Indian Institute of Technology Mandi

INDIAN INSTITUTE OF TECHNOLOGY MANDI
KAMAND-175005, HIMACHAL PRADESH

Green Panel Meeting

Minutes of the meeting was held at Conference Room, Stable Complex, Kamand on 12th February, 2016 from 03:00 pm – 5:30 pm.

Chair	: Prof.T.A.Gonsalves
Members	: Dr.Rinki Sarkar, Ar.N.K.Negi, Dr. Padmanabhan, Dr.Venkat Krishnan, Er. Sunil Kapoor, Col. Devang Naik, Ms Debleena Mukherjee
Invitees	: Dr. Atul Dhar, Dr. Deepak Swami, Dr. Pradeep Kumar, Dr. Satvasheel Powar, Dr. Priscilla Gonsalves

I. Welcome Address

Prof. Timothy A. Gonsalves welcomed the members and invitees to the second meeting of the Green Panel. He introduced Col.Devang Naik as new member and Ms.Debleena Mukherjee as new member as well as the Green-coordinator of the Green Panel. He asked everyone present in the meeting to introduce themselves.

II. Presentation on "Zero Waste Campus" by Dr. Atul Dhar, Dr. Deepak Swami, Dr. Pradeep Kumar and Dr. Satvasheel Powar

Dr. Atul Dhar delivered the presentation. Some waste management proposals were represented which included the following;

1. Installation of Biogas plant, gasifier- production of electricity from waste.
2. Separation of kitchen waste water and sewerage waste- thereby reduction of STP load, modification of existing STP for water separation and feeding solids in biogas plant, increase in biogas production, elimination of emission of methane and other harmful gases in environment and finally water conservation.
3. A major part of the biodegradable wastes will be decomposed for biogas production.
4. Dry carbonaceous waste after segregation will be subjected to gasification for producing fuels.
5. The different composition of available wastes will be experimentally tested to evaluate their synergetic effect for increasing the yield and desired quality of gasification products.
6. Solar heat and heat from gasification of carbonacoeus wastes will be utilized to increase gasification efficiency.
7. After STP treatment, the effluent can be passed through sand and plant filter and will be further connected to the water storage to be used for underground water recharge, reserve

storage for landscaping purposes.

8. Some future research opportunity were proposed as follows:

   a) Integration of total waste management solution

   b) Solar assisted gasification for gasifier efficiency improvement

   c) Biogas purification and bottling for improved process economics

   d) Innovation in design of oil and grease chamber

   e) Innovation in design of sand and plant filter, types of plants and grass

   f) Optimizing design of water storage pit and further purification process using membrane or RO filter for domestic purposes

   g) Research for increasing efficiency of honeycomb structure

   h) Further modification of soak-pit design for efficiency

   i) Designing RO/UV based filtration process for effluent to convert in fresh water

   j) Economic analysis may be done and low-cost solutions solutions designed for different population sizes

9. Expected Outcome in Physical Terms:

   a) 15 Kg (1 LPG equivalent) biogas from 500 Kg biodegradable wastes, 50 Kg organic fertilizer per day

   b) 50 units of electricity from 200 Kg of carbonaceous waste

   c) Water conservation

III. "Green Office Work Updates" by Ms. Debleena Mukherjee

The presentation was all about the work done, implementations installed, actions taken in the campus, data collection and report generation according to the decisions taken in the previous minutes of the Green Panel meeting, dated 31st October, 2014.

The reports updated the following information:

1) A Green Policy has been established.
2) Small sensor components for Environmental Monitoring have been procured and are being deployed by students.
3) Sewage Treatment Plant has been installed for water recycling and conservation
4) For waste management, segregation of different types of wastes have been started with colour coded dustbins- Green bins for disposing biodegradable wastes, Blue bins for disposing non-biodegradable wastes and Yellow bins for paper and plastic bolttles.
5) A vermicompost pit has been constructed for composting the biodegradable wastes to

convert into manure.

