INTERNATIONAL ENVIRONMENTAL PROTECTION PRACTICES

Case Studies

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DEUTSCHE ZUSAMMENARBEIT

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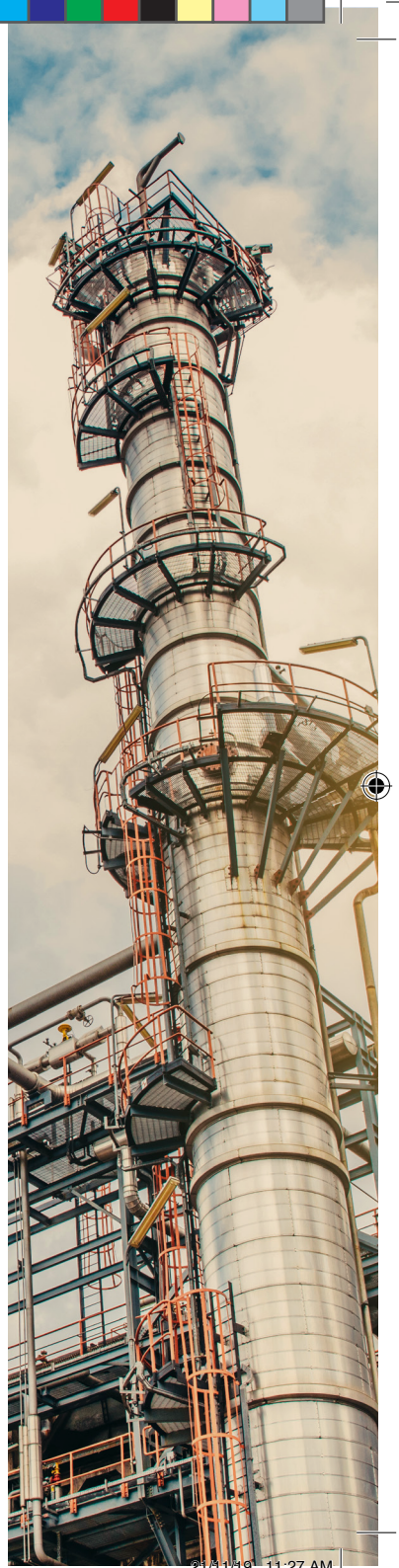


	NAME OF THE INNOVATION	Standards and guidelines	Compliance & enforcement	Capacity development, including research & partnerships	Public disclosure and information sharing	Technology integration	Voluntary adoption practices
1	EUR-LEX		✓		✓		
2	Water Re-use Guidelines, 2012	✓					
3	Riverine Inputs & Direct Discharges		✓		✓		
4	Environmental Technology Verification	✓			✓		✓
5	European Environment Protection Network (E-EPA)		✓	✓	✓		
6	Public Participation Guide	✓	✓		✓		✓
7	Pollution Control, Evaluation, and Rating (PROPER)	✓	✓				
8	GEMStat		✓		✓		
9	Green Chemistry and Manufacturing	✓				✓	✓
10	Waste-Wise			✓			✓
11	Sustainable marketplace and Eco-labelling						
12	Clean Ups Programme		✓				
13	Substance Registry Services and Toxics Release Inventory				✓		
14	My Environment & My Water Portal		✓		✓		
15	Cross Media Electronic Reporting Rule (CroMERR)		✓			✓	
16	Integrated, Intelligent and International Platform for Environmental Technologies (3i PET)	✓			✓		
17	Singapore Environment Institute	✓		✓	✓		
18	E-Discharge Monitoring Reports (E-DMR)	✓	✓				
19	National Water Quality Monitoring Council	✓	✓				
20	Best Available Technology (BAT) Reference Documents	✓		✓	✓		✓

BACKGROUND

Environmental management has been a key prerogative in India, both by way of deferment to international treaties and agreements, as well as from a well-established tradition of respect for the fundamental elements such as water, soil, air and other natural resources. However, with increasing urbanization and the need to extract more wealth out of existing resources for a large population, certain development practices have left a significant (if not irreversible) trail of damage to natural resources – notably water resources. Industrial development, seen as a key driver of growth has been one of the leading contributors to the degradation of water, soil and air quality. In most countries, development of manufacturing-based industry is held as synonymous with an urgent need to identify and mitigate potential degradation of natural resources. Much of the degradation is focused on fluid effluents emanating from the industrial processes – which may need containment, or treatment prior to discharge to nature.

Similar problems have been faced across the world; yet many countries have taken cognizance of the problems and have taken proactive steps to arrest the problem. The United States, Europe and the United Kingdom employ a number of practices that have mitigated the damage and ill-effects of industrial activities on the environment. Although the Indian systems of governance has adapted a number of systems on its own, notably with respect to pollution control, many of the results achieved in other countries have not been replicated with the same effectiveness, and many more such actions can be further adapted. The purpose of this publication is to illustrate some of these practices followed in many countries and make a prima facie assessment of whether they can be adapted to the Indian context.

CONSIDERATIONS

India employs a federal system with respect to environmental protection. Yet, minor variances with respect to the nature of operations contributes significantly to how similar initiatives taken in different countries fare. A more marked difference that is often seen is the nature and degree of engagement between the Government and the industry. Classically, industrial units in India tend to see Government bodies in 'policing' capacities, generally engaged in enforcing compliances. In the United States, the Environment Protection Agency has both 'policing' or 'compliance enforcement' powers, as well as a mandate to engage in 'collaborative' activities, which allows several voluntary compliance activities to be taken up directly by industrial entities that reduce impacts on water resources and air. Also – while the United States and Europe have a dedicated agency for environmental protection, India has only control boards for pollution – which, by definition, is a 'control' or 'punitive' protocol and not an 'enabling' one.

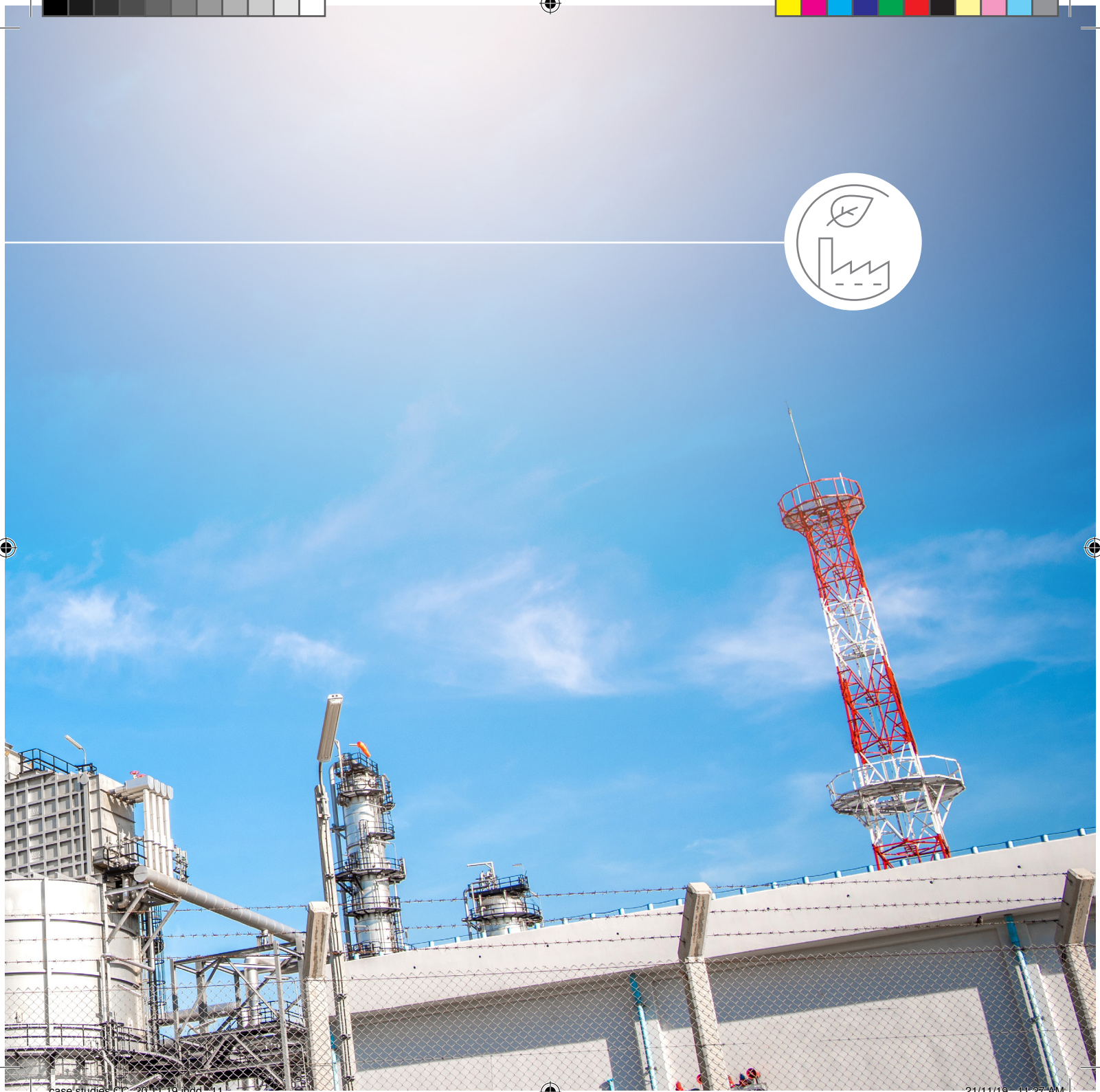
Within the European Union, similar protocols – both punitive as well as enabling – are enforceable as inter-Governmental covenants to be adopted in the local laws of each member country. The federal structure in India has a similar arrangement – wherein the subject of environmental protection features in the 'concurrent' list of the Constitution, empowering both the federal as well as provincial Government to legislate about environmental protection.

