MISSION REPORT

IGPN DELEGATION VISITS INDIA

6-8 March, 2006













One-Day Workshop on

GREEN MANUFACTURING & MANAGEMENT ELECTRONICS INDUSTRY

Organized by

Centre for Electronics Test Engineering, Pune in association with

Mahratta Chamber of Commerce, Industries and Agriculture



with support from
Japan Fund for Global Environment &
International Green Purchasing Network (IGPN)









Report Prepared by:

Mandar Parasnis (mandarvp@yahoo.com) E2KM Group, Pune, India

INITIATING GREEN PURCHASING ACTIVITIES IN INDIA

Since April 2005 there has been a series of interactions / discussions between Prof. Ryoichi Yamamoto, University of Tokyo, Mr. Hiroyuki Sato, Secretary-General, IGPN and Mr. Mandar Parasnis of E2KM Group, Pune India (formerly with Asian Productivity Organization, Tokyo) regarding organizing some activities in India towards the establishment of Indian Green Purchasing Network as the local counterpart of IGPN in India.

The International Green Purchasing Network (IGPN - www.igpn.org) is an organization which promotes Green Purchasing around the globe by coordinating those who take the initiative in implementing Green Purchasing toward sustainable consumption and production. The network consists of international organizations, businesses, governmental organizations, local authorities and NGOs. IGPN is expanding its global network and has been keen to establish some activities in India.

Accordingly, Mr. Parasnis held a series of discussions with the top management of Mahratta Chamber of Commerce, Industries and Agriculture (MCCIA – www.mcciapune.com) who showed a keen interest in this idea.

Mahratta Chamber of Commerce, Industries And Agriculture (MCCIA – www.mcciapune.com) has been in the service of the Trade and Industry for over six decades. Established in 1934, MCCIA today has more than 2000 members and has been recognized as one of the most prominent Chambers of Commerce in India. The Chamber renders service to its members not only in giving assistance and advice but also in representing - at the ministerial and Departmental level - the views of its members. MCCIA members form a complete cross-section of the business community in Western India.

In order to organize some concrete activities in India, Mr. Parasnis and Mr. Vinayak Kelkar, Director, MCCIA held numerous meetings and factory visits since July 2005 for planning and developing a strategy towards establishment of Green Purchasing Network, India. As an outcome of this exercise, it was decided to initiate some activities targeting Electronics sector to start with. Specifically, it was decided to organize a Workshop on Green Manufacturing and Management for Electronics Industries in and around Pune in Western India as an initial awareness-creation activity.

Subsequently, Mr. Kelkar coordinated with Center for Electronics Test Engineering, Pune – an autonomous training center under the Government of India, which was promoted by MCCIA – who agreed to organize a one-day workshop on Green Manufacturing for Electronics Industry in Pune in March 2006.

CETE, Pune was set up in September 2001 under an Indo-German technical collaboration by STQC Directorate, Dept. of Information Technology, Ministry of Communication & IT, Government of India. Main objective was to bridge the gap between industry & academia on one hand and also continuously update the knowledge-based skill of industry personnel on the other, through knowledge based skill oriented training programs. Centre also provides support for EMC/EMI testing, consultancy and development activities and has a vast network in the electronics industry in Western India.

SUPPORT FROM IGPN

Parallel to the preparations in India, IGPN Secretariat in Tokyo was approached and was requested for support in organizing the workshop in Pune – specifically by deputing a few Japanese experts to share the experiences regarding Green Supply Chain and Green Purchasing in Japanese electronics industries.

IGPN Secretariat supported by the Japan Fund for Global Environment thus decided to depute four expert speakers from Japan for this workshop and other meetings in the sideline of this event to plan for the next steps towards the establishment of Green Purchasing Network, India.

