

# Roadmap for Rating System for Water Efficient Fixtures

A Way to Sustainable Water Management in India



CENTRE FOR SCIENCE AND ENVIRONMENT  
New Delhi

# Roadmap for Rating System for Water Efficient Fixtures

A Way to Sustainable Water Management in India



CENTRE FOR SCIENCE AND ENVIRONMENT  
New Delhi

We are grateful to the Ministry of Urban Development, Government of India for their support to CSE as a Centre of Excellence for Sustainable Water Management.

*Prepared by*

**Water Management Team**

**March 2011**



**Centre for Science and Environment**

41, Tughlakabad Institutional Area, New Delhi-110062

Phones: 91-11-29955124, 2995125

Fax: 91-11-29955879

Email: [cse@cseindia.org](mailto:cse@cseindia.org)

Web: [www.cseindia.org](http://www.cseindia.org)

# Contents

---

<b>Abbreviations</b>	4
Section 1: <b>Introduction</b>	5
Section 2: <b>Context of Proposed Policy Roadmap</b>	7
Section 3: <b>Legal and Institutional Framework</b>	10
Section 4: <b>Proposed Policy Roadmap for Rating System for Water Efficient fixtures in India</b>	20
<b>Annexures</b>	29

## Abbreviations

---

AWWA	American Water Works Association
BEE	Bureau of Energy Efficiency
BIS	Bureau of Indian Standards
CoE	Centre of Excellence
CPHEEO	Central Public Health and Environmental Engineering Organisation
CSE	Centre for Science and Environment
GDP	Gross Domestic Product
GRIHA	Green Rating for Integrated Habitat Assessment
IAPMO India	International Association of Plumbing and Mechanical Officials India
IGBC	Indian Green Building Council
IPA	Indian Plumbing Association
IS	Indian Standard
LEED	Leadership in Energy & Environmental Design
LPCD	Litres Per Capita per Day
MLD	Million Litres per Day
MoEF	Ministry of Environment and Forests
MoHUPA	Ministry of Housing and Urban Poverty Alleviation
MoP	Ministry of Power
MoRD	Ministry of Rural Development
MoUD	Ministry of Urban Development
MoWR	Ministry of Water Resources
NAPCC	National Action Plan on Climate Change
NBC	National Building Code
NMSH	National Mission on Sustainable Habitat
NWM	National Water Mission
NWP	National Water Policy
PWD	Public Works Department
ULB	Urban Local Body
UNDP	United Nations Development Program
UT	Union Territory
WELS	Water Efficiency Labelling and Standards
WELS	Water Efficiency Labelling Scheme (Singapore)

# Roadmap for Rating System for Water Efficient Fixtures

## A Way to Sustainable Water Management in India

### SECTION 1: INTRODUCTION

#### **Centre for Science and Environment: Centre of Excellence for Sustainable Water Management**

The Centre for Science and Environment (CSE), New Delhi is a research and policy advocacy organization and has been working in the field of environment for around three decades. The Ministry of Urban Development (MoUD) has designated the Centre for Science and Environment (CSE) as a Centre of Excellence (CoE) for Sustainable Water Management. This distinction is a result of CSE's past efforts and initiatives on rainwater harvesting, decentralised wastewater management, community based water management, river pollution etc. Overall, there has been growing realization within the government, to make a conscious shift towards demand side management of water. Demand side management basically involves incorporating principles of efficiency and conservation that is aimed at reducing fresh water intake. Therefore, rating system for water efficient fixtures also is an important component of the larger goal of improving water use efficiency and savings.

As a part of this initiative, CSE is working towards developing a 'Roadmap for Rating System for Water Efficient Fixtures in India'. CSE undertook extensive research on water efficiency specifically on rating system for water efficient fixtures. The research was focused on status and issues in India and the best practices across the world on water efficient fixtures. Initially, a background paper on rating system for water efficient fixtures in India was prepared and disseminated which provided a comprehensive overview of the status, issues and prospects related to rating system, followed by meetings with relevant stakeholders on development of the rating system. This document includes, background of the preparation of roadmap including the draft framework proposed for introduction of rating system for water efficient fixtures in India. The document intends to facilitate understanding on the existing legal and institutional options available for mainstreaming the rating system. In addition, it also proposes additional options that can be considered to facilitate effective implementation of this crucial water reform. Besides this, the document covers another crucial aspect related to instruments and tools available in the form of manual, standards, guidelines etc. to improve understanding and implementation of water policies especially on aspects like conservation, efficiency etc. The final section provides details on the proposed roadmap inclusive of roles and responsibilities, time frame, dissemination, support agencies etc. to undertake and implement the rating system for water efficient fixtures in India.

#### **Urban India's Water Crisis**

The need for developing and implementing a rating system for water efficient fixtures, in fact has its genesis from the intensifying and growing urban water challenge. The development pressures are exerting intense stress on the water sources, with its manifestations in the form of deteriorating water quality, declining availability and unregulated groundwater extraction. As a result, water resources are in a severe crisis in India today and, it is going to get worse.

Urban areas fast emerging as the nerve centres for development and population growth are facing the major brunt. Urban water situation, deteriorating on the account of declining quality, distribution losses, demand supply mismatch, changing lifestyle etc. are leading to a severe conflict situation both at the intra and inter city levels. Big metropolis cities home to millions of people; attract both large and small commercial/ institutional establishments every year besides substantial residential development. The medium and small cities are devising their development agendas following on the footsteps of the big cities. As more and more people, businesses and interests concentrate in the city, big or small; water demand is going to rise, thus deteriorating the already existing water crisis.

Statistically demonstrated, the urban population has doubled over the past 30 years and accounted for nearly 30 per cent of the total population in 2009. It is expected to reach 41 per cent by 2025, with over 575 million people from the present level of 286 million (MoHUPA-GOI and UNDP 2009). The situation is more explicitly exhibited by the examples from two of the largest cities in India, which have established themselves as the magnets for development, investments and population growth. In 2005, the official water demand for India's largest cities of Delhi and Mumbai was a massive 3973 and 3900 Million Litres per Day (MLD) and the per capita demand was estimated at 268 and 307 Litres Per Capita per Day (LPCD) respectively (CSE 2009). However the water supply is often no match to the ever increasing demand, as a result these cities are constantly facing demand supply gap which leads to conflicts. The shortfall in this case was about 600 and 900 MLD in Delhi and Mumbai respectively. The situation is worsened by the fact that almost 30-40 per cent of water is lost during transmission and supply in almost every city in India. In 2005, 65 per cent of households across seven major Indian cities faced severe water deficiency, as a result many cities are on a constant expedition for augmenting supply by tapping distant water sources which are often meant for rural areas for agriculture or for other uses (Anon 2010). Delhi and Chennai currently receive water from rivers that are 250 Km and 450 km away, respectively.

Besides increasing population, the rising water demand is also attributed to the changing lifestyle and consumption patterns across the country especially in the urban centres. The large cities like Delhi, Mumbai, Bangalore etc. are growing exponentially both in terms of population and spatial coverage, attracting large and small commercial and institutional establishments like offices, IT parks, malls, hospitals, schools, colleges, hostels, hotels etc every year. Due to the amenities now considered essentials for urban life, such as flush toilets, showers, washing machines, cooling plants etc., city dwellers tend to lead a more water intensive lives. The medium and the small cities are also following similar trends towards urbanization and development, with big cities as their role models. As more and more people and businesses move into the city, water crisis is going to accelerate and worsen, plagued with increasing intra city inequity, discharge of waste water and waste into the water sources and environment.

### **Characteristics of Water Use in Buildings**

Cities and the complex functions they perform have had a profound impact on the nature of buildings over the years. Over the years buildings have put substantial pressure and demand on the resources like energy, water, buildings material etc. which get consumed and infact wasted. This to a large extent coincides with growth of the construction sector in India, which is experiencing a boom similar to the IT industry in the 90's. Presently, construction is the second largest economic activity after agriculture, and accounted for 8.5 per cent of India's GDP in the 2008 (Research and Markets 2008).

In terms of water, there are large variations in areas of water usage within a building, depending on the building type. In buildings meant for residential/institutional or commercial purposes, there are four main types of water and wastewater categories that need to be considered.

These are potable water, greywater, blackwater and stormwater. For e.g. in commercial buildings water use is related to and governed by the functions of the building, type of equipments installed, plumbing fixtures type etc. A building with restaurants, commercial kitchens, cafes etc. and a facility that operates hydronic cooling systems use a greater percentage of processed water. Although a considerable amount of water is used for these systems, the major water guzzlers in the buildings are the restroom plumbing fixtures like toilets, faucets, urinals and showers.

The U.S. Department of Energy estimates that restroom plumbing fixtures account for approximately 60 per cent of the total water use in office and administrative buildings. According to a study performed by the Boston-based Massachusetts Water Resources Authority, plumbing fixtures account for approximately 47 per cent of commercial building water use, with cooling systems and kitchens trailing at 34 per cent and 14 per cent, respectively (Gilmer and Hugal 2008). In India, Tata Consulting Engineering estimated that an average family of five in Mumbai consumes about 920 liters per day, which amounts to 184 LPCD, with more than 60% consumed in kitchen and toilets. According to the report, bathing consumes highest amount of water at 28 per cent. Consumption in toilets (20 per cent), washing clothes (18.6 per cent) and washing utensils (16.3 per cent) follow the consumption in bathing. On an average, less than 10 per cent of the total water in a household is used for drinking and cooking (Shah 2009). In India, CPHEEO recommends 135 LPCD (See Fig. 1) as standard water consumption inclusive of flushing, bathing, washing uses. But, the fact is that toilets and bathrooms are the biggest water guzzlers in buildings.

**Fig 1: Average Domestic Water Consumption in Indian Cities**

Use	Consumption in litres/day/person
Drinking	5 Litres
Cooking	5 Litres
Bathing (incl. ablution)	55 Litres
Washing clothes	20 Litres
Washing of utensils	10 Litres
Cleaning of houses	10 Litres
Flushing of latrines	30 Litres
Total for urban areas	135 Litres

Source: Central Public Health and Environmental Engineering Organisation (CPHEEO), India Water Portal, 2010





## SECTION 2: CONTEXT OF PROPOSED POLICY ROADMAP

### 2.1 Status Check: Water Efficiency in Fixtures

Reducing water consumption and improving water efficiency in buildings is a major step towards sustainable water management. According to the American Water Works Association (AWWA), by installing more efficient water fixtures and regularly checking for leaks, households can reduce daily per capita water use by about 35 per cent. Water efficient fixtures have been widely accepted and are been used across the world especially in the countries like Australia, USA, parts of Europe etc. Fixtures like dual flush toilets, low water using/ sensor based/ waterless urinals, sensor faucets/faucets with flow restrictors, water efficient showers etc. are some of the available technologies (See Fig. 2).



**Fig 2: Water saved by water efficient fixture**

Fixture	Water use in standard fixtures	Water-efficient fixture	Water saved
 Toilet	Single flush toilet uses 10-13 litres/flush	Dual flush toilet in 3/6 and 2/4 litre models	4-11 litres/flush
 Urinals	4 liters; 10-13 litres/flush if toilet pan is used	Sensor operated adjustable flush	2.2-10 litres per flush
 Taps	10-18 litres/minute depending on pressure	Sensor taps	5.5-15.5 litres/minute
 Showers	10-15 litres/minute	Flow restrictors	4-20 litres/minute

Source: Watertight, Down to Earth, 15 October, 2010

The rapidly growing international market for water efficient fixtures technologies, has made an impact on the Indian manufacturers as well. There are an increasing number of low water using fixtures that are now being manufactured and sold in the markets for the retail and wholesale consumers. The Indian sanitaryware and wellness products market is growing leaps and bounds with an impressive market value of approximately Rs. 2500 crores. The formal sector is growing at 20% per annum, while the non branded sector is growing at 8-9% every year (CSE 2010). But there still exists a considerable scope for developing a niche for the water efficient fixtures market.

Thus rating of water efficient fixtures would facilitate consumers to identify products that are more water efficient without compromising on performance and the manufacturers can benefit in the marketplace by offering rated water efficient fixtures that perform at par or better than the available models using more water. In addition, to installing water efficient fixtures, setting standards for performance and measuring water efficiency of these fittings would provide credibility and widen its adoption across the building sector. Labelling and rating has proved to be an effective process in guiding consumers interested to conserve water, but have little information even for those who may be motivated by other benefits especially from an economic perspective.

Even though product standardization system exists in the Bureau of Indian Standards (BIS), the premier standard setting agency in India, there are no standards or specification for water efficiency in water using fixtures in toilets and kitchens.

Several countries across the world have established standards for labeling and ratings for water efficient fixtures scheme and appliances with robust supportive legislations. The Water Efficiency Labeling and Standards (WELS) in Australia, WaterSense in USA, Water Efficiency Labeling Scheme (WELS) in Singapore, National Association for Quality in Building Installations (NQBI) labelling system in Portugal are only a few examples of these reforms. The green building concept over the years have accorded importance to water efficiency, savings and reuse besides energy efficiency and materials as key attributes in awarding ratings to buildings. In the green building ratings stipulated points are awarded to buildings which install water efficient fixtures and through it achieve water use reduction.

With India graduating from 'bucket-baths' to showers, creating water-efficient fixtures becomes critical.

## 2.2 Groundwork for Rating System Development

The entire chronology of the CoE process related to rating system for water efficient fixtures is detailed in the following paragraphs.

1. Background Research paper on 'Rating System for Water Efficient Fixtures – Towards Sustainable Water Management in India'
2. Formation of sub committees and stakeholders meetings (3)
3. Draft Roadmap (including rating system) for introducing rating system for water efficient fixtures in India

CSE through its earlier paper in August 2010, on rating system for water efficient fixtures<sup>1</sup> had made an attempt to provide an overview of the current situation and foster discussion on this critical issue. CSE envisaged that the discussions would be vital in evolving a roadmap for implementation based on consultation with a wide range of stakeholders.

Following dissemination of the paper on the subject, CSE organized a stakeholders meeting held on 28<sup>th</sup> September 2010, with participation from representatives of industry dealing in water fixtures, government and non government organisations, academic institutions, sector experts etc. The main objective of the meeting was to present the findings of the paper on Rating System for Water Efficient Fixtures in India and to initiate discussions on the issue. This was meant to be the first step towards developing a rating system for the country and lead to the formation of a core group constituting the resource people from relevant fields (see annexure 1). The core group agreed on creating a framework for a voluntary water fixture rating system. Secondly, it suggested revision and amendment of the existing product specifications in accordance with the ratings. A press note on the meeting was developed and disseminated by CSE (see annexure 2). IPA and IAPMO-India, with their past experience and expertise in the subject matter volunteered to develop the draft rating system for water efficient fixtures. Previously, both the organizations have come out with manuals related to plumbing and fixtures namely, Uniform Plumbing Code- 2008 and Green Plumbing Code- India, 2010 respectively.

