Sustainable Procurement in Indian Railways

-The track ahead…

Sustainable Procurement

Sustainable Procurement is one of the key drivers for promotion of Sustainable Consumption & Production (SCP). Many countries have recognized the importance of Sustainable Public Procurement (SPP) and have formulated policies, regulations and guidance for its promotion. The sustainable procurement aims at integrating environmental and social considerations into the purchasing process and provides unique opportunity to leapfrog directly on a more sustainable growth path. It is an affirmative action in the procurement process of selection and acquisition of products and services that most effectively minimize negative environmental impacts over their life cycle of manufacturing, transportation, use and recycling or disposal. Examples of environmentally preferable characteristics include products and services that conserve energy and water, minimize generation of waste and release of pollutants; products made from recycled materials and that can be reused or recycled; energy from renewable resources; alternative fuel vehicles; and products using alternatives to hazardous or toxic chemicals, radioactive materials and bio hazardous agents. SPP helps to create human well being and healthy & safe work places. This leads to a paradigm shift in the national procurement and influences the markets, vendors and public at large thus demonstrating Government's commitment towards a sustainable future. Sustainable procurement is in sync with the principle of waste management, with the aim of achieving "near-zero waste", by adopting the principle of 3 Rs — Reduction, Recycle and Reuse— that Indian Railways Vision 2020 visualizes achieving.

The Third Largest Railways Network

Indian Railways is the third largest railway network in the world with 7,083 railway stations, with 9000 locomotives, 51,030 passenger coaches, 2,19,931 freight cars, 1,31,205 railway bridges, and 63,974 route kilometers[1]. Today Indian Railways operates 19,000 trains each day, comprising 12,000 passenger trains and 7,000 freight trains. It transports 2.65 million tonnes of freight traffic and 23 million passengers every day — 7.2 billion passengers per year. It currently has 1.36 million employees and an annual revenue base of Rs.1,06,000 Crores as projected on March 31, 2012. Indian Railways is also home to great talent and excellence in organization, focused on operation, efficiency and safety.

Rail as a Sustainable Mode of Transport

India has been struggling with a major development challenge that is both national and global in nature, namely, reducing hazardous GHG emissions thus combating climate change. The Indian Railways can play a critical and substantial role in mitigating the challenges of climate change. So far, there has been inadequate recognition of the Railways' contribution towards India's climate protection efforts.

1 Report of Exert Committee on Modernization of Railways, 2012.

For passenger transport, going by rail is on average 4 times more efficient than taking the car and more than 3 times better than taking the plane[2]. Further, rail is more energy efficient than road as can be seen from the graph given below.

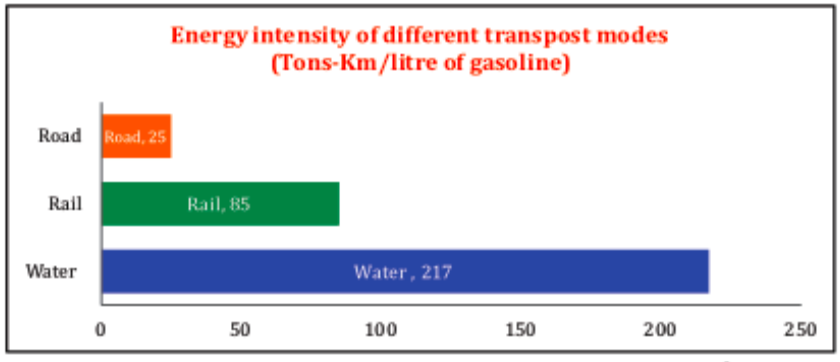


Fig -1: Energy efficiency of different modal transports[3]

By carrying more people and goods than other modes of transport, Railways can help protect the environment while promoting sustainable development.

Indian Railways Vision 2020

Indian Railways has been playing a significant role in reducing carbon foot-print and is committed to further reduction by keeping environmental considerations in mind while taking business decisions. The Indian Railways Vision 2020 document clearly identifies target areas for reducing carbon emission and enumerates areas for future sustainable actions. Our vision is to deepen and broaden this agenda of low carbon growth and to take it to new heights.