MISSION MEMBERS

The IGPN delegation visiting India comprised of the following four members:

- 1. Mr. Kiyoto Furuta, Deputy Senior General Manager, Environment Management and Engineering Center, Global Environment Promotion Headquarters, Canon Inc.
- 2. Mr. Taro Hatano, Chief, Market Information Department, Murata Manufacturing Co., Ltd.
- 3. Mr. Hiroyuki Sato, Secretary General, Green Purchasing Network (GPN), Japan and Secretary General, International Green Purchasing Network (IGPN)
- 4. Mr. Akira Kataoka, Manager, International Green Purchasing Network (IGPN)

ACTIVITIES DURING THE MISSION

Following was the schedule of activities during the mission by the IGPN delegation:

5 March, 2006

• Arrival in Pune, India from Tokyo

6 March, 2006

- Coordination meeting with CETE and MCCIA at CETE
- Visit to InfoTech Park at Hinjawadi on the outskirts of Pune
- Visit Infosys Technologies

7 March, 2006

• Workshop on Green Manufacturing and Management for Electronics Industry at CETE, Pune

8 March, 2006

- Meeting at MCCIA for planning the future activities and establishment of GPN, India
- Departure for Tokyo

ACTIVITIES ON 6 MARCH, 2006

COORDINATION MEETING AT CETE (1030-1230)





IGPN delegation visited the CETE campus and had a meeting with Mr. Banerjee, Director of CETE, and Mr. Kukade, Joint Director, who welcomed the delegation to CETE. Later, Mr. Banerjee presented the activities of the Center – highlighting the various courses conducted by the CETE. This was followed by a walk-

through of the Center's laboratory facilities and a visit to the venue of the workshop. After the visit, CETE hosted a welcome luncheon for the IGPN delegation at a nearby restaurant.

VISIT TO INFOTECH PARK & INFOSYS TECHNOLOGIES (1400~1700)





The IGPN delegation visited the InfoTech Park at Hinjawadi, Pune – which houses a number of Indian and international IT companies, which are leading the IT services revolution in India.







In the evening, Mr. Mr. Pravin Dhole, Chairman of the Electronics Sub-committee of MCCIA and Partner & Managing Director, TechnoFour Ltd., hosted a welcome dinner for the delegation.

WORKSHOP ON 7 MARCH, 2006

CETE and MCCIA organized the Workshop on Green Manufacturing and Management for Electronics Industry in cooperation with IGPN, supported by Japan Fund for Global Environment.

The CETE had widely advertised this workshop through its mailing lists, personal networks as well as through the newspaper advertisements. MCCIA had also promoted the event through its in-house magazine and mailing lists.

The workshop was attended by around 25 participants from various electronics industries and related organizations / agencies in the region including those from CETE and MCCIA. Considering that this was the first of its kind in Western India on the topics of green purchasing and green supply chains and that it was not free, the participant number of around 25 was considered to be very good in the local situation.

INAUGURAL SESSION

The workshop was inaugurated by welcoming all the international and local speakers with flowers by Mr. S. A. Kukade, Joint Director, CETE.

Mr. Banerji, Director, CETE delivered the Welcome Addresses wherein, he explained the background and rationale behind organizing the workshop. Underlining the need of integrating environmental concerns in the electronics manufacturing due to the changing customer needs in the globalization era, Mr. Banerjee emphasized that Indian electronics industry must embrace Green Manufacturing in order to remain competitive in the global markets.

Dr. Prasad Modak, a leading environmental management expert in India and Partner, Environmental Management Centre presented the keynote address on the topic "Globalization - Challenges and Opportunities for Indian Electronics Industry". Through numerous examples, from India as well as from abroad, he presented the emerging paradigm of sustainability and deliberated on how the environmental and social issues are fast becoming mainstream issues for the survival & competitiveness of the Indian electronics industry. His presentation gave an excellent overview of the issues and thus set the context for the subsequent presentations.



Mr. Hiroyuki Sato, Secretary General, Green Purchasing Network, Japan in this keynote address on



Green Manufacturing for Global Competitiveness, presented the concept of green purchasing and green supply chain in detail. The highlight of his presentation was an extensive list of examples from across the world and the green purchasing related activities in Japan, which the participants found very interesting and useful. Mr. Sato concluded his presentation by saying that the customers have already started green purchasing/procurement across the world and had made reasonable successes. Due to increasing customer pressures, now such companies/businesses are increasingly required to source eco-products, eco-components, and eco-services throughout the supply chain.

Hence, to remain competitive in the global market, businesses should enhance green manufacturing.

Mr. Vinayak Kelkar, Director, MCCIA presented the Vote of Thanks to all the international as well as local speakers and reiterated a strong support from the MCCIA for the activities related to green manufacturing in the industrial sector in Western India in general and electronics industry in particular.