6) "Enviro Engineers" - a local group from Shimla has been appointed for disposal and management of the hazardous wastes, chemical reagents from AMRC laboratory and medical unit. M/s Shivalik Solid Waste Management Ltd. is also taking some solid wastes from the AMRC unit of the IIT Kamand campus.
7) Energy consumption data have been collected from the power station and energy audit have started.
8) For biodiversity conservation- a herbal garden has been developed with 27 species of medicinal plants.
9) A Botanical garden has been established recently for growing indigenous plants and trees for all seasons.
10) Some future master plans for waste management in the campus were proposed:

    a) A farm may be constructed at the site near the vermicompost pits, where, different vegatables can be grown using the natural manures from the vermicomposted soil
    b) A biogas plant can be constructed
    c) A biofuel plant can be constructed
    d) A recycling unit can be constructed at IIT Kamand campus, where various types of wastes can be recycled inside the campus

12) Some suggestions for beautification of the campus were proposed:

    a) Removal of harmful plants like Parthenium from along the sides of the road and from the campus.
    b) Plants which have medicinal values can be planted in good numbers, viz; Aloe vera, tulsi, etc.
    c) Ornamental and bright flowers is to be planted. Eg; Orchid, Wild-Rose, Cherry Blossoms (seasonal), etc.
    d) Hervarium can be planned in some free spaces.
    e) Beautiful gardens can be constructed with rare and extinct flowers.
    f) A museum can be planned with a collection of a variety of insects and butterflies and plants (including the extinct ones).
    g) A rock-garden may be constructed with full natural resources, like spring water and rocks (which are generally thrown away or dumped here and there).

IV. Discussion on the following Points:

1) Effects of ongoing construction
2) Water conservation
3) Parthenium remova
4) Landscaping of the campus
5) Use of paper

V. Suggestions from the participants :

1) Ar. N.K. Negi pointed out that there should be percolated pavements or cement floors with 30% water and 70% solid land where feasible. This may help in the slow flowing of rainwater directly into the soil to be stored as ground water.

2) Ar. N.K.Negi also gave emphasis on the construction of reservoirs for rainwater harvesting and artificial lakes.

3) Prof .T.A.Gonsalves asked Dr.Deepak Swami to estimate the quantity of ground water.

4) Ar. N.K.Negi gave a proposal for electric floor wiring, which will impart uniform heating and replace room heaters.

5) Prof .T.A.Gonsalves gave an advice of keeping doors of room closed while heater is on.

6) Ar.N.K. Negi mentioned about constructing all rooms with double glass to avoid extreme cold may also cut down the use of room heaters.

7) Dr.Padmanabhan suggested the use of solar gizzers for heating water. This will reduce electricity consumption to a great extent.

8) Dr.Rinki Sarkar suggested about cross-checking of the results of BOD and COD of STP effluent by performing tests inhouse.

9) Dr.Rinki Sarkar also threw light on the roadside plantation by some small hedge shrubs, which will prevent dust and impart beauty to the campus. She discouraged the idea of Eucapytus. She also opined on the planting of Bahumia.

10) Ar. N. K. Negi suggested for planting Oak trees, roots of which penetrate deep into the soil. He also encouraged discussing with local village panchayats for any modification of the common road within the campus.

11) Dr.Rinki Sarkar mentioned that there should be temporary sanitation facilities and awareness for segregated colour coded dustbins for labor camps.

12) Prof. T.A. Gonsalves opined for small farm plots near vermicompost pit to be alloted to different residences for gardening and growing vegetables.

13) Prof. T.A.Gonsalves suggested for the auction of paper wastes. He also pointed out that paper cups should be stopped.

14) Dr.Venkat Krishnan also suggested to replace the paper cups by personal cups inside the institute and washing it after use.

VI. Recommendations :

1) All new constructions should have a provision for rainwater harvesting tanks.
2) Artificial ponds along natural waterways.
3) Stone retaining walls instead of concrete walls.
4) Minimise paved areas, preferably use paver blocks or other paving that allows percolation of water.
5) Concrete rainwater drains to have soak pits at periodic intervals.
6) To plant suitable shrub hedge along the sides of the road to prevent dust and at the same time enhance the beauty of the campus. Planting of Bahumia, Oak, Silver Oak, Amaltas, etc.
7) Estimation of ground water by Dr.Deepak Swami.
8) Performing BOD and COD tests in the AMRC or at other reputed labs for cross-checking the testing of the STP effluent by CPWD and IPH.
9) Vermicomposting to be shifted near the Herbal Garden to avoid attracting monkeys to the residential area.

The Chair thanked the members and invitees for their active participation. He thanked the School of Engg. Faculty for their presentation. The members appreciated the efforts of the Green Co-ordinator Ms.Debleena Mukherjee.

Prof. T.A.Gonsalves
Chairperson, Green Panel
(Director, IIT Mandi)