However, federal legislation and protocols take precedence in case of a conflict.

However, while entities in India are not precluded from taking up a wider range of actions or protocols, not at least by way of law, structural issues – notably institutional structures and complexities have prevented these entities from engaging productively in managing wastewater management. A lot of the products and services issued by the EPA, for instance, are meant for the research and academic community involved in environmental protection.

The issue is further exacerbated by the nature of industrial entrepreneurs. By several estimates since those listed by the National Commission on Enterprises in the Unorganized Sector (NCEUS), a large percentage of commercial establishments – including industrial ones lie in the informal or semi-formal sector, which usually find full-scale compliance costs disproportionately high compared to the cost of production. This is meant to be countered through the actions of State owned Industrial Development Corporations – whose mandate(s) could be interpreted as being enabling measures for reducing compliance costs for environmental protection. However, capacities of many of these entities are limited and have largely been restricted to providing serviced land and basic infrastructure – and not supporting sustainability measures to be taken through industrial development.

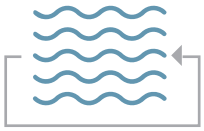
CASE STUDIES



1 EUR-LEX

Background and purpose of the practice/ intervention	The European Union, although comprised of several separate sovereign entities, works as a unified entity with respect to certain common laws, established by treaty. These may be in the form of: • binding legal instruments (regulations, directives and decisions) • non-binding instruments (resolutions, opinions) • other instruments (EU institutions' internal regulations, EU action programmes, etc.)
What the practice/ intervention	EUR-Lex is essentially a portal that allows perusal of laws, rules, regulations, byelaws, case laws, and a host of other statutory documents that need being referred to by any person or business that may be interested to operate inside any of the EU member States, or by the research community, or even the public at large. An interactive version allows a user to follow the life cycle of a legislative proposal from the moment it is launched until the final law is adopted. A timeline gives a visual representation of the procedure. All interventions by the institutions and bodies involved in the decision-making process are represented. From the timeline, one can access detailed information about each institution's decisions and how they were taken; the services and departments involved; the legal basis of the act, etc. It also carries a section on EU jurisprudence that allows access to case laws from different countries.
Who does the practice/ intervention apply to	Any party in understanding the laws and regulations concerning industrial protection within the European Union.
Where is the practice/ intervention meant to be applied (location)	All member countries of the European Union; can be referred to by the public at large (https://eur-lex.europa.eu/homepage.html)
Under what circumstances in the practice/ intervention meant to be used	Federal procurement within the US now necessarily insists on products and services with eco-labeling, thereby according a preferential treatment to such products and/or services that are eco-labelled.

How does the intervention work	EUR-Lex provides free access, in the 24 official EU languages, to: • the authentic Official Journal of the European Union • EU law (EU treaties, directives, regulations, decisions, consolidated legislation, etc.) • preparatory documents (legislative proposals, reports, green and white papers, etc.) • EU case-law (judgments, orders, etc.) • international agreements • European Free Trade Association documents • summaries of EU legislation, which put legal acts into a policy context, explained in plain language It also allows perusal of procedures leading to the adoption of legal acts.
Why is this a best practice?	Increasing complexities in environmental law requires careful scrutiny and examination of any and all known processes. The EUR-Lex is a single stop knowledge resource for conduct of such research and due-diligence, as well as being able to simplify the process of law to the uninitiated or layperson. A resource such as EUR-Lex can also find application in 'de-mystifying' environmental law compliance and potentially reducing infructuous litigation or helping communities, authorities and other stakeholders make informed demands from their stakeholders.
Relevance for India	At some point of time, platforms such as All India Reporter and now IndiaKanoon offer(ed) services analogous to EUR-Lex; but they (1) work on paid subscription, (2) cover general law and not environmental law, and (3) do not cover simplification of the processes of environmental compliance. Besides, these portals are generally designed with the legal fraternity in mind, and not researchers, or general public in mind. There is a need for a platform that makes information that is duly authenticated by a competent authority and can be referred to by multiple stakeholders.



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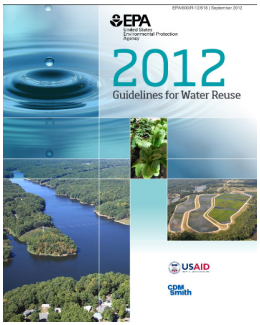
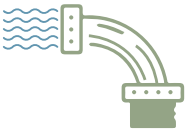
WATER RE-USE GUIDELINES, 2012

Background and purpose of the practice/ intervention	Scarcity of water is widely recognised as a problem in several areas of the United States, as is the potential of reclamation of water from non-conventional sources. However, in addition to quality standards, there is also a need to understand the economics and intricacies of how wastewater can be used for specific purposes of human consumption, habitation and associated economic, social and cultural activities. The States and other authorities have already included statutes governing (as well as mandating) the recycling and re-use of water, this intervention by US EPA attempts to harmonise such practices and provide certain benchmarks that need to be adhered to by local authorities.
What the practice/ intervention	EPA has developed comprehensive, up-to-date water reuse guidelines in support of regulations and guidelines developed by states, tribes, and other authorities. EPA has committed to work with communities to incorporate the approach of integrated water management, where nonconventional water sources are incorporated as part of holistic water management planning. The primary purpose of these guidelines is to facilitate further development of water reuse by serving as an authoritative reference on water reuse practices.
Who does the practice/ intervention apply to	The EPA guidelines can assist in developing reuse programs and appropriate regulations. They are meant to be used by engineers and others involved in the evaluation, planning, design, operation, or management of water reclamation and reuse facilities. These guidelines serve as a national overview of the status of reuse regulations and clarify some of the variations in the regulatory frameworks that support reuse in different states and regions of the United States. The guidelines apply to State Administrations, Water utilities, local Governments and administrations including counties, tribal reserve Councils and such other authorities that may govern the use of water resources for purposes of human
Where is the practice/ intervention meant to be applied (location)	No specific locational aspect; any local authority engaging in forming statutes governing or mandating the re-use of water or engaging in any kind of wastewater reclamation and re-use project anywhere within the United States may utilise these guidelines.

Under what circumstances in the practice/ intervention meant to be used	In forming statutes governing or mandating the re-use of water, these guidelines need being taken into consideration. Although these guidelines do not enjoy any statutory compliance requirements, entities engaging in preparation of such statutes may use these guidelines as a reference.
How does the intervention work	The guidelines inform and supplement State regulations and guidelines by providing technical information and outlining key implementation considerations; it provides a wide variety of treatment technologies that are available to achieve any desired level of water quality (fit for specific groups of purposes), apart from detailed guidelines for engineers as well as planners for implementation in projects related to wastewater reclamation and
Why is this a best practice?	These guidelines allow public authorities to rapidly draw up statutes without the need for developing them from scratch or evolving technical standards of their own – especially if such local authorities are not adequately capacitated to develop and/ or administer such statutes themselves. This also allows local administrations to hold service providers engaged in providing water reclamation and re-use services accountable to performance and operational standards in case of concession agreements.
Relevance for India	Several centrally sponsored schemes have insisted on similar statutes (viz. JNNURM) being formed by local Governments; in certain cases, power generation plants have been mandated to use partially treated/ untreated wastewater from sewage treatment plants for turbines (where feasible in terms of distance of conveyance). State Industrial Development Corporations have also attempted to come up with such guidelines/ statutes that allow for lower water consumption within their estates. However, because there is no standardised or recognised set of guidelines, most efforts of water reclamation and re-use have been ad-hoc at best. A document of this nature will help foster a wide variety of service provision agreements/ concessions to be structured to common standards and help reduce overall water footprint, apart



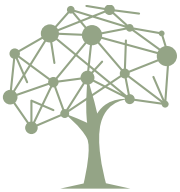


3

RIVERINE INPUTS & DIRECT DISCHARGES

Background and purpose of the practice/ intervention	Countries within the EU are obligated to ensure that water sources that span more than one country remain free from pollutants, and that no country treats water in any way that makes it unusable for any other country. Therefore, as part of the EU, a Water Convention has been established to monitor the quality of all common water sources within the continent. The monitoring responsibilities are delegated to the member Nations of the EU.
What the practice/ intervention	The Comprehensive Study on Riverine Inputs and Direct Discharges (RID) aims to assess all inputs and discharges of selected contaminants that are carried via rivers into tidal waters or are discharged directly into the sea (for example through sewage pipelines or activities like aquaculture inputting substances directly). The RID Study currently focuses on mandatory monitoring and reporting of the concentrations and loads of the metals, cadmium, copper, lead, mercury and zinc, the organic pollutant lindane, nitrogen and phosphorus species and suspended particulate matter. Monitoring of Polycyclic aromatic hydrocarbons (PAHs), mineral oil, polychlorinated biphenyls (PCBs) and other hazardous substances, especially organohalogens, are recommended for voluntary monitoring.
Who does the practice/ intervention apply to	All member countries of the European Union for all transboundary rivers or any such rivers discharging to transboundary rivers.
Where is the practice/ intervention meant to be applied (location)	Member Nations of the EU are required to report annually on quality of water and the discharge of pollutants into the same to ensure compliance as regards transboundary obligations regarding water quality. The Convention sets forth requirements and standards for monitoring
Under what circumstances in the practice/ intervention meant to be used	This is a suo-motu, continuous monitoring system that is meant to report on water quality to the Convention on Water within the EU on an annual basis. The Convention itself released an annualized comprehensive study on the subject, based on verified inputs from the member Nations.

