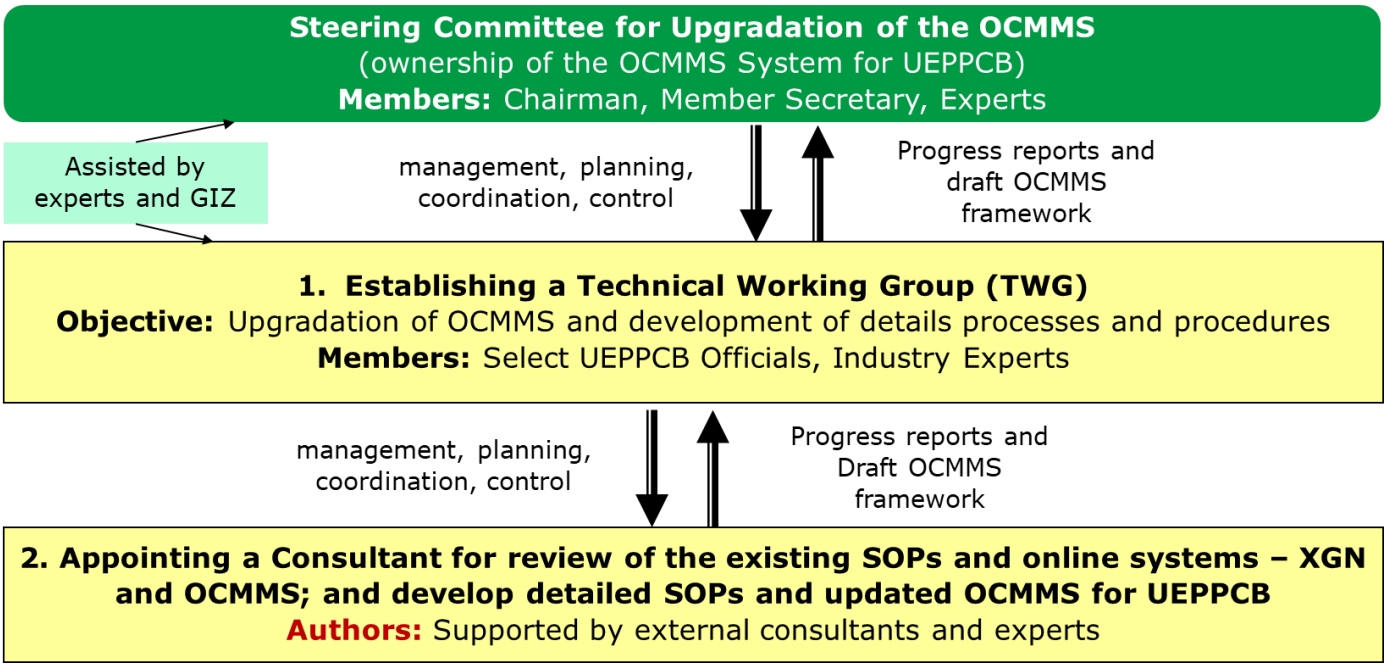
Integrated Compliance Information System (ICIS) - ICIS is the national database to track compliance with NPDES permit requirements for major dischargers. From the system one can review information on (a) When a permit was issued and its expiry?, (b) How much the company is permitted to discharge? and (c) The actual monitoring data showing what was discharged. ICIS-NPDES integrates data from several separate data systems, such as Physical Monitoring Tools and LIMS etc.

Although the needs of UEPPCB at present are very basic, the following :

(1) Integration of multiple systems in one single system;
(2) Development of standard operating procedures (SOPs) for each task/ activity for pollution monitoring and control; and
(3) Updation of the online pollution monitoring system, to integrate the standard processes and procedures.

(c) How to implement the solution?

Implementation structure: Implementation structure for the proposed solution is as follows:



Mapping the stakeholder requirements:

	Authority	TWG	Authors
Role of the stakeholder	• Establish the steering committee – including identification of the external experts to be the members of the committee • Steering committee to identify of the detailed scope of work – inclusions, exclusions, deliverables, budget and timelines • Coordination and updates from the TWG. • Appointment of Authors • Appointment of consultants/ developers for upgradation of OCMMS	• Working closely with the Authors and elaborations on expected deliverables • Providing guidance existing practices and SOPs available • Review and comments on SOPs developed • Review of the OCMMS framework developed • Coordinating with external stakeholders – TPAs and institutions • Approving the final deliverables	• Assessment of the existing pollution monitoring functions of the UEPPCB • Review of the available SOPs • Updation and detailing of the SOPs • Proposed an a suitable framework for upgradation of the OCMMS framework • Participating in the stakeholder consultations on the policy and accomodate suggestions
Possible alignment (internal/external)	• Internal & External	• Internal & External	• Not Applicale
If internal, UEPPCB divisional alignment	• Engagement of Chairman and Member Secretary	• Alignment with Chief Environmental Officers (at HO) and Regional Officers (from regional offices)	• Not Applicale
If external, possible partners	• External Experts and institutiinal partnerships on Pollution monitoring, TPA and IT.	• External Experts and institutiinal partnerships on Pollution monitoring, TPA and IT.	• Not Applicale

(d) Impact of the solution

Key impacts of the proposed recommendations are:

(1) **Streamlining systems, tools and processes for institutional efficiency:** This recommendation will further strengthen the internal processes related to pollution monitoring and control, which will be then streamlined with the existing OCMMS, making the on-ground processes and the OCMMS system in-sync with each other. This will enable the UEPPCB to access reliable pollution rated data at a point in time, as a result enhancing the institutional efficiencies;

(2) **Systematic collation of pollution related data collection:** The systems will enable systematic and regular collection of pollution data from industries, which are consistent across industries and over a long period of time. This will make available the UEPPCB an industry pollution databased for the state. Further analysis of the information can feed in to state level policy interventions;

(3) **Automation/ IT integration to increase the turn-around:** Integration of information technology into institutional processes and procedures to increase the turn-around time of approval/ renewal process. This will also free up staff form redundant day to day tasks of monitoring, which are dependent on manual processes and help then to focus on core and critical activities for the organization.

2.5 Development of a Laboratory Information Management System (LIMS)

At present UEPPCB has a Lab Division, however most of the testing is conducted at MOEF accredited labs. Testing of sample is expected to increase development and implementation Environmental Audit Policy for UEPPCB. Monitoring of inspection results from labs is to be more critical. Therefore, need it is recommended to develop a Lab information management system. This may include the following:

(1) Recording of sample collected from the field;
(2) Recoding of test details and sample analysis;
(3) Validation and evaluation of results; and
(4) Quality assurance;

These are further detailed in the section below.

(a) Objective and Scope of the solution

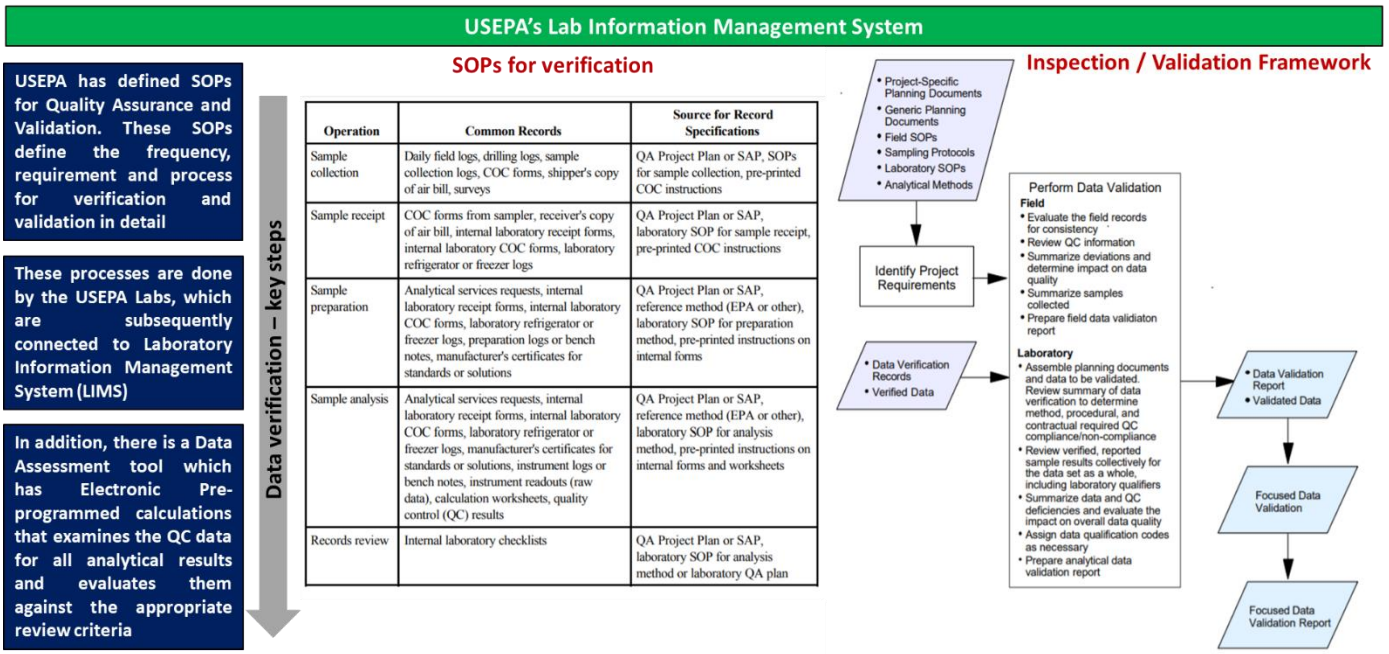
Objective: The objective of this intervention is to develop a system for management of information received from own and private labs in relation to pollution monitoring from the industries → enabling the UEPPCB review the lab results when required and also to regulate the associated laboretories.