In the 2<sup>nd</sup> stakeholders meeting on rating system for water efficient fixtures held on 22<sup>nd</sup> December 2010, the draft rating system document was presented by IPA-IAPMO technical committee before the core group formed by CSE for developing the rating system for India. The fixtures categories covered water closets, urinals, showerheads, faucets (including kitchen faucets), hand-held bidets, dishwashers and clothes washers. The rating system for water efficient fixtures once developed and implemented would facilitate informed decision making by the consumers and provide boost to the awareness on water efficiency. The draft rating system document was revised based on the discussion and comments sent by the members (see annexure 3). Finally, the 3<sup>rd</sup> stakeholder meeting was organised on 27<sup>th</sup> March 2011. In the meeting this document was presented and discussed with the core group members including representative from MoUD (see annexure 7).

In an effort to increase dissemination, CSE published a 2 page special report "Watertight" in their widely circulated environmental magazine Down to Earth (15 October 2010)<sup>2</sup>.

This document presents a roadmap on the framework for implementation of rating system for water efficient fixtures in India to the Ministry of Urban Development. The aim of the above initiatives undertaken by CSE was to facilitate the MoUD to formulate related policies in the immediate future to effectively tackle the water efficiency and conservation issues.

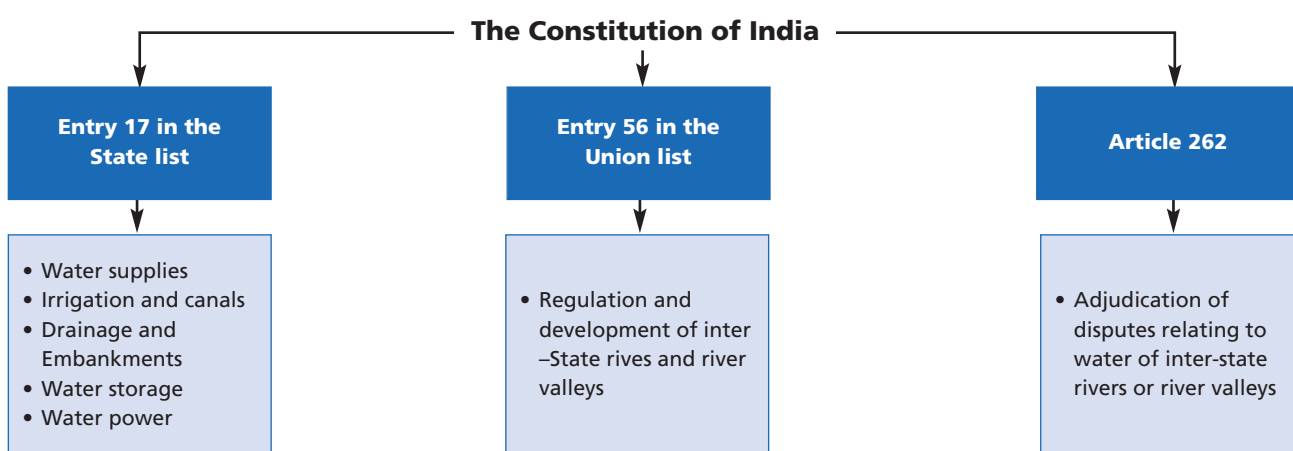
<sup>1</sup> <http://cseindia.org/content/research>

<sup>2</sup> <http://downtoearth.org.in/node/1992>

## SECTION 3: LEGAL AND INSTITUTIONAL FRAMEWORK

According to the Government of India Act (1935) in the Indian Constitution, water is a state subject. The Indian Constitution, provisions in the Entry 17, makes water a state subject wherein, they (state) have the exclusive power to regulate water supplies, irrigation and canals, drainage and embankments, water storage, water power and fisheries (Constitution 1947: Schedule 7, List 2, Entries 17, 21). But Entry 56 provides its inclusion in the Union List, which states: “Regulation and development of inter-state rivers and river valleys to the extent to which such regulation and development under the control of the Union is declared by parliament by law to be expedient in the public interest.” Article 262 explicitly grants parliament the right to legislate over the matters in Entry 56, and also gives it primacy over the Supreme Court (see figure 3).

**Fig 3: Water Related Provisions in the Indian Constitution**



The Union is entitled to legislate on shipping and navigation on national waterways, on tidal and territorial waters (Schedule 7, List 1, Entries 24, 25, 57); and on the adjudication of inter-state water disputes (art. 262). The latter was regulated in the Inter-State Water Disputes Act (1956).

The existing water law framework in India is characterised by the co-existence of a number of different principles, rules and acts adopted over many decades. These include common law principles and irrigation acts from the colonial period as well as more recent regulation of water quality and the judicial recognition of the human right to water.

### 3.1 Existing Legal and Institutional Framework

#### 3.1.1 Legal framework

- Water Pollution Act, 1974- Regarding water pollution, one of the most important developments was the adoption of the Water (Prevention and Control of Pollution) Act, 1974. The Water Act was enacted by the Parliament Act, 1974 with a purpose to provide for the prevention of control of water pollution and the maintaining or restoring of wholesomeness of water. As on day, it is applicable in all the states of India. This act was India's first attempt to deal with issues related to the environment comprehensively. The act prohibits the discharge of pollutants into water bodies beyond a given standard, and lays down penalties for non-compliance. It set up the CPCB (Central Pollution Control Board) which lays down standards for the

prevention and control of water pollution. At the state level, the SPCBs (State Pollution Control Board) functions under the direction of the CPCB and the state government.

- Water (Prevention and Control of Pollution) Cess Act, 1977- This Act provides for a levy and collection of cess on water consumed by industries and local authorities. It aims at augmenting the resources of the central and the state boards for prevention and control of water pollution. Following this act, The Water (Prevention and Control of Pollution) Cess Rules were formulated in 1978 for defining standards and indications for the kind of and location of meters that every consumer of water is required to install.
- The Indian Fisheries Act, 1897- The Indian Fisheries Act, 1897 contains seven sections. Section 5 of the act prohibits destruction of fish by poisoning waters.
- The River Boards Act, 1956- According to this act the regulation and development of inter-state rivers and river valleys was to be entrusted to various river boards, which were designed to advise the central government on development opportunities, co-ordinate activities and resolve disputes. Under their mandate, the boards were required to provide advice to the government on aspects related to conservation and optimal use, promotion and operation of schemes related to irrigation, water supply, drainage, hydro-power and flood control; promotion and control of navigation, afforestation, soil erosion control, pollution prevention and other duties as deemed necessary.
- Environment Protection Act, 1986- The Government of India enacted the Environment (Protection) Act, 1986 (EPA) under article 253 of the constitution. The purpose of the act is to act as an “umbrella” legislation designed to provide a frame work for the central government and coordinate activities of various central and state authorities. In terms of responsibilities, the act and the associated rules require obtaining environmental clearances for various projects and for submission of an environmental statement to the State Pollution Control Board annually. It authorizes the central government to protect and improve environmental quality, control and reduce pollution from all sources, and prohibit or restrict the setting and/or operation of any industrial facility on environmental grounds. The EP Act is applicable to the whole of India. The act provides power to make rules to regulate environmental pollution, to notify standards and maximum limits of pollutants of air, water, and soil for various areas and purposes, prohibition and restriction on the handling of hazardous substances and location of industries (Sections 3-6). The central government is empowered to constitute authority or authorities for the purpose of exercising and performing such of the powers and functions (Sec 3), appoint a person for inspection (Sec 4), for analysis of samples and for selection or notification of environmental laboratories.
- State Acts- Various water related Acts have been enacted by the individual states. First, are Andhra Pradesh Farmers Management of Irrigation Systems Act 1997; Maharashtra Management of Irrigation Systems by Farmers Act 2005; Rajasthan Farmers’ Participation in Management of Irrigation Systems Act 2000. These Acts in Andhra Pradesh, Rajasthan and Maharashtra are enacted to promote participation of farmers in irrigation schemes along the principles of ‘participatory irrigation management’. For example the Kerala Irrigation and Water Conservation Act (2003) aims to consolidate and amend the laws relating to construction of irrigation works, conservation and distribution of water for the purpose of irrigation and levy of betterment contribution and water cess on lands benefited by irrigation works and to provide for involvement of farmers in water utilisation system.

Second, several states, including Andhra Pradesh and Maharashtra have adopted legislation seeking to restructure the water institutional framework such as Andhra Pradesh Water Resources Development Corporation Act 1997; Maharashtra Water Resources Regulatory Authority Act 2005. The Maharashtra authority has broad prerogatives to establish a regulatory system for the water resources of the state, including surface and ground waters, to regulate their use and apportion entitlements to use water between different recognised categories of use. Also the authority has to promote the efficient use of water, to minimise wastage and to fix reasonable use criteria.

Third, several states have also adopted groundwater legislation, which are related to the model law. The central government formulated the Model Bill to Regulate and Control the Development and Management of Ground Water (2005) and the Environment Protection Act (1986: 3(3) ) established a Central Ground Water Authority to regulate and control development and management of groundwater resources. This is, for instance, the case of the Kerala Ground Water (Control and Regulation) Act, 2002.

Although, there are several acts at the state level referring to irrigation and groundwater management, there is none that is referring to water conservation and efficiency with respect to water efficient fixtures. Similarly, at the central level acts related to environment protection, water pollution control have been able to regulate and control water pollution to a large extent, but water conservation and efficiency improvement is not referred under any act with reference to water using fixtures.

### 3.1.2 National and State Water Policies

- National Water Policy, 2002- the first National Water Policy (1987) was adopted by the National Water Resources Council reformulated in 2002. The NWP 2002, clearly states the need for conservation of water in the two sections namely,

#### Conservation of Water

16.1: Efficiency of utilisation in all the diverse uses of water should be optimised and an awareness of water as a scarce resource should be fostered. Conservation consciousness should be promoted through education, regulation, incentives and disincentives.

16.2: The resources should be conserved and the availability augmented by maximising retention, eliminating pollution and minimising losses. For this, measures like selective linings in the conveyance system, modernisation and rehabilitation of existing systems including tanks, recycling and re-use of treated effluents and adoption of traditional techniques like mulching or pitcher irrigation and new techniques like drip and sprinkler may be promoted, wherever feasible.

This implies that the national policy that guides water policies and laws in India has also recognized efficiency improvement and conservation of water as key to water resource management in India. This is evident from the above two sections, which put forth several ways and measures that could be undertaken to reduce water loss, increase savings and efficiency.

- State Water Policies- The national policy has been supplemented by the state water policies. Largely, the national and the state water policies share common principles wherein, water is a natural or economic resource that can be harnessed to foster the productive capacity of the economy, from irrigation water for agricultural production to water for hydropower. Also it has been felt that the priority of use should be allocated in the following order: drinking water, irrigation, hydropower, ecology, agro-industries and non-

agricultural industries, navigation and other uses (National Water Policy 2002: 5; Rajasthan State Water Policy 1999: 8).

So far the State Water Policies have been finalized and adopted by 11 states namely Andhra Pradesh, Chhattisgarh, Goa, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, and Uttar Pradesh. However, the State of Chhattisgarh and Tamil Nadu are in the process of revising the State Water Policies. The states / UTs namely Delhi, Daman and Diu and Dadra and Nagar Haveli have adopted the National Water Policy. The formulation / adoption of State Water Policies is in progress in Arunachal Pradesh, Assam, Bihar, Gujarat, Haryana, Jammu and Kashmir, Jharkhand, Manipur, Meghalaya, Mizoram, Nagaland, Punjab, Rajasthan, Sikkim, Tripura, Uttarakhand, West Bengal and Union Territories of Andaman and Nicobar, Chandigarh, Lakshadweep, and Puducherry.

It is clear that the national water policy a guiding document for states specifically addresses water efficiency and conservation. NWP and SWP which is a vision document for policies and strategies at both levels would be useful when drafting specific reforms and measures for water efficiency improvement with respect to the water fixtures.

### 3.1.3 Water Related Institutions in India

The management of India's water resources falls under the jurisdiction of a number of government ministries and related departments/agencies, although the primary responsibility for the development of water belongs to the individual states (see fig 4).

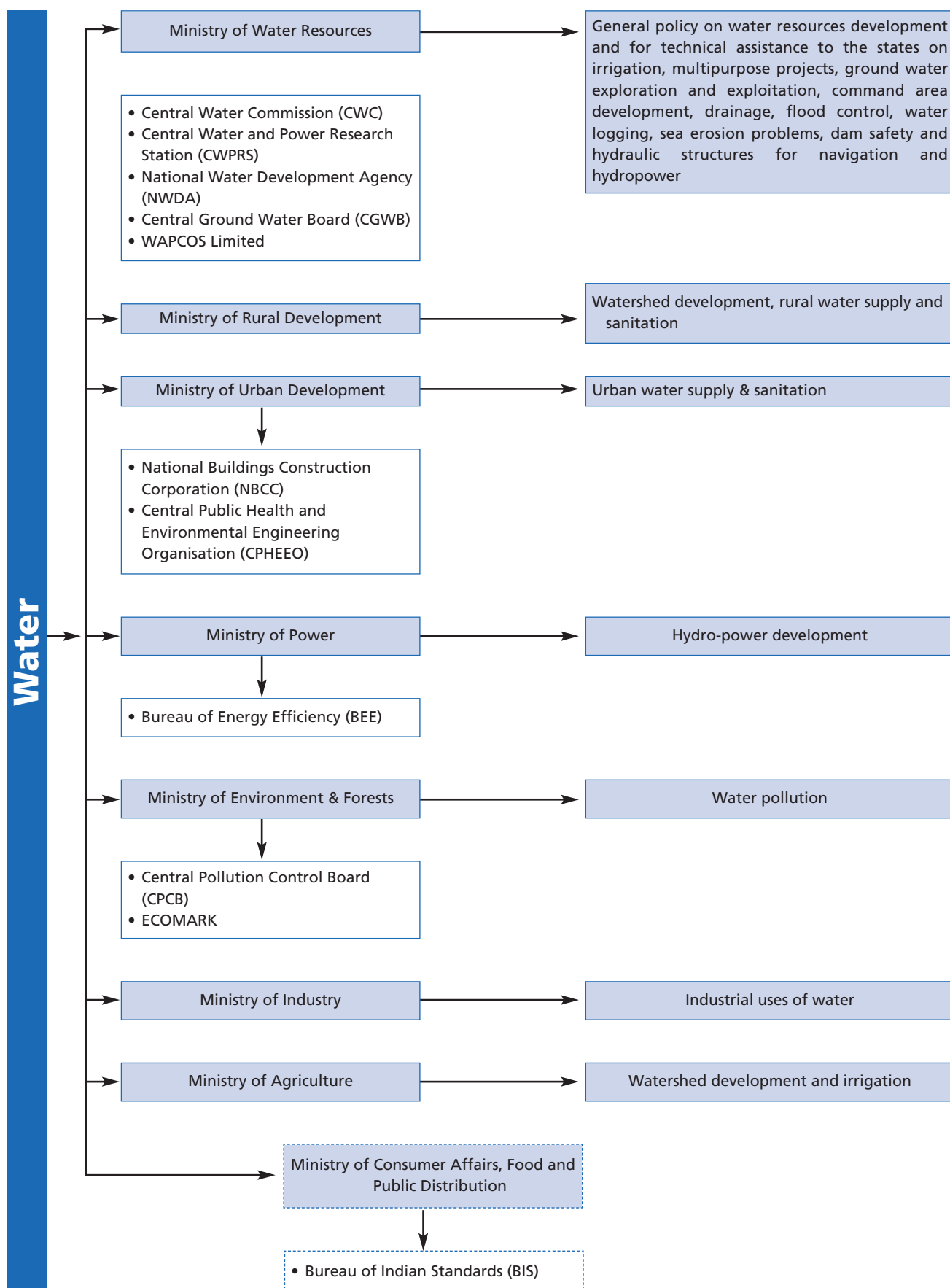
At the central level the Union Ministry of Water Resources is responsible for development, conservation and management of water as a national resource, i.e., for the general policy on water resources development and for technical assistance to the states on irrigation, multipurpose projects, ground water exploration and exploitation, command area development, drainage, flood control, water logging, sea erosion problems, dam safety and hydraulic structures for navigation and hydropower. It also oversees the regulation and development of inter-state rivers. These functions are carried out through various central organisations.

