THE GREENING OF THE URBAN AND INDUSTRIAL TRANSFORMATION AGENDA PROJECT

Commissioned by SouthSouthNorth Projects

PREPARED FOR

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PREPARED BY

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Table of Contents

Acronyms and Abbreviations

BAU	Business as Usual
CAE	Conformity Assessment Enterprise
CP	Cleaner Production
CRGE	Climate Resilient Green Economy
CSR	Corporate Social Responsibility
ECPC	Ethiopian Cleaner Production Centre
EINDC	Ethiopia's Intended Nationally Determined Contribution
EMP	Environmental Management Programme
EMS	Environmental Management System
ESA	Ethiopian Standards Agency
FSMS	Food Safety Management Systems
GDS	Global Development Solutions
GHG	Greenhouse Gas
GTP	Growth and Transformation Plan
GTP II	Growth and Transformation Plan II
IAIPs	Integrated Agro Industrial Parks
IP	Industrial Park
IPDC	Industrial Park Development Corporation
IPE	Industrial Park Enterprises
ISO	International Organization for Standardization
MoEFCC	Ministry of Environment, Forest and Climate Change
MoI	Ministry of Industry
MoST	Ministry of Science and Technology
QMS	Quality Management Systems
SD	Sustainable Development
SDG	Sustainable Development Goals
SWS	Sanitary Waste System
ToT	Training-of-Trainers
UNIDO	United Nations Industrial Development Organization
WWTP	Waste Water Treatment Plants
ZLD	Zero-Liquid-Discharge

1. Introduction

The Greening of the Urban and Industrial Transformation Agenda Project, undertaken by Global Development Solutions, LLC (GDS) and commissioned by SouthSouthNorth Projects (Africa) as part of the Climate and Development Knowledge Network (CDKN), supports decision-makers in designing activities to deliver climate-compatible development. The project aims to foster adoption of an international environmental management system (EMS) and other 'green' standards by the domestic private manufacturing sector in Ethiopia. Specifically, GDS was tasked to create awareness and initiate processes for the 'green' certification of domestic private sector industries that are located within industrial parks (IPs) throughout the country.

The expected outputs of the project were:

1. Assessment of the needs and capacity of local industries in relation to international standards on environmental management systems;
2. Preparation of training materials on international environmental standards;
3. Case studies on implemented international EMS requirements as well as an experience of a model local industry that has acquired and maintained EMS certification; and
4. Recommendations on the next steps and what industrial parks should provide – in terms of common facilities/systems/plans – to create a competitive local manufacturing sector that is well placed to meet international EMS and green standards.

The GDS report addresses all the expected outputs in a holistic manner such that the requirements of the international EMS standard are discussed under Section 2, followed by an assessment of the status of the current EMS implementation in Ethiopia in Section 3. Moreover, the existing constraints for developing and implementing ISO 14001:2015 based EMS in Ethiopia is presented in Section 4. Sections 5 and 6 discuss the training-of-trainers (ToT) on EMS implementation, requirements for certification, and practical international and local case studies and examples. The benefits and challenges of implementing ISO 14001:2015 based EMS certification in the IPs in Ethiopia are discussed in Section 7. Section 8 highlights the capacity and needs of the Industrial Park Development Corporation (IPDC) to lead the implementation of EMS and certification in the IPs in Ethiopia. Finally, recommendations on the way forward for the IPDC to follow for enabling enterprises in the IPs to meet international EMS and 'green' standards are presented in Section 9.

Additionally, to facilitate Government buy-in and identification of the pertinent stakeholders who can contribute towards the realization of the objectives of the project, GDS prepared and delivered a ToT workshop on the benefits and requirements of the international EMS standard as well as the processes of EMS implementation, with a focus on training representatives from key Government ministries and other implementing organizations. Details of the workshop are included as Annexes to the report.

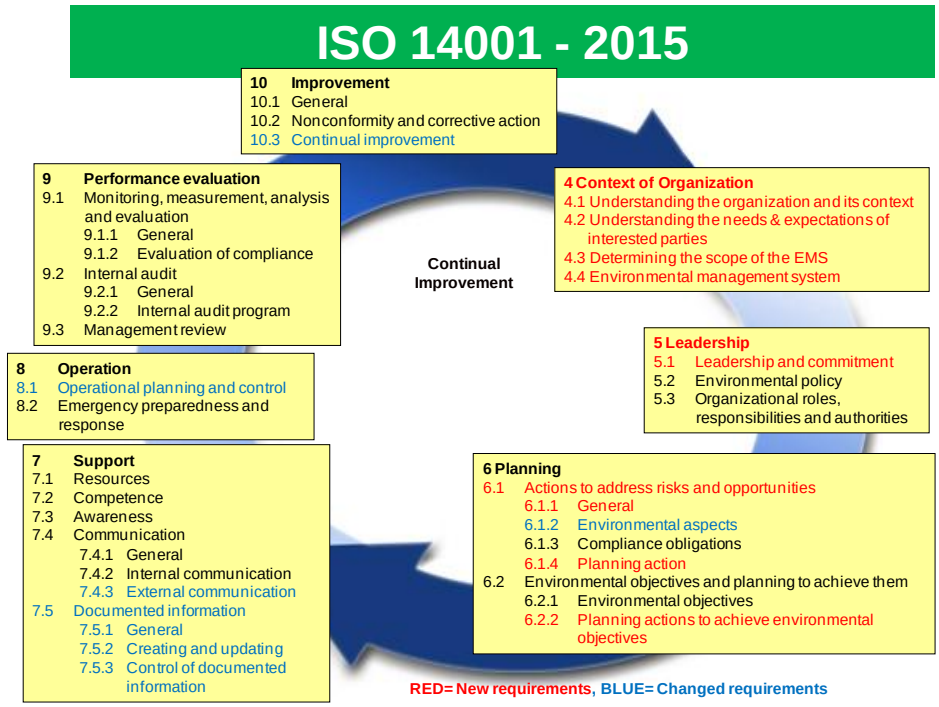
2. Requirements for International Standard for EMS Certification

ISO 14001;2015 is an international standard that defines the principles of an environmental management system (EMS) by which companies control their impact on the environment. It does not state requirements for environmental performance, but rather maps out a framework that a company or organization can follow to set up an effective EMS that assists enterprises in meeting their environmental and economic goals, such as improving resource efficiency, reducing waste, driving down costs and assuring both internal and external stakeholders that environmental impact is being measured and improved.[1] The approach consists of establishing, implementing and maintaining properly structured EMS, which is part of the overall management system and is associated with all elements of the environmental performance of an organization.