Indian Railways has always been receptive to environmental challenges posed by rapid economic growth during last two decades. Even when sustainable procurement was not on the radar of policy makers, Indian Railways integrated environment concerns in its decision-making. While the list of environmentally sustainable actions undertaken by Indian Railways is large, some of the important ones are discussed below.

Environmentally Sustainable Actions Undertaken by Indian Railways

Energy Efficient Lighting

Indian Railways has identified energy efficiency as a key strategy to usher in low carbon path. It decided to phase out incandescent lamps (ICLs) way back in 2009. In her 2011 railway budget speech, the then Railway Minister Mamata Banerjee declared 2011–12 the "Year of Green Energy". Indian Railways Vision 2020 document states its intention to conserve energy by sourcing "at least 10% of energy through new and renewable sources" and "achieving 15% enhanced energy efficiency". Since 2007, Indian Railways has

2 Rail Transport & Environment - Facts & Figures, UIC, 2008
3 Environmentally Sustainable Transport, UNESCAP, 2011

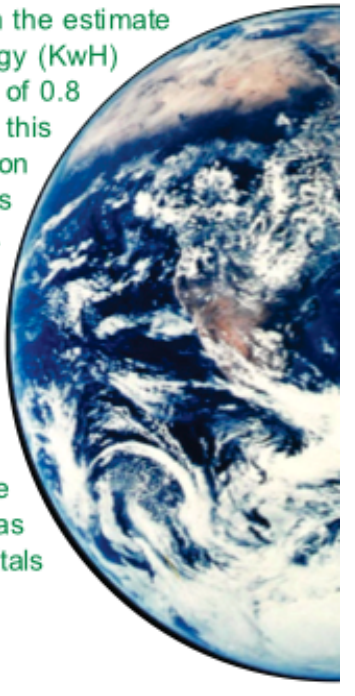
also been buying only BEE 3-star or higher-rated products for achieving energy efficiency.

In 2011, Indian Railways carried out a program to provide 1.4 million Compact Fluorescent Lamps (CFL) to its employees living in railway housing colonies, collecting in exchange their existing energy-intensive incandescent light bulbs. Through this initiative, the State-run transporter aims to play its part to reduce GHG emissions while reducing its energy bill. The project covered almost all 16 zones of Indian Railways.

The Director of CQC Green Ventures Private Limited, the company undertaking this project with Indian Railways, told the Times of India in March last year: "Since one incandescent lamp (ICL) or ordinary bulb consumes four times more energy than one CFL, we decided to replace ICLs with CFLs across the nation to save energy and generate CERs (certified emission reduction points) from the United Nations' appointed designated operating entity.[4]"

Under this project, M/s C-Quest Capitals, Malaysia purchased CFLs from M/s Phillips India Ltd and supplied 4 CFLs free of cost in lieu of 4 ICLs to each Railways employee's household. The Bureau of Energy Efficiency, a statutory body under Government of India, was responsible for monitoring the entire project. Public awareness programs were also organized to encourage consumers to collect fused CFLs after their useful life at select locations for onward transmission to C-Quest Capitals for environmentally safe disposal as per guidelines of the Ministry of Environment & Forest, Government of India.

The saving accrued to each Railway's employee due to reduction in energy bills by use of CFLs in place of ICLs worked out to Rs. 800/- per annum. Based on the estimate that 1 Unit of energy (KwH) saved, leads to reduction of 0.8 Kg of CO_2 reductions, this project resulted in reduction of approx. 0.14 million tonnes of CO_2 emission per year. This project provided win-win opportunities to all stakeholders. Indian Railways earned money equivalent to 3% of the accrued Carbon Emission Reduction (CERs) from the project, while the balance was shared by C-Quest capitals and Phillips India.