Scope of the solution:

- **Development of SOPs:** Development of SOPs for laboratory process, including sampling protocols, sample collection, log maintenance, internal lab checklists formats,
- **Recording of sample collected from the field** – to record the details for the samples collected from the field by the laboratories, including industry, effluent type, collection location, date & time of collection and other relevant aspects. It will also act as a database management system for the labs to store analysis;
- **Recoding of test details and sample analysis** – Based on the sample recorded and industry type, specific tests shall be performed for the effluent type. The system will enable the recording of the results of the relevant test. Further, analysis of the sample will be facilitated by the system, highlighting the outliers, making it easy to spot and analyse for the labs as well as UEPPCB;
- **Validation and evaluation of results** – Data recorded in the system shall be check/ validated for errors by application on validation rules. In select cases, repeat evaluation of the samples can be conducted to validate the record. This may done in coordination/ assistance of UEPPCB and is expected to enhance the reliability of data reported on the system;
- **Quality assurance:** The system is may be embedded with quality assurance protocols, including periodic check through online declaration by the labs, supplemented by random laboratory audits can be included.

(b) Learnings from case studies and implementations for UEPPCB

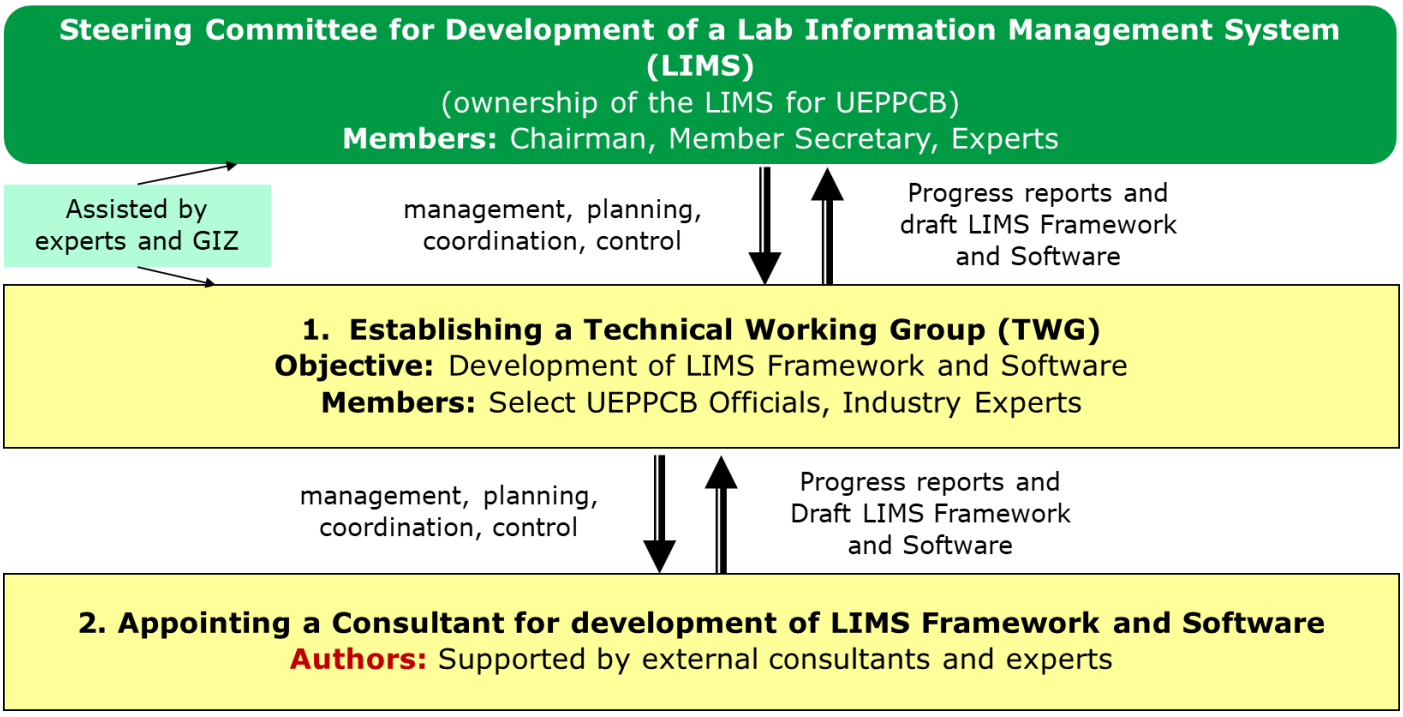
USEPA's Laboretories Information Management System (LIMS): The USEPA's LIMS was designed to address environmental and public health concerns on a national, state, local, and tribal level using the latest state-of-the-art information technology and innovative approaches. The system was positioned such that it encouraged advance communication, cooperation, and management activities across the laboratories, as well as with other federal and non-federal entities, to provide consistent and effective environmental analysis, data collection, and other customer-driven scientific and technical functions. These functions ensured that the USEPA continued to produce world-class scientific results to make informed decisions on environment and public health concerns. A framework for this system presented in the schematic below:



Key features from the case-study, highlights the following needs for the UEPPCB's Laboretories Division, develop a system – LIMS for (1) Sample recording, (2) Sample analysis, (3) Validation and evaluation of results and (4) Quality assurance. Details of the implementation of the initiative are detailed in the section below.

(c) How to implement the solution?

Implementation structure: Implementation structure for the proposed solution is as follows:



Mapping the stakeholder requirements:

	Authority	TWG	Authors
Role of the stakeholder	• Establish the steering committee – including identification of the external experts to be	• Working closely with the Authors and elaborations on expected deliverables	• Assessment of the existing systems of coordination with laboretories –

	Authority	TWG	Authors
	the members of the committee • Steering committee to identify of the detailed scope of work – inclusions, exclusions, deliverables, budget and timelines • Coordination and updates from the TWG. • Appointment of Authors • Appointment of consultants/ developers for development of LIMS	• Providing guidance exisitng processes for labs and their monitoring/ regulation • Review and comments on SOPs and system developed - LIMS • Coordinating with external stakeholders – TPAs, laboratories etc • Approving the final deliverables	registration, reporting, validation etc • Review of the available SOPs for labs and sample collection • Updation and detailing of the SOPs for the laboratory management ment system • Development of a Laboretory Information Management System • Participating in the stakeholder consultations on the the LIMS and incorporating the suggestions
Possible alignment (internal/external)	• Internal & External	• Internal & External	• Not Applicale
If internal, UEPPCB divisional alignment	• Engagement of Chairman and Member Secretary	• Alignment with Chief Environmental Officers (at HO) and Laboratory Division officers	• Not Applicale
If external, possible partners	• External Experts and institutiinal laboretory testince, indipendednt experts and instituttions	• External Experts and institutiinal laboretory testince, indipendednt experts and instituttions	• Not Applicale

(d) Impact of the solution

Key impacts of the proposed recommendations are:

(1) **Reduced errors in the data:** The system reduces the errors made as a result of manual data logging and compilations. This minimised the efforts required for data review, validation, correction and compilation → resulting in generation of a credible pollution monitoring database;

(2) **Ease of customized reporting and supporting analysis:** Collate sample data supports analysis on the sample database collected. This also facilitates generation of customised sample analysis reports; customizations may based on locations, regions, industry type/ category, effluent type, product category etc.

(3) **Contributes to decision support:** Results from the analysis shall help the UEPPCB to evaluate the existing pollution scenario of the state, helping to narrow down to specific industries, pollutants and processes. This shall enable UEPPCB to take up strategic initiatives such as circulation of industry specific standards, guidelines, notices etc.

IV. PART C – SIIDCUL & SIDA, Uttarakhand

1. Brief overview of the Baseline Assessment

Part A & Part B of this report reviewed organizations pertaining to the regulatory authority for enabling industrial wastewater pollution. This 'Part C' will assess industrial wastewater management aspects from the industrial infrastructure development standpoint, which will pertain to the states' initiatives for enabling sustainable industries.

1.1 An overview of SIIDCUL & SIDA

SIIDCUL:

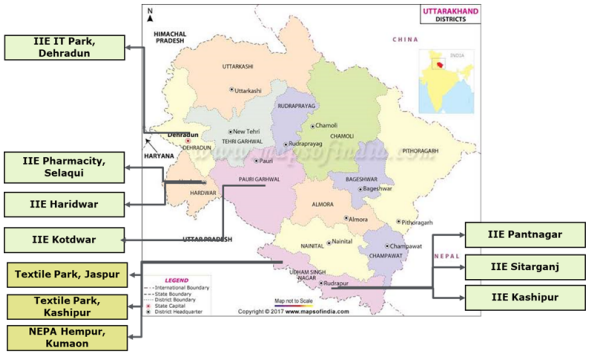
State Infrastructure and Industrial Development Corporation of Uttarakhand Limited (SIIDCUL), a government of Uttarakhand Enterprise was established in 2002 under the Companies Act 1956, and is the nodal agency for promoting industrial development in the state. It was established primarily with an objective of enabling overall industrial development in the state by developing necessary infrastructure directly or through special purpose vehicles, investments assisted companies etc. At present SIIDCUL has developed seven (7) world Integrated Industrial Estate (IIEs) facilitating and promoting industrial and economic development.

The State Industrial Development Corporation of Uttarakhand Limited (SIIDCUL), established in 2002, as **nodal agency for promoting industrial development** in the state.

Objective: Providing overall industrial development of the state by developing necessary infrastructure and industries in the state of Uttarakhand

Key infrastructure under SIIDCUL

- **Integrated Industrial Estates**
- **Industrial parks & industry promotion**
- **UP's SIDC Estates post partition**



SIDA:

The State Industrial Development Authority, Uttarakhand (SIDA), established in 2005, holds the responsibility of regulated, controlled and sustainable industrial development in the state of Uttarkhand. It provides for Planning, Developing, Regulating and Operations under a Single Authority for Industrial Development[1]. SIDA is **anchored under SIIDCUL**, which shall provide all secretarial and financial assistance to SIDA.

The key **statutory functions** of SIDA, as per the notification include the following:

- Exercise the powers conferred to the Industrial Development Authority under the **Uttar Pradesh Industrial Area Development Act, 1976** (UP. Act No. 6 of 1976)
- Power to acquire, hold and dispose of property both movable and immovable, and to contract & shall by said name sue and be sued;
- To charge development fees/ levies, which shall be deposited with SIIDCUL as a separate account
- To frame bye-laws/rules to govern its functioning

The State Industrial Development Authority (SIDA), established in 2005, under **UP Industrial Area development act**, anchored under SIIDCUL.