In the international dimension, ISO 14001:2015 is a key standard for the introduction of environmental management and certification. ISO 14001:2015 based EMS specifies standards including the key requirements that an organization must meet in order to become certified by a certification authority.

The first EMS standard issued by the International Organization for Standards (ISO 14001:2005) has been replaced by ISO 14001:2015 (Figure 1).

Figure 1: ISO 14001:2015 Standard



Source: International Organization for Standards (ISO 14001:2015)

[1] ISO 14001 Key Benefits, International Organization for Standardization (ISO), 2015

The standard shares the following topics that are harmonized with other ISO standards such as ISO 9001.

- Introduction
- Clause 1. Scope
- Clause 2. Normative references
- Clause 3. Terms and definitions

As can be seen in Figure 1, the most recently updated EMS standard added new requirements, and a number of clauses have been changed compared to ISO 14001:2005. For any company to be certified, all the clauses (Clause 4 to 10) of the standard should be fulfilled and verified by a third party audit.

The development and implementation of the EMS standard requires the awareness and commitment of an organization's top management regarding the environmental concerns that need to be addressed, rules and regulations to be followed, and other conditions, such as customer requirements. The training and involvement of employees is critical to undertake the implementation of the management system.

The top management should formulate an environmental policy pertinent to the company's nature of activities that has the aim of addressing the environmental aspects it needs to address. The policy needs also to show the commitment of the company to prevent pollution, comply with rules and regulations, and continuously improve its environmental performance. The policy needs to be communicated publicly to an organization's stakeholders and employees.

The company must then develop a management structure for implementing the EMS along with appropriate leadership for which roles and responsibilities are defined formally. Once the structure is in place and roles and responsibilities are defined, then an EMS implementing team is set up. The EMS team in consultation with the top management prepares an implementation plan of the EMS by setting objectives, targets, resource requirements and time schedules of the activities with the aim of realizing practically the environmental policy of the company. According to the ISO 14001:2015, the participation and involvement of the top management in the planning process is critical; it should not be left to the EMS team alone to prepare and present the Environmental Management Program (EMP) action plan for top management approval.

The top management provides all the necessary support, such as: allocate resources, guide the capacity building process at all levels, raise employee awareness and provide competency trainings for workers at critical operational positions. Systems for documentation and documentation control need to be created. Essential operational procedures and work instructions are developed and communicated to pertinent internal stakeholders. The company policy as well as critical procedures must be communicated to external stakeholders, such as suppliers and contractors, so that they can comply with the company policy and working procedures.

Once the implementation is underway and the EMP action plan is operationalized, monitoring and evaluation as well as an internal audit are carried out to check for conformity and compliance. The management review leads to corrective and preventive measures as well as issues identified for continuous improvement of the EMS being undertaken in the company. Certification is attained based on the assessment of the EMS processes, documentation, conformity and compliance achieved as per the EMP and other audit findings by the third party auditor.

In general, ISO 14001:2015 specifies the requirements for an EMS system that an organization can use to improve its environmental performance. ISO 14001:2015 is intended for use by an organization that seeks to manage its environmental responsibilities in a systematic manner that contributes to the environmental pillar of sustainability.

ISO 14001:2015 helps an organization achieve the planned outcomes of its EMS, which provide value for the environment, the organization itself and interested parties. Consistent with the organization's environmental policy, the intended outcomes of an environmental management system include:

- Enhancement of environmental performance;
- Fulfillment of compliance obligations; and
- Achievement of environmental objectives.

ISO 14001:2015 based EMS is a generic system and is applicable to any organization, regardless of size, type and nature, and applies to the environmental aspects of its activities, products and services that the organization determines it can either control or influence in the context of a life cycle perspective.

3. Ethiopian Industries in Terms of ISO EMS Certification Process

There are about 1,733 medium- and large-enterprises in the manufacturing sector registered in Ethiopia.[2] The first EMS certification in Ethiopia was achieved by six organizations (5 manufacturing and 1 service provider).[3] Another six companies were certified with ISO 14001:2005 in 2007 through facilitation and technical support provided by the Ethiopian Cleaner Production Centre (ECPC).[4] The ECPC was established in 1999 by United Nations Industrial Development Organization (UNIDO) and hosted by the former Ethiopian Science and Technology Commission.

It is also reported that Horizon (Addis Tyre) and Ethiopian Airlines attained certification with ISO 14001:2015, in 2015 and 2016, respectively. However, the number of EMS certified organizations in Ethiopia is negligible compared to other African countries (Table 1).

[2] Central Statistical Agency of Ethiopia (CSA), 2015
[3] Dashen Brewery, Meta Brewery, Ethiopian Tannery, Kombolcha Textiles, ECPC, ELICO – Awash Tannery
[4] Harar Brewery; Dire Dawa Food Complex; ELICO – Leather Garments and Goods; ELICO - Goats Suede, Shoes and Gloves; Metehara Sugar Factory; and Ethiopian Pharmaceuticals (EPHARM)

Table 1: ISO 14001 EMS Certified Companies

ISO 14001 Environmental Management System Certificates				
Year	South Africa	Egypt	Kenya	Ethiopia
2014	988	476	41	12
2015	1144	582	74	13

Source: ISO Survey of Management System Certifications (1999-2015)

As per the audit requirement for maintaining ISO certification, a company should conduct a surveillance audit at least annually and a recertification audit every three years. The certified companies in Ethiopia have maintained their certificate through surveillance and recertification audits. However, the ECPC no longer exists as an organization, since it was restructured in 2012 and subsumed into the Ethiopian Standards Agency (ESA), and thus could not maintain its certificate.

4. Constraints for Developing and Implementing EMS in Ethiopia

4.1. Low level of awareness of companies of the benefit of implementing EMS

In most cases, companies consider the implementation of EMS as a tool for protecting the environment and addressing legal compliance issues. The economic benefits (and other benefits such as company image, marketing benefits, social benefits, etc.) brought about by implementing EMS are not well understood by companies prior to the implementation of the management system.

4.2. Lack of environmental technical support

Currently, there are no public or private entities that can provide environmental technical support regarding EMS implementation. The ECPC used to assist and facilitate implementation of cleaner production and EMS by providing technical extension service, and the achieved results were encouraging according to the number of certified enterprises and cleaner production implementing companies during its existence. Awareness creation and advocacy for addressing environmental concerns in tandem with regulatory requirements would give impetus to exercising cleaner production activities and implementation of EMS.