How does the intervention work	The initiative works through an extensive set of monitoring systems comprising of • Station Network • High sampling frequency • Sampling methodology covering a wide range of conditions • Quantification of river flow • Method of calculation of pollutant load The system provides a 'map' with water quality in rivers and allows for correlation with potentially polluting industries or other human settlements in its catchment. The system also allows for ruling out of natural phenomena that may affect water quality naturally.
Why is this a best practice?	This system allows for river water quality to be correlated with the nature and extent of developments within its catchment and for 'tracing' the source of pollution through other components of the NPDES. This should also allow for proactive 'modelling' of what a new element added into the development catchment could do to the rover quality based on correlation models developed from legacy data.
Relevance for India	India's States are largely like that of the EU, with water and water resources largely being State subjects. The CPCB and the Environmental Pollution Control Authority can set out standards in the same manner as the Convention within the EU, while State Pollution Control Boards can monitor water on a regular basis. However, the levels of compliance and control exercised in India are not as strong as what would be seen in the case of EU; with river catchments being treated differently across different States.



4 ENVIRONMENTAL TECHNOLOGY VERIFICATION

Background and purpose of the practice/ intervention	Across member Countries within the EU, a large number of entrepreneurs constantly keep developing new technologies that claim to accurately monitor or mitigate the ill effects of pollutants or other sources. Keeping in view the fact that these technologies and solutions have a pan-Europe market, there is a need to establish a verification and certification mechanism that allow for products certified in one Nation to be sold in the others.
What the practice/ intervention	The European Technology Verification is a protocol that allows certification of new technologies from across the member Nations of Europe to be tested and certified for use. The aim of ETV is to provide reliable information on the performance of new eco-technologies, to make market penetration and market awareness of the product easier. By enhancing the quality and reliability of information on the performance of new environmental technologies arriving on the market, ETV should increasingly contribute to the deployment of eco-efficient innovation, generating further investment in environment-related technologies and industries within the EU and enhancing competitive advantage.
Who does the practice/ intervention apply to	All businesses within member nations of the EU, and such testing and certification bodies that agree to follow the protocols of the EU as regards testing, certification and disclosure of information; to all such manufacturers and providers of products and/or solutions that have applications in environmental control and is meant to be available within the common European market.
Where is the practice/ intervention meant to be applied (location)	All member nations within the EU, including all member countries within the European Economic Area.
Under what circumstances in the practice/ intervention meant to be used	The protocol is applicable when products and solutions meant for use in environmental controls – such as mitigation of pollution, monitoring, making streamlined and efficient production processes – need to be released to the market, and are expected to access all of the European market in line with the trading principles of EU.

How does the intervention work	ETV works through a network of institutions agreeing to share similar protocols for testing & certification, that allow a product to be certified for use under different circumstances that are largely agreed to by all member EU countries. ETV Statements of Verification are registered and published on a public website, allowing stakeholders to check references relating to ETV verifications and to access a reliable source of comparable data on environmental technologies. Verifying the performance of a technology under ETV is just one step in a process leading from research and development to market penetration and diffusion. It is therefore essential that ETV is undertaken at the right moment in this process.
Why is this a best practice?	ETV would verify, through qualified third-parties and transparent procedures, that performance claims are based on complete, fair and reliable test data. This would benefit all parties: • The technology developer can show reliable data proving the value of the innovative technology, • Technology buyers and investors have reliable information on which to base their purchasing decisions and to better manage technological risk, • Other stakeholders, public policy-makers or regulators have clear indications of the performance achievable by new technologies.
Relevance for India	This role is very similar to what the Bureau of Indian Standards plays in India, just that its input standards are not entirely synchronised with emission and effluent standards set forth by the CPCB. There is a need to make certain equipment, package units and processes compliant with the emission and effluent standards of the CPCB by having the inputs certified by BIS.

5

EUROPEAN ENVIRONMENT PROTECTION NETWORK (E-EPA)

Background and purpose of the practice/ intervention	Selecting the Right Level of Public Participation discusses the different forms that public participation might take depending on the potential for public influence on a decision by informing the public by providing information to help them understand the issues, options, and solutions. Conducting meaningful public participation involves seeking public input at the specific points in the decision process and on the specific issues where such input has a real potential to help shape the decision or action.
What the practice/ intervention	It is an informal network of national environmental agencies in Europe at management level. At present, authorities from 32 countries and regions and the European Environment Agency are part of the EPA network. The European Commission participates as a regular guest and the European Parliament as an occasional guest. It comprises of various interest and support groups such as: • Better regulation • Climate change – and adaptation • Green and circular economy (lead by the UBA and the Finnish Environment Agency – SYKE) • Noise abatement (lead by the UBA and the Swiss Environmental Agency – FOEN) • Plastic in the environment (lead by the UBA) • Citizen Science The purpose of this group is to collaborate and collate knowledge amongst each other and collectively
Who does the practice/ intervention apply to	Environment Protection Agencies within all member countries within the European Union
Where is the practice/ intervention meant to be applied (location)	All member countries within the European Union
Under what circumstances in the practice/ intervention meant to be used	Although a voluntary and informal network, the EPA network has a wide range of collaborative resources and protocols for seeking and sharing knowledge from member agencies. The EPA deliberates periodically, apart from using a wide range of collaborative tools, documentation, best practices and such other matters.

How does the intervention work

The EPA network collaborates both online as well as offline. Online, it has a series of common tools such as libraries, databases or such other collaborative tools where member agencies are encouraged (and possibly informally obligated) to share information regarding practises, protocols, specifications that could be used by other member agencies to align their tools with. In addition, the members regularly engage in

- Regular, personal contact management at management level;
- Reinforcement of technical / technical assistance to the European Commission;
- Strengthening the exchange of information and experience;
- Identification of common problems and possible development of common solutions;
- Forming alliances and working out joint positions with the European Commission;
- Improving the exchange of information and the provision of data on the state of the environment;
- Checking the environmental behavior of your own facility.

Why is this a best practice?

Given a certain degree of homogeneity within the EU, member nations have certain analogous standards which require being in line with what member States are using. The European EPA Network allows this homogeneity to be maintained by ensuring that standards and protocols developed in each member State is not significantly different, and the spirit of economic cooperation between EU member States is maintained.

Relevance for India

States in India have a similar need for collaboration as the member States in the EU, possible more so since agencies such as the State Pollution Control Boards are in fact, governed by the same law. However, there is usually a wide range of situations that may vary between what one State PCB may encounter versus another – as may certain capabilities, resources etc. A collaborative network allows for State PCBs and Central PCB to work in the same collaborative manner. This method can also be extended to wider audiences such as other SAARC member States.

6

PUBLIC PARTICIPATION GUIDE

Background and purpose of the practice/ intervention	Typically, any kind of developmental effort will require considerable deliberations between stakeholders – notably proponents of the proposal, statutory authorities, and most importantly, public at large. This last group, however, is often the one that is more susceptible to misinformation and misgivings, often caused either by lack of information, or possibly from too much information 'dumped' on to them at a late stage. Many developing nations have faced such issues, which is why the US EPA, learning from its own experience, has, as a part of its international cooperation programme, prepared a guidebook for conduct of public participation throughout the development lifecycle.
What the practice/ intervention	The United States EPA has a guide for conduct of public participation in decision making processes that concerns environmental quality. This is meant to be used by supporters of projects, local Governments, statutory authorities and all such stakeholders that may need to – whether as a requirement of law or otherwise – consult with the public at large. Selecting the Right Level of Public Participation discusses the different forms that public participation might take depending on the potential for public influence on a decision by informing the public by providing information to help them understand the issues, options, and solutions. Conducting meaningful public participation involves seeking public input at the specific points in the decision process and on the specific issues where such input has a real potential to help shape the decision or action.
Who does the practice/ intervention apply to	Voluntary adoption by agencies proponents of projects, local Governments, statutory authorities and all such stakeholders who have a stake in a developmental decision.
Where is the practice/ intervention meant to be applied (location)	No specific location is required; but it can be used across any developmental sector in any part of the world – this is essentially a sourcebook on "how to conduct public participation"
Under what circumstances in the practice/ intervention meant to be used	While different jurisdictions have different requirements on how to internalize public participation – whether as a requirement of law or otherwise, the general principle is that proponents, stakeholders or other interested parties must necessarily engage at the early or formative stages of the development proposal itself, and apply a collaborative approach that emphasises on the benefits of such a proposal as opposed to the negative impacts of such a proposal.