Objective: Regulate, control and sustainable industrial development under a single Authority in the State of Uttarakhand

Responsible for all **Notified industrial areas** in the state

Services: Building & Layout Plan Approval (CTE); Occupancy Certificate (CTO)

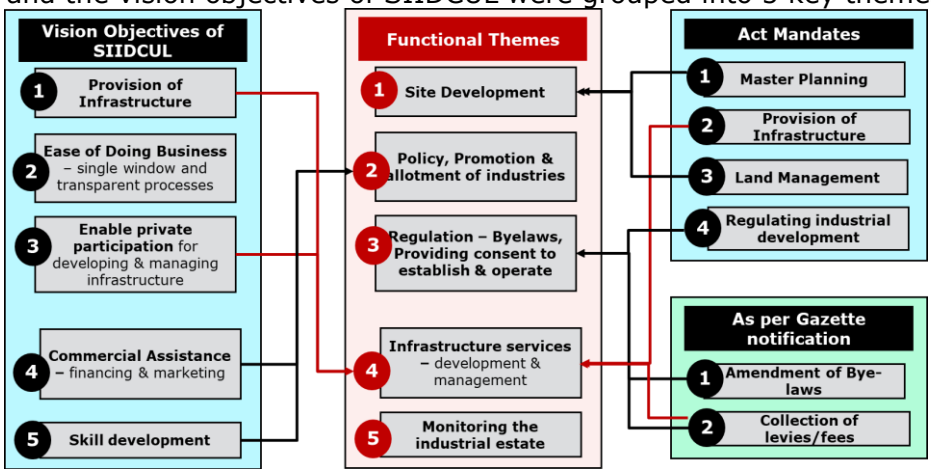
Bye-laws: formulation & update to include relevant industrial & urban norms

[1] Based on the information obtained from SIDA website, and notification No. 2381/VII-ID-1-2005-137 UDYOG/2005, dated July 2005 - https://www.sidaonline.in/UserManual/About%20SIDA.pdf

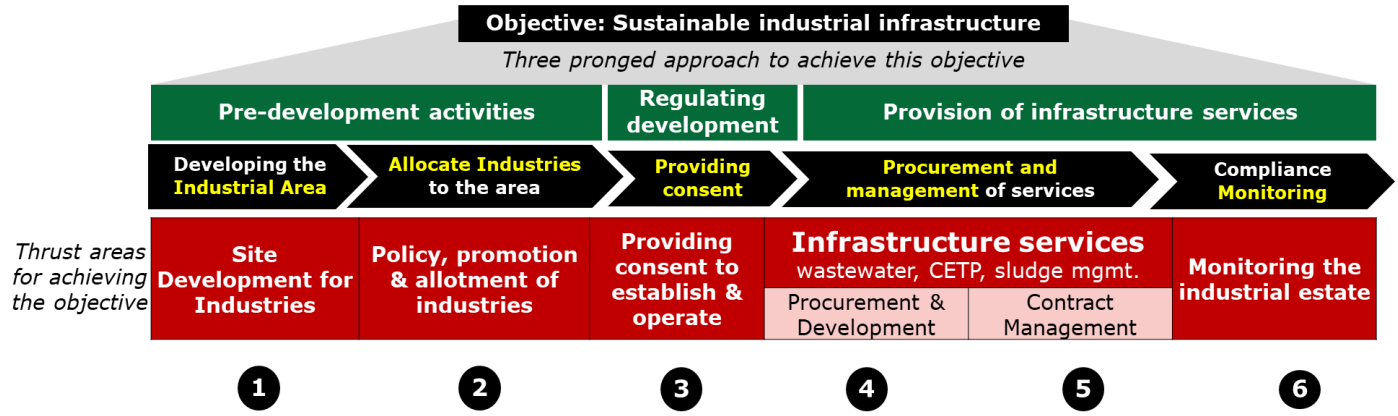
1.2 Key activities undertaken in our baseline assessment

(1) Mapping the roles & functions of SIIDCUL

As a first step of our baseline assessment, the key role of SIIDCUL & SIDA based on the Industrial Development Act and the vision objectives of SIIDCUL were grouped into 5 key themes.

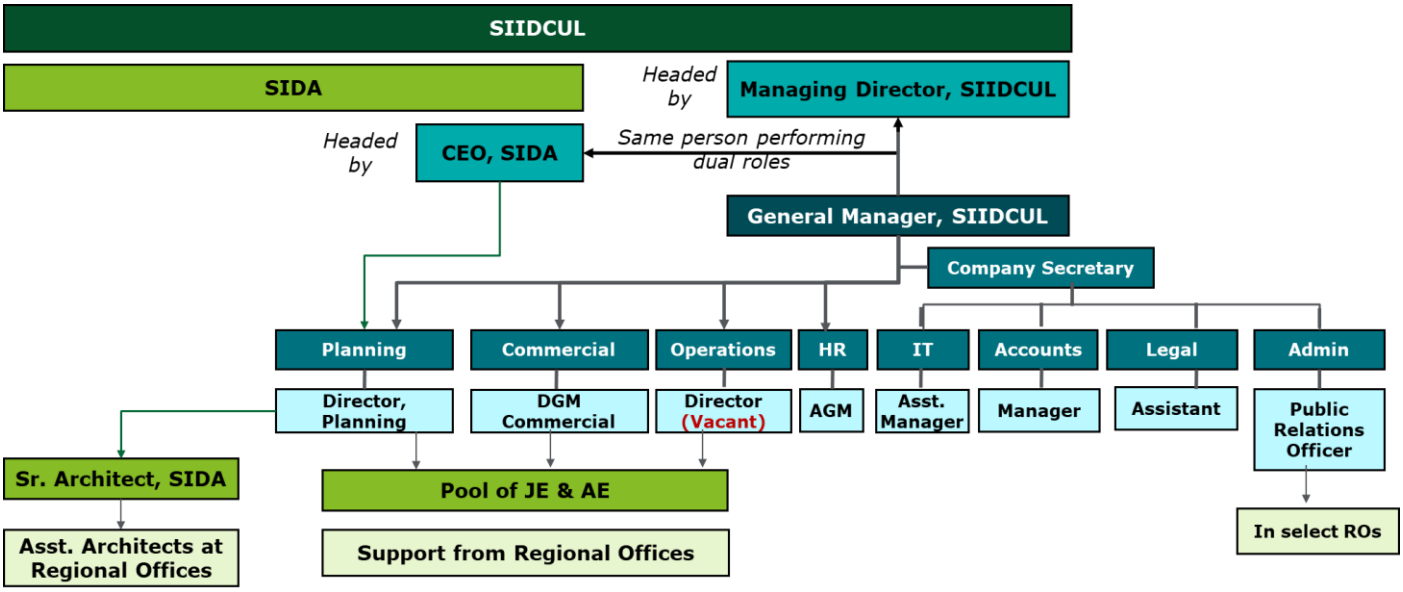


Accordingly these themes were mapped out as the key elements in the value chain of SIIDCUL, as sown below:

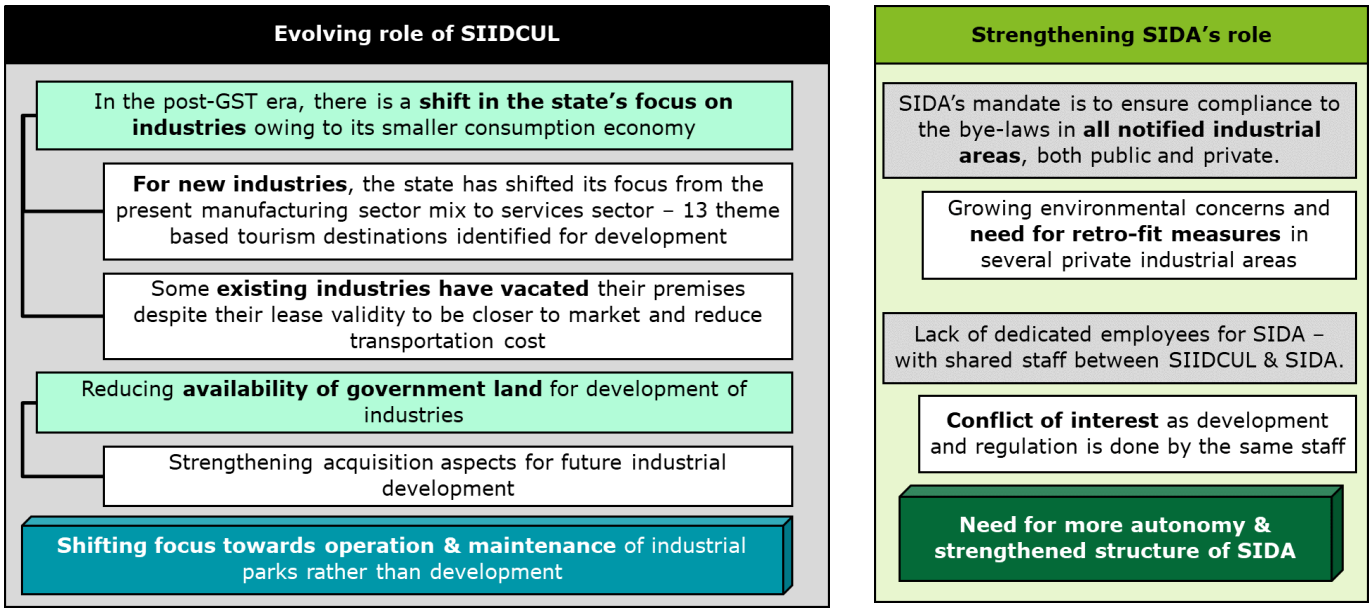


(2) Study of the organization and governance structure

Secondly, the shared organization structure of SIIDCUL and SIDA, along with the manpower alignment in each of these aspects were studied in detail. The study tried to understand the various functions that are to be performed by the organizations against the available staff for undertaking these activities.

