EVS Case Study: DMRC Environment Policy

1 Description of the Policy

Vishal Raj Dutta (2015115)

Ever since the inception of the Delhi Metro service, it has constituted an essential spine on which the city thrives and persists. The metro, owing to its economical viability for daily commute, caters to the needs of every class of citizen. The vast web of rails and concrete not only binds the city together, but has also induced great environmental benefits for the capital.

However, conjuring such an extensive framework and maintaining it was not without challenges. Cautious steps had to be taken so as to minimize further degradation of the already polluted capital. Hence, a policy was devised, so as to make the Delhi Metro self-sustainable and lessen environmental hazards.

The DMRC strives to comply with all relevant [1] environmental legislations and regulations that are required by the Govt. of India, such as the Environmental Protection Act (1986), Air (Prevention and Control of Pollution) Act (1981) among others. It seeks to reduce emissions and waste, through efficient use of resources (Recycled Plastic Usage Rules (1998), etc.) and also on a day-to-day level, raise environmental awareness and integrate pro-environment practices for staff and the public, in general. It also ensures policy are followed in the implementation stages, by contractors and sub-contractors [1].

Scope of the Policy

The policy seeks to act through multiple incision points in implementation and design [1]. With regards to implementation, strategies and cleaner technologies have been introduced to reduce wastes and use resources judiciously, (such as barricading, noise monitoring, etc.) during construction. Also during the design stage, various energy-friendly techniques have been taken into the system (such as use of regenerative braking which saves 30-40% of traction energy, closed recirculation of conditioned air, usage of CFLs, etc.).

It also aims to reduce day-to-day energy demands [1] by employing techniques (such as paradigm shifting from time-oriented to demand oriented time-tabling, monitoring driving technique, etc.).

2 Benefits and Costs of the Policy

Sanidhya Singal (2015085)

Delhi Metro Rail Corporation Ltd. (DMRC) has been following the environmental policy quite well. Their efforts have been applauded and recognized by various independent agencies. Despite increase in the scale of operations, DMRC has accomplished success in the implementation of the policy. It has performed reasonably well on the scale of energy efficiency, the usage of renewable energy in operations, replantation of trees in affected areas and the restoration of water bodies [2]. e.g., for every tree cut during construction work, DMRC plants 10 trees to ensure that there is no depletion of the green cover due to Metro's expansion. Plantations are done wherever possible. CO_2 emissions from metro have been reported to be significantly lower than from other modes of transport (like cars, two wheelers, etc.) as per the United Nation Framework Convention on Climate Change (UNFCCC). Also, several measures have been taken

to contain pollution. These include: barricading, dumping of excavate at designated areas only, recharge of dewatered water, traffic diversion, installation of noise barriers, noise monitoring, etc. [1] During the planning and design stage, a number of measures have been taken in order to minimize energy consumption and mitigate negative impact on the environment (e.g., employing energy innovative architectural features in design; the use of more efficient plant and equipments).

Both Phase 1 and 2 construction of Delhi Metro have completed successfully as of 2014. For a ridership of 27 lakhs, DMRC has been able to achieve many benefits. Most importantly, Delhi Metro has been able to take vehicles off the roads. This has reduced air pollution (a major problem that Delhi is still dealing with) as well as annual fuel consumption (petrol, diesel, etc.). As per the report given by DMRC, as many as 390971 vehicles were taken off the roads daily [3]. This huge figure clearly proves the amount of benefit that Delhiites have been able to achieve from the Delhi Metro.
Let us consider the costs associated with all the benefits mentioned above [3]:

- Cost of savings in fuel (not including electricity charges): Rs. 1,972 Crore
- Cost of less pollution saved: Rs. 489 Crore
- Cost of time and fuel saved due to de-congestion: Rs. 491 Crore

In short, we can say that the measures taken under the DMRC's environment policy are proving to be quite fruitful, and resulting in environmental sustainability.

3 Future Estimates of the Policy Benefits and Costs

Saurabh Kapur (2015087)

The future benefits of this policy can be understood by studying the proposals for Delhi Metro Phase 3 construction. DMRC proposed that all the upcoming metro stations under the Delhi metro's third phase of expansion will be constructed as 'Green Buildings'. These metro stations will be designed to conserve energy, save water and will have better waste management arrangements. These stations will have environment friendly features like reduced heat island effect, landscape plant species, insulated building envelope, adequate fresh air, low VOC paints and water efficient fixtures. The estimated savings from this project are [4]:

Elevated Metro station:

- Savings in energy consumptions – 3,66,272 kWh/Annum
- Savings in energy in cost – 23,99,819 './Annum
- CO_2 emission reduction – 345 tCO_2/Annum

Underground Metro station:

- Savings in energy consumptions – 10,11,482 kWh/Annum
- Savings in energy in cost – 69,29,203 './Annum
- CO_2 emission reduction – 953 tCO_2/Annum

However, there are also some costs involved with process of construction like loss of trees. Due to the loss of the trees, the process of CO_2 conversion will get affected. The estimated values are [5]:

- Total number of mature trees – 5537
- Decrease in CO_2 absorption @21.8 Kg/year tree for 8 years – 96553 Kg
- Oxygen production @ 49 Kg/year for 8 years – 2170504 Kg

Other costs involved are those related to drainage problems, project affected people (these include the families displaced from their location) and impact on historical and cultural monuments.

4 Recommendations for Enhancing the Policy

Sumeet Kumar Bhardwaj (2015182)

Although the policy is providing a reasonable development in environment, still a long way has to be travelled to gain what is lost in the construction process, as well as to provide enough resources for the increasing future population to sustain their growth (by generating dependency on renewable resources). Still a considerable amount of energy is being used to drive metros in the city. Recommendations for enhancing the current policy are as follows:

- Replacement of split ACs with air cooled chillers in all metro stations. Air cooled chillers are energy efficient.
- Installment of effluent and sewage treatment plants to treat and use the wastewater generated.
- Implementation of rainwater harvesting techniques in all Phase 3 metro stations.
- Solar Plants help in saving non-renewable resources. Previously, these were installed in Dwarka Sector 21. These should be installed in other stations as well.
- Provision of bicycle facilities at every metro station.

The policy has been well driven until now. A reasonable amount of work is yet to be done. But beyond all developments, creating awareness among common people about the environment is the most essential part, because after all, it is the conscious and cumulative effort of individuals which is going to make a real difference.

References

[1] DMRC Environment Policy http://www.delhimetrorail.com/otherdocuments/DMRCEnvironmentalpolicy.pdf

[2] DMRC Sustainability Report 14-15 http://www.delhimetrorail.com/otherdocuments/SustainabilityReport2014-15.pdf

[3] DMRC Green Initiative http://www.delhimetrorail.com/greeninitiative.aspx

[4] http://www.delhimetrorail.com/whatnew_details.aspx?id=5VAe6LK85hAlld

[5] http://www.delhimetrorail.com/projectsupdate/DelhiMassEIA.pdf