4.3. Low level of capacity for implementing EMS in enterprises

Factors contributing to a low level of capacity for implementation include:

- *Lack of resources:* lack of time, lack of knowledge and shortage of skilled human resource;
- *Negative attitudes and company culture:* lack of or inconsistent top management support for EMS as well as general resistance to change;
- *Inadequate understanding and perception:* low awareness of EMSs and lack of knowledge of the requirements for implementing the system; and
- *Implementation problems:* difficulty in dealing with environmental aspects, such as the evaluation and determination of impact significance, and uncertainty about how to maintain continuous improvement.

4.4. Low level of enforcement of regulations and environmental standards

Ethiopia has promulgated environmental laws for conducting environmental impact assessment and for pollution control and prevention along with regulations and standards pertaining to various industrial sub sectors and activities in other economic sectors. However, the level of enforcement is minimal. This is due to lack of general awareness of policy and decision makers.

In addition, the implementation of environmental regulations in Ethiopia has been constrained by:

- Inadequate expertise and equipment;
- Limited public participation; and
- Lack of institutional capacity to carry out inspections and guide organizations toward effective environmental planning and management.

5. Training-of-Trainers on Environmental Management System Implementation and Requirements for Certification

The major expected output of the "Greening of the Urban and Industrial Transformation Agenda Project" has been capacity building of pertinent stakeholders, including the IPDC, by way of providing an awareness creation workshop on the benefit and process of implementing EMS in enterprises and the requirements for the international certification. The awareness creation workshop was designed in the form of ToT. The major stakeholders identified to take-up the issue of implementing EMS and lead or support enterprises toward certification were:

- Industrial Parks Development Corporation;
- Ministry of Industry;
- Ministry of Trade;
- Ministry of Environment, Forest and Climate Change;
- Ethiopian Investment Commission; and
- Ministry of Finance and Economic Cooperation.

Prior to the conducting of the workshop, a terms of reference (TOR) was prepared for the training of trainers (ToT) (see Annex I) in order to define the objective and scope of the training.

One of the major outcomes of the ToT workshop was the creation of awareness on the process of implementation and certification of EMS in manufacturing industries of Ethiopia in general and enterprises in the IPs in particular. The importance of EMS certification of industrial park enterprises (IPEs) is recognized as one of the tasks to be undertaken by the IPDC as confirmed by the Environmental Protection & Social Safeguard Directorate of the corporation while designing the content of the ToT training.

The general objective of the training was to increase awareness and knowledge on EMS in the industrial parks and thereby meet Sustainable Development Goal (SDG) numbers 9 and 13 in Ethiopia.

Specifically, the training had the following aims:

- Introduce participants to the importance and benefits of an ISO 14001:2015 EMS;
- Create awareness on key requirements, terms and definitions of ISO 14001:2015;
- Enable participants to identify the structure and requirements of an effective environmental management system and what this means to them;
- Introduce participants to main concepts such as process approach, Plan-Do-Check-Act, lifecycle perspective, aspects and impacts;
- Introduce principles that support the identification of risk and opportunities and the different techniques/methodologies needed to address them; and
- Empower leadership through addressing the skills needed by those operating in Quality, Environmental and Health and Safety roles for the forthcoming evolution of management systems standards and their respective commercial impacts.

The training covered the following subject areas by incorporating knowledge from global experiences:

- ISO 14001: 2015 EMS in industrial parks and in their industries;
- Series of standards on environmental management tools and systems;
- ISO 14001:2015 EMS Gap assessment: readiness for certification;
- Integrated management system;
- Top management commitment to continuous improvement, compliance, and pollution prevention;
- Creating and implementing environmental policies, including setting and meeting appropriate targets;
- Integrating environmental considerations in operating procedures; and
- Training employees in regard to their environmental obligations.

Accordingly, training materials (see Annexes II and III) as per the TOR were prepared, addressing the following major topics:

1. Environmental Management System (EMS) and Sustainable Development;
2. Concept, Intentions and Drivers of EMS;
3. Implementing EMS; and
4. Requirements for EMS Certification and a Case Study on Group Certification.

Moreover, as discussed in Section 6 below, besides the international experience that was shared The response to the questionnaire revealed that, prior to the workshop, 80% of the participants of the workshop lacked a clear understanding of cleaner production, ISO 14001 standards and related certification and sustainable development. Even though some participants knew that there are environmental laws in Ethiopia, most were unaware of the details and enforcement of such laws. The concepts of sustainable development and sustainable development goals also were unknown to most of the participants. A handful of participants exhibited slight knowledge *a priori* of cleaner production, environmental management system and sustainable development goals with the workshop participants, a presentation on the certification process and overall benefits gained by a local company, namely, Kombolcha Textile S.C., that was followed by discussions and experience sharing.

A pre-training questionnaire (see Annex IV) was prepared to gather information on the level of awareness and implementation of ISO 14001:2015 based EMS application in industrial parks.

A post-training workshop evaluation questionnaire (see Annex V) was also used to assess the level of awareness created among participants of the workshop on implementation and certification requirements of ISO 14001:2015 based EMS. The responses to this evaluation revealed that all participants were able to gain some knowledge about cleaner production, ISO 14001:2015 standard and related certification, and sustainable development goals. All participants commented that the time allocated for the workshop was very short (_8 hours) relative to the importance and necessity of the subject matter. Moreover, the participants highlighted that all presentations were useful and relevant, and the Kombolcha Textile S.C presentation in particular was very helpful to gain knowledge on the practical side of EMS implementation. The presentations on the workshop were rated as very valuable and pertinent. It was also suggested that it would be beneficial if a similar workshop were to be organized for government, public and private enterprises.

6. Case Study on EMS Certification in a Model Local Industry and International Group Certification Experience

Case of Kombolcha Textile Share Company: The textile industry is one of the most pollutant-releasing industries of the world. According to the World Bank, over 20% of global water pollution is caused by the textile industry.[5]
Kombolcha Textile Share Company (S.C.), located in the northeastern part of the country was established in 1984, and manufactures textile products such as bed sheets, terry towels, mattress covers, curtains, abujedid (cotton clothes), twill and other products. The company has an annual capacity of 25,000,000 m^2 of textile products and employs about 1,521 workers.