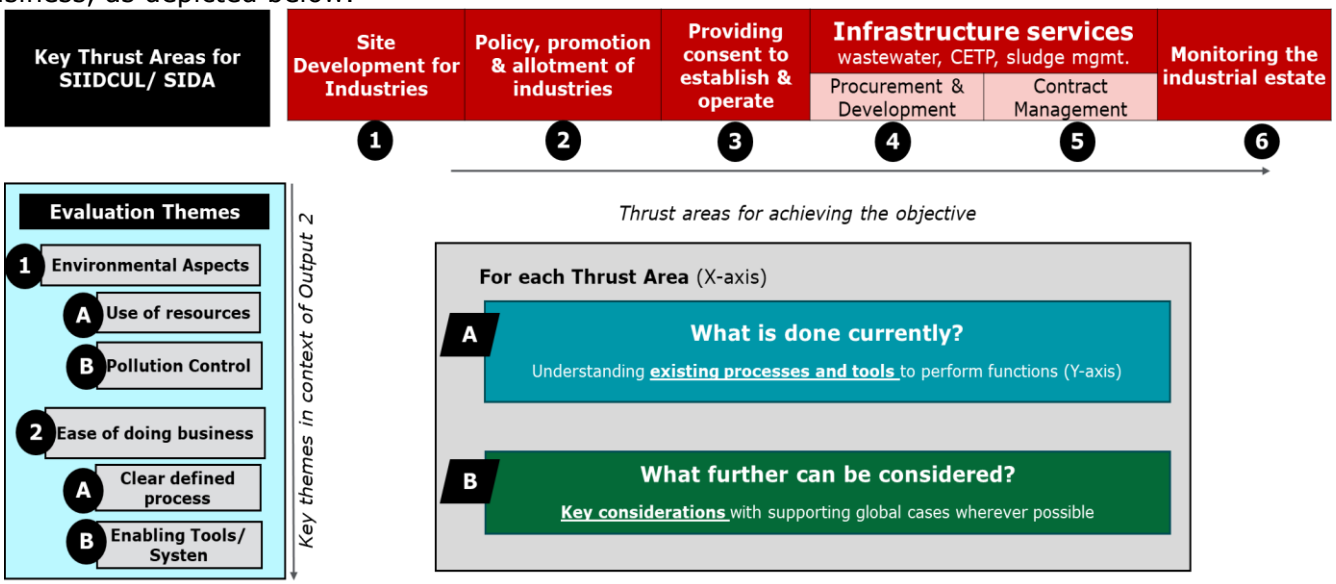


Based on the organizational studies undertaken, the following key implications emerged for SIIDCUL & SIDA's organization and governance structure



(3) Process gap analysis and needs assessment

Keeping in mind the above key themes, the key processes for each element in the value chain was assessed in terms of their suitability to address the environmental concerns and enable ease of doing business, as depicted below.



1.3 Key emerging suggestions based on baseline assessment

The detailed institutional gap analysis was done both from an organizational standpoint and the key process improvements that need to be undertaken.

The following table summarizes some of the **key emerging solutions/recommendations** for SIIDCUL and SIDA for improving the existing organizational structure, procedures and processes and enhancing the cooperation aspects with various strategic partners.

Type of intervention	Emerging Thrust Areas for CPCB	Key suggestions and recommendations
Structural interventions	**Organization structure of SIDA**	Drafting clear **role of SIDA**, with defined organization structure and manpower requirement for SIDA based on the work load
	Realigning SIIDCUL's structure to focus on "O&M aspects" with an Environmental Cell	Shifting focus towards provision of infrastructure services – Developing in-house capacity for procurement and contract management for various infrastructure
Process Interventions		An Environmental cell to focus on the environmental aspects right from site selection - including • Environmental plan as part of Master Plan to include treatment, reuse/recycling and disposal aspects – EIA & EMP to be included • Inclusion of bye-laws and rules on environmental aspects • Formulation of guidelines on providing, developing and maintaining environmental infrastructure services such as CETP & sludge disposal facility
	Standardized procurement & contract process	• **Financial power delegation** at different levels of staff based on the nature & cost of works • Defined procurement **process with clear responsibilities, process of selection** for various level & type of activities • **Guidelines** for enabling infrastructure – techno-commercial feasibility, tariff setting and standard bid documents
Tools/ System interventions	**Integrated Industrial Area monitoring tool**	A single tool to monitor the status of works in industrial areas - - GIS Mapping of Allocation of land in each industrial area from SIIDCUL - Consent status from SIDA - Complaint on common infrastructure services from SIIDCUL - Environmental performance data of ETP/CETP from SPCB

2. Detailed suggestions/ recommendations

This chapter details the select structural, process and system interventions for SIIDCUL & SIDA identified and agreed from the baseline gap analysis and needs assessment studies undertaken by the study team.

2.1 Methodology adopted for detailing the solutions

We understand, from the Terms of Reference and stakeholder discussions, that the key purpose of this report is to **detail out the suggestions/recommendations for SIIDCUL & SIDA to implement the same, given their current structure and manpower constraints.**

Therefore, accordingly, the detailing of each suggestion, covers the following aspects:

(1) **What is the solution?** – its objective and scope
(2) **Need and Impact for the solution** – strategic institutional need for the solution, benefits and beneficiaries, possible advantages for implementing the solution and the complexity involved in implementation, if any
(3) **Has this been attempted earlier?** – any past global/ local experiences with key learnings
(4) **Adapting the solution**–
   a. key features of the solution
   b. who can take this work in SIIDCUL/ SIDA?
   c. What are the current works done by the particular division
   d. Need for strategic outsourcing/ partnerships/ role delegations
(5) **How to implement the solution**? –
   a. listing the steering structure for implementing the solution
   b. role of various stakeholders,
   c. competency/skills required for each stakeholder,
   d. manpower required for each stakeholder
   e. divisional staff alignment for undertaking the solution
   f. suitable partnerships for enabling the solution and their skill/competency

2.2 Defined role and organization structure for SIDA

(a) Objective and Scope of the solution

Objective: A clearly defined role and organization structure for SIDA with detailed manpower requirement and required personnel for undertaking the work

Scope of the solution:

- **Defining the role** of SIDA with clear functional sub-divisions, to perform this role:
  - Planning division – focussing on
    - Requesting for sanctioning an indetified areas as a notified industrial area to the state
    - Preparation/ Updation of building Byelaws and gaining approval from the board
    - Preparing checklists and Processes for providing Consent to Establish (CTE) and Consent to Operate (CTO) certificates to the industries in the notified industrial areas,
  - Permits provision & monitoring – regional officers focussing on providing CTE/CTO certification and conducting frequent inspections
  - Supporting role – dedicated manpower for supporting roles such as accounts, IT and Admin works
- **Staff Alignment based on skills** by mapping required skills, expected alignment and staff structure

(b) Need and Impact of the solution

Need for realignment:

- Presently there are **no dedicated employees** for SIDA, and the responsibilities are shared with the employees of SIIDCUL, which has indirectly resulted in lack of ownership.
- **Conflict of Interest**: In the SIIDCUL developed industrial areas, the plans are prepared by a planner from SIIDCUL, which is then to be approved by SIDA. However, with the shared staff arrangement the plans are developed and approved by the same staff, thereby resulting in a conflict of interest

- **Growing environmental concerns in other industrial areas, not under SIIDCUL**: SIDA's mandate is to ensure compliance to the bye-laws in all notified industrial areas, both public and private. However, with the limited staff the present focus of SIDA is mainly restricted to SIIDCUL's industrial areas. In the recent years, there have been several complaints and court cases in the other private industrial areas, which has resulted in SIDA taking responsibility for retro-fit measures in such areas at huge cost.

Therefore, there is a need for defining a clear organization structure for SIDA, with better autonomy rather than being dependent on SIIDCUL for these work.

Benefits and impact of enabling a functional structure:

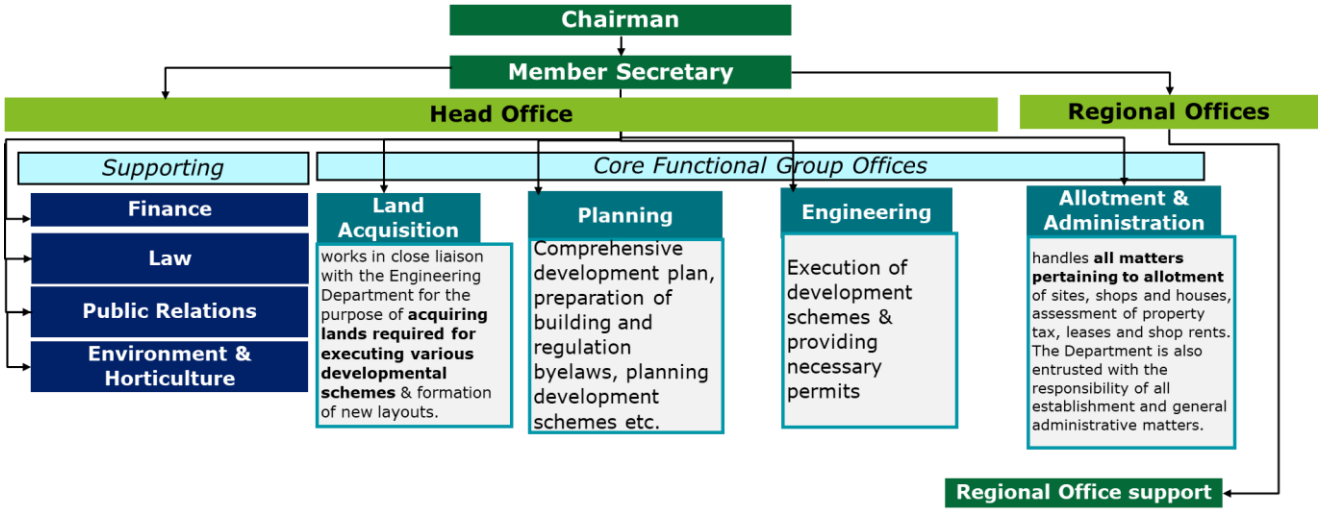
By realigning the staff to a functional approach in the long run it will result in the following advantages:

- **Gives ownership**: With a designated team at site for undertaking monitoring works, provision of permits and monitoring the provided permits become easier. Specific persons may be appointed for specific regions, thereby ensuring quicker and frequent review.
- **Better compliance assessment** against discharge permits, consent management, investigation of pollution incidents and more effective environmental monitoring.
- **Improves efficiency and saves time:** Presently preparing bye-laws , compliance and enforcement activities are all done individually by the very limited staff. With the realignment, it is easier to
  (1) focus specifically on environmentak concerns and developing related industry specific bye-laws
  (2) monitor compliance of the industrial