Urban water supply and sanitation is handled by the Ministry of Urban Development while rural water supply and sanitation comes in the purview of Department of Drinking Water under Ministry of Rural Development. The subject of hydro power is the governed by the Ministry of Power and issues related to pollution and environment control comes under the purview of the Ministry of Environment and Forests (see fig 4).

Since water is primarily a state subject, therefore the main responsibility for water use and control rests with the state governments. In addition the administrative control and responsibility for development of water rests with the various state departments and corporations. Urban water supply is generally the responsibility of public health departments and panchayats take care of rural water supply.

- **Bureau of Indian Standards**

Bureau of Indian Standards under the aegis of Ministry of Consumer Affairs, Food and Public Distribution is the premier agency in India assigned with the task of development of standardization, marking, quality certification and quality control on a wide range of products and processes. Over the years, BIS has formulated nearly 18,000 standards in different technology areas ranging from product specifications,

**Fig 4: Institutional Setup for Water in India**



testing methods, codes (practices, guidelines, etc.), terminologies and basic standards.

At present there are a few BIS standards that prescribe guidelines and certify sanitary fixtures and products like cisterns, commodes, faucets etc. For e.g., the standard for cisterns (plastics and non plastics) include specifications on flushing capacity, discharging etc. IS 774: 2004, is for flushing cistern for water closets and urinals (non plastics). IS 2326: 1987 is for automatic flushing cisterns for urinals and IS 7231: 1994 is the specification for plastic flushing cisterns for water closets and urinals. These standard covers discharge rate, discharge capacity, size, quality, pressure, coating, manufacturing process etc. Taps on the other hand are tested for leakages, pressure etc. At present, there are no standards for waterless urinals, since all are imported and imported products are not liable to BIS certification except under very specific conditions. However, applying for these standards is also completely voluntary and there is no regulation that mandates a manufacturer to adhere to them while producing fixtures. Therefore, although product standardisation system does exist in BIS (though voluntary) but there are no standards or specifications for water efficiency in water using fixtures.

- **ECOMARK**

In 1991, Ministry of Environment & Forests instituted a scheme on labeling of Environment Friendly Products through Gazette Notification No. 71 named “ECOMARK”. The scheme is operating on a national basis and provides accreditation and labeling for household and other consumer products which meet certain environmental criteria along with quality requirements of the Indian Standards for that product. According to the scheme, any product which is made, used or disposed of in a way that significantly reduces the harm it would otherwise cause to the environment, are categorized as environment friendly product. The details on the objectives and organisational structure for ECOMARK is provided in the annexure (Annexure 4).

- **Central Public Health and Environmental Engineering Organisation**

CPHEEO is the technical wing of the Ministry of Urban Development, and deals with the matters related to urban water supply and sanitation including solid waste management in the country. Though water supply and sanitation is a state subject, the policies, strategies and guidelines are being provided by CPHEEO to the states & UTs Governments including municipal corporations / committees which play a vital role in processing the schemes posed for external funding agencies. It also acts as an advisory body at central level to advise the concerned state agencies and Urban Local Bodies (ULBs) in implementation, operation and maintenance of urban water supply, sanitation and solid waste management projects and helps to adopt latest technologies in these sub sectors. Besides, the CPHEEO also implements centrally sponsored Accelerated Urban Water Supply Programme (AUWSP) for small towns (scrutinizing / approving the schemes received from state departments from techno-economic angle).



- Bureau of Energy Efficiency

The Bureau of Energy Efficiency, Ministry of Power has developed a scheme for energy efficiency labeling of equipment, pending issue of notification under clause (d) of section 14 of the Energy Conservation Act, 2001 by the Central Government (see box 1).

The scheme has been developed in collaboration with all the stakeholders, and aims at providing information on energy performance so that consumers can make informed decisions while purchasing appliances. The scheme provides information and procedures for the test procedures, schedule of tests, rating plan, sampling plan, qualification requirements, label design, label fee and the manner of display of label in relation to the aforesaid equipment. A committee has been set up by the Bureau to oversee implementation of the scheme. The committee is chaired by the Director General, Bureau of Energy Efficiency and consisting of representatives from Ministry of Power, Bureau of Indian Standards, Consumer Associations, manufacturers association, and test laboratories. The scheme was launched in May, 2006 and is currently invoked for equipments/appliances like (Frost Free (No-Frost) refrigerator, Tubular Fluorescent Lamps, Room Air Conditioners, Direct Cool Refrigerator, Distribution Transformer, Induction Motors, Pump Sets, Ceiling Fans, LPG, Electric Geysers and Colour TV). Further details on Bureau of Energy Efficiency are mentioned in annexure (see annexure 5).

#### Box 1: Objectives of BEE

In 2001 the Energy Conservation Act 2001, was passed and the Bureau of Energy Efficiency (BEE), an autonomous body under Ministry of Power was set up in 2002 under the act with the following objectives.

- Provide a policy framework and direction to national energy conservation and efficiency activities.
- Co-ordinate policies and programme on energy efficiency and conservation with stakeholders.
- To establish energy measurement, monitoring and verification protocol.
- To leverage multi-lateral, bilateral and private sector support in implementation of Energy Conservation Act and efficient use of energy and its conservation.
- To demonstrate delivery of energy efficiency services as mandated in Energy Conservation Act through public private partnership.
- To plan, manage and implement energy conservation programmes as per Energy Conservation Act.

#### 3.1.4 Special National Programmes

- National Action Plan on Climate Change (NAPCC) - With a view to address the related issues, the National Action Plan on Climate Change (NAPCC) has been prepared by the Government of India & released in 2008. The NAPCC has laid down the principles and has identified the approach to be adopted to meet the challenges of impact of climate change through eight National Missions including on water and sustainable habitat.

These National Missions have been institutionalized by respective ministries and will be organized through inter-sectoral groups which include in addition to related ministries, Ministry of Finance and the Planning Commission, experts from industry, academia and civil society. The institutional structure would vary depending on the task to be addressed by the mission and will include providing the opportunity to compete on the best management model.

- National Water Mission (NWM) - The NWM is under the Ministry of Water Resources (MoWR) and the main objective is conservation of water, minimizing wastage and ensuring its more equitable distribution both across and within the states through integrated water resources development and management. Of

the five main goals of the mission, the fourth goal is on increasing water use efficiency by 20%. The sub objectives under this goal also elaborate on the various areas where water use efficiency improvement are to be targeted in India as part of the national strategy to combat climate change impacts. The sub-objectives include

- *Research in area of increasing water use efficiency in agriculture, industry and domestic sector.*
- Development of guidelines for incentivizing recycling of water including wastewater by March 2011.
- Promotion of water efficient techniques and technologies including (a) promotion of micro irrigation techniques such as sprinkler and drip irrigation and (b) expansion of “Farmers’ Participatory Action Research Programme”
- *Undertake Pilot projects for improvement in water use efficiency in collaboration with States by March 2012*
- Promote the Water Regulatory Authorities for ensuring equitable water distribution and rational charges for water facilities
- Promote mandatory water audit including those for drinking water purposes
- Adequate provision for operation & maintenance of water resources projects
- *Incentivize through award for water conservation & efficient use of water*
- Incentivize use of efficient irrigation practices and fully utilize the created facilities

The italicized sections in the sub objectives of national water mission, highlights the emphasis accorded to water efficiency and conservation. It also provides an insight into the various measures that the mission intends to adopt to reduce water wastage and increase its efficiency.

- National Mission on Sustainable Habitat (NMSH)- The Mission on Sustainable Habitat aims to make cities sustainable by promoting sustainability of habitats through improvements in energy efficiency in buildings, urban planning, improved management of solid and liquid waste, modal shift towards public transport and conservation through appropriate changes in legal and regulatory framework and is the responsibility of the Ministry of Urban Development. Of the 14 objectives outlined in the mission, objective seven mentions “to conserve the natural resources that are the key to sustainability of human habitats like water, clean air, flora and fauna, recognizing the integrated nature of human and other systems”. In the section on adaptation under water resource management and drinking water supply, the mission states that ‘water needs to be used more efficiently across all sectors. Measures to be taken include water- saving appliances, reduced leakage in supply systems, water recycling and rainwater harvesting. Finally, the last section on time lines and fund requirement in the mission document, point 2.1.3 under the principles of sustainable habitats to be incorporated in the city Development plans, states the same points as the above to be implemented within 2009-2017.

Thus, both these missions clearly state water efficiency in varying capacity and spheres. While National Water Mission is more explicit and aims to address efficiency improvement in several sub sectors like agriculture, industrial and domestic even at the state level, the Sustainable Habitat Mission mentions it as a sub goal on adaptation with respect to buildings, with continued emphasis on energy. Therefore, it is important that water efficiency gets addressed in both these missions adequately and appropriately in various spheres and activities ranging from agriculture to municipal and irrigation techniques to water fixtures.

### 3.1.5 Building and Water related Initiatives

- **National Building Code-** The National Building Code of India (NBC), is a building code and a national instrument providing guidelines for regulating the building construction activities across the country. It serves as a model code for adoption by all agencies involved in building construction works including the public works departments, other government construction departments, local bodies or private construction agencies. The code mainly contains administrative regulations, development control rules and general building requirements; fire safety requirements; stipulations regarding materials, structural design and construction (including safety); and building and plumbing services.

The code was first published in 1970 at the instance of Planning Commission and then revised in 1983. Thereafter three major amendments were issued, two in 1987 and the third in 1997. The NBC 2005, formulated by the Bureau of Indian Standards, spells out new regulations for adoption by infrastructure departments, municipal administrators, public bodies and private agencies. Some of the byelaws of corporations, municipalities and other local bodies in the states of Maharashtra, Gujarat, Tamil Nadu, Karnataka, Andhra Pradesh, Uttar Pradesh, Rajasthan, Bihar, West Bengal, Union Territory of Delhi, Madhya Pradesh and Haryana were redrafted to bring them in line with National Building Code and submitted to the respective governments. These are under various stages of consideration, while in some of the state construction departments like Public Works Departments (PWD) have set up cells to look into the revision of PWD specifications and codes to align them with the National Building Code and other related Indian standards. The building that does not satisfy the building code or violation of NBC leads to penalty, cancellation of sanction or demolition of the building. The building is inspected by concerned authorities for the issuance of completion certificate for the apartment or building. Issuing of completion certificate ensures that the owner has constructed the building as per approved plan. Without the occupancy certificate, it is difficult to get the electricity, water and sanitary connection. The NBC 2005, formulated by the Bureau of Indian Standards, spells out new regulations for adoption by infrastructure departments, municipal administrators, public bodies and private agencies. Rain water harvesting system and solar water heater are mandatory for newly constructed building in some states. Unfortunately, the NBC does not include water efficiency standard and offers only guidelines for construction.

- **Green Building Ratings-** The green building rating systems is another initiative aimed at guiding stakeholders in the construction industry to incorporate components for improving water efficiency in planning, developing and operating new and existing buildings. There are several internationally adopted green building rating programs like LEED India, IGBC Green homes and factory ratings and the GRIHA rating system developed under the aegis of Ministry of Non Renewable Energy, Government of India. All the four rating systems have integrated water efficiency and savings as a key component of its rating systems beside energy, pollution, materials, environmental quality etc. The water section mentions the requirement of designing, replacement and installation of fixtures, technologies etc. with some minor variations. Although, none of the green building rating systems are mandatory, very few buildings in India have actually received or applied for these ratings. Therefore, it's builders and developers prerogative to sought green building ratings and improve water efficiency and use in the buildings.
- **Green Plumbing Code-** Green Plumbing Code Supplement-India (GPCS-I), published in 2010 documents sustainable plumbing systems. It offers guidelines on design, selection, installation and maintenance of water and energy saving plumbing products and systems. Another plumbing related document titled

Uniform Plumbing Code India (UPC-I) was published in 2008 by the Indian Plumbing Industry represented by Indian plumbing association in partnership with International Association of Plumbing and Mechanical Officials (IAPMO)-USA. The code customized for India, addresses modern plumbing design and installation practices. Both UPC-I and GPCS-I are adopted voluntarily by the Indian Plumbing Industry.

Indian Plumbing Association (IPA), established in 1993, is the apex body of plumbing professionals in the country. It was set up with an objective to promote advancements in plumbing and the building services industry. IPA has to its credit, a laboratory facility showcasing modern plumbing technologies and system-performances, in collaboration, with the College of Engineering Pune (COEP). International Association of Plumbing and Mechanical Officials (IAPMO) is an 83-year-old non-government organization (NGO) and non-profit association and works on health and safety, primarily in the plumbing and mechanical fields.

## **SECTION 4: PROPOSED POLICY ROADMAP FOR RATING SYSTEM FOR WATER EFFICIENT FIXTURES IN INDIA**

### **4.1 Proposed Roadmap**

Based on the above sections and discussions with the relevant stakeholders, CSE is proposing a roadmap for rating system for water efficient fixtures in the following sub section.

#### **4.1.1 MoUD as the Key Facilitator**

Ministry of Urban Development (MoUD), is proposed to be the key facilitator of this process. But, it is reiterated that establishing processes and institutions that would ensure cooperation and convergence between the MoUD and other ministries especially Ministry of Water Resources (MoWR), is equally important.