Sustainably Designed Bio-toilets in Trains

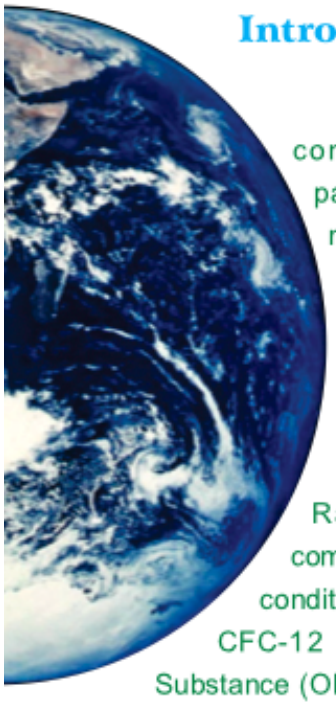
Indian Railways has a fleet of over 40,000 coaches for passenger services operations. Toilet systems are one of the most critical passenger amenities, especially in long distance passenger trains operation. Toilet systems presently used on the trains are of the flush type, which discharge human waste directly on the tracks leading not only to pollution and hygiene problems but also to corrosion of the track fittings. The cost of repairing the corrosion of tracks works upto more than Rs.350 Crores every year. Developing appropriate technology with a view to having cleaner, hygienic and safer railway ecosystem has been a challenging task.

Indian Railways developed green toilet technology in year 2010, in partnership with the Defense Research Development Organization (DRDO), Government of India, using DRDO bio- digester for the toilet system. It has since successfully completed pilot runs on Gwalior-Varanasi Bundhelkhand Express of four variants in August '2011. It disposes human waste in a 100% eco-friendly manner and generates colour-less, odour-less inflammable biogas and absolutely clear odour-less water. These newly designed lavatories are likely to be manufactured in Motibagh workshop in Nagpur under the South East Central Railway (SECR). The toilets do not allow the refuse

Fig-2: Coach fitted with Bio-toilet

to fall on the tracks. Instead, it would be collected in a tank fixed below the coach floor. The tank has a 900 lt. capacity. The interiors are similar to the current train toilets. The retention tank is provided with a small vent at the top of the coach so that the gases generated in the tank escape into the atmosphere. The system also requires fitting of an underground drainage facility at stations to discharge the wastes. The performance has been reviewed by the joint working group and based on satisfactory performance, Indian Railways have decided to introduce bio-toilets in 2,500 coaches in the current financial year 2012-13. Trials with retention-evacuation type toilets such as vacuum toilets are also planned on a few premium trains. Based on experience, more coaches would be equipped with such green toilets.

Introduction of Environmental Friendly Refrigerant



Indian Railways runs air-conditioned coaches for passengers and has a fleet of more than 6000 such coaches that require refrigerant for maintaining comfortable temperature in running trains.

Prior to 2008, Indian Railways had been using combination of CFC-12 for its air conditioning requirement. Since CFC-12 is an Ozone Depleting Substance (ODS) and India is a signatory to the Montreal Protocol that required complete phasing out of CFC-12 by 2010, Indian Railways faced the challenge of shifting from CFC-12 to more eco-friendly HFC refrigerants such as R-134a for its cooling needs. The problem was compounded by the fact that HFC-134a is not a direct replacement for CFC-12 due to incompatibilities in the compressor oils used for each refrigerant. Therefore, the coach also required change in design and retrofitting equipment. Further, the total quantity of HFC-134a required for converting 1000 coaches itself worked out to approx. 47,000 Kgs per annum.

Characteristics	CFC-12	HFC-134a
Ozone Depletion Potential	1.0	0.0
Global Warming Potential	11000	1,300

Table-1: Property Comparisons (Based on UNEP/WMO Ozone Assessment, 2006)

Mindful of the precautionary measures needed for the protection of the Ozone Layer, Indian Railways has shifted from CFC-12 to more environment friendly HFC-134a for air-conditioning requirement. The transition from CFC to HFC has helped reducing greenhouse gas emission by about 10 or more times as compared to historical greenhouse gas emission since Ozone Depleting Potential and Global Warming Potential of HFC-134a is substantially low as compared to CFC-12. Timely action by Indian Railways has resulted in a better, cleaner and safer environment for future generations. Further, Indian Railways is committed to meet phase-out targets of consumption of HCFC to achieve the Stage-II reduction targets of the Montreal Protocol.

Water—Reduce, Recycle & Reuse

With the current economy and the rising threat of water scarcity across the globe, the Indian Railways is opting to invest in water recycling system that would assist them meeting challenges of scarcity of water.

Indian Railways have several Coach Maintenance Complexes, which has the facility for washing and maintaining coaches of trains. The washing of coaches is water intensive activity and generates several litres of water as discharge. The total consumption of water in this activity alone can be judged from the fact that Coach Maintenance Complex, Ghorpadi of Central Railway, which maintains approx. 15 trains per day, discharges about 5,000 lt/hour.