TECHNICAL SESSION 1: UNDERSTANDING GREEN MANUFACTURING — AN OVERVIEW

In the first technical session, two case studies were presented.

Dr. L. Ramakrishnan, Philips India Ltd., presented the *Green Manufacturing Activities at Philips* throughout its products life cycle. His very vivid and illustrative presentation was an excellent opportunity for the participants to get a complete overview of the green manufacturing activities in the electronics sector.





Mr. Kiyoto Furuta, Deputy Senior General Manager, Environment Management and Engineering Center, Global Environment Promotion Headquarters, Canon Inc. presented the Canon's Environmental Management Strategies and Green Procurement Activities in Japanese Electronics Industry. The highlight of his presentation was the detailed explanation on the Material Declaration Standardization (Green Procurement Survey) practices in Japan. As this was quite a new concept for the Indian electronics industry, it was found to be very interesting by all the participants.

TECHNICAL SESSION 2: GREEN MANUFACTURING - CASE STUDIES

In the second technical session after lunch, Mr. Atul Killedar, Manager, Chemical Technology and Environmental Coordination at Vishay Components India Pvt Ltd., presented their case study of *Conversion to Lead-free solder*. As this is a pressing issues for the Indian electronics industry, this presentation rich in information and experiences was very much appreciated by all the participants.



Mr. Taro Hatano, Chief, Market Information Department, Murata Manufacturing Co. Ltd., Japan presented the Green Manufacturing Activities in Japanese Parts Manufacturing Industry. Specifically, he presented the efforts at Murata Manufacturing through his presentation "The outline of the Management of Chemical Substances as our Green Manufacturing Activities". Mr. Hatano's presentation covered three main topics:



- 1 Why do we need to manage legal and customer requirements for product environment?
- 2 How do we manage chemical substances in manufacturing our products?
- 3 How do we manage compliance with product environmental legislation?

Mr. Hatano, with the aid of excellent PowerPoint slides elaborated in detail the efforts made by Murata Corporation in eliminating

hazardous substances from their manufacturing operations in response to various national and international requirements such as RoHS in EU.

PANEL DISCUSSION: FUTURE PLANS AND ACTIVITIES

To kick off the last session of the day, Mr. Akira Kataoka, Manager, IGPN Secretariat presented the status of *IGPN Activities in other Asian Countries*. This presentation was an excellent overview of ongoing efforts and initiatives of IGPN as well as other agencies in different parts of the world with regard to green manufacturing and green purchasing. This provided an excellent food for thought and pointers for the participants in terms of some issues and ideas that can be considered while planning the future activities in the Indian situation.



After the presentation by Mr. Kataoka, the floor was opened for the panel discussion, which was moderated by Mr. Vinayak Kelkar of MCCIA and Mr. Mandar Parasnis of E2KM Group. All the participants actively participated in the discussion and gave their feedback and ideas for future activities. Below is a summary of comments / remarks made during the panel discussion:

- The general impression from the participants was that this was a very useful workshop and it very much fulfilled the expectations of most of the participants.
- A management consultant attending the program said that he learned a lot of new issues during the workshop and he would disseminate these ideas to his clients.
- An electronics factory manager said that she would disseminate this new knowledge to the workers and top management in her company.
- A number of participants expressed their appreciation to Vishay Components Ltd. for sharing their efforts with regard to lead-free soldering, as it was their immediate concern.
- An issue was raised by one of the participants that while their company has been RoHS compliant since June 2005, they face difficulties in finding RoHS compliant suppliers. Hence it was suggested that in the future, component manufacturers should be targeted.
- Some participants observed that the green manufacturing / green purchasing activities could very well be integrated in the framework of ISO14001 EMS.
- A comment was made that green purchasing could also be integrated in the purchasing of local government. Mr. Kelkar of MCCIA added that it can work with the Pune Municipality in this regard.
- Mr. Parasnis added that a large number of local governments in Japan are ISO14001 certified and are practicing green purchasing in response to the green purchasing legislation.
- Mr. Sato added that the Japanese government had introduced a simplified EMS called EcoAction 21, which costs 1/10th of the normal EMS.

In conclusion, Mr. Kelkar of MCCIA informed the meeting that MCCIA was working towards the establishment of a local chapter of IGPN in India and it would continue the cooperation with CETE – especially on the technical issues pertaining to electronics industry.