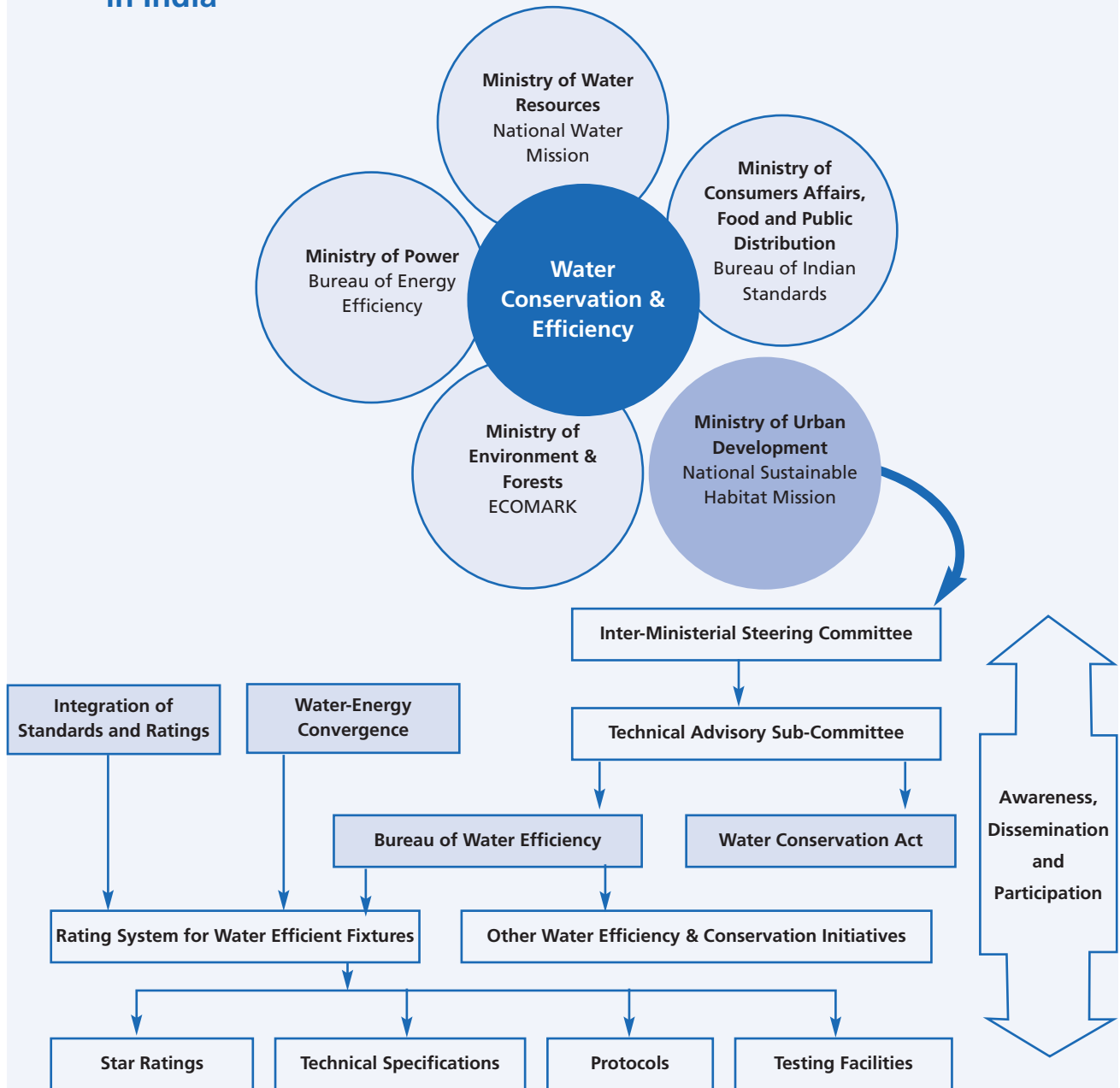
#### **4.1.2 Inter-Ministerial Steering Committee**

Further, since both urban development and water are primarily a state subject, the central government ministries needs to continue to play a catalytic role in provision of legal and institutional framework, capacity building and ensuring convergence of interests and resources to undertake efficiency reforms in water sector (see fig 5). As part of the Sustainable Habitat Mission, MoUD could establish a national inter-ministerial steering committee, with representatives from Ministry of Water Resources (including from CPHEEO & National Buildings Construction Corporation), Ministry of Power (from Bureau of Energy Efficiency), Ministry of Consumer Affairs, Food and Public Distribution (from Bureau of Indian Standards) and Ministry of Environment and Forests (from ECOMARK).

#### **4.1.3 Technical Advisory Sub-Committee**

A technical advisory sub-committee could be constituted, that would provide technical, legal, regulatory, management and economic based inputs to facilitate the central committee. The sub-committee could have experts from the relevant fields including water, plumbing, public policy/law, management, economics, public health, engineering etc., including from CSE. The committee could explore options and suggest, establishing a centralized institution/agency (for water efficiency, certifying and awarding ratings etc.). Besides this the committee could also work towards a central law on water efficiency, improving coordination, cohesion and compliance of regulatory arrangements and its implementation etc.

**Fig 5: Proposed Roadmap for Rating System for Water Efficient Fixtures in India**



## 4.2 Framework for implementation of Rating System

### 4.2.1 Objectives of the Rating System

The proposed rating system for water efficient fixtures would be a crucial reform if undertaken. The key objectives of the rating system could be,

- Reducing water consumption to conserve water
- Provide information on water efficient fixtures/ appliances/ technologies for informed decision making and purchases
- Promote the adoption of water efficient fixtures/appliances/ technologies

### 4.2.2 Star Ratings

The proposed rating system for water efficient fixtures may require water using fixtures/appliances to display a certifying agency's water-rating label at the point of sale. The rated products could be carrying a label, which shows star rating that allows a comparative assessment of the model's water efficiency (the more stars on the label the more water-efficient the product) and a figure showing the water consumption or water flow rate of the product, based on laboratory tests. The proposed star rating would take into account the water efficiency of the product as well as its performance. The summary of the draft rating system proposed is discussed in annexure 6.

### 4.2.3 Technical Specifications for Rating System

Detailed technical specifications need to be devised for the rating system, to establish the necessary benchmark values to be assigned to each star. The initial groundwork in terms of a draft rating system has already been prepared by CSE, with technical inputs from IPA-IAPMO technical committee which was part of a core group formed by CSE (see annexure 1). The proposed rating system (see annexure 6) provides star ratings for fixtures categories including water closets, urinals, showerheads, faucets (including kitchen faucets), hand-held bidet, dishwashers and clothes washers. The summary of the draft proposed rating system compiled in the box 2. Further refinement and strengthening, including implementation of the proposed rating system can be undertaken by the technical advisory sub-committee.

### 4.2.4 Setting Protocols and Testing Facilities

For any labeling and rating system to be effective and successful, basic testing facilities and infrastructure is a precondition. These testing labs, facilities and conditions have to follow specific protocols, besides being fully equipped and accredited by the concerned authorities. Taking a lead from the international rating systems and BEE in India, specific protocols and procedures have to be defined for the proposed rating system. It can be proposed that the manufacturers signing up to the system have to register and sign an agreement with the proposed certifying agency, which will define the conditions under which they can issue and use the star rating labels. The initial tests, which will be the basis for the conformity statement and permission to use the labels, could be carried out by the manufacturer/importer in an independent accredited laboratory/s conforming to the technical and testing specifications. The proposed certifying agency could provide the initial certification and can carry out random tests of labeled products on the market at intervals. The labels could have a code with references for the firm and the product, and showing the date of the last conformity evaluation.

## Box 2: Proposed Draft Rating system for Water Efficient fixtures

### Water Closets

- European water closet with cistern or flush valve using not more than 6 litres per flush. ★
- European water closet with dual flush cistern or flush valve using 6 litres for full flush and 3 litres for half flush. ★★
- High-efficiency European water closet using 5 litres single flush. ★★
- High-efficiency European water closet using less than 5 litres per flush. ★★★
- Combination or Asian / Indian pan using 6 litres per flush; cistern or flush valve. ★
- Combination or Asian / Indian pan using 6 litres per full flush and 3 litres for half flush; cistern or flush valve. ★★

### Urinals

- Urinal with flushing device using 4 litres per flush. ★
- Urinal with flushing device using 3 litres per flush. ★★
- Urinal with flushing device using 2 litres per flush. ★★★

### Shower Heads / Hand-held Showers

- Shower head with flow-rates of 9.5 lpm. ★
- Shower head with flow-rates of 7.5 lpm. ★★
- Shower head with flow-rates less than 7.5 lpm. ★★★

### Faucets

#### *Faucets (Private use)*

- Non-metered faucets or faucets with aerators with flow-rates of 8 lpm. ★
- Non-metered faucets or faucets with aerators with flow-rates of 5.7 lpm. ★★
- Non-metered faucets or faucets with aerators with flow-rates less than 5.7 lpm. ★★★

#### *Faucets (Public use)*

- Metered faucets with or without aerators with flow-rates of 1 litre per cycle or non-metered faucets with flow-rate of 2 lpm. ★★
- Metered faucets with electronic actuator with flow-rates of 1 litre per cycle. ★★★

#### *Kitchen Sink Faucets*

- Kitchen sink faucets or faucets with aerators with flow-rates of 8 lpm. ★
- Kitchen sink faucets or faucets with aerators with flow-rates of less than 8 lpm. ★★

### Handheld Bidet Spray (Ablution faucet with hose and trigger)

- Handheld bidet spray with flow-rates of 8 lpm. ★
- Handheld bidet spray with flow-rates of less than 8 lpm. ★★

### Dishwashers

- Dish washer with a Water Factor (the quantity of water used in liters per full machine wash and rinse cycle) of 22 litres: ★
- Dish washer with a Water Factor (the quantity of water used in liters per full machine wash and rinse cycle) less than 22 litres: ★★

### Clothes Washer

- Clothes washer with a Water Factor (the quantity of water in litres used to wash each cubic meter volume of machine drum capacity) of 5 liters for private use and 8 liters for public use: ★
- Clothes washer with a Water Factor (the quantity of water in litres used to wash each cubic meter volume of machine drum capacity) of less than 5 litres for private and less than 8 liters for public use: ★★



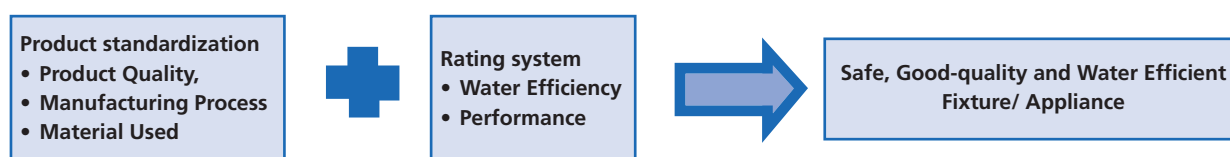
#### 4.2.5 Self Sustaining

Like BEE, the proposed certifying agency could be self sustaining with some initial capital investment from the central government. For the proposed rating system a similar procedure could be followed with appropriate changes. For example BEE's Standard & Labelling scheme requires a payment of Rs. 1 lakh for every company/equipment as security deposit, which shall be Rs. 25, 000 for the Small Scale Industries (SSI) provided they upload their SSI certificate duly valid. The manufacturer/company need to provide Rs. 1000/- model registration fee in multiples, thereafter. The company has to supply quarterly production data of various models since BEE charges a labeling fee for affixation of label on each piece of qualified product which is Rs. 10.

#### 4.2.6 Integration of Standards and Ratings

In addition to the introduction of a rating system for water efficient fixtures, there is a need to integrate the BIS standards with the proposed rating system. These are two separate entities since BIS standards on fixtures deals with product quality, manufacturing process, material used etc., while the proposed rating system grades water fixtures/appliances on basis of water efficiency (including performance). Therefore to ensure safety, product quality and efficiency, product standardization (BIS) could be made a prerequisite for compliance with the rating system (see fig 6).

**Fig 6: Integration of Product Standardization and Water Efficiency**



#### 4.2.7 Voluntary Initially

To initiate the process, the rating system for water efficient fixtures could be voluntary, later on making a transition to a mandatory system in a time bound and systematic manner with least inconvenience. Since this is going to be a novel reform, hence several issues and challenges could arise that could require resolution. Several inclusion, changes and modifications would be required in the existing process, regulation, legal/policy framework to initiate this reform. If the system is voluntary initially, the required knowledge, experience, resources/infrastructure, label designs etc. requirements could be developed and strengthened before switching over to a mandatory system. In addition, a voluntary system could also provide some preparatory lead time and appropriate opportunities to the fixtures manufacturers to tune their products, manufacturing process and sales towards a compulsory system. Infact, the BEE program on standards and labeling system also started as a voluntary program and is only recently that it has made labeling and star rating mandatory for maximum of its designated products.

#### 4.2.8 Water-Energy Convergence

There is a long list of fixtures and appliances wherein both water and energy aspects have to be addressed. Products like faucets, showers, geysers, water pumps etc. some of which are presently rated for energy efficiency, could also require water efficiency rating. In the future there could be a need to devise a water-energy ratings that would ensure that both these aspects in the specific products are addressed.

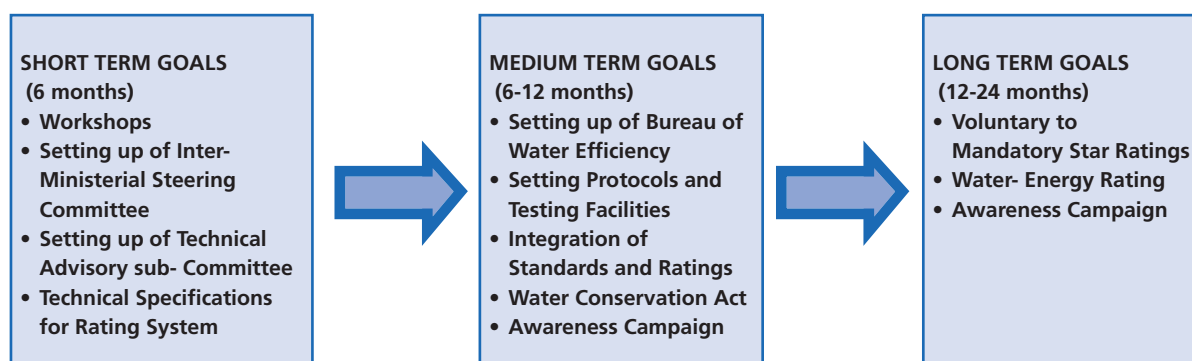
#### 4.2.9 Awareness, Dissemination and Participation

The key objectives of the proposed rating system are to facilitate informed decision making and generate awareness on water conservation and efficiency. Therefore, it is proposed that a national level workshop is organized by the MoUD before initiating the process of developing and implementing the rating system. Although CSE had undertaken two stakeholders workshops and undertaken dissemination activities to generate awareness on the issue, but an effort at a larger scale is required, to be propelled by MoUD. With participation from across India and from various sectors, this public workshop could generate opinion, suggestions and discussion on this critical issue. This workshop could be followed up by the process of establishing the rating system supported with a creative and large scale awareness campaign.