Kombolcha Textile S.C. is one of 12 enterprises to be certified with ISO 14001 based Environmental Management System in 2005 and 2007 through the assistance of the Ethiopian Cleaner Production Center (ECPC) in the previous Science and Technology Commission (now Ministry of Science and Technology). The company has maintained its EMS certificate for more than a decade. Its experience on the process of implementation and EMS certification was presented at the ToT training workshop of the "Greening of the Urban and Industrial Transformation Agenda Project."

According to the presentation, customers' strong demand, environmental pollution, poor utilization of resources and national and international legal and other requirements are some of the driving forces for implementing EMS in the company. Major achievements gained through the implementation of EMS in Kombolcha Textile S.C. include effective control of the effluent by treating waste water, recycling (treated waste water for irrigation, caustic soda and used water from the swimming pool and discharges from some machines) and greening of nearby mountain areas. Ability to meet customers' demand, reducing barriers for export marketing, helping the company address its corporate social responsibilities, reducing waste and improving working conditions for employees are some of the benefits achieved through the implementation of EMS.

[5] http://cen.acs.org/articles/93/i41/Cutting-Textile-Pollution.html

Implementation of ISO 14001 at Kombolcha Textile S.C. has been a success story. It has provided an effective framework for developing environmentally benign processes and products, improving environmental performance, complying with environmental standards and achieving economic benefits (See Annex III).

Hackefors approach of Joint EMS Implementation: Implementing a joint environmental management system (EMS) is another type of regional environmental management. In practice, every company has their individual environmental management system, e.g. ISO14001:2015. The environmental management systems are implemented in cooperation, and most of the administration is centralized.

Enterprises in IPs can develop and implement EMS certification through a joint effort due to their geographic proximity and possibility of resource pooling (see Box 1).

Box 1: Example of Joint EMS Implementation

Hackefors in Sweden is an example of an industrial district where EMS has been implemented cooperatively.

The prominent network model is the so-called "Hackefors approach," a system of joint ISO 14001 certification, first established in 1995 in the Hackefors industrial district outside the city of Linköping, Sweden. The network was designed to help small participating firms achieve certification by working on the assumption that group involvement would be both easier and cheaper for member firms. The original Hackefors network consisted of 26 small- and medium-size enterprises (SMEs), drawn from a wide range of business sectors, including manufacturing, transportation, construction and graphics industries. By the beginning of 1999, the group was certified according to ISO 14001, and each enterprise within the network had an environmental management system with its own ISO approval. At present, some 24 SME networks in Sweden are believed to be using the Hackefors approach.

In practice, all companies have an environmental coordinator, and the coordinators form an EMS group. A steering committee is chosen from this group which then selects a central coordinator. The central coordinator can be selected from the companies in the network or from the outside, e.g., in Hackefors it was chosen by a consulting firm. Decisions are prepared by the steering committee and taken by the EMS group. The central coordinator prepares documents, identifies and communicates common legal requirements, raises interest and commitment, calls meetings and plans environmental training. The coordinator also heads the steering committee. The steering committee develops the EMS and plans environmental auditing.

7. Benefits and Challenges of Implementing ISO 14001:2015 based EMS Certification in the Industrial Parks in Ethiopia

Benefits: The Government of Ethiopia has taken a transformative leadership and bold measures to gain significant benefits in the economic sphere. To discharge this objective, the Government reviewed its national development plan and embarked on a 5-year growth and transformation plan (GTP II) and a Climate Resilient Green Economy (CRGE) strategy that guided to identify opportunities and entry points for green industrialization, and thus developed an economy-wide green growth vision.

To actualize this vision, the government established the IPDC in 2014. Currently, IPDC is vigorously working in developing 12 industrial parks in different regions of the country. These industrial parks will need to take off in climate resilient and sustainable path where equipped with an integrated and efficient energy transmission, water supply, waste disposal features, efficient solid and liquid waste treatment technologies, good community relations and corporate social responsibility (CSR).

ISO 14001:2015 based EMS is one of the tools that equip IPDC and the industries residing in the parks to achieve the vision of the government towards green industrial development. If EMS certification is practiced in the manufacturing industries in the parks, it helps to achieve good environmental performance through more efficient use of resources, i.e., energy and water, reduction of waste and emissions to air, water and soil pollution. It also helps to ensure employees' well being, park communities' and customers' satisfaction as well as ensure the economic viability of the parks through cost effective and competitive performance.

Challenges: The fundamental challenge to implement ISO 14001:2015 based EMS certification in the industrial parks is lack of knowledge and skill about the EMS standard in the IPDC as well as in the manufacturing industries. Moreover, lack of skilled staff in the organizational set-up of the IPDC to lead the implementation of the standard in the IPs is another challenge.

8. Capacity and Needs of IPDC to lead the Implementation of ISO 14001:2015 based EMS Certification Processes in Industrial Parks in Ethiopia

To implement ISO 14001:2015 based EMS in IPDC and in the manufacturing enterprises of the IPs, IPDC and the enterprises need to develop adequate working knowledge of the standards, build partnership with national and international institutions (e.g., Cleaner Production Unit under ESA, UNIDO, UNEP) for technical support and capacity building.

To support the development and certification of EMS in the IPs, IPDC should identify existing entities that provide environmental technical support. The technical support providers can assist in building the capacity of employees for implementing EMS in enterprises. There is a need to contact certifying bodies (international EMS auditing firms for the immediate present) to facilitate the certification of the enterprises.

The creation of working relationships with regulatory bodies, such as the MOEFCC as well as Regional Environmental Bureaus, could help enterprises to make the necessary preparations for

the fulfilment of environmental standards by identifying national regulations and norms. Moreover, the IPDC should build common facilities in its jurisdiction in the IPs as well as facilities outside the IPs required for EMS certification. Furthermore, there is a need for the IPDC to play a coordinating role in facilitating group EMS certification for the IP enterprises by minimizing cost of implementation and certification through sharing resources.

9. Recommendations

As pointed out earlier in Section 3 above, there are a number of constraints for developing and implementing ISO14001:2015 based EMS in Ethiopia. In order to overcome the existing challenges that enterprises face and enable them to attain EMS certification, many activities have to be undertaken by all the pertinent stakeholders at different levels. The major activities that need to be undertaken are:

1. Creating and increasing awareness of companies on the benefit of EMS certification;
2. Establishing private and public environmental technical support providing entities;
3. Building capacity of employees for implementing EMS in enterprises on a continuous basis;
4. Enhancing the enforcement of laws and regulations towards the fulfilment of environmental standards by companies;
5. Establishing common facilities in the industrial parks required for EMS certification; and
6. Facilitating group certification of IP enterprises.