Mr. S. A. Kukade, Joint Director, CETE, who also served as the Master of Ceremony for the day, thanked all the speakers and participants for their contributions and closed the workshop.



The IGPN delegation visited the MCCIA headquarters on 8 March, 2006 to meet with the MCCIA top management and to discuss the next steps towards the establishment of green purchasing

network in India.



The delegation was received by Mr. S. Ramchandran, Director-General and Cmdr. Pankaj Joshi, Additional Director-General of MCCIA, who appreciated the support from IGPN in organizing the workshop. Emphasizing the relevance of green purchasing and greening supply chains, the MCCIA top management expressed their keen interest to continue the activities in this area as they would be greatly important for the competitiveness of the Indian SMEs in the era of globalization. Continued

collaboration with IGPN network was very important in this regard.







Subsequently Mr. Kelkar of MCCIA gave a detailed presentation on the Pune city and the activities of MCCIA including a virtual walk-through of the upcoming International Convention Center being developed by MCCIA, which would be operational from May 2006.





This was followed by in-depth discussion on the possible activities and future plans for initiating activities related to green purchasing in India with MCCIA. Following is the summary of the discussion:

- MCCIA is interested and committed to continue cooperation with IGPN and its partner agencies and organizations for promotion of green purchasing / green supply chain concepts in the Indian industries.
 - MCCIA could host the Secretariat for Indian Green Purchasing Network (InGPN).
 Initially it could reach out to its members, before expanding to a wider stakeholder group in due course.
 - o MCCIA will soon send an official letter to IGPN about this matter.
- MCCIA will organize another awareness seminar for industries (not only electronics sector) sometime in autumn 2006. Support from IGPN was requested in terms of experts' deputation as speakers in this workshop and IGPN agreed to this request.
 - Some side events would be organized to maximize the benefits from the Japanese experts visiting Pune during autumn visit. This would include additional events for auto cluster, construction industry, seminars for design schools, business schools, meetings with local governments etc.
- MCCIA will explore the possibility of compiling the directory of available eco-products in India. IGPN was requested to share the experiences of compiling such a database.
- MCCIA every year organizes "Pune Expo" a major exhibition which had 300 exhibitors and 250,000 visitors in 3 days this year. Next year, MCCIA will explore the possibility of introducing the Eco-Products theme and possibly allocate a special pavilion for the same. IGPN could be requested to be one of the sponsors of Pune Expo.
- MCCIA could establish a separate section on green purchasing, green supply chain issues in its library which would be opened in the new International Convention Center.
- IGPN requested for the inputs to the Green Purchasing kit (promotional booklet, CD ROM) being developed by IGPN.
- IGPN also requested for the Indian representation on the advisory committee of the 2nd International Conference on Green Purchasing in Barcelona later this year.

ANNEXES

Following additional information is included in the annexes:

- 1. Promotional brochure and agenda for the Workshop
- 2. Copy of the advertisement of the Workshop in the Times of India
- 3. List of Participants for the Workshop

PowerPoint presentations of all the speakers and photographs of the workshop are separately submitted in the CD ROM.







CENTRE FOR ELECTRONICS TEST ENGINEERING, PUNE

in association with

Mahratta Chamber of Commerce, Industries and Agriculture with support from





Announces a One-Day Workshop on

GREEN MANUFACTURING & MANAGEMENT IN ELECTRONICS INDUSTRY

Indian Electronic industries are well involved in exports where observing the rules & regulations for GREEN MANUFACTURING is going to be a mandatory from the year 2007. Hence it is high time to understand this activity to proper depth & start implementing.

So also some of the industries who have already progressed in this direction can act as a guideline. Advanced countries like JAPAN are leading in implementation of GREEN MANUFACTURING & MANAGEMENT IN ELECTRONICS INDUSTRY.

CETE Pune in association with MCCIA with active support from International Green Purchasing Network (IGPN) is organizing a days workshop in which Japanese experts along with Indian implementers of this concept are going to guide participants of the workshop for the said activity.

KEY TOPICS:

- Globalization Challenges and Opportunities for Indian Electronics Industry
- Green Manufacturing for Global Competitiveness
- Understanding Green Manufacturing and Management in Electronics Industry
- Green manufacturing and procurement activities in Japanese electronics manufacturer
- Conversion to Lead-free solder Case study by Vishay Components India Pvt Ltd.
- Green manufacturing activities in Japanese component manufacturer

Fees:- Rs. 1,000/- per person, including 10.2% Service Tax. 10% Discount for 3 or More Persons from the same organisation (Payment by D. D. only in favour of "**PAO, DIT**", payable at **New**

Delhi.)