Beneficiaries: Industries, SPMGs, SIDA, SIIDCUL, and General public

(c) Learnings from global case studies

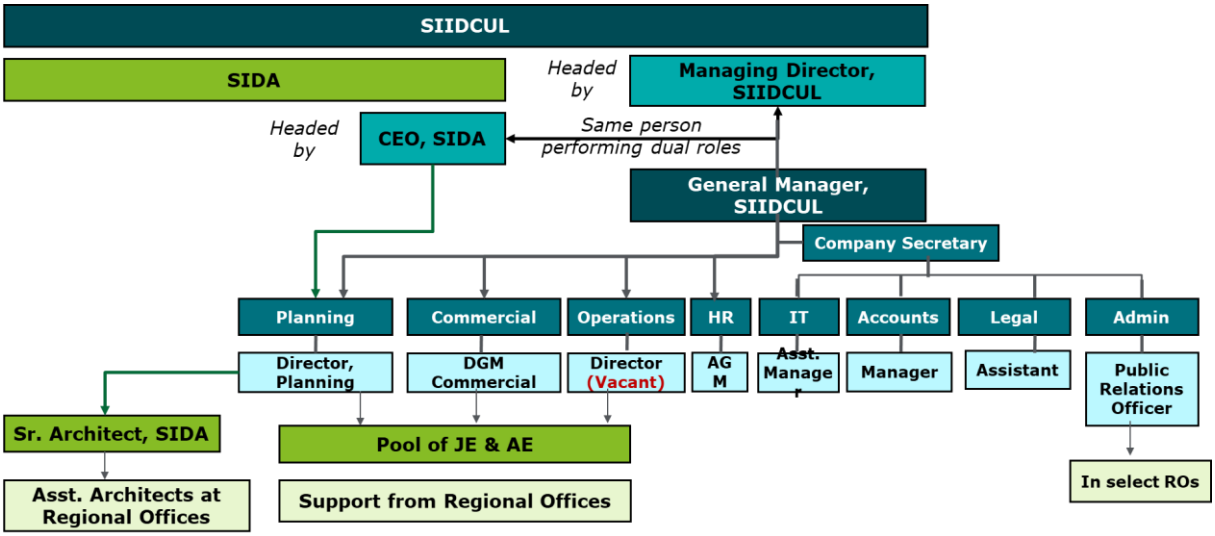
BDA's functional organization structure: SIDA being a regulator, can seek learnings from other development authorities in the region. The following divisions form a part of organization structure of Bangalore Development Authority (BDA)



(d) Implementing in the SIDA context

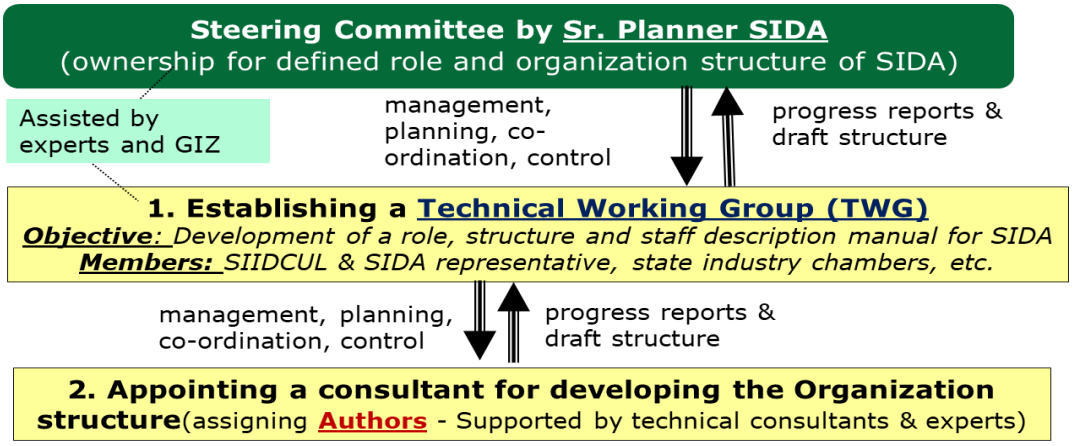
Features of the solution, in SIDA context: Drawing from BDA's organization structure, SIDA may also consider a similar grouping of functions,

Present organization structure of SIDA's, staff alignment and their roles: To ensure smooth transition to this divisional realignment, it is important to understand the current division and its roles. Based on our institutional baseline assessment, we understand the following sharing arrangement between SIIDCUL & SIDA.



Who will be responsible? The HR personnel along with the Planning Head can be in-charge of undertaking this re-alignment as the key activities, as it involves both skill assessment and work assessment works. However, as this involves development of a detailed organization structure with manpower planning and clearly defined role for each staff these works have to be undertaken by a separate independent consultant

Implementation structure: For realigning and defining SIDA's organization structure. we have adopted the terms and methodology used in the BAT process by EU Nations for implementing specific solutions. Accordingly, we propose the following implementation structure – consisting of a Working group, supported by Authors (*An Author may be internal/external consultant – representing and individual or group responsible for developing the document)*



Mapping the stakeholder requirements: With an implementation steering structure in place, it is now relevant to understand the specific role, key outcomes, and competency/skill requirement of various

	Authors	TWG	SIDA– Steering Committee
Role of the stakeholder	▪ Define clear role and boundaries for SIDA ▪ Develop the key organizational aspects – functional division, manpower requirement, skill assessment, etc. As per agreed format ▪ Prepare for TWG meetings	▪ Appoints "Authors" ▪ Review & finalize the reports prepared by Authors ▪ Prepares & chairs the TWG meetings ▪ Enable coordination with other stakeholders ▪ Provide data as required	▪ Appoints TWGs & ensures development as per agreed timelines ▪ Orientation & training the TWG/ Authors ▪ Internal knoweldge sharing sessions ▪ Implement the proposed structure

	Authors	TWG	SIDA– Steering Committee
Timeline	Develop the guidebook for organization structure as per agreed format **within 8 months**	Bi-weekly TWG meetings to monitor progress	Monthly meetings with TWG to track progress
Competency/ skills required for the role	• Technical knowledge experts – for asssesing required skillsets and work load, SOPs and checklists • Institutional experts – for institutional recommendations such as head office structure, regional office structure and reporting requirements	• Regulators with technical knowledge to detail the issues faced and assess teh work load etc. • industry representatives to outline their key challenges/ issues	• Understanding of industry & regulator requirements to implement required structure
Manpower required for the skills & role	• Technical experts –2 members • Institutional expert – 4 nos.	• SIDA & SIIDCUL – 3 mebers • Industry experts – 3-5 nos. • Other local & state industry bodies – 3-5	• 2-3 member group headed by the Sr. Planner of SIDA
Possible alignment – internal/ external	• Externally appointed consultants through a competitive bid	• 10 member working group- defined through a common order by SIDA	. 2-3 member group headed by the Sr. Planner of SIDA

2.3 Realigning SIIDCUL's organization structure

(a) Objective and Scope of the solution

Objective: A clearly defined role and organization structure for SIIDCUL with focus on "provision and operation of infrastructure services" – Developing in-house capacity for procurement and contract management for various infrastructure detailed manpower requirement and required personnel for undertaking the work

Scope of the solution:

- **Defining the role** with clear functional sub-divisions, to focus on operational aspects
  - Land acquisition division to enable purchase of new lands for SIIDCUL
  - Environmental Cell – focussing on environmental concerns and infrastructure, such as
    - Environmental plan as part of Master Plan defined structure of the master plan to include treatment, reuse/recycling and disposal aspects – EIA & EMP to be included
    - Inclusion of bye-laws and rules on environmental aspects
    - Formulation of guidelines on environmental infrastructure services
  - Procurement and contract management division – for procuring construction, operation and maintenance services on their own, rather than depending on external agencies
- **Staff re-alignment based on skills** by mapping required skills, expected alignment and staff structure as per the expected work load and nature of work in each division

(b) Need and Impact of the solution

Need for realignment:

- ❑ **No dedicated team/ personnel for managing the operation of infrastructure services** – transaction advisory and contract management works: As per the sanctioned posts, a Director-Operations is envisaged for SIIDCUL. However, presently there is no such position. Considering the shift from development focus to operations focus, it is therefore relevant to strengthen the team right from the bottom level to enable these services
- ❑ **No specific personnel to assess the environmental aspects** At each activity of industrial development, right from site selection, planning and promotion/allotment of industries there si need to look at the environmental aspects – such as water consumed, source of water, discharge

quantum of water, expected quality of the discharged wastewater, . Also there is need to develop common infrastructure such as CETP, keeping in mind these environmental aspects

- **Lack of clear roles for each staff**. Owing to the nature of shared work between SIIDCUL and SIDA, and also between various divisions, there is lack of clear role definition for each employee presently. With no specific reporting, and multiple adhoc nature of workload, it therefore becomes difficult to assess and evaluate the performance of the existing staff, or plan for future needs
- **Limited staff** Of the expected sanctioned posts, only about 50% is presently filled, thereby increasing the workload on the available limited staff
- **Need to improve internal training, capacity building & skill development :** There are presently no systems for internal training, and capacity building.
- **Lack of clear HR policy** on promotion, resulting in low employee motivation

Therefore, there is a need for defining a clear organization structure for SIIDCUL while realigning the staff to a more functional oriented structure, for performing specific activities based on skillsets.