9.1. Creating and Increasing Awareness of Companies on the Benefits of EMS Certification

The implementation of EMS hinges on the concept of protecting the environment, but businesses exist for the purpose of making profits and creating wealth. Accordingly, when one approaches leaders of businesses to implement environmental tools, the first reaction is that implementation requires incurring additional costs. The counterargument is rather that environmental technical tools such as Cleaner Production (CP) and EMS are meant to reduce costs through resource efficiency and thereby achieve also environmental sustainability.

Cleaner Production can be achieved in any single, or combination of, the following ways: good housekeeping and operating procedures, materials substitution, technology changes, on-site recycling and product or service redesign. Pollution and risks to human health and safety are reduced at the source, rather than the end of the production process, i.e., at the end-of-pipe stage. The adoption of Cleaner Production typically involves improving maintenance practices, upgrading or introducing new technology, changing production processes and/or modifying management and quality control procedures.

Cost savings are one of the most important direct economic benefits from implementing a CP project. Lower water consumption, higher energy efficiency or a reduced need for input materials result in lower operating expenses. The improved efficiency of the plant's operation, through the implementation of both technical and management measures, is another benefit. This may in turn lead to lower labour requirements to maintain production.

Cleaner Production provides enterprises with techniques that help them reduce waste and increase resource efficiency, whereas EMS as a management system provides a standardized structure for implementing CP exercises on a continuous basis. In general, enterprises that implement EMS and get certification attain the following benefits:

- *Compliance to laws and regulations:* national and international laws are getting more stringent and stricter with regard to meeting set standards of emissions, effluents and wastes they generate in their production processes and services.
- *Access to more demanding global markets:* consumer preferences especially in developed countries have been shifting toward products that are produced by applying environmentally friendly processes. Ethiopia currently follows an export-oriented industrialization strategy. Accordingly, investors are being attracted to occupy the many industrial parks which are 'plug-and-play' types in order to generate employment opportunities and foreign exchange. Therefore, the tenants of the IPs would benefit from EMS certification as it serves them as a "*green passport"* for exporting their products to developed countries.
- *Minimizes accidents and problems*: The capacity of enterprises to undertake environmental, health and safety (EHS) measures is enhanced and thus they are able to minimize accidents and hazards in their premises.
- *Easily implement other management systems like ISO 9001*: enterprises that implement ISO 14001:2015 can also easily implement other management systems. They can even integrate the systems and reduce resources, number of documentation and paperwork.

9.2. Establishing Private and Public Environmental Technical Support Providing Entities

Harnessing and utilizing existing private and public environmental technical support providers: as mentioned above, the non-existence of public and private entities that can provide environmental technical support is the main problem at present. However, the IPDC can harness experts working in different companies who have the professional capabilities to assist and facilitate implementation of cleaner production and EMS by coordinating with the enterprises in each IP so that the enterprises implement EMS and obtain the ISO 14001:2015 certification.

On the other hand, the IPs have by design put in place physical structures such as centralized waste water treatment plants (WWTP), sanitary waste system (SWS), fire fighting system, health facilities, common parking lots, and signage that enterprises need not invest in. The role of the IP administration would be in coordinating with its tenant enterprises to develop common environmental policy and operational procedures in order to facilitate the implementation of EMS.

The IPDC is in a good position to coordinate and facilitate the awareness creation process in the IPs as well as pooling expertise from different companies and resources from the enterprises to undertake trainings and implementation of cleaner production and EMS in an organized way. Moreover, the Cleaner Production and Project Unit of the Ethiopian Standard Agency can also play a pivotal role in providing training and guidance as well as in the identification of resourceful experts that have the knowledge and experience in implementing CP and EMS.

What is important is that the IPDC takes the leadership role in organizing; coordinating and facilitating the implementation of CP and EMS in the IPs to enable the enterprises attain EMS certification.

Establishment of accredited certifying bodies for EMS: At present, there are no certifying bodies for EMS in Ethiopia. So far, companies who implement or maintain EMS systems rely on foreign auditors for certification and recertification. This involves high costs in foreign exchange and lengthy time frames for auditing the system in the enterprises. On the other hand, the Conformity Assessment Enterprise (CAE), under the Ministry of Science and Technology (MoST) is accredited to certify Quality Management Systems (QMS) for enterprises. Therefore, enhancing the capacity of CAE to also certify EMS standards could encourage enterprises to undertake EMS and get certification at lower cost. This will reduce the time required for processing the EMS certification. Likewise, the Ethiopian Accreditation Office under the MoST could strengthen its capacity and capability in order to accredit certifying bodies in Ethiopia.

9.3. Building Capacity of Employees for Implementing EMS in Enterprises on a Continuous Basis

Many small-and medium-size companies, especially in developing countries, cannot afford to design, build and operate their own pollution control systems. For such companies, environmental compliance problems could be handled more easily, and more cost-effectively, by locating in appropriately managed industrial parks. Industrial parks with sound environmental management systems including energy efficiency measures, resource conservation, waste minimization, cleaner production and information centers, and preparedness for accidents prevention can be developed.

The formation of industrial parks creates environmental benefits and is influenced by a number of drivers and barriers. The tangible environmental benefits include:

- Reducing greenhouse gas emissions and toxic air emissions;
- Promoting green technology development and diffusion;
- Improving energy, materials and water use efficiency and conservation; and
- Promoting pollution prevention on a system or community basis.

In the framework of industrial parks development, the industrial parks management body plays a vital role. A pivotal element for the industrial projects can be represented by one sole coordinator responsible for the managerial and organizational elements. The industrial parks management body aims at grouping the needs of settled enterprises and satisfies common requests. The management body of the industrial park committee can express views on and promotes practices such as:

- Collective environmental policies of the companies;
- Communication material and plan; and
- Regular meetings of all the companies.

Collective decision in cooperation will commit the companies in the park to:

- Develop cooperation to increase material and energy efficiency;
- Prevent environmental degradation;
- Minimize the environmental load;
- Enhance the involvement of the personnel; and
- Follow environmental legislation.

The IPDC and the administrative staff of each IP should endeavor to increase awareness of EMSs and knowledge of the requirements for implementing the system by working closely with enterprise management through arranging platforms for discussion on the benefits of cleaner production and EMS on continuous bases. This will result in gaining support from top management of IP enterprises and remove resistance to change, if any. In the same manner, the commitment of the top management for continual improvement in their environmental performance can be obtained.