#### 4.3 Time line

Like for all other reforms there is need to have a time frame for development, uptake and implementation of the proposed rating system. Based on the points mentioned above in the process for the proposed roadmap, a time line for short/medium/long term goals has been proposed (see fig 7).

**Fig 7: Time line for the Proposed Rating System Rating**



#### 4.4 Proposed Legal and Institutional Reforms

##### 4.4.1 Water Conservation Act

The requirement for legal support is reiterated by the fact that water quality and pollution control got addressed when they received a legal backing from the Water Pollution Act, 1974 and the Environment Protection Act, 1986. The setting up of the central and state pollution control boards were infact the most significant provisions under the acts, which led to improved regulation and control over pollution specifically water pollution. Therefore the institutions created and granted powers under the act and this led to the implementation, regulation of and compliance with the government policies.

Similarly, the Energy Conservation Act 2001 provided the legal support to various initiatives including setting up of Bureau of Energy Efficiency (BEE), implementation of Standards and Labelling Program, filing of energy returns and audits for the designated users etc. BEE today is spearheading the improvement of energy efficiency in the economy through regulatory and promotional instruments.

Although there are several acts related to water, but there is none on water conservation. Therefore any attempt to institutionalise or regulate water efficiency would require a strong legal support in terms of a comprehensive and visionary act, that could ensure water efficiency in every sector including domestic, agriculture and industrial.

It is essential to initiate efforts towards devising a water conservation act for India with regards to rating system for water efficient fixtures since in countries where rating is functional, it is mandated through a legal framework. Water Efficiency Labelling and Standards (WELS), which is Australia's water efficiency labelling scheme, requires certain products to be registered and labelled with their water efficiency in accordance as per the national Water Efficiency Labelling and Standards Act 2005. Similarly, in 1992 the federal Energy Policy Act was passed in USA which laid down uniform water efficiency standards for nearly all toilets, urinals, showerheads, and faucets manufactured after January, 1994. The act envisaged that the reduced water demand and wastewater volumes could influence policy and planning decisions of utilities.

#### 4.4.2 Bureau of Water Efficiency

It is proposed that either a new organisation by the name of Bureau of Water Efficiency (BWE) is established or expansion of the existing Bureau of Energy Efficiency be done to include water efficiency.

However, the issue with BEE is that it is under the aegis of Ministry of Power, which only has hydropower as part of its mandate. BEE's mission was to develop policies and strategies with a thrust on self regulation and market principles with the primary objective of reducing energy intensity of the Indian economy.

Therefore, creation of a new institute with powers, capacity and mandate to undertake water conservation and efficiency reforms is suggested. Both the national missions on water and sustainable habitat have proposed mandates for efficiency improvement, with, the National Water Mission more explicitly listing water efficiency as one of its five goals and setting a benchmark of increasing water use efficiency by 20%. On the other hand, the sustainable habitat mission clearly mentions in its principle 2.1.3 (for the City Development Plans) for water supply to 'promoting water saving appliances, reducing leakages in supply systems, water recycling, rainwater harvesting and harvesting through check dams', between 2009-2017 along with providing 10 crores as the fund requirement for pilot projects.

Taking a clue from BEE, central agency which performs a wide variety of functions related to energy efficiency, BWE can also be developed to undertake relevant reforms in water sector at the central level and state water bureau to implement it at the state level. For example BEE, works towards developing norms for processes and energy consumption standards, standards and labeling design for equipment and appliances, energy conservation building codes, notifying designated energy consumers, accreditation to energy auditors and awareness creation and dissemination. All these activities are as per the Energy Conservation Act, 2001 which was instrumental in ushering energy reforms in India.

It is understood that water efficiency reforms are not limited to fixtures/appliances for buildings. Since water is used in every sector and area, therefore the efficiency reforms also have to be extend to public water utilities, industries, irrigation etc. Therefore, creation of BWE could be an extremely significant step towards managing country's water resources effectively and efficiently. It could also lead to

convergence of efforts related to efficiency and conservation taken up by various ministries, departments and agencies. Further, it can also serve as a research center for efficiency improvement, certification, regulating body and knowledge centre.

The inter-ministerial coordination as suggested in the mission documents could serve as a catalyst to bring together the concerned stakeholders to initiate this reform. The Inter-Ministerial Group (IMG) is mandated with sanctioning projects and activities in pursuance of the mission objectives.

## 4.5 Challenges

Over the years provision of water and water supply for various uses including for agriculture, industrial and domestic has been the mainstay of India's water sector. But, the growing scarcity and declining quality of water resources has provided impetus to programs and initiatives related to water management, conservation and efficiency improvement. There are some challenges that could confront the efforts to implement the proposed reform.

- 4.5.1 Since water is under the jurisdiction of various ministries, it would require considerable effort on part of MoUD to ensure inter-ministerial coordination and knowledge exchange for establishing a proposed bureau of water efficiency, especially since in the National Water Mission, Ministry of Water Resources has highlighted water efficiency improvement as one of its five main goals. Since, energy was under the mandate of only one ministry i.e. Ministry of Power, it was relatively easier to undertake energy efficiency reforms like enactment of energy conservation act, creation of BEE etc.
- 4.5.2 Further, since water is a state subject hence it would be crucial for water efficiency and conservation reforms to be properly addressed and institutionalised at the state level.
- 4.5.3 Unlike energy, water is still under-priced. The high tariff for energy was a major factor which led to the successful implementation and is sustaining the BEE's standards and labeling program. The consumers which are the main target group for the labeling program accepted it since the BEE label would help them choose the most energy efficient appliance and save on electricity bill.
- 4.5.4 Almost 50% of the sanitaryware market is informal; therefore it could be a challenge to bring manufacturers and companies producing these goods under the purview of the rating and product standardization regime.
- 4.5.5 It could be rather difficult to initiate, implement and regulate a reform unless, there is strong legal framework (act/law) supporting it. Agencies like Central Pollution Control Board, BEE etc. are effective in regulating and implementing the policies and norms since they derive powers from acts like Water Pollution Act, 1974 and Energy Conservation Act, 2001 respectively. Unfortunately, there is no special act for water conservation to support the water efficient reforms.

## 4.6 Conclusion

As discussed above, India is at a critical juncture where it has to undertake and implement reforms related to water conservation and efficiency, especially in the present scenario of growing water scarcity and declining quality. Rating system for water efficient fixtures is just one of the initial steps towards this direction, which has already been reinforced internationally. The water efficiency rating system is a comprehensive mechanism with an ultimate goal of providing the consumers with informed decision making to choose water efficient products.

The Ministry of Urban Development's initiative is therefore a step in the right direction and requires a systematic approach essentially to standardize and mainstream the water efficiency rating process. Centre for Science and Environment (CSE), as a Centre of Excellence has facilitated this process by undertaking initial research, dialogue, dissemination and advocacy on rating system for water efficient fixtures in India, in addition to developing a roadmap for MoUD for the same.

## REFERENCES

- Anon, 2010. Climate Change and Urbanization in India, May 27, 2010 (Online), Available at: <http://urbanhealthupdates.wordpress.com/2010/05/27/climate-change-and-urbanization-in-india/>
- Anon., 2003. Environmental Regulations and Legal Framework in India, (Online) Available : [sjvn.nic.in/projects/environmental-regulations.pdf](http://sjvn.nic.in/projects/environmental-regulations.pdf)
- Centre for Science and Environment., 2009. Review of the Interceptor Plan for the Yamuna (Online) Available at: [http://www.cseindia.org/userfile/CSE\\_interceptor\\_analysis.pdf](http://www.cseindia.org/userfile/CSE_interceptor_analysis.pdf) (Accessed on 20 June 2010).
- Research and Markets, 2008. Indian Construction Industry – Summary (Online), Credit Analysis & Research Limited (Updated 2010), Available at: [http://www.researchandmarkets.com/reportinfo.asp?report\\_id=661754](http://www.researchandmarkets.com/reportinfo.asp?report_id=661754) (Accessed on 12 February 2010)
- Cullet Philippe., 2006. Water Laws and Reforms- Analysis of recent developments, 48/2 Journal of the Indian Law Institute (2006), p. 206-231. (Online) Available <http://www.ielrc.org/content/a0603.pdf>
- Dellapenna. Joseph W. & Gupta Joyeeta (eds)., 2009. The Evolution of the Law and Politics of Water, Springer Academic Publishers and Business media B.V
- Gilmer, L., and Hughel, G., 2008. Improving Water Efficiency in Your Building (Online) Buildings Magazine, (Updated 2010) Available at: <http://www.buildings.com/Magazine/ArticleDetails/tabid/3413/ArticleID/6461/Default.aspx> (Accessed on 9 February 2010).
- Ministry of Housing and Urban Poverty Alleviation- Government of India and United Nations Development Programme (UNDP), 2009. India: Urban Poverty Report 2009 (Online), Available at: [http://data.undp.org.in/poverty\\_reduction/Factsheet\\_IUPR\\_09a.pdf](http://data.undp.org.in/poverty_reduction/Factsheet_IUPR_09a.pdf) (Accessed on 8 February 2010).
- Ministry of Water Resources-Gol., 2008. National Water Mission, Volume - II , New Delhi, December 2008 (Online) Available [http://www.wrmin.nic.in/writereaddata/linkimages/Mission\\_Doc\\_Vol22880755143.pdf](http://www.wrmin.nic.in/writereaddata/linkimages/Mission_Doc_Vol22880755143.pdf)
- Ministry of Water Resources- Gol., 2009. National Water Mission, Volume -, New Delhi, April 2009 (Online) Available: <http://india.gov.in/allimpfrms/alldocs/15658.pdf>
- Ministry of Urban Development-Gol.2010., National Mission on Sustainable Habitat. (Online) Available <http://www.indiaenvironmentportal.org.in/files/National%20Mission%20on%20sustainable%20habitat.pdf>
- Shah. S., Thakar. D., and Panda. S., 2009 Water Audit – Need of the Hour, Tata Consulting Engineer (Online) (Updated 2009), Available at <http://www.tce.co.in/Downloads/index.htm#ap> (Accessed on 10 February 2010).

## ANNEXURES

### Annexure 1- List of Core Group Members

Centre for Science and Environment, Delhi convened all the stakeholders group meetings. The following core group members participated in the deliberations on the subject.

#### Stakeholders Categories

##### Government

- Mr. A. K Mehta, Joint Secretary- UD&A, Ministry of Urban Development- Government of India
- Ms. E. P. Nivedita, Director, (WS), Ministry of Urban Development- Government of India

##### Academics

- Prof. Aruna Ramani Grover, Professor, Department of Architecture, School of Planning and Architecture
- Mr. Prof. V. K Paul, Professor and Head of the Department Building Engineering and Management, School of Planning and Architecture

##### Manufacturers

- Mr. C.S.Gupta, Secretary, IPA and Head, Gems Sanitaryware
- Mr. R. K Somany, Chairman and MD Hindustan Sanitaryware & Industries Limited

##### NGO's

- Ms. Sunita Narain, Director General, Centre for Science and Environment (CSE)
- Dr. Suresh Kumar Rohilla, Programme Director- Urban Water, Centre for Science and Environment (CSE)
- Ms. Sakshi C. Dasgupta, Deputy Coordinator- Water Unit, Centre for Science and Environment (CSE)
- Dr. Hina Zia, Sustainable Building Science, Energy Environment Technology, The Energy and Resources Institute (TERI)

##### Technical Bodies

- Mr. J.B.Ravinder, Asst. Adviser (PHE), CPHEEO, MoUD
- Mr. A.K Saini, Scientist F & Head Civil Engineering, Bureau of Indian Standards, Manak Bhawan,
- D K Agarwal, Scientist F, Bureau of Indian Standards

##### Non Governmental Technical Organisations

- Mr. Subash Deshpande, Director, Education and Certification, International Association of Plumbing & Mechanical Officials India
- Mr. M. K Gupta, Managing Director and Chairman (Delhi Chapter) MKG Engineering Services Private limited and Indian Plumbing Association (IPA)
- Mr. S.P Sree Kumar, Director General, IAPMO, India
- Mr. Ramani Iyer, Forbes Marshall, Pune
- Mr. Sandeep Goyal, Spectral Services Consultants Ltd.

##### Experts

- Mr. S G Deollalikar, Sanitary Engineer & Ex President, Chairman Emeritus, Indian Plumbing Association (IPA)



## Annexure 2: Press note for the 1st stakeholders meeting

28<sup>th</sup> September 2010

Venue: CSE office, Core 6 A- 4th floor, India Habitat Centre, New Delhi

### *Green buildings: CSE's new report advocates rating of water-efficient fixtures*

#### **New report advocates rating of water-efficient fixtures in buildings**

- Fixtures in toilets and kitchens consume over 40 per cent of the water a building uses in India's cities. With India graduating from 'bucket-baths' to showers, creating water-efficient fixtures becomes critical.
- No standards for water-efficient appliances in the country



Centre for Science and Environment (CSE), designated a 'Centre of Excellence' by the Union ministry of urban development, brings together regulators, industry and environmentalists to discuss a way ahead, presents a report on developing a rating system for water-efficient fixtures. Calls for voluntary appliance rating system to begin with, to be made mandatory later.

**New Delhi, September 28, 2010:** Water use in urban buildings constitutes a very high percentage of the total water use in any city. Fixtures in toilets and kitchens such as cisterns, urinals, faucets and showerheads consume more than 40 per cent of the water any building uses. Reducing water consumption and improving water efficiency in buildings can, therefore, be one of the keys to sustainable water management in a city.



**From right:** E.P. Nivedita, (Dir, MoUD) Sunita Narain (Dir, CSE) and A.K Mehta (Jt.Sect, MoUD)

In a stakeholder's meet held here today, Centre for Science and Environment (CSE), the New Delhi-based research and advocacy body, released its report on Rating System for Water Efficient Fixtures in India. The report, presented to kick-start discussions on the issue, is the first step towards developing such a rating system for the country (**see the full report**).

"Energy efficiency has come to be recognised as a key element that defines a 'green' building. The other key mark is water-efficiency. The Indian consumer has begun recognising the need for being water-prudent, and is keen to know about products that save water. As a nation, we need a rating system which looks at performance and efficiency of products and a labelling scheme that tells the consumer what to buy," said Sunita Narain, director, CSE at the launch of the report.

"We are hopeful that the report and today's discussions will help the Union ministry of urban development formulate related policies to effectively tackle water efficiency and conservation issues," said Suresh Rohilla, senior coordinator, CSE's water unit. CSE has been designated a 'Centre of Excellence' by the ministry.