How does the intervention work	The guidebook has several sections – which deal with, inter-alia: • Tools – to inform the general public about a proposal, to generate and obtain inputs from stakeholders and for consensus building and seeking agreement • Characteristics of a good participatory exercise, viz. clarity in purpose, goals, structure & process, commitment to the process and ensuring effective representation The guidebook provides broad indicative examples of how to: • Consult with the public to obtain their feedback on alternatives or decisions • Involve the public to ensure their concerns are considered throughout the decision process, particularly in the development of decision criteria and options • Collaborate with the public to develop decision criteria and alternatives and identify the preferred solution • empowering the public by placing final decision-making authority in their hands.
Why is this a best practice?	Projects and proposals taken up with due public consultations typically tend to face far less issues with objections and resistance than the ones that engage only with "compliance centric" measures. There is also far greater clarity as regards what the immediately affected people, e.g. those that reside or work within the project affected areas should expect as a result of the practice(s).
Relevance for India	Several regulatory requirements in India, especially those covered under directive S.O. 1533(e) dated 7th September 2006, require mandatory public hearing, which is usually coupled with social and environmental impact assessment. While guidebooks exist as to how such impact assessments are conducted, there is limited literature on how public participation itself need to be conducted. As a result, the public involvement occurs mainly as a compliance requirement and not so as a proactive developmental activity. A tool like the Public participation Guide should bring some degree of standardisation of the process – as well as dispel the notion that this is meant to be done only when a compliance related activity such as public hearing is carried out.

Public Participation Guide

7

POLLUTION CONTROL, EVALUATION, AND RATING (PROPER)

Background and purpose of the practice/ intervention	As in most emerging economies, Indonesia is also faced with the challenge of industrial units often not complying with pollution control standards. While the country has evolved a series of well-developed standards and protocols for environmental impact assessment and monitoring, a need was felt to take a more direct approach to incentivise industrial units for improved compliance.
What the practice/ intervention	PROPER is a national-level public environmental reporting initiative. The objective of this novel regulatory tool is to promote industrial compliance with pollution control regulations, to facilitate and enforce the adoption of practices contributing to "clean technology," and to ensure a better environmental management system. This program is built on the premise that the mechanisms of public disclosure and accountability, transparency in operations, and community participation will empower local communities to achieve effective and sustained pollution control practices. The program uses a color-coded rating, ranging from gold for excellent performance to black for poor performance, as well as "reputational incentives."
Who does the practice/ intervention apply to	All businesses operating within Indonesia that are known to be carrying out activities that require regulation by the Ministry of Environment and Forestry
Where is the practice/ intervention meant to be applied (location)	All over Indonesia
Under what circumstances in the practice/ intervention meant to be used	Regular protocol carried out by the Ministry and its affiliate agencies on an annual basis.

How does the intervention work

Every year, the performance rating process includes the following steps:

- identify and select the polluters; gather data through mail surveys;
- verify and inspect plants;
- develop a pollution database;
- analyze data at BAPEDAL;
- verify data at BAPEDAL;
- obtain rating from the advisory board;
- obtain rating approval from the Environment Minister;
- report ratings to the President, and finally;
- release the information to the press

Why is this a best practice?

PROPER endeavors to raise awareness among people regarding waste management regulations, as well as encouraging business communities to comply with pollution control standards. The color coding system is based on five colors—gold, green, blue, red, and black. These colors correspond to the different levels of performance in terms of pollution control. The incentive associated with factories rated gold and green is public praise, which would enable them to gain a competitive edge in the market, whereas the deterrents for factories rated blue, red and black are public pressure and legal enforcement

Relevance for India

PROPER utilises a "name and shame" approach, which can be used to work both ways – recognise an industry for its work on mitigating pollution as well as to bring disrepute to a polluting industry. While this mechanism is currently not available to agencies in India, a system like this will allow customers to make more informed choices about products and services that they use and the plants that these products and services these originate from.

8

GEMSTAT

Background and purpose of the practice/ intervention	The International Centre for Water Resources and Global Change, founded by the German Federal Government under the aegis of UNESCO in Koblenz, has commenced work in July 2014. Specialised UNESCO Water Centres pool competencies in single countries or regions, acting as international reference platforms for the exchange of knowledge and methods. The Centre is located at the Federal Institute of Hydrology (BfG). Amongst its many initiatives is the GEMStat, which is essentially a voluntary research and contribution based system that compiles and collate water quality data all over the world.
What the practice/ intervention	GEMStat hosts water quality data of ground and surface waters providing a global overview of the condition of water bodies and the trends at global, regional and local levels. At present, the growing database contains more than 4 million entries for rivers, lakes, reservoirs, wetlands and groundwater systems from 75 countries and approximately 4000 stations. Overall, data is available for the time period from 1965 to 2017 and about 250 parameters. Countries and organisations voluntarily provide water quality data from their own monitoring networks. The Data Portal is a web-based information system that gives access to GEMStat water quality data and allows to generate statistical and graphical visualisations of the data.
Who does the practice/ intervention apply to	This is a voluntary exercise conducted by members of research bodies and owners of monitoring stations – irrespective of whether owned by Government or privately, to collect and contribute data. The data may be used by researchers, Governments and other interested parties – whether as a primary source, or as a validation of data collected by their own State-owned sources etc.
Where is the practice/ intervention meant to be applied (location)	Globally, entities from member countries may choose to be part of the system, depending on where they are located. There is no restriction on number of entities participating from each country.

Under what circumstances in the practice/ intervention meant to be used	No particular point of time; however, round the year monitoring data is usually solicited from the member entities that contribute data to the portal; this allows for improved correlation of datasets to local conditions including weather and climate.
How does the intervention work	The data is compiled both in terms of a database as well as a geospatial format of representation. For the user seeking to access data from the portal, s/he must select the stations from which s/he would like to access data. In map view, this can be done by selecting stations with the rectangle or the polygon tool to generate a statistical visualisation. Visualisations can be produced for single or multi parameters. About 250 parameters are available, which are classified into a hierarchical system of groups and subgroups. Datasets can be compiled and downloaded accordingly. The Statistics Portal provides a convenient way of viewing aggregated statistics of water quality data available in GEMStat. The user can select water quality parameters of interest, a desired level for spatial aggregation, as well as the individual spatial element that he/ she wants for the spatial aggregation.
Why is this a best practice?	The water quality data available in GEMStat can be used for status evaluation, policy-making, research purposes or within the scope of education and training initiatives. It also harmonises and standardises monitoring data exchange, allows for dynamic data visualization, and enhances data discoverability and accessibility.
Relevance for India	India has a wide number of research and academic institutions which could be networked in the same manner, and possibly with a distributed database (e.g. BlockChain enabled) system for collecting and collating similar data. This could work both as a supplement as well as a validation of data collected by CPCB/ SPCB monitoring stations and could also be used to validate the quality of data being generated from OCEMS. It also keeps all the data accessible to all the stakeholders, allowing for large volume research and analysis to be taken up on water quality.

9
GREEN CHEMISTRY AND MANUFACTURING

Background and purpose of the practice/ intervention	Over the years, there has been an increasing awareness of the need to reduce environmental overheads with respect to industrial products. As a result, a number of manufacturers have espoused a need to be able to understand the processes associated with their activities on a molecular level and the impact(s) such processes and materials used in them may generate. This would allow them to select processes suitable for their manufacturing activities pre-emptively and plan plant, machinery and material deployment accordingly.
What the practice/ intervention	EPA has commissioned as well as co-opted a series of tools developed by third parties, such as ChemSteer, GreenScope, PARIS III etc. to help manufacturers simulate chemical and/or engineering processes without actually engaging into the production process. The purpose is to find means of selecting the least polluting means of production within the generic process itself, as opposed to first polluting and then remedying through 'end of pipe' cleaning operations. Manufacturers, both existing as well as new ones, may use these to understand what their manufacturing processes entail and select an appropriate set of processes. A students' version of this is also available by way of the
Who does the practice/ intervention apply to	Any interested party who is engaged or may wish to engage in manufacturing operations within the United States may access these tools to determine the least polluting or disruptive set of processes that could be used in manufacturing.
Where is the practice/ intervention meant to be applied (location)	Chiefly the United States. Although the tool could also be used by current or potential manufacturers outside the United States, it is may or may not carry recognition in such jurisdictions.
Under what circumstances in the practice/ intervention meant to be used	There is no mandatory requirement of using these tools; however results from application of these tool to proposed manufacturing processes can be used to (1) select an appropriate set of materials, processes and techniques for manufacturing, and (2) use the results from the tool to seek approvals and/or recognition where required (e.g. EPA,

How does the intervention work

Depending on the nature of manufacturing activities proposed, any one or more of the said tools, viz. ChemSteer, GreenScope, PARIS III, carry a set of input screens on which a manufacturer may input relevant data related to his manufacturing processes. Once this data has been entered, the system automatically computes a bunch of environmental impact parameters that are associated with the same. Based on these simulations, a manufacturer may re-adjust the manufacturing strategy

Green Engineering Tools

Program for Assisting the Replacement of Industrial Solvents PARIS III

ChemSTEER

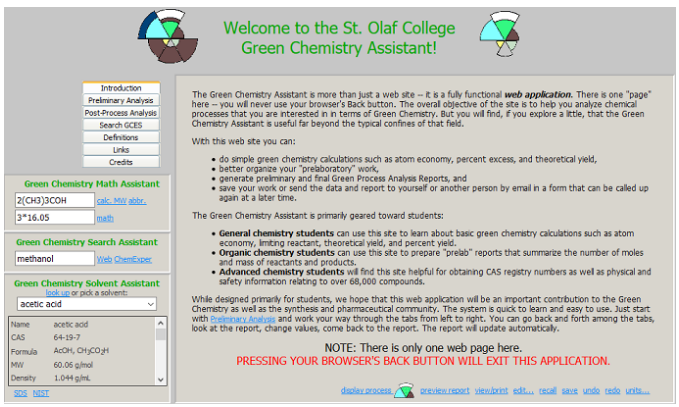
Chemical Screening Tool for Exposures and Environmental Releases

Why is this a best practice?