Benefits and impact of enabling a functional structure within IPC:

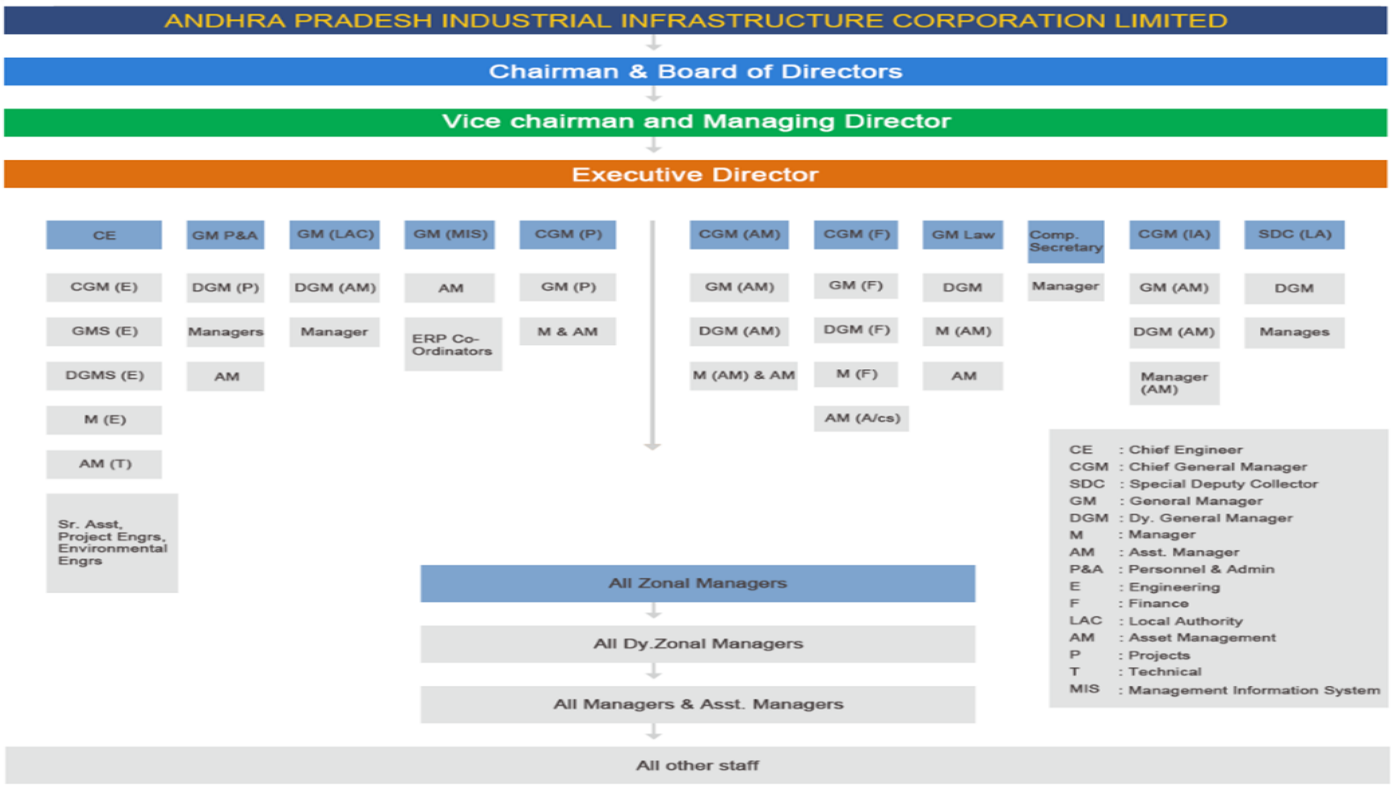
By realigning the staff to a functional approach in the long run it will result in the following advantages:

- **Gives ownership**: With a designated team for procurement and contract management, SIIDCUL can gain more autonomy and control over various services provided. Specific persons may be appointed for specific regions, thereby ensuring quicker and frequent review.
- **Improved employee morale:** With a clearly defined promotion policy, recruitment and HR process systems, employee morale will be boosted and encourage employee retention
- **Better compliance assessment** against allocated permits, consent management, investigation of pollution incidents and more effective environmental monitoring.

Beneficiaries: Industries, SPMGs, SIDA, SIIDCUL, and General public

(c) Learnings from global case studies

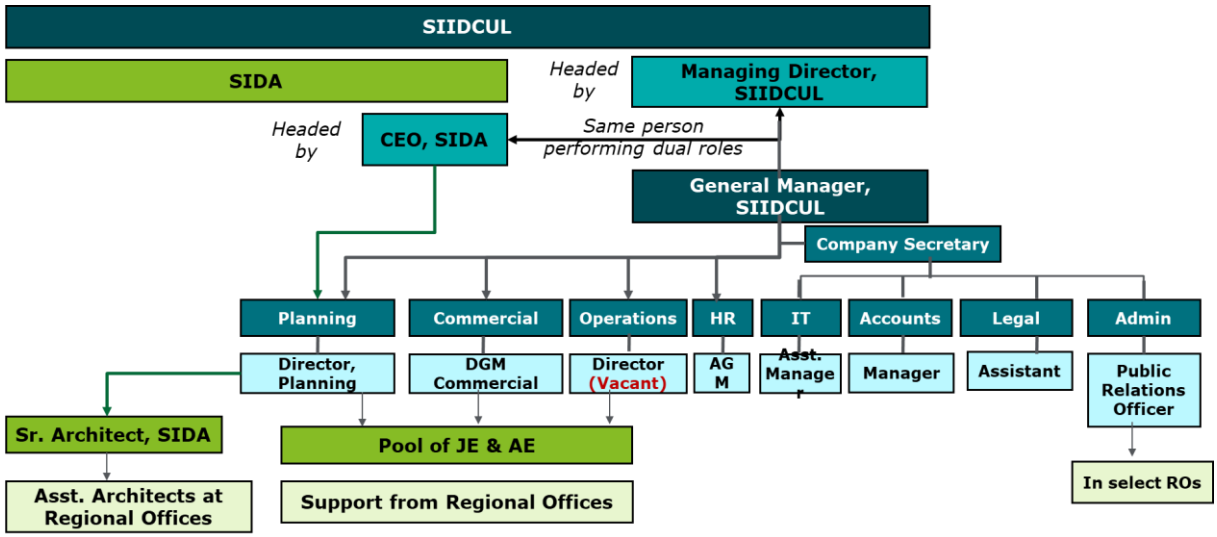
APIICL's functional organization structure: SIIDCUL being and industry infrastructure development company, can seek learnings from other such development corporations in the region. The following divisions form a part of organization structure of Andhra Pradesh Industrial Infraastructure Corporation Limited (APIICL)



(d) Implementing in the SIIDCUL context

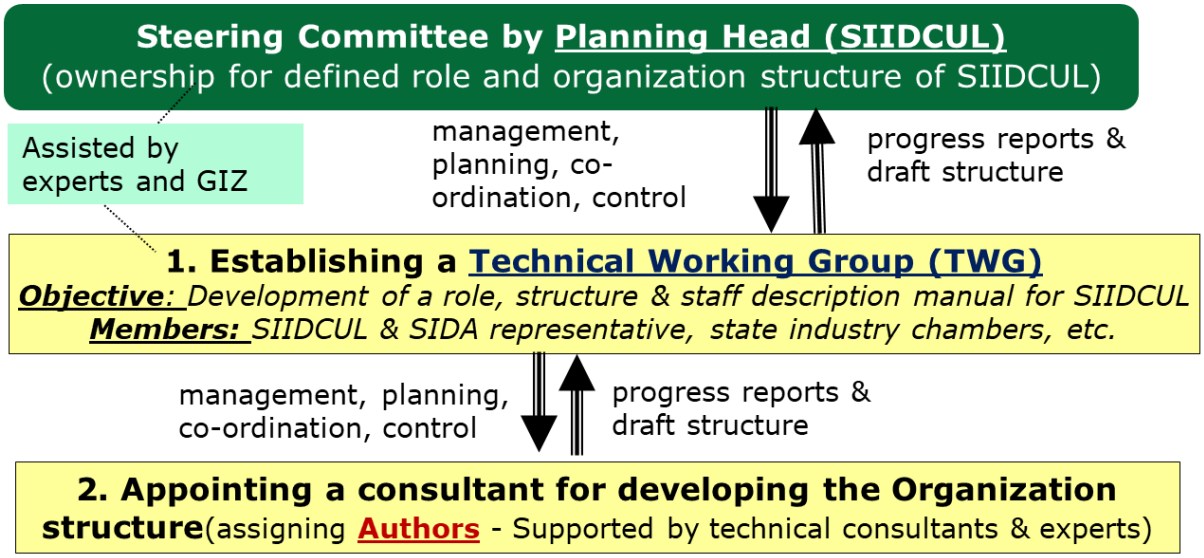
Features of the solution, in SIIDCUL context: Drawing from APIICL's organization structure, SIIDCUL may also consider a similar grouping of functions,

Present organization structure of SIIDCUL's, staff alignment and their roles: To ensure smooth transition to this divisional realignment, it is important to understand the current division and its roles. Based on our institutional baseline assessment, we understand the following sharing arrangement between SIIDCUL & SIDA.



Who will be responsible? The HR personnel along with the Planning Head can be in-charge of undertaking this re-alignment as the key activities, as it involves both skill assessment and work assessment works. However, as this involves development of a detailed organization structure with manpower planning and clearly defined role for each staff these works have to be undertaken by a separate independent consultant

Implementation structure: For realigning and defining SIIDCUL's organization structure, we have adopted the terms and methodology used in the BAT process by EU Nations for implementing specific solutions. Accordingly, we propose the following implementation structure – consisting of a Working group, supported by Authors (*An Author may be internal/external consultant – representing and individual or group responsible for developing the document)*



Mapping the stakeholder requirements: With an implementation steering structure in place, it is now relevant to understand the specific role, key outcomes, and competency/skill requirement of various

	Authors	TWG	SIIDCUL– Steering Committee
Role of the stakeholder	▪ Define clear role and boundaries for SIIDCUL ▪ Develop the key organizational aspects – functional division, manpower requirement, skill assessment, etc. as per agreed format ▪ Formulate the roles & responsibilities for environmental cell – including guidebook for provision of environmental infrastructure- ▪ Prepare for TWG meetings	▪ Appoints "Authors" ▪ Review & finalize the reports prepared by Authors ▪ Prepares & chairs the TWG meetings ▪ Enable coordination with other stakeholders ▪ Provide data as required	▪ Appoints TWGs & ensures development as per agreed timelines ▪ Orientation & training the TWG/ Authors ▪ Internal knoweldge sharing sessions ▪ Implement the proposed structure
Timeline	Develop the guidebook for organization structure as per agreed format **within 8 months**	Bi-weekly TWG meetings to monitor progress	Monthly meetings with TWG to track progress
Competency/ skills required for the role	• Technical knowledge experts – for asssesing required skillsets and work load, SOPs and checklists • Institutional experts – for institutional recommendations such as head office structure, regional office structure and reporting requirements	• Regulators with technical knowledge to detail the issues faced and assess teh work load etc. • industry representatives to outline their key challenges/ issues	• Understanding of industry & regulator requirements to implement required structure
Manpower required for the skills & role	• Technical experts –2 members • Environmental Expert- 2 members • Institutional expert – 2 nos. • Procurement/ Commercial expert – 2 nos	• SIIDCUL – 4 members • Industry experts – 3-5 nos. • Other local & state industry bodies – 3-5	• 2-3 member group headed by the Director Planning of SIIDCUL
Possible alignment – internal/ external	• Externally appointed consultants through a competitive bid	• 10 member working group- defined through a common order by SIDA	. 2-3 member group headed by the Director Planning of SIIDCUL

2.4 Standardizing procurement process

(a) Objective and Scope of the solution

Objective: A clearly defined procurement process with clear responsibilities, process of selection, criteria for evaluation, draft contract, etc.