With an aim to conserve water, the Pune division of the Central Railways has decided to implement a water-recycling project at Ghorpadi. The project will have a capacity to treat 5,000 litres of water per hour and will be implemented at a cost of over Rs 36 lakhs on turnkey basis. The railways have stipulated the standards for recycled water. The recycled water will be tested in laboratories every month and reused for washing of coaches and thus saving of water.

Employment through Procurement from KVIC, ACASH & SMEs

A large portion of India's population lives in the villages where illiteracy still prevails and large industry is not in a position to absorb the work force from rural areas. With the liberalization and globalization of the Indian economy and the removal of quantitative restrictions, the smaller units of the khadi and village industry sector are further facing stiff competition from the organized sector. It is socially desirable to create more employment opportunities in villages by utilizing local resources and skills so that rural people can get work in the villages. Indian Railways recognizes its role in promoting employment generation in rural areas for inclusive growth of India and has decided to purchase all requirements of hand-woven, hand-spun items from Khadi & Village Industries Commission (KVIC) and handloom textile items from Association of Co-operatives and Apex Society of Handlooms (ACASH) on single tender basis. Further, approx. 300 items are reserved for purchase exclusively from Small Scale Industries. In such tenders, besides the technical specification, eligibility criteria are defined in such a manner that only offers from Small Scale Industries meet the tender requirements. In 2009-10, Indian Railways procured goods worth Rs.1834 crores from the small-scale sector & KVIC. By this act, Indian Railways is helping create employment in rural sectors in India.

Leveraging Procurement as Strategy for Sustainable Development

Indian Railway has well established procurement policies to ensure transparency, fair play, competition & equal opportunity to all eligible vendors. The procurement basket of Indian Railways consists of raw materials and equipment for production, operation & maintenance of rolling stock and its fleet of locomotives, requirements for staff welfare, healthcare and passenger amenity. It has

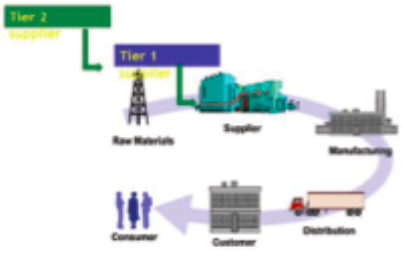


Fig-3: A typical supply chain process

more than 10,000 vendors starting from small SMEs to big corporates in India. During 2011-12, Indian Railways procured goods worth Rs. 2,9099 crores. i.e, $ 5.50 Billion. Indigenous purchases constitute about 97% of the total procurement in Indian Railways and import is very less and opted in certain inescapable situations only.

The procurement decision taken by Indian Railways based on lowest technically suitable bid has far-reaching impacts on upstream and downstream. Indian Railways can leverage its purchasing power to spur innovation, create jobs, protect the environment and safeguard biodiversity by adopting sustainable procurement for transition to a low-emission economy and can emerge as a champion and torch bearer in the area of sustainable procurement in entire Asia-Pacific region.

The agencies involved in procurement functions in Indian Railways are Railway Board, Zonal Railways/ Production Units and DGS&D. The table given below provides role played by these agencies, share and comments in the context of sustainable procurement[5].

S.No.	Agency	Share	Comment in the context of GPP
1	Railway Board	40 to 45%	Some items, in which technology transfer is involved, can speed up Indian Railways on SPP path.
2	Zonal Railways/ Production Units	50 to 55%	Few items such as battery, chemicals, cleaning agent etc. offer big opportunity here. Indian Railways can enter into take-back arrangement by buyer while placing contract for battery.
3	DGS & D	2 to 5%	Key goods could include ceiling fans, refrigerators, air conditioners, motors with focus on energy efficiency.

Table-2: Agencies involved in Procurement of Goods in Indian Railways

Several measures undertaken by Indian Railways in the past indicate that environmental and social concerns have always been at the back of the mind of policy makers in Indian Railways. However, these initiatives do not form part of a comprehensive Sustainable Procurement strategy of Indian Railways. On the brighter side, they do indicate awareness, environmental consciousness and the readiness of the Railways to identify and adopt an appropriate SPP policy framework.