These tools focus on an "at-source" approach to preventing pollution and/or environmental degradation as opposed to an "end of the pipe" solution – which involves clean up at the end of the manufacturing processes. These tools allow manufacturers to select an optimum economic model for use in manufacturing, comprising of the right ingredients, right processes and right environment. By adopting these, it is possible to reduce future requirements of compliance monitoring

Relevance for India

Central and State Pollution Control Boards are competent to issue 'Consent to Operate'(CTO) for new manufacturing units, having taken into consideration what kind of activities, processes, materials etc. are being used by the unit and duly satisfying themselves that the plant and machinery are adequate to address the activities, processes and materials being proposed for use on the site. Tools such as ChemSteer, GreenScope, PARIS III, suitably updated by means of processes and materials used in India could be used by proprietors of prospective manufacturing units to obtain a CTO.



10
WASTE-WISE

Background and purpose of the practice/ intervention	US businesses and other entities are firmly ingrained for the use of "Reduce, Re-use, Recycle" with respect to manufacturing processes. To further widen and deepen the process, the EPA, as part of its proactive processes for encouragement of good environmental management practices has instituted a number
What the practice/ intervention	WasteWise is a programme comprising of branding, recognition and promotion initiatives which promote the use and reuse of materials more productively over their entire life cycles. It is part of EPA's sustainable materials management efforts. All US businesses, governments and non-profit organizations can join WasteWise as a partner, endorser or both. Partners demonstrate how they reduce waste, practice environmental stewardship and incorporate sustainable materials management into their waste-handling processes. Endorsers promote enrolment in WasteWise as part of a comprehensive approach to help their
Who does the practice/ intervention apply to	All businesses with operations inside the US, with an option to
Where is the practice/ intervention meant to be applied (location)	Exclusively within the United States. Businesses outside the US or international business units of US businesses cannot participate for recognition on their own, though they may be treated as part of the overall benefits of the waste management
Under what circumstances in the practice/ intervention meant to be used	No specific requirements; any and all businesses can participate provided they follow the protocols as below.

WasteWise Information Helpline

Contact the WasteWise Helpline: 800-EPA-WISE (372-9473) or wastewisehelp@epa.gov to learn more about WasteWise and all of its benefits.

How does the intervention work

A partner or endorser is expected to

- Register with EPA as a WasteWise Partner or Endorser
- Form a waste reduction team to maintain its participation in waste reduction practices
- Conduct a waste assessment associated with the processes in the business
- Define the scope of your participation
- Evaluate waste reduction activities
- Set goals that can be tracked and measured
- Implement your planned activities
- Announce its waste reduction successes to your employees and community.

Why is this a best practice?

Joining with Waste-Wise accords the following benefits

- Opportunities to receive WasteWise Awards for outstanding achievements.
- Public recognition in WasteWise publications, case studies, meetings and on EPA's website.
- Annual WasteWise Climate Profile describing greenhouse gas reductions achieved through waste diversion.
- Reduced purchasing and waste disposal costs.
- Outreach and educational materials and free one-on-one

Relevance for India

Over the last few years, a series of ranking exercises has been carried out with respect to cities and towns under the "Swachh Sarvekshan". However, there is currently no analogous protocol for private businesses, especially in the manufacturing sector. With significant emphasis on programmes like "Make in India" and a focus on exports, there is a need for such products to meet up with safeguards that are analogous to WasteWise, both to command a better market value, as well as remaining competitive. An effort like WasteWise will allow Indian products to compete fairly in markets where environmental

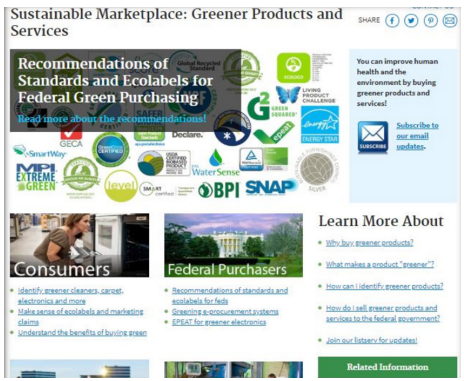
Helpful Resources for WasteWise Participants

- Ten Steps to Being WasteWise: Welcome to WasteWise!
- Tips for Reaching Your Waste Reduction Goals
- Metrics for Waste Reduction

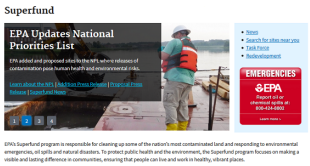
11
SUSTAINABLE MARKETPLACE AND ECO-LABELLING

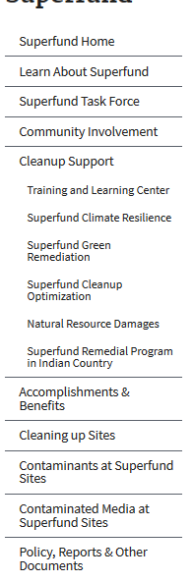
Background and purpose of the practice/ intervention	Products and services developed in the US, but consumed within US as well as internationally have retained a competitive edge on account of being certified as being more sustainable in terms of production as well as operative footprint. These certifications have also influenced consumer behaviour in other countries where US made/ promoted products are purchased and consumed regularly, leading to recognition of such standards within such jurisdictions too.
What the practice/ intervention	EPA works with a variety of private sector standards developers to create voluntary consensus standards for environmentally preferable goods and services. Examples of EPA eco-labeling programs include ENERGY STAR™, WaterSense® and Safer Choice. A growing number of companies are treating "sustainability" as an important objective in their strategy and operations to increase growth and global competitiveness. This trend has reached well beyond the small niche of those who traditionally positioned themselves as "green," and now includes many prominent businesses across many different industry sectors.
Who does the practice/ intervention apply to	Any manufacturing or service being offered by a firm or entity incorporated in US, even if the actual place of manufacturing of the product and/or delivery of services is elsewhere.
Where is the practice/ intervention meant to be applied (location)	Chiefly within the US; other jurisdictions may recognise and adopt such standards.
Under what circumstances in the practice/intervention meant to be used	Federal procurement within the US now necessarily insists on products and services with eco-labeling, thereby according a preferential treatment to such products and/or services that are eco-labelled.
How does the intervention work	EPA works along with industry partners to create a series of parameters that will be used to accord the Eco-Label, which are thereafter placed in the public domain, as well as appointing partners for sampling, testing and certification of products. A robust licensing system for use of the Eco-Label ensures that each and every separate product type has to be separately tested and certified. Once a product has been certified, it may be listed or advertised as being a eco-labelled product and would be eligible for being included as part of federal procurement.

Why is this a best practice?	Federal procurement is widely regarded as a key avenue for business, both in terms of volume as well as value. A robust and well recognised standard is often picked up in other jurisdictions where the product is selected as part of federal or State procurement (for instance, Energy Star electronic devices are universally preferred over non-energy star rated devices, even if the purchase is being made in another country). However, as countries evolve their own ability to manufacture, these benchmarks and eco-labels, developed analogous or comparable to the US eco-labels can help restore balance in trade, or even compete in other emerging markets.
Relevance for India	In the past few years, electrical appliances have been rated with BEE (Bureau of Energy Efficiency) Star ratings, which are comparable to some of the US eco-labels. This has reduced dependency on items manufactured and certified in the US. However, some analogous standards such as WaterSense has not been developed in India, leading to situations where Indian manufacturers resort to obtaining the US certification – which is expensive and often cannot compete with local manufacturers (who are not eco-labelled). A local set of eco-labels will allow smaller manufacturers to make products that meet the same kind of performance as US eco-labelled ones, and allow federal procurement platforms in India (viz. Government e-Marketplace or GeM) to insist on listing only such products that are eco-labelled in India, and augmenting both the demand and supply for such products.