On the other hand, the lack of skill and knowledge of CP and EMS in the enterprises can be overcome by providing repeated short term trainings to employees. Thus, skilled human

resource in the IPs for the implementation of EMS can be obtained. To realize this, the leadership role of the IPDC is of paramount importance by way of developing common environmental policies in the IPs and introducing systems of resource allocation and sharing for implementing EMS as a joint effort.

Notwithstanding the above, the skill and knowledge base in the IPDC itself should be enhanced with regard to coordinating and facilitating the implementation of CP and EMS in the IPs. Luckily, the structure of IPDC with a pertinent directorate, namely, the Environmental Protection and Social Safeguards is in place albeit an adequate number of staff for this important role assisting IPs supports their tenant enterprises to implement EMS and gain the essential certification for the envisaged export of their product in the global market.

9.4. Enhancing the Enforcement of Laws and Regulations towards the Fulfilment of Environmental Standards by Companies

Increased awareness of environmental issues and increasingly stringent regulations are now pushing industrial parks to look for cost-effective ways to improve their environmental performance. As mentioned in the preceding section, enterprises located in IPs can comply with the rules and regulations by working as a team.

It is known that Pollution Prevention and Control Proclamation No. 300/2002 and the Council of Ministers Regulation on Pollution Prevention No. 159/2008 provide ample information on the compliance requirements. At present, enterprises in the IPs are mostly engaged in textile and garment production. The norms (standards) for effluents and emissions as per the regulation (see Annex VI) are available for the enterprises to comply with and make provisions in their respective sheds. The management of the IPs need to communicate with the Ministry of Environment Forest and Climate Change (MoEFCC) and/or the Regional Environmental Bureaus to create working relationships so that enterprises in the IPs are made aware of their compliance needs.

Accordingly, the management of the IPDC should take the initiative to bring together the collective group of the enterprises in the IPs to a consultative meeting with the environmental regulatory bodies so that they obtain guidance with regard to their environmental aspects and limits of discharges and emissions within their working premises.

9.5. Establishing Common Facilities in the Industrial Parks Required for EMS Certification

The IPs under the administration of the IPDC have been designed such that enterprises to be housed in the parks have access to infrastructural needs such as power and water supply, internal roads and lighting, surface water drainage system, traffic and directional signs, sanitary systems that serve all the sheds in the IPs. They are, therefore, attractive to investors wherein the sheds serve as “plug-and-play” readymade facilities that lessen time of implementation. Moreover, the IPs provide logistical services related to customs, banking, transportation maritime and forwarding services that reduce bureaucratic processes. Each IP has administrative system that manages and coordinates support for investors.

From the point of view of environmental management, it is to be noted that the IPs operate common facilities, such as waste water treatment and solid waste disposal for which the IP administration takes the responsibility of complying with regulatory norms. However, the performance of the waste water treatment and solid waste disposal systems must fulfill international standards in order for the enterprises to meet requirements of EMS certification as well as fulfill other customer requirements in addition to regulatory aspects.

An example in this regard could be the successful implementation of zero-liquid-discharge (ZLD) waste water treatment facilities built in the IPs. But, since the disposal of the tonnes of solid wastes generated daily in the form of sludge by this state-of-the-art technology is not managed in an environmentally friendly manner, it would be difficult for the IPDC to facilitate the EMS certification of the enterprises of the IPs unless a holistic approach is put in place and implemented as soon as possible. The mere disposal of the sludge outside the premises of the IPs in dump yards cannot be acceptable from the point of view of ensuring environmental sustainability of the production processes of the IP enterprises for EMS certification. Therefore, the IPDC must embark on the design and construction of proper landfills for solid waste disposal from the IPs under its administration and thereby ensure that enterprises in the IPs meet both national and international requirements for EMS certification.

In general, the IPDC must ensure that the construction and implementation of IPs take into account the recommendations of the environmental and social impact assessment reports so that common facilities such as waste water treatment and soil waste disposal systems achieve performance standards that meet the national and international EMS requirements for certification.

9.6. Facilitating Group Certification of IP Enterprises

Enterprises housed in the IPs share common facilities for their environmental management related to waste generated in their production processes. This contributes greatly to their attempt to obtain EMS certification provided they fulfill the requirements of ISO 14001:2015 standard within their respective sheds. The enterprises in each specialized IP are engaged in similar production activities, e.g., textile and garment. Therefore, they can share resources to undertake EMS implementation and certification working jointly (See Box 1). It is possible to develop a common environmental policy and pool resources in order to minimize costs and time of implementation that would have been higher for undertaking on separate basis. Thus, each enterprise in the IP will be able to obtain the EMS certification individually.

It is, therefore, recommended that the IPDC and the IP administrations should coordinate with enterprises to establish a joint working scheme so that enterprises can pool resources and ultimately obtain their individual EMS certifications.

Annex I: Terms of Reference for Short Term Training ISO 14001:2015 Environmental Management System Application within Industrial Parks of Ethiopia

Background & Context

The Government of Ethiopia has embarked on a 5-year growth and transformation plan (GTP), which aims to achieve 11.2-14.9% GDP growth annually to attain a middle-class income status by 2025. Among the different development directions of the GTP, one highlighted growth area is the manufacturing sector. The GTP calls for the manufacturing sector to grow by 21.9% annually and to broaden its the role in the structure of the national economy.

Ethiopia's development endeavors are also planned to be conducted in a climate resilient green path. To achieve this, a Climate Resilient Green Economy (CRGE) strategy has been designed. The CRGE strategy, put in place in 2010 and now mainstreamed in the second five-year national development plan (GTP II), takes a sectoral approach to address the different climate resiliency and mitigation requirements of the different economic sectors of the country.

Accordingly, the manufacturing sector CRGE plan seeks to address the expected increasing GHG emissions from the sector for the GTP years. As per the CRGE strategy, greenhouse gas (GHG) emissions from the sector will be driven by the envisioned growth in the number of manufacturing industries and the volume of production in existing industries. The annual GHG emissions from the manufacturing sector are projected to rise, under business as usual (BAU) conditions, from around 4 Mt CO_2e in 2010 to 71 Mt CO_2e in 2030.[6]

Ethiopia's intended nationally determined contribution (EINDC) targets to limit the country's net GHG emissions by 255 Mt CO_2e or 64% of the BAU scenario in 2030. Out of this set reduction target, the industrial sector will account for 20 Mt CO_2e emissions reductions by 2030.

To realize the above duty, the government came up with the decision to develop industrial parks that provides the necessary services and facilities for industries.