(No cheque or cash is acceptable)

Date:-March 7, 2006 Tuesday p.m.

Timing:- 10.00 a.m. - 5.00

Venue:- CETE, Pune.

For further details / Registration contact: Shri S. A. Kukade./Shri A.U.Kokani at CETE

Telefax: 020-25452922,020-25421896Email: cetepune@vsnl.net

Shri Vinayak Kelkar/Shri Prashant Joglekar at MCCIA

Tele: 020-24440371,020-24440472,fax:020-24440792 Email: mcciagri@rediffmail.com

GREEN MANUFACTURING AND MANAGEMENT FOR ELECTRONICS INDUSTRY

ECO-PRODUCTS & GREEN MANUFACTURING

Environmental issues are increasingly becoming important in managing any business today. While there are environmental regulations domestically, there are also growing demands by the overseas buyers for more and more environment-friendly products. At times, the environment issues are becoming non-tariff trade barriers for the exports. Hence, industries - especially in Europe and Japan - are shifting to environment-friendly products or eco-products as the business strategy for future sustainability and competitiveness. Green manufacturing therefore is attracting a great deal of attention in the electronics industry worldwide.

Green manufacturing is a holistic approach combining technology and management interventions, for producing eco-products. This includes:

- Eco-design (design changes to improve environmental performance of the product throughout its lifecycle e.g. energy efficient, easy to dissemble & recycle etc.)
- Choice of environment-friendly materials (recyclable, non-hazardous such as lead free soldering, less packaging etc.)
- Green Supply Chain
- Green Purchasing
- Environmental Management Systems (EMS)

Though presently there is a limited market for the eco-products, there are definite signs that this trend would eventually pick-up in a big way. In many countries the governments, industries and civil society organizations are working together to promote eco-products which would ultimately benefit the environment and thus the society.

GREEN MANAGEMENT

Today Green Purchasing and Greening Supply Chain are the two popular management approaches adopted around the world.

- Foreen Supply Chain: In order to produce environment friendly products, manufacturers need to work with their suppliers of raw materials and components. Using their purchasing power, the industries can set up environmental criteria for their suppliers upstream in their supply chain. In addition to setting up the requirements, the big buyers can also provide assistance to the SME suppliers in meeting these requirements. The supplies and eventually the end product thus become environment-friendly. As this phenomenon percolates along the supply chain, ultimately it can result in the "greening" of the entire supply chain.
- Green Purchasing: Public and corporate purchasers spend billions every year across the

world. Government procurement budgets alone amounts to a significant percent of GDP. 'Greening' these purchases could contribute substantially to the promotion environment-friendly products and thus the environmental protection. Many public and corporate purchasers around the world are therefore including environmental factors in their purchasing criteria, and thus procuring environment-friendly products and services. Internationally, Germany undertook structured green public procurement activity in the 1980s followed by other European countries like Denmark (1994), France (1995), UK, Austria (1997) and Sweden (1998). The EPA developed Guidance Environmentally Preferable Purchasing, while Japan enacted the Green Purchasing Law in May 2000 to promote green purchasing as national policy. The law requires all governmental bodies including local governments to practice green purchasing and report the summarized purchasing records to the public.

INTERNATIONAL TRENDS

Japan has introduced a recycling law requiring manufacturers to take back used home appliances such as air conditioners, televisions, washing machines & refrigerators. The Home Appliances Recycling Law requires the consumers to transfer their used appliances to the take-back sites and pay additional collection and recycling fees to retailers. Retailers then pay manufacturers to recycle the appliances. The Law also aims to ensure that future products are made from more recyclefriendly materials. Punishment for noncompliance is as much as 500,000 yen, or \$4,200. Such trends are requiring the electronics manufacturers and their suppliers to fundamentally change their operational strategies and make necessary changes in design, manufacturing, packaging and information disclosure and overall business management.

HOW DOES IT AFFECT INDIAN INDUSTRIES?