12
CLEAN UPs PROGRAMME



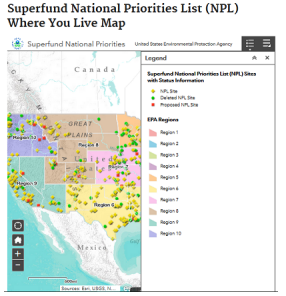


Background and purpose of the practice/ intervention	Despite the best of safeguards, there is always the possibility of failure of containment and protection mechanisms within industries, which may lead to unintended degradation of soil, water or air. While safeguards such as the use of appropriate technology and processes for interception for waste may minimise loss to life and/or property, the persistent damage to environment remains – and often this cannot be covered under normative forms of insurance against accidents. For such accidents, countries such as the US account for a contingency for meeting the costs of remediating long term damages.
What the practice/ intervention	EPA conducts and supervises investigation and cleanup actions at sites where oil or hazardous chemicals have been or may be released into the environment. Cleanup activities take place at active and abandoned waste sites, federal facilities and properties, and where any storage tanks have leaked. EPA, other federal agencies, states or municipalities, or the company or party responsible for the contamination may perform cleanups. Since land is a precious commodity, there is also a persistent need for reclaiming what are often regarded as 'degraded' land – usually on account of some kind of industrial activity that has left the land in a situation where it cannot be reclaimed and re-used in its original capacity. In such a case, clean-up funds may be used to reclaim and restore sites that are being considered for development or redevelopment.
Who does the practice/ intervention apply to	Environmental Protection Agency usually carries out such kind of activities based on requests from federal, provincial or local authorities.
Where is the practice/ intervention meant to be applied (location)	All over the United States. The practice is also widely followed in the United Kingdom, albeit under a different set of programmes – especially with respect to reclamation of land (a portion of the King's Cross transit oriented development region in Greater London was developed over reclaimed land from chemical degeneration caused by a now closed plant)
Under what circumstances in the practice/ intervention meant to be used	Usually, this protocol is initiated if any federal, provincial or local authority is of the view that any particular site has been contaminated and needs long term remediation. It can also be invoked by the EPA in the case of chemical accidents, disasters and other untoward incidents that may lead to degradation of soil, water or air or poses a health and safety risk on account of the environment.

How does the intervention work

There are several programs under which EPA and its partners conduct cleanup-related activities.

- Emergency Response – when the danger from pollutants poses an immediate threat to human health or the environment.
- Superfund Cleanup – for large, abandoned hazardous waste sites
- Federal Facilities Cleanup – for cleanups at facilities owned by the federal government
- Brownfields Cleanup – for assessments and cleanups grants related to potentially usable properties
- Underground Storage Tank Cleanup – a state-delegated program for cleanups involving underground storage tanks
- RCRA Corrective Action – a state-delegated program for hazardous waste management facilities with a spill or release
- Cleaning Up Oil Spills – for spills of oil on land and in inland waters
- Cleaning Up Air Pollutants – for addressing releases of pollutants to the air
- Cleaning Up Water – to check on the quality of water in waterways and such other sources



Why is this a best practice?

While many legislative and regulatory tools allow for corrective action such as sealing or restricting access to a contaminated source, this line of initiatives goes a level further in terms of mitigating the long term effects of an accident or untoward results of a developmental or economic activity as a public charge. Further, this is also used proactively for reclamation of resources for re-use.

Relevance for India

At this time, the powers of the Central Pollution Control Board and other such statutory bodies is largely linked to containment of potential sources of pollution – but not for remediation often leaving this to State and local Governments that may not be sufficiently capable to remedy a situation such as restoration of a water body, oil spillage etc.. In recent times, Government of India has been considering a fund for emergency responses for certain industries that are prone to hazards, but not by way of 'end-of-the-pipe' clean-up – in case of emergencies. With a large number of old industrial areas turning into normal commercial real estate, there is a definite need to bring such practices into mainstream.

13

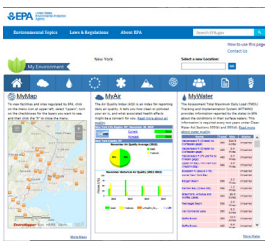
SUBSTANCE REGISTRY SERVICES AND TOXICS RELEASE INVENTORY

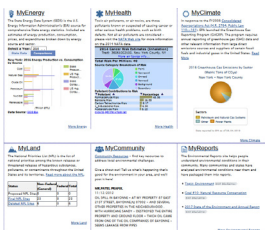
Background and purpose of the practice/ intervention	Part of legal requirements of running industries within the United States is the need to report procurement, storage, inventory, application and disposal of certain substances that may be restricted on account of being hazardous in nature, or posing a potential threat by way of the means and form in which they are disposed. Some of this information is also covered within the "right to know" of the public-at-large. EPA is federally mandated to acquire this information and keep it
What the practice/ intervention	Substance Registry Services (SRS) is the Environmental Protection Agency's (EPA) central system for information about substances that are tracked or regulated by EPA or other sources. The Toxics Release Inventory (TRI) is a resource for reporting of toxic chemicals (about 650 of them), including releases and other waste product handling protocols (e.g. recycling, energy recovery and treatment), and pollution prevention activities reported by industrial and federal facilities. The SRS and TRI allow local communities and authorities to be: • Prepared for chemical emergencies and the availability of information on hazardous substances. • In a position to encourage facilities to first eliminate waste at its source (source reduction). • Provide a strong incentive for companies to improve environmental performance and specifying how facilities
Who does the practice/ intervention apply to	Binding on all US businesses and federal entities that utilize any of the substances specified in the appropriate statutes, including importers, manufactures, suppliers, users and such other parties that may either be involved with the substance,
Where is the practice/ intervention meant to be applied (location)	All over the United States. This works as a supplement to the National Pollutant Discharge Elimination System and its specific rule on electronic reporting, and this data is reflected in the network Discharge Monitoring Report – both required to be populated statutorily by any and all US businesses and

Under what circumstances in the practice/ intervention meant to be used	The SRS and TRI become applicable at the time of seeking the applicable licenses, and where it is disclosed that the particular business or facility will use one or more substances that fall under the appropriate statutes, or will engage in a process that is likely to release one or more toxic substances.
How does the intervention work	Substance Registry Services lists complete families of chemicals, including their derivatives, allotropes and variants (by whatever trade or scientific name or other identification they may be identified by), which are monitored by the EPA, including (a) full details of the substance, (b) amounts produced or imported (c) facilities authorized to manufacture, import, handle, store, use as well as dispose of them including current and past details thereof. This data can be perused by the public and local authorities at large in issuing zoning permits/ other controls that may apply to such facilities. The Toxics Release Inventory spatially tracks the release of toxic substances from such points such as water bodies etc. as well as links them to specific businesses or groups thereof to correlate them.
Why is this a best practice?	The SRS and TRI allow the EPA to: • Maintain a real time watch on specific substances including manufacture, import, handle, store, use and disposal • Spatially link water and soil quality data to release of toxic substances However, that this data can be perused as part of public disclosure by interested parties plays an important role in ensuring compliance to both reporting as well as proactive participation between local authorities, industries and
Relevance for India	While systems similar to SRS and TRI exist in India (the CPCB monitored OCEMS for instance – though this is more similar to the NPDES and its electronic reporting tool), this data is not placed in public domain, and is for the most part, not spatially referenced or integrated with substance registration or inventory management within the industrial units. As a result, there is no or limited proactive local involvement with industrial processes with respect to environmental protection.

14

MY ENVIRONMENT & MY WATER PORTALS



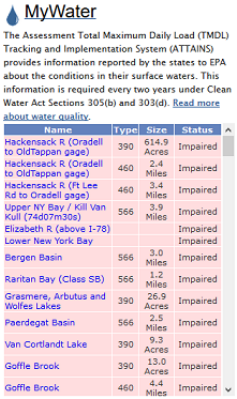


Background and purpose of the practice/ intervention	The EPA in US has long attempted to demystify water and environment quality to the common user. Using its large repository of information on air & water quality, it has attempted to simplify this for the common person through interactive tools such as the MyWater and MyEnvironment portals that allow users to interactively extract information regarding their own local environments.
What the practice/ intervention	My Environment search application is an interactive tool designed to provide a cross-section of environmental information based on the user's location. Users can get the environmental information of their surroundings or any other location they wish to see. The MyWater Portal – a scaled down version of the Water Quality Portal, is the nation's largest source for water quality monitoring data. The purpose of this guidance was to streamline and reduce the reporting burden to the states and improve the information needed to make water quality management decisions. State water quality assessments are normally based upon five broad types of monitoring data: biological integrity, chemical, physical, habitat, and toxicity. Each type of data yields an assessment that must then be
Who does the practice/ intervention apply to	Available to all US residents; but accessible internationally as well. The data set is however, limited to the geographical limits
Where is the practice/ intervention meant to be applied (location)	All over the United States
Under what circumstances in the practice/ intervention meant to be used	This is a system of continuous disclosure that deals with popularizing environmental awareness and monitoring means. Data that is fed into NPDES and other systems is mirrored on
How does the intervention work	The system works on a geospatially linked map and database system that allows a user to search by location name (eg: New York, Kansas etc.), indicates the location of monitoring stations in the area marked on the map and the number of facilities which are required to renew their discharge permit. Reports are also generated for water quality and drinking water locations in the area. Based on this, users can be aware of the environmental status of industries and other establishments

Why is this a best practice?

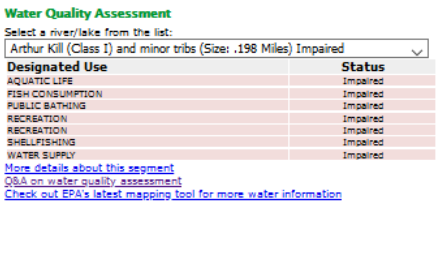
The utility provides several useful features, such as:

- Water Quality Assessment data can be obtained with maps assistance.
- Water Quality Monitoring by identifying monitoring stations in your neighbourhood by the pollutants they measure.
- Drinking Water Sources – provides EPA Local Drinking Water Provider information and Community Water System information from Safe Drinking Water Information System (SDWIS).
- Watersheds – this feature shows your area's watershed and connects you to the EPA Surf Your Watershed Web site which provides a variety of links to citizen-based groups at work in your watershed, water quality data, and more.
- Urban Waters Widget – this feature links to the Urban Waters Mapper which allows you to see or share activities in your area.
- New/Expiring Permits – this feature reports new and expiring permits (from EPA's Permit Compliance System database) given to facilities that emit pollutants to water in your neighbourhood.
- Water conditions for local water bodies based on EPA Water Quality and Impaired Stream data



Relevance for India

As of now, the system of local environmental monitoring for citizens is extremely less developed in India, largely because datasets are generated in disparate manner. However, an entity such as CPCB can together a system such as this as a means of public outreach to ensure high quality information is being disseminated to the public.