Scope of the solution:

- **Financial power delegation** at different levels of staff based on the nature & cost of works
- Standardizing **procurement process** with clear responsibilities, process of selection, criteria for evaluation, draft contract, etc.
- For procurement of services standardized guidebook with key steps such as –
    - Preparation of Business case – techno-commercial feasibility assessment for different business models and technologies available for the infrastructure.
    - Tariff regulation – Using inputs from the techno-commercial feasibility a mutually agreed tariff is decided in discussion with the industries
    - Standardized RFP document for different modes of procurement

(b) Need and Impact of the solution

Need for defined procurement process:

Presently identification of the required construction/ O&M services, procurement of infrastructure services – and contract management is presently not done by SIIDCUL.

Once the master plan is approved by SIDA, the specific service packages are demarcated. Each of these work packages, are then awarded to any other central/state government bodies such as PWD, Jal Nigam, etc. on a "**Deposit basis**". In such an arrangement, the entire work with an estimate is given to the other agency. The agency, in turn, either procures local contractors for undertaking the works or does the work on their own.

The process of selection of the government body to which this "deposit" package works is to be awarded is not clearly defined, and is generally decided based on mutual availability and agreement.

Further, there is increased dependency on top management, as all works are done only after approval by the Director-Planning.

Therefore, there is a need for defining a clear financial power delegation along with a defined procurement process for various types of services

Benefits and impact of enabling a functional structure:

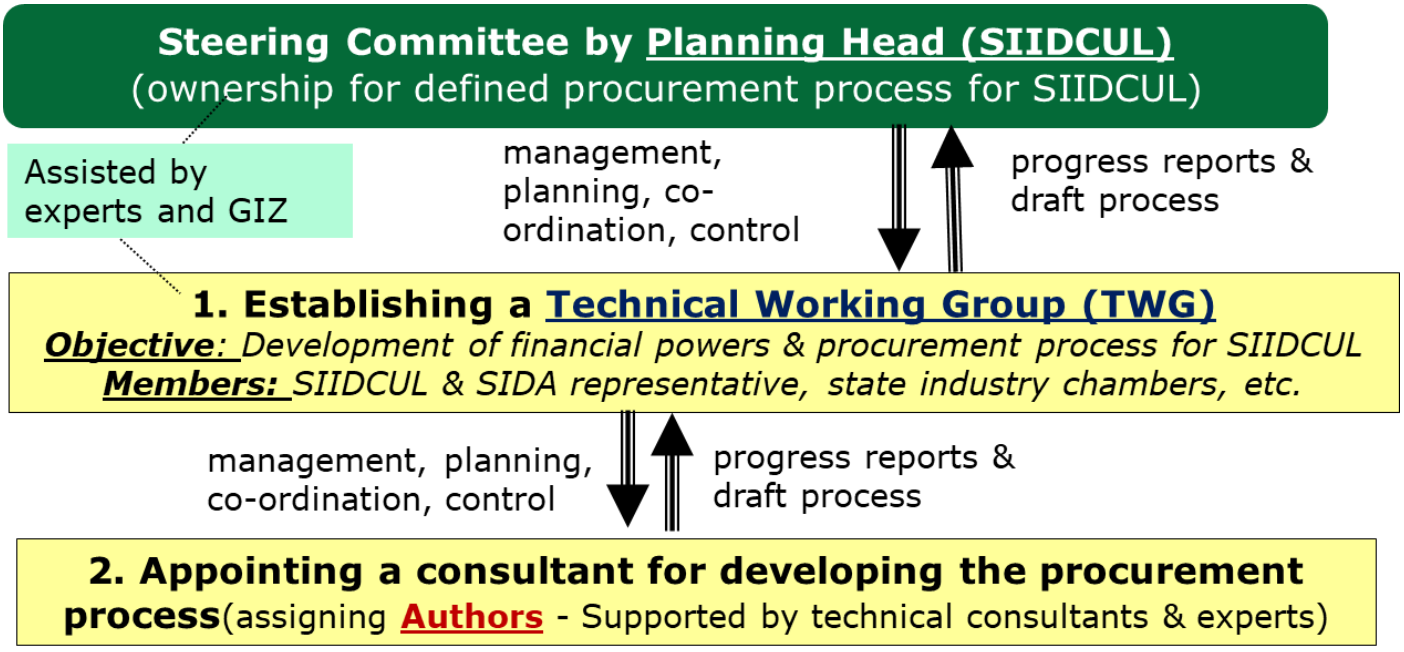
By realigning the staff to a functional approach in the long run it will result in the following advantages:

- **Gives ownership**: With a designated process in place, the procurement works can be done in a more systemized manner and without dependency on other institutions.
- **Improves efficiency, saves time and money** with reduced dependency on higher officials and defined financial powers, it will be possible to make decentralized decisions. Clear SOPs also help in reducing reliance on individuals rather on process itself.

Beneficiaries: Industries, SPMGs, SIDA, SIIDCUL, and General public

(c) Implementing in the SIIDCUL context

Implementation structure: For defining a procurement process, we have adopted the terms and methodology used in the BAT process by EU Nations for implementing specific solutions. Accordingly, we propose the following implementation structure – consisting of a Working group, supported by Authors (*An Author may be internal/external consultant – representing and individual or group responsible for developing the document)*



Mapping the stakeholder requirements: With an implementation steering structure in place, it is now relevant to understand the specific role, key outcomes, and competency/skill requirement of various

	Authors	TWG	SIIDCUL– Steering Committee
Role of the stakeholder	▪ Define clear procurement process as per agreed structure ▪ Define the financial powers depending on nature & type fo services, cost fo services etc. As per agreed format ▪ Collect stakeholder feedback ▪ Prepare for TWG meetings	▪ Appoints "Authors" ▪ Review & finalize the reports prepared by Authors ▪ Prepares & chairs the TWG meetings ▪ Enable coordination with other stakeholders ▪ Provide data as required	▪ Appoints TWGs & ensures development as per agreed timelines ▪ Orientation & training the TWG/ Authors ▪ Internal knoweldge sharing sessions ▪ Implement the proposed structure
Timeline	Develop the process guidebook as per agreed format **within 6 months**	Bi-weekly TWG meetings to monitor progress	Monthly meetings with TWG to track progress
Competency/ skills required for the role	• Institutional experts – for institutional recommendations such as process mapping, reporting powers etc. • Procurement experts - defining clear process, considering techno-commercial factors, etc	• Regulators with technical knowledge to detail the issues faced and assess teh work load etc. • industry representatives to outline their key challenges/ issues	• Understanding of industry & regulator requirements to implement required structure
Manpower required for the skills & role	• Procurement experts –3 members • Institutional expert – 2 nos.	• SIDA & SIIDCUL – 5 mebers • Other local & state industry bodies – 3-5	• 2-3 member group headed by the Director Planning of SIIDCUL
Possible alignment – internal/ external	• Externally appointed consultants through a competitive bid	• 10 member working group- defined through a common order by SIDA	. 2-3 member group headed by the Director Planning of SIIDCUL

2.5 Integrated Industry Portal – linked with NIC Code

(a) Objective and Scope of the solution

Objective: One place for all industry data in the state that can be developed with multi-users and accessed by multiple beneficiaries for taking actions on improved industrial pollution control and management.

Scope of the solution:

- **Data from multi-users:** SIIDCUL, SIDA, UEPPCB, Local town planning department, etc.
- **GIS Mapping of Allocated land**, in each industrial area under SIIDCUL
- For each industry**, a one-stop portal**, displaying status of consent, category, pollution levels, and monitoring report
- Data can be **searched and downloaded** using search parameters such as Location, Pollutant parameters, SPCBs, Industry by name, industry category/type, and Time.
- **Linking data from SIDA & SPCB** - Consent status from SIDA, Complaint on common infrastructure services from SIIDCUL and Environmental performance data of ETP/CETP from SPCB
- **Data alert & complaint system** - optimizing alert prioritization using complaints raised by industry, and physical inspection reports from SIIDCUL
- **Statistical Reports** on selected/filtered parameters – such as performance of industry, works done by SPCB, complaints raised, industry type, etc.
- Downloadable Desktop App for easier analysis of selected data.

(b) Need and Impact for the solution

Need for an inventory of all existing industries in the country: SIIDCUL does not have the data of all industries in the state, by category, which leads to the following issues:

- Difficult to assess the quantum of waste generated from the industries and also monitor the environmental performance of the industries.
- Without the exhaustive list of industries, it is also challenging to understand the status of consent and physical inspection carried out by SPCB & SIDA
- In several instances, it has been observed that the number of industries reported by the state and that by the PCB differs. For example, in Uttarakhand, in a recent NGT case, the state identified 70 seriously polluting industries, while the NGT with help of PCBs assessed that there may be over 298 seriously polluting industries in the country.

Therefore, there is a clear need for inventorizing the list of industries in the country, though in terms of effort, it is a tedious task, to be carried out by CPCB/ SPCBs alone.

To ease this work, a dedicated **industry area monitoring portal** of all industries in the state, specifically in those areas managed by SIIDCUL may be developed.