Hence, the Industrial Parks Development Corporation (IPDC) was established in 2014 by the Council of Ministers (Regulation 326/2014), with a mandate to develop, operate and administer wide ranges of industrial parks in the country through lease, transfer and sale of land and construction. The IPDC is designated to prepare a detailed national industrial parks master plan based on the national master plan of the Regional States and the two City Administrations (Addis Ababa and Dire Dawa). The Corporation also is empowered to serve as an industrial land bank in accordance with the agreement concluded with Regional States and the City Administrations. Currently, IPDC is vigorously working to develop 100,000 hectares of land between 2016 and 2025, for a total factory floor area of 20 million m^2.

On the other hand, the Ministry of Industry (MoI) plans to construct 17 Integrated Agro Industrial Parks (IAIPs) that will be built in all states. Four states, Amhara, Oromia, Tigray and Southern Nations, Nationalities and Peoples' Region (SNNPR), have already laid cornerstones to

[6] Million metric ton of carbon dioxide equivalent

commence the construction of their own pilot integrated agro-processing industrial parks. In this regard, the MoI plans to develop an area of 1,000 hectares of land in each of four agro-industrial parks; 250 hectares of land will be developed during the first phase. Based on agro-ecology of the parks, pulses, oil-seeds, poultry, meat, milk, honey, vegetables, fruits, and coffee, among other processing factories will be established. Some 60 large or 120 medium size factories will be established during the pilot level.

Rationale

The planned short-term training initiated by the Climate and Development Knowledge Network (CDKN) aims to build the capacity and capability of the industrial park developers, IPDC, MoI and selected private sectors in the industrial parks to achieve the set sector GHG reduction targets through the implementation of ISO 14001:2015 Environmental Management System.

The rise of an official environmental management system (EMS) certification follows the earlier initiative in 1992 Rio Earth Summit which emphasized the need for environmental commitment.[7] EMS refers to a holistic approach for an organization to manage its environmental impacts.[8] It allows organizations to perform a continuous improvement on its environmental performance. The standard provides a framework to ensure that an organization meets their environmental objectives through a consistent control of operations ISO 14001, the most widely adopted environmental standard worldwide. It is a voluntary management tool for an organization to measure, evaluate, and improve its environmental performance.[9] The standard mandates five requirements: environmental policy, planning, implementation, checking and corrective actions, and management review. Adoption of the certification leads not only to environmental performance improvement, but also to enhanced organizational performance. Furthermore, via the adoption of ISO 14001 standards, companies also are able to demonstrate their corporate environmental responsibility to discerning customers, thereby enabling them to attract more buyers and build legitimacy with stakeholders. In recent years, the global adoption of ISO 14001 standards have exponentially increased. Hence, it can be argued that in the near future, the adoption of the standard will be the norm rather than exception.

The ambitious GTP II, which aims for rapid green industrialization through the development of industrial parks, is a new initiative to the country. Hence, the industrial parks are expected to take off in a climate resilient path as well as to mitigate their environmental impacts. In this regard, the parks should be backstopped with different GHG regulatory drivers such as ISO 14001 Environmental Management System to achieve the GHG reduction targets.

[7] Massoud M.A., Fayad R., El-Fadel M., Kamleh R., 2010, Drivers, barriers and incentives to implementing environmental management systems in the food industry: a case of Lebanon. Journal of Cleaner Production, 18(3), 200-209

[8] Agan Y., Acar M.F., Borodin A., 2013, Drivers of environmental processes and their impact on performance: a study of Turkish SMEs. Journal of Cleaner Production, 51, 23-33

[9] Jones N., Panoriou E., Thiveou K., Roumeliotis S., Allan S., Clark J.R.A., Evangelinos K.I., 2012, Investigating benefits from the implementation of Environmental Management Systems in a Greek University. Clean Technologies and Environmental Policy, 14(4), 669-676

Objective

The training seeks to increase awareness and knowledge of Environmental Management System (EMS) in the industrial parks (IPs) and thereby meet the Sustainable Development Goals of #9 and #13 in Ethiopia.

Specifically, the training aims to:

i. Introduce participants to the importance and benefits of an ISO 14001:2015 EMS;
ii. Create awareness on key requirements, terms and definitions of ISO 14001:2015;
iii. Enable participants to identify the structure and requirements of an effective environmental management system and what this means to them;
iv. Introduce participants to main concepts such as process approach, Plan-Do-Check-Act, lifecycle perspective, aspects and impacts;
v. Introduce principles that support the identification of risk and opportunities and the different techniques/methodologies needed to address them; and
vi. Empower leadership by addressing the skills needed by those operating in Quality, Environmental and Health and Safety roles for the forthcoming evolution of management systems standards and their respective commercial impacts.

Training Scope

The training aims to cover the following subject areas by incorporating knowledge from global experiences:

- ISO 14001:2015 EMS in industrial parks and in their industries;
- Series of standards on environmental management tools and systems;
- ISO 14001:2015 EMS Gap assessment: readiness for certification;
- Integrated management system;
- Top management commitment to continuous improvement, compliance, and pollution prevention;
- Creating and implementing environmental policies, including setting and meeting appropriate targets;
- Integrating environmental considerations in operating procedures; and
- Training employees regarding their environmental obligations.

Annex II: PowerPoint Presentation on "The Greening of the Urban and Industrial Transformation Agenda Project"

Provided under separate cover

Annex III: PowerPoint Presentation on "Kombolcha Textile Share Company's Experience Sharing Session on Environmental Management Practices"

Provided under separate cover

NB: The two annexes above refer to the power point presentations made at the Training-of-Trainers workshop and are attached separately to this report for reference.

Annex IV: Questionnaire for Gathering Information on the Level of Awareness and Implementation of Environmental Management System (EMS) ISO 14001:2015 Application within Industrial Parks of Ethiopia

Objective: The purpose of this questionnaire is to gather information on the level of awareness and implementation of ***Environmental Management System (EMS)***, pre-training, among stakeholders in relation to development of industrial parks.