15

CROSS MEDIA ELECTRONIC REPORTING RULE (CROMERR)

Background and purpose of the practice/ intervention	The EPA receives a significant amount of information through its monitoring mechanisms, almost all of it being routed through statutory entities, local authorities etc. Most of these carry evidential value and could be used with regard to framing new legislation, public policy or even use in litigation. To arrange for faster collation, authentication and trail-accounting (determining how any information was originated, collected, authenticated, collated and transmitted), EPA has developed a set of tools. However, in order to be used in a statutory manner, there is a need for a legal framework to this effect. CroMERR is meant to meet this requirement.
What the practice/ intervention	The Cross-Media Electronic Reporting Rule (CroMERR) provides the legal framework for electronic reporting under all of EPA's environmental regulations. CroMERR establishes technology-neutral, performance-based standards for information systems that receive reports and other documents electronically under their EPA-authorized programs. The standards provide electronic submittals with the same level of legal dependability as the corresponding paper submittals. The uniqueness of CroMERR is that the outputs generated from the same are admissible in Courts of law, and are duly authenticated by an authorised representative of the State, as in the Attorney General. Essentially if the EPA proceeds with legal recourse against an errant industry, the evidence base on which such case shall be decided is duly authenticated under CroMERR.
Who does the practice/ intervention apply to	All States, local authorities, tribes as well as the federal Government of the US as regards any and all information that is collected, collated and transmitted under the CroMERR framework on the directions of the EPA.
Where is the practice/ intervention meant to be applied (location)	All over the United States;
Under what circumstances in the practice/ intervention meant to be used	All data that is collected and collated by the EPA through State Governments and administrations – such as NPDES, RID etc. are meant to be transmitted using the CroMERR framework. Therefore it is applicable on all statutory reporting.

How does the intervention work

To incorporate electronic reporting, a state, tribe, or local government must submit an application to the EPA that includes four elements:

- Attorney General (AG)/ Legal Certification
- System Descriptions
- System Upgrades
- Additional Information

The CroMERR Application Cover Sheet includes the following

- Type of agency
- Application contacts
- List of attachments included with the application
- Attorney General Certification information
- Brief system overview
- List of the programs and reports covered by the application

Why is this a best practice?

The CroMERR standards focus primarily on the following processes:

- Criteria for establishing a copy of record;
- Integrity of the electronic document;
- Validity of the electronic signature;
- Determination of the identity of the individual uniquely entitled to use a signature device; and
- Opportunity to review and repudiate the copy of record.

Relevance for India

As of this time, data captured by CPCB under OCEMS, data captured by State PCBs and such other protocols are not as soundly protected by the Indian Evidence Act, 1872. Further, electronic reporting is also not governed by any standard protocol that allows for authentication and trace of the information to its source. A system like CroMERR will allow closing this gap, strengthening cases for PCBs in the cases of litigation and closure.

16
INTEGRATED, INTELLIGENT AND INTERNATIONAL PLATFORM FOR ENVIRONMENTAL TECHNOLOGIES (3i PET)

Background and purpose of the practice/ intervention	Given the humongous scale of manufacturing in China, it is only natural that there is a wide variety of technological and strategic options that exist with respect to abatement of pollution during the course of the manufacturing technologies. However, selecting an appropriate technological or strategic option is often seen as a challenge, given the complexity of the production processess as well as the business needs of ensuring high volume production in short spans of time. To aid and assist such units, the Government of the People's Republic of China has come up with an innovative collaborative solution that allows potential and current entrepreneurs to select appropriate tools for manufacturing.
What the practice/ intervention	The 3iPET International Platform for Environmental Technology is a professional service platform (International, Intelligent, Integrated Platform for Environmental Technology, shortened as 3iPET) established by the International Environmental Cooperation Center with the support of the Ministry of Ecology and Environment). 3iPET focuses on water, air and soil pollution prevention, energy conservation and emission reduction, cleaner production and compliance with environmental conventions.
Who does the practice/ intervention apply to	All industries within the Peoples Republic of China are encouraged to participate on the system. It is supported by International Environmental Cooperation Center along with the Ministry of Ecology and Environment, Peoples Republic of China
Where is the practice/ intervention meant to be applied (location)	All industries – whether new or existing – within the Peoples Republic of China are encouraged to participate on the system. This system is also applicable to units operating inside large scale manufacturing zones such as Guangzhou and Shenzen.
Under what circumstances in the practice/ intervention meant to be used	Existing as well as new businesses may approach the platform for selection of the appropriate technological solutions that can mitigate pollution at its source, apart from the end-of-the-pipe disposal processes, where it is not possible to mitigate pollution at its source.

How does the intervention work	The 3iPET platform provides the following services: • Policy market consulting • Integrated exhibition/display • Technology matchmaking promotion • Technical evaluation and recommendation • Selection of Sectors • Collection of Information • Evaluation of Techniques and Decision Making process The platform allows stakeholders to reach a consensual decision, if not achieved, voting done and final decision taken by team leader. Techniques chosen not ranked, but presented as equally good alternatives.
Why is this a best practice?	It aims to build an international, intelligent and integrated environmental protection technology professional service platform to promote the "import and export" of environmental protection technologies and industrialization development. Through online/offline combination of internet + environmental protection technologies, 3iPET is committed to providing domestic and foreign enterprises, governments, industrial parks and environmental practitioners with pollution prevention technologies, so as to realize knowledge sharing in China's environmental governance, promote environmental technology exchanges and cooperation at home and abroad. 3iPET provides four services: integrated exhibition/display, technical evaluation and recommendation, technology matchmaking promotion, and policy market consulting.
Relevance for India	The Indian manufacturing industry is also being given a boost in the same manner as in the case of China to augment production and improve competitiveness. However, since a large portion of the industry lies in the semi-formal or partially unorganised sector, it is often difficult for them to access structured advise on choosing appropriate manufacturing techniques suited to their economy. A platform like 3iPET would help – amongst others – a large part of the MSME segment engaged in manufacturing and exports.

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SINGAPORE ENVIRONMENT INSTITUTE

Background and purpose of the practice/ intervention	Selecting the Right Level of Public Participation discusses the different forms that public participation might take depending on the potential for public influence on a decision by informing the public by providing information to help them understand the issues, options, and solutions. Conducting meaningful public participation involves seeking public input at the specific points in the decision process and on the specific issues where such input has a real potential to help shape the decision or action.
What the practice/ intervention	Singapore Environment Institute (SEI) is the training and knowledge division of the National Environment Agency (NEA). It is responsible for delivering in-house technical training and building of environmental knowledge among staff to build a relevant, resourceful and resilient NEA workforce. SEI also supports capability building and Continuing Education and Training (CET) needs within the local environmental services industry through its industry programmes with institutes of higher learning. In addition, the Institute actively participates in capacity building of identified countries via training and workshops catering to selected government officials. It also extends trainings for private sector entities engaged in activities that may be regulated by the National Environment Agency, or those utilities that are established, owned and operated privately, but work in association with the Public Utilities Board (e.g. Take of Pay plants for wastewater)
Who does the practice/ intervention apply to	Available for use to all public and private entities and businesses operating within the island nation of Singapore;
Where is the practice/ intervention meant to be applied (location)	All over the island nation of Singapore; is also available for international collaboration
Under what circumstances in the practice/ intervention meant to be used	Largely to meet training and continuing needs of the National Environmental Agency, apart from utilities such as the Public Utilities Board as well as private businesses

How does the intervention work	SEI periodically brings in professionals across various fields to share their expertise and perspectives on environmental issues on PSS which is a knowledge-sharing platform. Topics that have been covered range from emerging environmental technologies and management approaches, to good environmental practices and environmental awareness. Singapore's NEA makes partnerships for international organisations for international development in developing countries. Safety courses are transferred to training partners to leverage their expertise in teaching, curriculum design and training facilities.
Why is this a best practice?	Environmental management practices are continuously evolving, and stakeholders need to periodically update their skills in order to be able to absorb and understand new technologies, practices etc. for better results management. Having a dedicated training & development institute allows the same nature of information and learning to be disseminated across all types of stakeholders, and also appreciate each other's perspectives.
Relevance for India	Although a much larger country, the number and nature of stakeholders in India are just about as diversified as in Singapore. With a large number of academic and research institutions already in place, India could utilise these as a "network" to leverage the collective knowledge of environmental protection and management for both Pollution Control Boards as well as industry stakeholders, so that they are in sync with understanding why and how a practice is used. This will also help emerging entrepreneurs who engaged with industrial development corporations for managed facilities in PPP mode.