### **Water use in cities: a growing nightmare**

In 2005, the official water demand of Delhi and Mumbai was 3,973 and 3,900 million litres daily (MLD), respectively; the per capita demand was estimated at 268 and 307 litres per capita daily (LPCD), respectively. The supply, in most cases, is way below the demand. In fact, in 2005, the shortfalls in Delhi and Mumbai were a massive 600 and 900 MLD, respectively.

With almost 30-40 per cent of their water lost in transmission and supply, every city in India is fighting a growing water crisis. Along with this, cities are also saddled with mounting sewage and wastewater generation and extremely decrepit – even non-existent – sewerage systems.

With the construction sector emerging as the second largest economic activity after agriculture, water use in Indian cities and their buildings is all set to touch new highs. While different agencies have suggested varying estimates of average per capita water use in cities, they all agree on the fact that toilets and bathrooms are the biggest water guzzlers in a house — with flushes, taps and showers devouring more than 60-70 per cent of the total water use.

### **Better fixtures make a difference**

Globally, nations have established norms for water-efficient fixtures. The Water Efficiency Labelling Scheme of Singapore is a case in point. The scheme applies to showers, basins and sink taps, low capacity flushing cisterns, urinals and urinal flush valves, washing machines and showerheads. Australia's Water Efficiency Labelling and Standards (WELS) require certain products to be registered and labelled in accordance with the Water Efficiency Labelling and Standards Act of 2005.

“The good news is that over the years, significant technological progress has been made in improving water efficiency in fixtures, with minimum compromise on performance,” says Rohilla. And it does make a difference. According to the American Water Works Association (AWWA), by installing more efficient water fixtures and regularly checking them for leaks, households in the US can reduce daily per capita water use by about 35 per cent.

In India, a 2009 survey by Tata Consulting Engineering conducted in Mumbai found that by using simple water-efficient fixtures, a five-member household could save (on an average) over 400 litres of water every day; the same survey had found the household consuming 920 litres a day on an average without the fixtures.

“Mr. A. K Mehta, Joint Secretary in the Ministry of Urban Development (MoUD), addressing the meeting emphasised the need for efficiency in urban water sector. He mentioned that the recently launched the Sustainable Habitat Mission, can possibly provide a window for the legal framework for this reform. If the group present could work towards a robust labelling system for water efficient fixtures, the Ministry would also make all efforts to initiate the labelling program in India in a time bound manner at the earliest.”

### **So, the way forward**

The stakeholder's meet agreed on creating a framework for a voluntary appliance rating system. Secondly, it suggested revision and amendment of the existing product specifications in accordance with the ratings. And finally, the effort – the stakeholders agreed — should be to eventually make the rating system mandatory.

“As India industrialises and urbanises, water will be a key part of its growth. The need and clamour for it will



grow. Traditionally, India has been a water-prudent nation. Our challenge would be to keep India like that, a country that knows how to save its water,” says Narain.

#### **List of Members in the Core Group- 1<sup>st</sup> Stakeholders Meeting**

- Mr. A. K Mehta, Joint Secretary- UD&A, Ministry of Urban Development- Government of India
- Ms. E. P. Nivedita, Director, (WS), Ministry of Urban Development- Government of India
- Ms. Sunita Narain, Director, Centre for Science and Environment (CSE)
- Mr. A.K Saini, Scientist F & Head Civil Engineering, Bureau of Indian Standards, Manak Bhawan,
- Prof. Aruna Ramani Grover, Professor, Department of Architecture, School of Planning and Architecture
- D K Agarwal, Scientist F, Bureau of Indian Standards
- Dr. Hina Zia, Sustainable Building Science, Energy Environment Technology, The Energy and Resources Institute
- Mr.Parveen Kumar, The Maurya, ITC Hotel
- Mr Neville Bhasin, Member, CII National Water Committee & Vice-Chairman at Forbes Marshall Ltd.
- Mr. C.S.Gupta, Secretary, IPA
- Mr. R. K Somany, Chairman and MD Hindware (Hindustan Sanitaryware & Industries Limited)
- Mr. S G Deollalikar, SaSanitary Engineer & Ex President, Chairman Emeritus, Indian Plumbing Association (IPA)
- Mr. Subash Deshpande, Director, Education and Certification, International Association of Plumbing & Mechanical Officials India
- Mr. Prof. V. K Paul, Professor and Head of the Department Building Engineering and Management, School of Planning and Architecture
- Mr. Sandeep Goyal, Spectral Services Consultants Ltd.
- Dr. Suresh Rohilla, Senior Coordinator- Water Unit, Centre for Science and Environment (CSE)
- Ms. Sakshi C. Dasgupta, Deputy Coordinator- Water Unit, Centre for Science and Environment (CSE)

## Annexure 3: Press note for the 2nd stakeholders meeting

### Minutes of the Meeting

#### 2<sup>nd</sup> Stakeholders Meeting on Roadmap for Rating System for Water Efficient Fixtures in India

22<sup>nd</sup> December 2010

Venue: CSE office, Core 6 A- 4th floor, India Habitat Centre, New Delhi

The 2nd stakeholders meeting on the rating system for water efficient fixtures was held at the Centre for Science and Environment (CSE) branch office in India Habitat Centre on the 22nd December 2010. The meeting was coordinated by Dr. Suresh Rohilla of CSE by welcoming the participants and briefly summarizing the 1st stakeholders meeting on roadmap for rating system for water efficient fixtures in India. Dr. Rohilla briefed the participants on the agenda for the meeting which included presentation on the draft document on rating system for water efficient fixtures developed by the IPA-IAPMO's technical committee, discussion on the methodology and roadmap for its implementation.



Pic 1: 2nd Stakeholder meeting in progress

This was followed by a detailed presentation on the draft rating system document by Mr. Subash Deshpande on behalf of the IPA-IAPMO technical committee, who emphasized on the need for and nature of water savings from low flow and high efficient plumbing fixtures. The draft document proposed *Water Efficient Products in India or WEPI* as the name for the rating process, which would provide rating to and information on the water efficient fixtures. The overall goal of the rating process is to raise awareness and support consumers in making informed choices with regards to water fixtures. The fixtures categories covered in the presentation included **water closets, urinals, showerheads, faucets (including kitchen faucets), hand-held bidet, dishwashers and clothes washers**.



Pic 2: Subash Deshpande of IAPMO making the presentation on proposed rating system

The presentation and the draft document included the suggested star ratings, basis for star ratings, specific fixtures which have been excluded, amongst other details. In addition, concerns with regards to water pressure, drainline carriage were also addressed during the presentation.

In the discussion following the presentation, there were suggestions to strengthen the document by detailing and defining the logic and criteria for inclusion and exclusion of specific fixtures models for closets, urinals, showerheads (rain showers, jet sprays), faucets etc. In addition it was suggested that more clarity needs to be provided on issues related health, standardizing minimum water requirement to clean the fixtures (surface) and units for measuring flow rate.

Mr. Ravinder from CPHEEO-MoUD reiterated Ministry of Urban Development's (MOUD) commitment for introducing the rating system for water efficient fixtures appropriately- including into the recommendations of related sub-committees formed under the National Sustainable Habitat Mission to evolve parameters for sustainable water management. He further emphasized that the initiative has a strong support and backing from the Ministry which is keen to implement it starting as a voluntary program gradually evolving into a mandatory program in a time bound manner. It was recommended that the Ministry of Environment and Forests (MoEF) should also be sent a copy of rating system of water fixtures that could be incorporated as important guideline while issuing clearances to building and construction projects.

#### **There was agreement on the following points**

- IPA-IAPMO's technical committee agreed to incorporate the suggestions including BIS comments (if any) and submit the revised draft by January end.
- BIS's comments if any would be circulated by CSE to the group members. There was a general consensus that agencies like BIS should be continuously engaged in the process since they are important and may have a role play in the future in implementation and regulation of rating system and standards.
- It was also agreed that the recommended rating system would also provide scope for regular revision for the rating revision to include the emerging and future fixture technologies.
- There was an agreement amongst the group members that the rating system once finalized needs to be extensively disseminated at various forums amongst a range of stakeholders to improve awareness and for effective mainstreaming and uptake.
- Dr. V. K Paul, member of the group agreed to develop the 1st draft of the roadmap framework in light of the discussion by January end. The framework would include short, medium and long term objectives, identification of responsible players with responsibilities, timeframe for introducing rating system in India.
- There was an agreement amongst the members that there is a need to strengthen understanding and build consensus on the rating system amongst the policy makers at central and state level including other key players like manufacturers, users, NGOs, professional bodies etc. working in this area. CSE would develop outreach and policy support for introduction of rating system.

The meeting ended with CSE thanking all the core group members for their participation in the 2<sup>nd</sup> stakeholders meeting on rating system for water efficient fixtures in India.

#### **List of Participant Members**

- Mr. J.B.Ravinder, Asst. Adviser (PHE), CPHEEO, MoUD
- Mr. C.S.Gupta, Secretary, IPA
- Mr. R. K Somany, Chairman and MD Hindware (Hindustan Sanitaryware & Industries Limited)
- Mr. S G Deollalikar, Sanitary Engineer & Ex President, Chairman Emeritus, Indian Plumbing Association (IPA)
- Mr. Subash Deshpande, Director, Education and Certification, International Association of Plumbing & Mechanical Officials India
- Mr. Prof. V. K Paul, Professor and Head of the Department Building Engineering and Management, School of Planning and Architecture
- Mr. M. K Gupta, Managing Director and Chairman (Delhi Chapter) MKG Engineering Services Private limited and Indian Plumbing Association (IPA)
- Mr. Ramani Iyer, Forbes Marshall, Pune
- Mr. S.P Sree Kumar, Director General, IAPMO, India

- Mr. Sandeep Goyal, Spectral Services Consultants Ltd.
- Dr. Suresh Rohilla, Senior Coordinator- Water Unit, Centre for Science and Environment (CSE)
- Ms. Sakshi C. Dasgupta, Deputy Coordinator- Water Unit, Centre for Science and Environment (CSE)
- Ms. Sanyukta Dasgupta, Consultant Researcher- Water Unit, Centre for Science and Environment (CSE)
- Ms. Richa Sharma, Research Assistant- Water Unit, Centre for Science and Environment (CSE)

## Annexure 4: Details on MoEF's ECOMARK Scheme

The specific objectives of the ECOMARK scheme are as follow

- To provide an incentive for manufacturers and importers to reduce environmental impact of products.
- To reward genuine initiatives by companies to reduce adverse environmental impact of their products.
- To assist consumers to become environmentally responsible in their daily lives by providing information to take account of environmental factors in their purchase decisions.
- To ensure citizens to purchase products which have less harmful environmental impacts.
- Ultimately to improve the quality of the environment and to encourage the sustainable management of resources.

### Organizational structure

- The MoEF has constituted two committees namely Steering Committee and Technical Committee to identify product categories, develop criteria and to coordinate related activities. The Bureau of Indian Standards assesses and certifies products and draw up a contract with the manufacturer, allowing the use of the label, on payment of a fee. The terms of committees shall be for three years or until reconstituted.

### Functions of Steering Committee:

- Selection of the logo for ECOMARK.
- Activities related to creation of mass awareness for promotion and acceptance of the scheme.
- Determining the product category to be taken up under the scheme.
- Coordinating ways of ensuring that industry is actively involved in the scheme.
- Securing the involvement of other Ministries, Government Departments, Industry Associations and other Non-Government Organizations and consumer organizations.
- For emulation of strategies for future development of the scheme.
- Identifying institutions in India or outside which are engaged in the standardization of any article or process or improvement of quality of any article or process and recommending assistance to build consumer awareness.
- Promoting programme of comparative testing of products by consumer organizations and disseminate their results to the general public.
- Supporting any research for the formulation of ECOMARK products in the interest of consumer groups.

### Functions of Bureau of Indian standards

- Assess the product for ECOMARK, certify the product for award of the Ecomark.
- Review, suspend or cancel or license, for the use of Ecomark.
- Inspect and monitor the industries.

### Certification and Licensing

For certification under ECOMARK scheme the manufacture shall apply testing of products which fall under the notified categories along with fee set by BIS. The testing and certification shall be carried out by BIS. The label shall be awarded for a minimum period of one year and shall roll forward annually.

### Criteria for ECOMARK

Primary criteria i.e. parameters to be considered for determining product for ECOMARK is as follows:

- Production process including source of raw material.
- Case of natural resources.
- Likely impact on the environment.
- Energy conservation in the production of product.
- Effect and extent of waste arising from the production process.
- Disposal of the product and its containers.
- Utilization as 'waste' and recycled materials.
- Suitability for recycling or packaging.
- Biodegradability.

## Annexure 5: Details on Bureau of Energy Efficiency

A committee will be set up by the Bureau to oversee implementation of the scheme. The committee will be chaired by Director General, Bureau of Energy Efficiency and consist of representatives from Ministry of Power, Bureau of Indian Standards, Consumer Associations, Manufacturers Association, and Test laboratories.

The Standards and Labeling Implementation Committee will recommend BEE on the following issues:

- i. Enforcement of provisions of this scheme.
- ii. Develop the criteria for deciding whether challenge test and further actions should be undertaken or not.
- iii. Verification of the legitimacy of challenges to the label, and further action
- iv. Selection of samples for verification and challenge testing.

### Scheme Participation Process

- a. Manufacturers of equipment/importers/persons- in- trade can participate in the scheme by registering with the Bureau.
- b. Manufacturers of equipment/importers/persons- in- trade (hereinafter called the User of label) will enter into an agreement (Annexure – 1) on a non-judicial stamp worth Rs.100/- (Rs. One Hundred only), with the Bureau of Energy Efficiency (hereinafter called the Bureau) agreeing to abide by the terms and conditions of the scheme. The agreement will be valid for a period of 3 years or until Notification under clause (d) of section 14 of the Act is issued by Central Government, whichever is earlier.
- c. A separate application (Annexure – 2) will be made by the user of label for labeling of each equipment/model. The application for each equipment/model shall be accompanied by non – refundable registration charges of Rs. 1,000 (Rupees One thousand only) in the form of a crossed bank draft issued in the name of Bureau of Energy Efficiency and payable at New Delhi.
- d. A labeling fee (as defined in the schedule for each equipment) shall be given by the manufacturer (Rs 10/Refrigerator and Rs. 0.05/TFL) in advance to the Bureau of Energy Efficiency.
- e. The formats for application, agreement and application form for label are provided as annexure to this document.
- f. After receiving the complete application for an equipment/model, the Bureau will scrutinize the application, and seek further information, if required, within a month from the date of receipt.
- g. If there are no queries from the Bureau within a month, the user of label can affix the label under intimation to the Bureau, if an agreement for participation in the scheme has already been entered under (b) above.
- h. Proprietary information supplied to the Bureau should be marked as such by the user of the label, and Bureau shall keep it confidential
- i. The user of label will print and affix the labels as per the label design, manner of display, and the rating plan prescribed for the particular equipment.
- j. The Bureau would prepare a poster/brochure informing the consumers as to how to read/interpret the label and select equipment for purchase. The user of label would distribute a copy of the poster/brochure along with their technical brochure to the buyer and would also display the poster/brochure at the point of purchase.
- k. The user of label shall maintain the list of labeled equipments and provide a statement of the same with their star rating level and the number produced, with serial numbers, wherever applicable, every six months.
- l. A list of labeled equipment (and information on the label) will be maintained by the Bureau and made available to the public through publications and its web site.