Benefits and impact of the portal:

In the short term, while this may seem like a tedious task involving research for SIIDCUL, in the long run it will result in the following advantages :

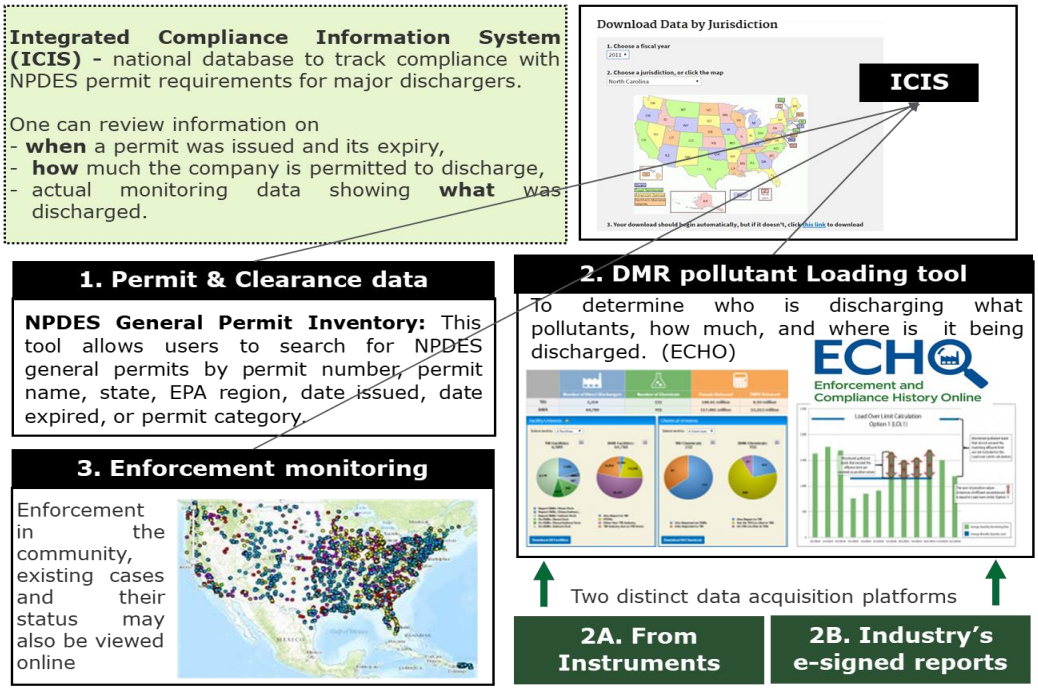
- **Saves time and improves efficiency:** For states to inventorize the entire list of industries in the state, by area and type enables better allocation, monitoring and enforcement.
- **Avoiding duplication of efforts:** by multiple agencies for undertaking similar works
- **Better compliance assessment** against discharge permits, consent management, investigation of pollution incidents and more effective environmental and industrial monitoring.
- Processing of industrial effluent/ emission data and **generation of meaningful maps**, graphs interactively and in near real-time.

Beneficiaries: SPCBs, Industries, State Industrial Development bodies, Research institutions, NGOs and General public

(c) Learnings from global case studies

USEPA's integrated industry portal: USEPA has also adopted a single portal for collating all industrial data – the status of clearances and permit, effluent generated from these indsutries and also monitoring the status of pending enforcement cases and complaints.

Eg: USEPA's Integrated Compliance Information System

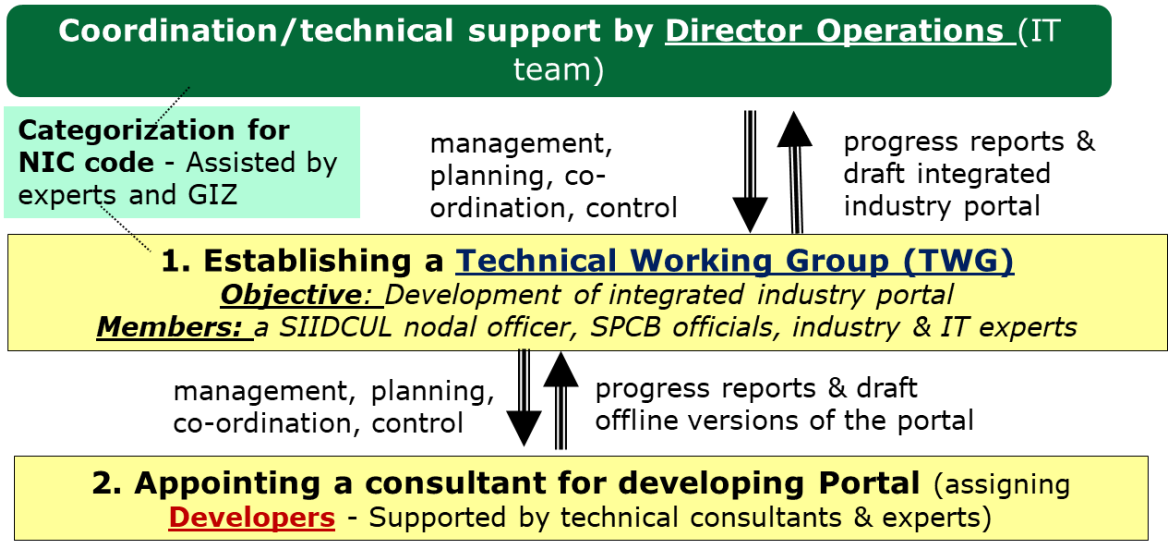


(d) Implementing in the SIIDCUL context

Presently **Director Operation** is expected to look after operation and management aspects of the industrial estate. Therefore, it will be prudent if the same division can take up the responsibility of establishing the Integrated Industry portal **with the help of IT division**.

However, with the limited staff available it may not be possible for the small team to undertake all activities featured above. Therefore, considering the limited resource and the expected IT expertise required for carrying out these tasks SIIDCUL may consider deploying consultants for undertaking the same. Further details for implementing the solution has been outlined in the subsequent section of this report

Implementation structure: For enabling the "Integrated Industry Portal" we have adopted the terms and methodology used in the BAT process by EU Nations for implementing specific solutions. Accordingly, we propose the following implementation structure – consisting of a Working group, supported by Developers



Mapping the stakeholder requirements: With an implementation steering structure in place, it is now relevant to understand the specific role, key outcomes, and competency/skill requirement of various

	Developers	TWG	SIIDCUL – Tech. Support
Role of the stakeholder	▪ Develop the portal architecture – key users, data points & outputs ▪ Digitizing Indsutry data & linking GIS data, and data from various stakeholders ▪ Develop the integrarated portal as per agreed scope & architecture ▪ Prepare user manual ▪ Data for TWG meetings	▪ Appoints "Developers" ▪ Review & finalize the portal architecture ▪ Prepares & chairs the TWG meetings ▪ Enable coordination with other stakeholders ▪ Provide data as required ▪ Review the portal ▪ Interact with industries	▪ Categorization of Industries basis NIC classification & codes ▪ Appoints TWG & ensures development as per agreed timelines ▪ Orientation & training the TWG/ Developers ▪ Internal knoweldge sharing sessions ▪ Publish the finalized portal on online platform
Timeline	Develop the portal & handover operations **within 1 year**	Bi-weekly TWG meetings to monitor progress	Monthly meetings with TWG to track progress
Competency/ skills required for the role	• Data enetry operators – for digitizing the data available • Application Developers – for integrating the various	• Regulators with technical knowledge to detail the requirements from the portal	• Research/ survey capabilities and knowledge of sector for categorizing Industries

	Developers	TWG	SIIDCUL – Tech. Support
	portal and developing a common platform	• Industry representatives to outline their key challenges/ issues	• Understanding of industry & regulator requirements to outline clear portal expectation
Manpower required for the skills & role	• Data entry operators – 2-3 members for digitizing • Industry & Environment experts – 2 members to translate business needs into IT requirements • Application Developers – 3-5 experienced software professionals	• SIIDCUL / SIDA – 5 memebers • SPCB – 3 members • Industry experts – 6-10 nos. • Local research instititues – 3 -5 memebers	• 2-3 member group headed by the Director Operations– supported by external research bodies such as IIT and IT division
Possible alignment – internal/ external	• Externally appointed consultants through a competitive bid	• 15 member working group- defined through a common order by SIIDCL	• 2-3 member group headed by the Director Operations– supported by external research bodies such as IIT and IT division

V. Stakeholder Workshop (22 Nov) – Key Outcomes

The GIZ team organized a national level workshop on 22 November 2019 to discuss the gaps and suggestions to improve organization structures, processes and procedures of key public institutions in the context of industrial wastewater. The workshop was attended by various stakeholders including officials from MoEFCC, central and state pollution control boards, state industrial development corporations, academia, industry associations, research and technical institutions. The key gaps in the organization structures, processes, and procedures were presented during the workshop and also the key suggestions and recommendations were discussed. Following key points were discussed during the workshop:

- NIC code linking with pollution index is the priority to have proper Inventorisation of industries and linking of pollution index. As present most of the state do not have update database on the number and nature of industries established in their respective areas. Also there is a need to link aspects related to consent management, renewal status, pollution indicators and related parameters to have overall understanding of the industrial development and environmental impacts to prioritize focus and interventions at appropriate levels
- The monitoring and compliance aspects is mostly constrained due to limited manpower with central and state pollution control boards. There are some recent efforts to develop online monitoring tools and systems which are catering to select set of industries. It was discussed that to make an effective ground level presence for monitoring the role of Third Party Agencies (TPAs) for monitoring and compliance reporting needs to be determined with an overall policy and framework for engaging such competent agencies and their classification to align with various industry categories
- The Central and State Boards work with various partners but mostly in an informal arrangements such as with technical and research institutes in technical appraisals and new developments. It was discussed that there is a need to define these partnerships in terms of their roles and responsibilities and to engage with such partners in a more formal structures
- To undertake capacity building of pollution control board officials, there is a requirement to develop short and preferably e-learning modules which are suited to the functional areas of the officials and preferably to make them mandatory for officials to undertake some minimum number of such trainings during the year for their capacity building and updates on the various aspects
- There is a need for developing an overall framework for CETP (Common Effluent Treatment Plant) development including the business model, techno-commercial guidelines, institutional strengthening with clear roles and responsibilities of various public and private agencies and stakeholders involved in development and operations and maintenance of such assets. This
- The discussions on organization structure were in the context of realignment of the teams from current sectoral focus to the functional and geographical focus; where in dedicated team is focused on having a structured mechanism for revision of standards with a rolling plan, another team focused on aspects related to monitoring and compliance and for technical and commercial appraisals.
- To develop a structured mechanism for revision of industry standards with a rolling plan wherein industry sectors are prioritized for undertaking review of existing standards. Also this needs to be supported with prerequisite activities such as BREFs, technical papers on technology development and global changes, if any on effluent standards etc
- There is a need for developing an overall framework for reuse and recycling of treated industrial wastewater including the standards for category wise usage, business models, techno-commercial guidelines, roles and responsibilities of various stakeholders etc.
- To develop knowledge platform and e-portal for industrial wastewater sector for member industrial to have easy access to recent technologies and good process practices etc.

Deloitte.