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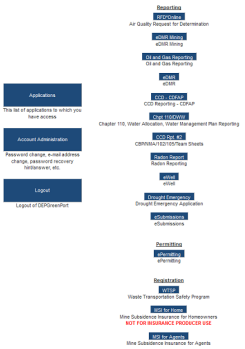
E-DISCHARGE MONITORING WEBSITE & REPORTS

Background and purpose of the practice/ intervention	As part of its efforts to eliminate contamination of water bodies, the US EPA uses a trio of tools –the National Polluting Discharge Elimination System, Water Quality Management and the Discharge Monitoring Reports. The first of the two work at 'destination' level – as in, at the points where pollutant load may be discharged from industrial activities, such as the water bodies, while the Discharge Monitoring Report is furnished by
What the practice/ intervention	Most facilities are required to submit Discharge Monitoring Reports (DMRs) that summarize effluent monitoring results to the Department of Environmental Protection (DEP). The eDMR system is a web-based application available through the internet. The system resides within DEP's Greenport system. The system serves as an electronic file cabinet to manage DMR reporting requirements of National Pollutant Discharge Elimination System (NPDES) and Water Quality Management (WQM) permits and to
Who does the practice/ intervention apply to	Facilities that are statutorily required to disclose effluent discharge, as may be identified and notified by statue (e.g.
Where is the practice/ intervention meant to be applied (location)	All over the United States; this works as a supplement to the National Pollutant Discharge Elimination System and the Water
Under what circumstances in the practice/ intervention meant to be used	Applicable from the time a facility commences operations that lead to discharge of effluent into a designated stream. The DMR must necessarily report on qualitative parameters set forth in

How does the intervention work	To generate a report, the user must enter or select values for the following criteria:
	• Monitoring Begin Date and Monitoring End Date
	• Region
	• County
	• Municipality
	• Permit # (as issued by the local authority)
	• Client
	• Parameter(s)
	  ◦ Parameter 1
	  ◦ Parameter 2
	  ◦ Parameter 3
	  ◦ ----
	  ◦ ----

Why is this a best practice?	The eDMR System: • Saves wastewater discharge facilities compliance costs with a streamlined reporting method and readily available computer tools. • Saves program costs by reducing resources required for managing paper-based DMR reports. • Improves accuracy of compliance data by eliminating potential errors that might otherwise be introduced through manual data entry processes. • Improves DEP's overall efficiency with faster responses to data analyses, compliance assessment, and decision-making. • Eliminates the need to send multiple copies of paper DMRs to separate agencies (e.g. EPA,DRBC, etc.)
Relevance for India	In India, a similar system exists as the Online Continuous Effluent Monitoring System, which relies on a set of sensors to relay data to the State Pollution Control Board. However, this is not connected to any system analogous to the NPDES or WQM and needs manual reconciliation. This is also restricted to certain forms of industries and does not have a comprehensive coverage. However, there is considerable scope for improvement of the system as this is also linked to water quality data and made



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NATIONAL WATER QUALITY MONITORING COUNCIL

Background and purpose of the practice/ intervention	The National Water-Quality Monitoring Council (NWQMC) is the permanent successor to the Intergovernmental Task Force on Monitoring Water Quality (ITFM), a subgroup of the Advisory Committee on Water Information (ACWI). The Council was created in 1997 as a vehicle for bringing together diverse expertise needed to develop collaborative, comparable, and cost-effective approaches for monitoring and assessing water quality within the United States.
What the practice/ intervention	The National Water Quality Monitoring Council (Council) provides a national forum for coordination of comparable and scientifically defensible methods and strategies to improve water quality monitoring, assessment and reporting, and promotes partnerships to foster collaboration, advance the science, and improve management within all elements of the water quality monitoring community. Vital to this role, the Council provides a voice for monitoring practitioners across the Nation and fosters increased understanding and stewardship of US water resources.The NWQMC operates a Water Quality Data Portal, which is widely regarded as an easy way to access data stored in various large water quality databases. The WQP provides various input parameters on the form including location, site, sampling, and date parameters to filter and customize the returned results. The WQP can return site information (locations where samples were collected), or it can return sample results (analytical data of collected samples)
Who does the practice/ intervention apply to	As resources are available and consistent with applicable legal requirements, organizations that voluntarily choose to participate in implementing the strategy will implement NWQMC recommendations and voluntarily use the guidelines and procedures developed by the National Council and accepted by the Advisory Committee on Water Information (ACWI).
Where is the practice/ intervention meant to be applied (location)	All over the United States;
Under what circumstances in the practice/ intervention meant to be used	At any given point of time, however, compliances and reporting are made on annual basis.

How does the intervention work	The overall purpose of the National Council is to champion and support water-quality information aspects of natural-resources management and environmental protection. It has a broad mandate that encompasses water quality monitoring and assessment that includes considerations of water quality in relation to water quantity. It further coordinates and provides guidance and technical support for the voluntary implementation of the recommendations presented in the Strategy for Improving Water-Quality Monitoring in the United States (the strategy) by government agencies and the private sector. It performs a variety of functions, including, but not restricted to: • Maintain the institutional framework • Evaluate progress • Methods and data comparability • Data quality and documentation • Methods and Data Elements • Information management and sharing • Data elements, codes, and reference tables • National assessment • Reporting and public education • Information dissemination • Other national water-information activities • International activities
Why is this a best practice?	As a National Policy making body on water resources, the Council carries considerable traction within the industry on account of the wide variety of memberships and participation. It may be a federal entity but is not an Authority by force of law; but by consensus regarding best practise on water resource management. It represents an amalgamation of Government, industry, academia and other stakeholders in policymaking.
Relevance for India	Policymaking in India has largely remained the preserve of the Government – specifically the executive and the deliberative wings, with industry and other stakeholders playing only a marginal role in matters. A mechanism such as the NWQMC would be useful to develop a consensus on water resource use at a National body. It should be noted here that the NWQMC does not impinge on the federal structure of the US.

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BEST AVAILABLE TECHNOLOGY (BAT) REFERENCE DOCUMENTS

Background and purpose of the practice/ intervention	Selecting the Right Level of Public Participation discusses the different forms that public participation might take depending on the potential for public influence on a decision by informing the public by providing information to help them understand the issues, options, and solutions. Conducting meaningful public participation involves seeking public input at the specific points in the decision process and on the specific issues where such input has a real potential to help shape the decision or action.
What the practice/ intervention	BREF or 'BAT reference document' means a document, resulting from the exchange of information organised pursuant to Article 13 of Directive 2010/75/EU, drawn up for defined activities and describing, in particular, applied techniques, present emissions and consumption levels, techniques considered for the determination of best available techniques as well as BAT conclusions and any emerging techniques, giving special consideration to the criteria listed in Annex III to Directive 2010/75/EU. BREFs are drafted through the Sevilla Process and sector-specific documents exist for several different industrial activities. BREFs exemplify appropriate documentation for new technologies and circumstances under which they should be adopted. A BREF typically contains information on a specific industrial/agricultural sector in the EU, on the techniques and processes used in this sector, current emission and consumption levels, techniques to consider in the determination of the best available techniques (BAT) and emerging techniques. Apart from a description of the technique itself, the list of references (background material) quoted in the reference document contains links to web pages containing relevant legislation/ standards, and additional technical information.
Who does the practice/ intervention apply to	Any and all businesses either operating or intending to operate within any member State of the EU, all environment protection agencies and the International Plant Protection Commission (IPPC) Bureau
Where is the practice/ intervention meant to be applied (location)	All member States of the EU; though the BAT Reference Documents (BREFs) can be used in other jurisdictions too that recognise the same.

Under what circumstances in the practice/ intervention meant to be used	The SRS and TRI become applicable at the time of seeking the applicable licenses, and where it is disclosed that the business or facility will use one or more substances that fall under the appropriate statutes or will engage in a process that is likely to release one or more toxic substances.
How does the intervention work	For each BREF, the European IPPC Bureau sets up a Technical Working Group (TWG) to carry out the exchange of information on BAT. A TWG usually consists of between 100 to 200 experts. IPPC organises the work of the TWG, fosters the exchange of information, makes a scientific and technical analysis of the vast amount of information exchanged, proposes compromise solutions on issues when views of TWG members differ, and writes the BREF. The European IPPC Bureau acts as a neutral, technically competent and permanent body to all TWGs. The procedure used to elaborate or review a BREF includes a few plenary meetings of the TWG, sub-group meetings, visits to installations, and submission of draft BREFs for comments. These documents aim at guiding the European IPPC Bureau and members of the technical working groups (TWGs) in the drawing up and reviewing the whole series of BREFs. Once it has been finalised, each BREF is presented by the European IPPC Bureau to DG Environment at the forum (Information Exchange Forum, IEF) established by the IED (ex IPPC Directive).
Why is this a best practice?	BAT Reference Documents are often referred to by businesses as well as environment protection agencies to (a) assess which technology suits the business best, (b) what to expect from application of the technology, and (c) level of compliances to expect. This allows common ground between compliance agencies as well as entrepreneurs as regards what to expect inside an industrial establishment under certain circumstances.
Relevance for India	BAT reference documents find a limited degree of acknowledgement in India, largely because they were not created keeping Indian conditions in mind. However, there is ample scope for adaptation of BAT reference documents with respect to India, more so for entrepreneurs that are desirous of selecting an appropriate technology for their unit and may not have ample resources to develop the same from scratch.

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