1. Have you ever attended any training on environmental protection or ***Environmental Management System (EMS)***?

   Yes ☐ No ☐

2. Is your organization//enterprise exporting or planning to export its products?

   Yes ☐ No ☐

   2.1. If **yes**, what standard requirements are you obliged to fulfill? *(circle all that apply)*

   a) Quality Management System (QMS): 9001:2005
   b) Food safety management systems (FSMS): 22000:2005
   c) Environmental Management System (EMS): 14001:2015
   d) None

   2.2. If **no**, what are the constrains to implement International Standards in the organization *(circle all that apply)*

   a) Lack of awareness
   b) High cost of implementation and certification
   c) Lack of skill in the workforce
   d) Lack of technical service providers for implementation
   e) Lack of regulatory pressure so far
   f) Lack of requirement by customers
   g) Other,
      please specify……

3. Which ***International Standard*** do your customers request to be fulfilled? *(circle all that apply)*

   a) Quality Management System (QMS): 9001:2005
   b) Food safety management systems (FSMS): 22000:2005
   c) Environmental Management System (EMS): 14001:2015
   d) None

4. Does your organization have a dedicated focal person, section or department in charge of environmental issues?

   Yes ☐ No ☐

5. What are the most important standard requirements to be certified with ISO 14001:2015 environment management system?

6. What do you think are the benefits of being certified with ISO 14001:2015 environment management system?

7. What type of organizations do you think can be certified with ISO 14001:2015 environment management system?

8. Do you know the concept of ***Sustainable Development (SD)***?

   Yes ☐ No ☐

9. What do you understand about ***Sustainable Development Goals (SDG)***?

10. How does your organization contribute towards the fulfillment of ***Sustainable Development Goals (SDG)***?

11. How does the implementation of environmental management system requirements contribute towards the fulfillment of SDGs?

12. Cleaner production (CP) is a methodology that helps in the successful implementation of EMS. What is the relationship between CP and EMS?

13. How do CP and EMS contribute towards environment protection?

14. Do you know that there are laws and regulations pertaining to Environmental protection?

    Yes ☐ No ☐

    14.1. If **yes**, please list the most important

15. Has your organization prepared an Environmental Management Plan (EMP) submitted to the pertinent environmental regulatory body?

    Yes ☐ No ☐

    15.1. If **yes**, how is it managed and audited?

16. Does your organization keep records of wastes (solid, liquid and emissions) it generates, if any?

    Yes ☐ No ☐

17. Has your organization been inspected by the pertinent environmental regulatory body in the recent past?

    Yes ☐ No ☐

Annex V: Post-training Workshop Evaluation Form for Gathering Information on the Level of Awareness Created among Participants of the Workshop on Implementation and Certification Requirements of Environmental Management System (EMS) ISO 14001:2015

Objective: the purpose of this evaluation form is to gather information on the level of awareness, post-training, created among participants of the workshop on the implementation of ***Environmental Management System (EMS)***

Date: _____

Enterprise or institution: _____

1. Which environmental tool do you think can be implemented in the enterprises of the Industrial Parks? *(circle all that apply)*

    a. General awareness creation about environmental concerns
    b. Cleaner production techniques to tackle environmental issues in your enterprise/institution
    c. EMS development and implementation for achieving certification in the long run for your enterprise
    d. All of the above

2. Which part of the presentations did you like most? And why?

3. Which part of the presentation do you think is the least useful? And why?

4. What are your overall feelings about the workshop?

5. What is your takeaway for implementation from the training workshop?

Please indicate your overall views on the workshop and rate the elements of the training in a scale of 1 to 5

No.	Workshop evaluation criteria	Poor	Fair	Good	Very good	Excellent
		1	2	3	4	5
1	Length					
2	Content					
3	Presentations					
4	Organization					
5	Overall benefit from the training					
6	Other comments					
	1					
	2					
	3					

Thank you for your feedback!

Annex VI: Standards for Effluents and Emissions of Leather and Textile Industries

1. TANNING AND LEATHER FINISHING

Limit Values for Discharges to Water

Parameter	Limit value
Temperature	40 °C
pH	6 – 9
BOD_5 at 20°C	90% removal or 200 mg/l, whichever is less
COD	500 mg/l
Suspended solids	50 mg/l
Total ammonia (as N)	30 mg/l
Total nitrogen (as N)	80% removal or 60 mg/l, whichever is less
Total phosphorus (as P)	80% removal or 10 mg/l, whichever is less
Oils, fats, and grease	15 mg/l
Mineral oils at oil trap or interceptors	20 mg/l
Chromium (as total Cr)	2 mg/l
Chromium (as Cr VI)	0.1 mg/l
Chlorides (as Cl)	1000 mg/l
Sulphides (as S)	1 mg/l
Phenols	1 mg/l

Limit Values for Emissions to Air

Parameter	Limit value
Total particulates	50 mg/Nm^3
Volatile organic carbons	75 g/m^2 product produced
Total hydrogen sulphide, sulphides and mercaptans (as S)	5 ppm v/v
Ammonia	40 ppm v/v
Acid vapors (as HCl)	30 mg/Nm^3

Source: Federal Environmental Protection Authority (now Ministry of Environment, Forest and Climate Change) 2008, Addis Ababa

2. THE MANUFACTURE AND FINISHING OF TEXTILES

Limit Values for Discharges to Water

Parameter	Limit value
Temperature	40 °C
pH	6 – 9
BOD_5 at 20°C	90% removal or 50 mg/l, whichever is less
Total nitrogen (as N)	80% removal or 40 mg/l, whichever is less
COD (mg O_2 /l)	80% removal or 150 mg/l, whichever is less
Total phosphorus (as P)	80% removal or 10 mg/l, whichever is less
Suspended solids	30
Total ammonia (as N)	20
Oils, fats & grease	20
Phenols	1

Parameter	Limit value
Mercury (as Hg)	0.001
Nickel (as Ni)	2
Cobalt (as Co)	1
Lead (as Pb)	0.5
Antimony (as Sb)	2
Tin (as Sn)	5
Chromium (as Cr VI)	0.1
Chromium (as total Cr)	1
Arsenic (as As)	0.25
Cadmium (as Cd)	1
Zinc (as Zn)	5
Copper (as Cu)	2
Mineral oils (Interceptors)	20
Benzene, toluene & xylene (combined)	1
Mineral oils (Biological Treatment)	5
Organochlorine pesticides (as Cl)	0.03
Mothproofing agents (as Cl)	0.003
Organophosphorus pesticides (as P)	0.003
Adsorbable organic halogen compounds (AOX)	5
Sulphide (as S)	2

Limit Values for Emissions to Air

Parameter	Limit value (mg/Nm^3)
Particulate matter	50
Volatile organic carbons (as C) (excluding formaldehyde)	50
Formaldehyde	20
Isocyanates (as NCO)	0.1

Source: Federal Environmental Protection Authority (now Ministry of Environment, Forest and Climate Change) 2008, Addis Ababa

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