While the "green" issues are currently far more relevant for the exporting industries, eventually they are expected to influence the entire Indian industry in a big way. Moreover, eco-products can provide industries with great marketing advantages and also a good corporate image. Besides, by promoting the eco-products, industries can make its own contribution to environmental protection for the benefit of the society at large.

The Indian industries, therefore, need to adopt a proactive approach to address the issues of green manufacturing and management, green supply chain and green purchasing for future competitiveness.

mccia

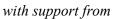




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Japan Fund for Global Environment & International Green Purchasing Network (IGPN)



One-Day Workshop on

GREEN MANUFACTURING & MANAGEMENT IN ELECTRONICS INDUSTRY

Tentative Agenda

1000-1115	Inaugural Session			
1000-1015	Welcome Addresses: CETE, Government of India			
1015-1030	Introduction and Felicitation of Guests and Speakers			
1030-1050	Keynote Address: Globalization - Challenges and Opportunities for Indian Electronics Industry: Dr. Prasad Modak, Environmental Management Centre, Mumbai/Pune - Formerly Associate Professor, IIT, Mumbai.			
1050-1105	Keynote Address: Green Manufacturing for Global Competitiveness – Hiroyuki Sato, Secretary General, Green Purchasing Network, Japan			
1105-1115	Vote of Thanks: MCCIA			
1115-1130	Tea / Coffee Break			
1130-1300	Technical Session 1: Understanding Green Manufacturing – An Overview			
1130-1210	Understanding Green Manufacturing and Management in Electronics Industry: Dr. L. Ramakrishnan, Philips India Ltd.			
1210-1245	Green manufacturing and procurement activities in Japanese Electronics Manufacturing Industry: Mr. Kiyoto Furuta, Deputy Senior General Manager, Environment Management and Engineering Center, Global Environment Promotion Headquarters, Canon Inc.			
1245-1330	Lunch			
1330-1530	Technical Session 2: Green Manufacturing – Case Studies			
1330-1420	Conversion to Lead-free solder – Case study by Vishay Components India Pvt Ltd: Mr. Atul Killedar, Manager, Chemical Technology and Environmental Coordination			
1330-1420 1420-1450	Conversion to Lead-free solder – Case study by Vishay Components India Pvt Ltd: Mr. Atul Killedar, Manager, Chemical Technology and Environmental Coordination Wave Soldering Technology for Green Manufacturing – Mr. Atul Limaye, Managing Director, EPS, Pune.			
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Annex 3: List of Participants for the Workshop

No.	Name of Participant	Organization	City	Tel.No.
01	Nanal S. S.	Tata Motors, Pune	Pune	56132790
02	Singhan B. S.	D-link India Ltd.	Verne, Goa	0332-2885400
03	Ashok Patil	Kronhe Marshal Pvt. Ltd.	Pune	7442020
04	Sameer Deshpande	Ajay Syscon Pvt. Ltd.	Pune	2744060,61
05	Vikas Khopade	Agate & Agate, Pune	Pune	2546986415
06	Dr. Veejay Mehta	Khyatee	Pune	94225-48210
07	Suhas Gole	Paradigm Services Pvt. Ltd.	Pune	25536559
08	Bhagatsingh Vibhute	Scope T & M Pvt. Ltd.	Pune	25411714
09	Prakash Barjatia		Pune	25896751
10	Mrs. Mukul A. Shetty	Keetronics (I) Pvt. Ltd.	Pune	25458980
11	Mrs. Shital M. Dravid	Auto Electronics	Pune	24392351
12	Shirish S. Jadhav	Auto Electronics	Pune	24392351
13	Deepak R. Parakhi	W.I.E	Pune	02169-244163
14	N.V. Tagare	Metaloys	Pune	
15	Mr. Mahindra	Metaloys	Pune	
16	Jagdish Chavan	R. D. Electronics		
17	Mrs. Babita Mishra	R.D. Electronics		
18	Vishal Londhekar	VSNL, Pune		
19	Abhijit Kulkarni	Canopus Instruments	Pune.	
20	Mr. Banerjee	CETE	Pune	
21	Mr. S. A. Kukade	CETE	Pune	
22	Mr. Kokanee	CETE	Pune	
23	Mr. Vinayak Kelkar	MCCIA	Pune	
24	Mr. Mandar Parasnis	E2KM Group	Pune	
25	Mr. Kaustubh Phadke	Environmental Management Center	Pune	