Considering the benefits and environmental relief potential of SPP, it makes immense sense for any government to implement SPP sooner rather than later. However, there are challenges to green procurement that need to be identified and a strategy to be put in place to overcome these challenges. Since awareness about environmental concerns among stakeholders, level of economic development, presence of green market etc. vary from country to country and organization to organization, the challenges for implementing SPP in Indian Railways were identified using the Hurdles Analysis Method. The results so obtained were further discussed during a Workshop on Green Public Procurement held in New Delhi on 19th & 20th March' 2012. The United Nations Environment Programme (UNEP) under the Policy Support Component of the SWITCH-Asia programme facilitated the Workshop for Indian Railways professionals. The major 4 challenges so identified are:

- Lack of skills, knowledge and expertise of Indian Railways professionals on SPP
- No clear policy guidelines on integrating environmental criteria in public procurement
- Absence of sufficient green products in the market
- Lack of preparedness of vendors on developing greener products

5 Workshop on GPP in the Indian Railways, Background Reading, Dr. Prasad Modak, 2012

Strategy for Implementing Sustainable Procurement in Railways

Ministry of Environment & Forest, Government of India has formulated a committee to frame guidelines on SPP that take into account environmental and social criteria at tender decision stage and evaluation of bid based on of total cost over entire life cycle of the product. Further, the Draft Public Procurement Bill-2012 introduced in Parliament states that environmental criteria of a product may be adopted as one of the criteria for evaluation of tender. Therefore, as a progressive organization, Indian Railways cannot and should not wait for the Bill to be formally enacted. To take leadership in this area, it should adopt SPP program and practices in right earnestness. It is necessary for Indian Railways to conceive, develop, operationalize and own the SPP program and policy to reap the full benefits of sustainable procurement. The IR should take strategic and systematic approach for implementing SPP that could include

- Thematic Approach: Consider addressing themes such as energy, water, waste and employment, healthy and safe work places, in tiers and build systems for SPP.
- Product/Service-based Approach: Product focus — Identify key products based on spend analysis and set target for procurement over the years.
- Mainstreaming Approach: Design criteria for product specification based on parameters like resource efficiency, exclusions, biodegradability, and recyclability.
- Introducing the category of Green tenders.

But before embracing any approach, it is felt that a committee may study the pros and cons of each approach and suggest what is best suitable. The participants in the Workshop discussed the way forward and suggested following measures for SPP program and policy to take off in Indian Railways:

- Formation of a Core Group to draft Indian Railways' SPP Road Map and identify pilot project.
- Issue of supporting guidelines/policies for integrating environmental and social criteria in procurement.
- Following Common Core Criteria approach to adopt SPP.
- Capacity building of Indian Railways professional both at strategic and operational levels.
- Applying metrics and doing strategic communication of initiatives taken up by Indian Railways towards Sustainable Procurement.
- Capacity building of vendors for identified products groups.

It is expected that with these measures in place, Indian Railways would take leadership in implementing SPP in India and help India shifts her growth on energy & resource-efficient, low carbon path.

Not everything that is faced can be changed. But nothing can be changed unless it is faced.

– James Baldwin

Author's remarks:

The idea of this publication emerged during a Workshop on Green Public Procurement held in March this year. Indian Railways has done pioneer works with aim to safeguard resources and energy. However, it was felt that people both within and outside Railways are unaware of these works. Therefore, it was felt important to collect these works and publish so that all stakeholders are aware of all outstanding works, which IR has undertaken before sustainability became the buzz word. This publication is an attempt in that direction.

The idea of sustainable procurement has arrived and we cannot wish it away. It is better that we adopt and lead the change. The time has come to start taking environmental concerns in more structured and sustained way in Indian Railways.

I hope that this publication would become a reference point to start any work in future. I am thankful to Dr. Prasad Modak, Sh. Rajan Gandhi, Ms Barbara Morton, and Ms Eveline Venanzoni for their comments and valuable suggestions.

I hope the readers would find this publication useful. Please do send me your comments at sanjayirss94@gmail.com.

Thanks
Sanjay

Published by : Sanjay Kumar, Dy. Chief Vigilance Officer, Northern Railways, New Delhi, India.