- m. If during the tenure of the scheme, for a particular model/equipment, there are changes in the energy efficiency of the model/equipment or any other information on the label, then a fresh application should be submitted, and it will be processed accordingly.
- n. The user of label shall be solely responsible for ensuring-
  - i. the accuracy of the information displayed on the label or any public claim for label level and quality of equipment.
  - ii. use of label only for such equipment/models for which the agreement has been entered with the Bureau.
  - iii. Compliance to the terms and condition of the scheme,
  - iv. directions of the Bureau on the implementation of the scheme
  - v. Payment of any compensation adjudicated by any court/tribunal to any person for any information displayed on the label.
- o. The Bureau will work towards creating a market for energy efficient equipment through consumer awareness and consumer education.
- p. The Bureau will appoint an independent agency to evaluate the program impact and process of implementation on a periodic basis. The scope of evaluation will include the impact on sales, energy consumption, cost, consumer purchasing behaviour, manufacturing, national energy use and the environment. The user of label shall extend full cooperation by providing the relevant data for the purpose.
- q. The Bureau will review the scheme periodically to determine the need for revision or amendment or termination of the scheme.
- r. The Bureau, at any time during the operation of the scheme, may decide to terminate or modify the scheme after giving three months notice period.
- s. The User of Label, at any time during the operation of the scheme, may decide to withdraw from the scheme after giving three months notice period to the Bureau as well as a public notice.
- t. The liability of the user for the accuracy of label will continue till those labeled products are available in the market.

### **Label Verification Process**

- a. The Bureau will verify the label contents, and the manner of display of label for each equipment/model on a regular basis.
- b. The frequency of the verification test will be determined by the Bureau depending on the nature of equipment and time required for testing.
- c. Verification testing will be conducted in an independent (NABL accredited) laboratory registered with the Bureau.
- d. The Bureau or its representative(s) will identify and seal the equipment samples as per the sampling procedure specified in the Schedule of the scheme (for each equipment).
- e. The User of label will
  - i. agree to make available samples free of charge for verification as well as challenge testing.
  - ii. be responsible for transportation (to and fro from the place of picking of sample to the test laboratory) and handling of the sealed samples to the assigned test laboratory.
  - iii. be responsible for getting the selected and sealed samples tested in the assigned laboratory and reporting the results to the Bureau within a reasonable time period.
  - iv. directly bear the cost of transportation, handling, and testing of samples for verification testing.



### Challenge Testing

- a. The label contents can be challenged by any person.
- b. The challenge must be submitted to the Bureau in writing.
- c. The Bureau will examine the challenge within a month of the date of receipt in writing. The Standards and Labeling Implementation Committee will recommend whether to conduct a challenge test or not, keeping in view the basis of the complaint and examination of past records.
- d. The decision of the Bureau will be final and will be conveyed to complainant along with justification.
- e. If a challenge test is required, then
  - i. the complainant will deposit the expenses related to transportation (to and fro from the place of picking of sample to the test laboratory) and testing in advance to the Bureau.
  - ii. the Bureau will arrange for selection and sealing of samples. The transportation to the assigned laboratory is the task of the user of label.
  - iii. the testing will be conducted in an independent laboratory registered with the Bureau and the testing charges would be paid out of the advance given by the complainant.
- f. The complainant and the user of label may witness the process of challenge testing.
- g. If the equipment fails the challenge test, then the expenses paid by the complainant would be reimbursed by the user of label whose equipment has failed.
- h. If the equipment passes the challenge test, then the complainant would forfeit the deposit.
- i. If the equipment fails the challenge testing, the enforcement process (section 5) will be followed.

### Enforcement Process

- a. If the equipment fails the verification/challenge testing, then the matter will be placed before the Standards and Labeling Implementation Committee and the user of label will be informed about the failure.
- b. The user of label has the option to go in for the second test, in case the equipment fails the first verification/challenge test.
- c. A second test will be carried out with twice the initial test sample size, and all the samples should pass the test.
- d. The user of label will bear the expenses related to the second test.
- e. If the equipment passes the second verification/challenge test, then no further action would be taken and the appliance would deem to confirm to the label level.
- f. If the equipment subjected to verification/challenge testing fails the second test, the user of label will, within the given time limit by the Bureau,
  - i. correct the label level or remove the defects or deficiencies found for new equipment/models yet to be shipped out as well as for equipment/models for sale in the market.
  - ii. change particulars/information on the advertising material
- g. If the user of label fails to comply with the directions issued under clause (e), then, the use of label for that model will be prohibited. In addition,
  - i. the Bureau will inform the consumers about the failure of the equipment/model by wide publicity.
  - ii. the Bureau may advise the government to debar the equipment/model/ and/or the user of the label from participating in any public tender.

### Requirement for Independent Testing Facilities for Participation in the Scheme

- a. An independent laboratory with a valid accreditation from National Accreditation Board for Laboratories (NABL) or other international accreditation in force (with NABL approval) for the test procedures (energy

efficiency and other performance tests) specified for each equipment/model as specified in the labeling plan for that equipment, can register with the Bureau.

- b. The Bureau will enter into a rate contract with the laboratories for carrying out verification and challenge test charges for the equipment covered under the scheme and the same shall be reviewed every year.
- c. The laboratories may be reviewed initially at the time of registration and then on a regular basis after that, and in case any laboratory ceases to fulfil any condition laid down at the time of registration, the same will be withdrawn

## Annexure 6: Draft Rating System for Water Efficient Fixtures

17<sup>th</sup> February, 2011

Water Efficient Products–India (WEP-I) – A Rating System: A Way to Sustainable Domestic Water Management in India

AN IPA-IAPMO PRESENTATION

### 1.0 PREAMBLE

Fresh water is a precious but dwindling resource, conservation of which calls for urgent and immediate measures. Increasing population, high rate of urbanization and associated changes in lifestyles, etc. are all contributing towards rising water demand.

Consumption of water for domestic applications constitutes a sizeable proportion of the total water demand. Therefore, there is a need to look for opportunities for the conservation of water within this user group, wherein the Plumbing Fraternity has a significant role to perform.

The demand on this scarce resource could be addressed through a two-pronged approach, namely, usage of low-flow plumbing fixtures and faucets and by usage of alternative sources of water (other than potable water) for applications such as flushing of water closets and urinals, landscape irrigation, car wash and makeup water for air-conditioning cooling towers. It is imperative that efficient plumbing design practices and installation procedures are adopted which evolve out of robust codes and standards as well as appropriate scientific principles.

The Indian Plumbing Association (IPA) has been in the forefront participating actively in the work of The Bureau of Indian Standards (BIS) by contributing towards the development of plumbing codes and standards. Additionally, in partnership with the renowned International Association of Plumbing and Mechanical Officials (IAPMO) of USA, the IPA has developed and published The Uniform Plumbing Code–India (UPC-I) and Green Plumbing Code Supplement–India (GPCS-I), apart from launching nation-wide Plumbing Education to Employment Programme (PEEP) and technical workshops on “Green Plumbers India (GPI)” to create a workforce of Accredited Specialists (Refer Annexure-I, Brief Profile of IPA and IAPMO).

In order to make professional practice responsibly, benchmarking should be adopted as an accepted strategy. Water-efficient labeling system for plumbing fixtures is one such approach recognised universally to achieve the objective of water conservation in domestic use. This document delineates the approach for Water Efficient Products- India (WEP-I).

### 2.0 Rating Systems in other countries:

A few countries across the world have already established standards for labeling and rating of water efficient plumbing fixtures, fittings and appliances with supportive legislations such as Water Efficiency Labeling System (WELS) in Australia, WaterSense in USA, Water Efficiency Labeling Scheme (WELS) in Singapore, ANQIPS labeling system in Portugal and WaterWise in UK.

#### WEP-I will seek to;

- Provide credible information on water-efficient products and practices.
- Raise awareness about the importance of water efficiency & recommend water-efficient products.
- Aid consumers to make an informed choice of products that conserve water.

### 3.0 PLUMBING FIXTURES TO BE CONSIDERED FOR WEP-I LABELING

#### 3.1 Water Closets

Water closets commonly used in India can be classified into three different types:

- European water closet
- Combination closet
- Asian closet (Indian pan)

The flushing devices to be used in combination with the above fixtures could either be a cistern (coupled or separate) or a flush valve.

In the case of European water closets, water efficient toilet suites are designed with a coupled cistern and integral trap to achieve effective flush using reduced volume of water. However, in the case of the Asian (Indian) or Combination closet, water reduction is presently dependent on use of efficient flushing mechanism (cistern/flush valve). The pan needs to be designed appropriately with further research to ensure efficient functioning with reduced water volumes.

##### 3.1.1 Suggested Rating:

- European water closet with cistern or flush valve using not more than 6 litres per flush. ★
- European water closet with dual flush cistern or flush valve using 6 litres for full flush and 3 litres for half flush. ★★
- High-efficiency European water closet using 5 litres single flush. ★★★
- High-efficiency European water closet using less than 5 litres per flush. ★★★★
- Combination or Asian / Indian pan using 6 litres per flush; cistern or flush valve. ★
- Combination or Asian / Indian pan using 6 litres per full flush and 3 litres for half flush; cistern or flush valve. ★★

##### Note:

- a) Push cocks cannot be accepted as flushing devices and hence do not qualify for ratings (A push cock is no more than an online stop cock. Outlet of the push cock is connected direct to a water closet pan. If the water supply system runs dry, back-siphonage can occur into the water distribution system contaminating the same. As a preventive measure, a well-designed flushing device must have an atmospheric vacuum breaker at the outlet to qualify for rating).
- b) All flush valves used with water closets shall have an atmospheric vacuum breaker to qualify for a rating.
- c) It is preferred that the flushing devices used with the European water closets are matched units from the same manufacturer. In the event, products of different manufacturers are to be submitted for rating appropriate undertaking of compatibility shall be produced to the satisfaction of the certification agency.

#### 3.2 Urinals

Flushing devices for urinals shall be classified as electronically or manually operated.

- a) Flush valves without atmospheric vacuum breakers shall not qualify for rating. (Outlet of the flush valve is connected directly to a urinal bowl. If the water supply system runs dry, back-siphonage can occur into the water distribution system contaminating the same. As a preventive measure, a well-designed flushing device must have an atmospheric vacuum breaker at the outlet to qualify for rating).

Automatic flushing cisterns for urinals are prohibited and shall not be considered for rating. (An automatic flushing cistern will continue to operate at pre-set intervals irrespective of usage of the urinal, thereby causing wastage of fresh water and generation of avoidable waste water.)

### 3.2.1 Suggested Rating:

- Urinal with flushing device using 4 litres per flush. ★
- Urinal with flushing device using 3 litres per flush. ★★
- Urinal with flushing device using 2 litres per flush. ★★★

#### Note:

- a) Certain projects mandate use of reclaimed water for flushing of water closets and urinals. Whilst these projects achieve the goal of water conservation, they are not being discussed here since the rating systems under consideration are specific to products alone. In such situations, since dual water supply piping is mandatory, devices to prevent backflow / back-siphonage such as vacuum breakers may be superfluous. In the absence of monitoring mechanism from the authorities on the quality of reclaimed water, it may be prudent to use flush valves (dual-flush) in lieu of cisterns since the latter could involve the danger of large volume of stagnant microbially-infested water in living spaces.
- b) Use of Non-water (Waterless) Urinals is considered as one of the means to conserve water in buildings for public use. However, provisions of Green Plumbing Code Supplement–India 2010 (Refer Annexure IV) shall be taken into consideration while installing such urinals.

Rating system for non-water urinals is not included in this document due to the apprehensions among plumbing professionals on the possible adverse effects such as:

- Drainage system going dry in the absence of adequate water required for self-cleansing velocity and thereby causing unsanitary conditions. The situation holds more relevance in retrofit/refurbishment installations since the existing drains designed for fixtures using water may not be suitable for non-water urinals.
- Stringent venting requirement on the drainage piping system calls for high levels of skills.
- One of the popular models of non-water urinals is dependent on a cartridge, replacement of which is recommended after a certain number of usages. It is impractical to keep track of this, especially in a large installation with a number of urinals with varying usage, such as, in a public washroom. Substantial replacement cost of the cartridge is also a concern.
- Other versions of non-water urinals use proprietary liquid seals to prevent foul odors from drainage system entering the living spaces. Emptying of, say, a bucket of water into the urinal bowl will negate the artificially created liquid seal.
- Cleaning of the bowls has to be done manually at regular intervals without use of water but with proprietary cleaning agents, much to the dislike of the maintenance personnel.
- Non-water urinals are known to cause frequent blockage of the drainage system due to the encrustation of the urine crystals.
- Installation calls for a high level of accuracy and skill, especially in the case of non-water urinals depending on the floating liquid since an incorrect installation can negate the liquid seal and cause unsanitary conditions in washrooms.
- Plumbing codes stipulate installation of a fixture using water upstream of non-water urinals. These requirements are often overlooked.

- The UPC-I calls for provision of a water connection at each location where a non-water urinal is installed. This is due to the apprehension of malfunctioning of the non-water urinals and eventual need for its replacement with a water-using urinal.
  - The MoEF regulations in India call for usage of treated effluent from onsite treatment plants for flushing. In such situations, usage of non-water urinals with a higher capital cost will not be justified.
- c) It is preferred that the flushing devices used with the urinal are matched units from the same manufacturer. In the event, products of different manufacturers are to be submitted for rating, appropriate undertaking of compatibility shall be produced to the satisfaction of the certification agency.

### 3.3 Shower Heads / Hand-held Showers

#### 3.3.1 Suggested Rating:

- Shower head with flow-rates of 9.5 lpm. ★
- Shower head with flow-rates of 7.5 lpm. ★★
- Shower head with flow-rates less than 7.5 lpm. ★★★

#### Note:

- a) Flow-rates mentioned above are not applicable for emergency showers or eye-wash stations.
- b) Multiple showerheads / Multi-jet showers serving a single user shall not have a cumulative total flow exceeding the above flow-rates. (Multi-jet shower units consuming volume of water exceeding the limits mentioned in 3.3.1 are not considered as water conserving installations).
- c) Bath tubs / Whirlpools consume large volume of water per usage and therefore are not considered as recommended fixtures in water-conserving installations. However, if bath tubs are preferred in an installation, the flow rate of the tub-filler is irrelevant since the time required to fill the tub can only be prolonged by use of a low-flow faucet and therefore not considered in the rating system.
- d) Flow rate of “rain showers” shall be as specified for normal showerheads and therefore no separate rating system is called for.

### 3.4 Faucets

Faucets can be classified as metered and non-metered types. Metered faucets (electronic sensor operated or manual) which discharge a pre-determined volume of water per usage cycle are to be installed in public washrooms.

#### 3.4.1 Suggested Rating (Private use):

- Non-metered faucets or faucets with aerators with flow-rates of 8 lpm. ★
- Non-metered faucets or faucets with aerators with flow-rates of 5.7 lpm. ★★
- Non-metered faucets or faucets with aerators with flow-rates less than 5.7 lpm. ★★★

#### 3.4.2 Suggested Rating (Public use):

- Metered faucets with or without aerators with flow-rates of 1 litre per cycle or non-metered faucets with flow-rate of 2 lpm. ★★  
Metered faucets with electronic actuator with flow-rates of 1 litre per cycle. ★★

**Note:**

Metered faucets shall be used on lavatory basins in public toilets. Volume of water in these faucets is pre-set per usage/cycle. The other faucets (continuous flow) are generally used in residential installations where flow rates are defined as litres per minute.

### 3.5 Kitchen Sink Faucets

#### 3.5.1 Suggested Rating:

- Kitchen sink faucets or faucets with aerators with flow-rates of 8 lpm. ★
- Kitchen sink faucets or faucets with aerators with flow-rates of less than 8 lpm. ★★

**Note:**

The flow-rates mentioned above do not take into consideration the possible issues related to user satisfaction in situations such as pot-filling which may be common in Indian context and social habits.

### 3.6 Handheld Bidet Spray (Ablution faucet with hose and trigger)

#### 3.6.1 Suggested Rating:

- Handheld bidet spray with flow-rates of 8 lpm. ★
- Handheld bidet spray with flow-rates of less than 8 lpm. ★★

**Note:**

It is important that handheld bidet spray units are always provided with a backflow prevention device.

### 3.7 Dishwashers

#### 3.7.1. Suggested Rating:

- Dish washer with a Water Factor (the quantity of water used in liters per full machine wash and rinse cycle) of 22 litres: ★
- Dish washer with a Water Factor (the quantity of water used in liters per full machine wash and rinse cycle) less than 22 litres: ★★

### 3.8 Clothes Washer

#### 3.8.1 Suggested Rating:

- Clothes washer with a Water Factor (the quantity of water in litres used to wash each cubic meter volume of machine drum capacity) of 5 liters for private use and 8 liters for public use: ★
- Clothes washer with a Water Factor (the quantity of water in litres used to wash each cubic meter volume of machine drum capacity) of less than 5 litres for private and less than 8 liters for public use: ★★

## 4.0 CONCERNS

### a) Dry-Drains

With the focus on water conservation, an important consequence not to be overlooked is possible unsanitary situations and the resultant health hazards that could occur due to absence of self-cleansing velocities in drainage systems. The deposition of solid matter within the drain due to inadequate flow and velocity is the phenomenon known as “Dry-Drains”. When retro-fitting existing installations, this aspect will require special consideration because the existing drainage systems may have been designed assuming higher flow velocities which would afford self-cleansing of drains.

#### NOTE:

FLOW-RATES OF VARIOUS FIXTURES INDICATED ABOVE ARE AT A WORKING PRESSURE OF 5.5 BAR. THE MAXIMUM AND MINIMUM WORKING PRESSURES RECOMMENDED BY THE UPC-I 2008 ARE 5.5 BAR AND 0.5 BAR (INSTALLATIONS WITH FLUSHING CISTERNS) / 1.0 BAR (INSTALLATIONS WITH FLUSH VALVES) RESPECTIVELY.

### b) Scalding / Thermal Shocks

While replacing existing showerheads with low-flow units where automatic temperature and pressure balancing mixer fittings are not used, the occurrence of scalding / thermal shocks could lead to serious injuries.

## 5.0 PLAN OF ACTION FOR IMPLEMENTATION OF WEP-I

Effective implementation of the WEP-I initiative will require active participation of all the stakeholders from the plumbing industry including consultants, contractors and manufacturers apart from the monitoring agencies designated by the Government. Appropriate legislation will need to be enacted with guidelines to be followed by all concerned in the industry. The programme may have to be recommendatory in nature during the early stages; to be made mandatory and enforced by law in due course.

Approved laboratories for testing will need to be identified to certify compliance of the products to the guidelines laid down by the government from time to time.

As technologies evolve across the globe continually, these guidelines will need to remain dynamic subject to revisions as and when necessary through an institutional framework for monitoring the effectiveness and identify need for such revisions. IPA and IAPMO can play a significant role in this process.

Being the sole representative body of all the stakeholders of the Indian Plumbing Industry, IPA offers to take the lead in this initiative towards the task of creating awareness. IPA's partner, IAPMO is recognised worldwide as an approved agency for testing and certification of plumbing products including the “WaterSense” programme of the USA.

#### Enclosures:

- Annexure –I : Brief profiles of IPA and IAPMO.
- Annexure – II: Source Documents
- Annexure – III: Definitions (Extracts from UPC-I 2008)
- Annexure – IV: Definitions (Extracts from GPCS-I 2010)



## Annexure I – Brief Profile of IPA and IAPMO

Indian Plumbing Association (IPA), established in 1993, is the apex body of plumbing professionals in the country. Set up with an objective to promote advancements in plumbing and the building services industry, IPA has successfully created a forum for exchange of ideas and dissemination of information amongst its members.

IPA's membership includes plumbing consultants, plumbing contractors, plumbing product manufacturers, traders, planners, education and vocational training institutions, architects and builders. IPA has 12 Chapters across the country with membership exceeding 1500.

IPA also conducts conferences and exhibitions throughout India and publishes the monthly magazine - Indian Plumbing Today (IPT). IPA has succeeded in creating awareness about the need for safe plumbing, and is now ready to assist Indian professionals with improving their knowledge and skills.

IPA, in collaboration, with the College of Engineering Pune (COEP), has created a unique world-class laboratory facility showcasing modern plumbing technologies and system-performances through live demonstrations.

Please visit <http://www.indianplumbing.org> for further details.

International Association of Plumbing and Mechanical Officials(IAPMO) is an 83-year-old non-government organization (NGO) and nonprofit association serving the industry. IAPMO is devoted to Health and Safety, primarily in the Plumbing and Mechanical fields.

IAPMO is recognized the world over for its Uniform Plumbing Codes (UPC). IAPMO headquarters is located in Ontario, California, USA and has 12 Regional Offices within the USA and abroad. IAPMO has assisted with code development in such diverse places as India, China, Indonesia, Columbia, Ghana, Venezuela, Vietnam, Taiwan, Philippines, Saudi Arabia, Abu Dhabi, Kuwait, Jordan, Israel, US Virgin Islands, Egypt, Australia, Canada and United States of America. UPC thus serves and protects more than half the population of the world.

In 2007, IAPMO Plumbing Codes and Standards India Private Limited (called IAPMO-India) is established with offices at Bengaluru and Pune.

Please visit <http://www.iapmoindia.org> for further details.

## Annexure-II – Source Documents

Uniform Plumbing Code - India (UPC-I) was published in 2008 by the Indian Plumbing Industry represented by IPA in partnership with IAPMO- USA. It is a comprehensive state-of-the-art code addressing modern plumbing design and installation practices.

Green Plumbing Code Supplement-India (GPCS-I), published in 2010, the most comprehensive document on sustainable plumbing systems. It offers guidelines on design, selection, installation and maintenance of water and energy saving plumbing products and systems.

Both UPC-I and GPCS-I are adopted by the Indian Plumbing Industry voluntarily. The proposed rating system is based on 2008 UPC-I and 2010 GPCS-I.

### Annexure – III: Definitions (Extracts from UPC-I 2008)

- Approved Testing Agency – An organization primarily established for the purpose of testing of approved standards and approved by the Authority Having Jurisdiction.
- Authority Having Jurisdiction – The organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, installations, or procedures. The Authority Having Jurisdiction shall be a federal, state, local, or other regional department or an individual such as a plumbing official, mechanical official, labor department official, health department official, building official, or others having statutory authority. In the absence of a statutory authority, the Authority Having Jurisdiction may be some other responsible party. This definition shall include the Authority Having Jurisdiction's duly authorized representative.
- Backflow – The flow of water or other liquids, mixtures, or substances into the distributing pipes of a potable supply of water from any sources other than its intended source. See Back-Siphonage, Back-Pressure Backflow.
- Backflow Connection – Any arrangement whereby backflow can occur.
- Backflow Preventer – A device or means to prevent backflow into the potable water system.
- Back-Pressure Backflow – Backflow due to an increased pressure above the supply pressure, which may be due to pumps, boilers, gravity, or other sources of pressure.
- Back-Siphonage – The flowing back of used, contaminated, or polluted water from a plumbing fixture or vessel into a water supply pipe due to a pressure less than atmospheric in such pipe. See Backflow.
- Bathroom (Group) – A group of fixtures consisting of a water closet, lavatory, bathtub or shower, including or excluding a urinal or bidet and emergency floor drain located together on the same floor level.
- Bathroom (Half) – A room equipped with a water closet and lavatory.
- Battery of Fixtures – Any group of two (2) or more similar, adjacent fixtures that discharge into a common horizontal waste or soil branch.
- Building Supply – The pipe carrying potable water from the water meter or other source of water supply to a building or other point of use or distribution on the plot. Building supply shall also mean water service.
- Combination Thermostatic/Pressure Balancing Valve – A mixing valve that senses outlet temperature and incoming hot and cold water pressure and compensates for fluctuations in incoming hot and cold water temperatures and/or pressures to stabilize outlet temperatures.
- Contamination – An impairment of the quality of the potable water that creates an actual hazard to the public health through poisoning or through the spread of disease by sewage, industrial fluids, or waste. Also defined as High Hazard.

- Cross-Connection – Any connection or arrangement, physical or otherwise, between a potable water supply system and any plumbing fixture or any tank, receptor, equipment, or device, through which it may be possible for non-potable, used, unclean, polluted, and contaminated water, or other substances to enter into any part of such potable water system under any condition.
- Department Having Jurisdiction – The Authority Having Jurisdiction, including any other law enforcement agency affected by any provision of this code, whether such agency is specifically named or not.
- Fixture Unit – A quantity in terms of which the load-producing effects on the plumbing system of different kinds of plumbing fixtures are expressed on some arbitrarily chosen scale.
- Flush Tank – A tank located above or integral with water closets, urinals, or similar fixtures for the purpose of flushing the usable portion of the fixture.
- Flush Valve – A valve located at the bottom of a tank for the purpose of flushing water closets and similar fixtures.
- Flushometer Tank – A tank integrated within an air accumulator vessel that is designed to discharge a predetermined quantity of water to fixtures for flushing purposes.
- Flushometer Valve – A valve that discharges a predetermined quantity of water to fixtures for flushing purposes and is actuated by direct water pressure.
- Insanitary – A condition that is contrary to sanitary principles or is injurious to health.
  - 1) Conditions to which “insanitary” shall apply include the following:
  - 2) Any trap that does not maintain a proper trap seal.
  - 3) Any opening in a drainage system, except where lawful, that is not provided with an approved water-sealed trap.
  - 4) Any plumbing fixture or other waste-discharging receptor or device that is not supplied with water sufficient to flush and maintain the fixture or receptor in a clean condition.
  - 5) Any defective fixture, trap, pipe, or fitting.
  - 6) Any trap, except where in this code exempted, directly connected to a drainage system, the seal of which is not protected against siphonage and back-pressure by a vent pipe.
  - 7) Any connection, cross-connection, construction, or condition, temporary or permanent, that would permit or make possible by any means whatsoever for any unapproved foreign matter to enter a water distribution system used for domestic purposes.
  - 8) The foregoing enumeration of conditions to which the term “insanitary” shall apply, shall not preclude the application of that term to conditions that are, in fact, insanitary.
- Labeled – Equipment or materials bearing a label of a listing agency (accredited conformity assessment body). See Listed (third-party certified).
- Listed (Third-party certified) – Equipment or materials included in a list published by a listing agency (accredited conformity assessment body) that maintains periodic inspection on current production of listed

equipment or materials and whose listing states either that the equipment or material complies with approved standards or has been tested and found suitable for use in a specified manner.

- Listing Agency – An agency accredited by an independent and authoritative conformity assessment body to operate a material and product listing and labeling (certification) system and that is accepted by the Authority Having Jurisdiction, which is in the business of listing or labeling. The system includes initial and ongoing product testing, a periodic inspection on current production of listed (certified) products, and makes available a published report of such listing in which specific information is included that the material or product conforms to applicable standards and found safe for use in a specific manner.
- Plumbing – The business, trade, or work having to do with the installation, removal, alteration, or repair of plumbing systems or parts thereof.
- Plumbing Appliance – Any one (1) of a special class of devices or equipment that is intended to perform a special plumbing function. Its operation and/or control may be dependent upon one (1) or more energized components, such as motors, controls, heating elements, or pressure- or temperature-sensing elements. Such device or equipment shall be permitted to operate automatically through one (1) or more of the following actions: a time cycle, a temperature range, a pressure range, a measured volume or weight; or the device or equipment shall be permitted to be manually adjusted or controlled by the user or operator.
- Plumbing Appurtenance – A manufactured device, a prefabricated assembly, or an on-the-job assembly of component parts that is an adjunct to the basic piping system and plumbing fixtures. An appurtenance demands no additional water supply, nor does it add any discharge load to a fixture or the drainage system. It performs some useful function in the operation, maintenance, servicing, economy, or safety of the plumbing system.
- Plumbing Fixture – An approved-type installed receptacle, device, or appliance that is supplied with water or that receives liquid or liquid-borne wastes and discharges such wastes into the drainage system to which it may be directly or indirectly connected. Industrial or commercial tanks, vats, and similar processing equipment are not plumbing fixtures, but may be connected to or discharged into approved traps or plumbing fixtures when and as otherwise provided for elsewhere in this code.
- Plumbing System – Includes all potable water, building supply, and distribution pipes; all plumbing fixtures and traps; all drainage and vent pipes; and all building drains and building sewers, including their respective joints and connections, devices, receptors, and appurtenances within the property lines of the premises and shall include potable water piping, potable water treating or using equipment, medical gas and medical vacuum systems, liquid and fuel gas piping, and water heaters and vents for same.
- Pollution – An impairment of the quality of the potable water to a degree that does not create a hazard to the public health but which does adversely and unreasonably affect the aesthetic qualities of such potable water for domestic use. Also defined as Low Hazard.
- Potable Water – Water that is satisfactory for drinking, culinary, and domestic purposes and that meets the requirements of the Health Authority Having Jurisdiction.

- Pressure – The normal force exerted by a homogeneous liquid or gas, per unit of area, on the wall of the container.
  - Static Pressure – The pressure existing without any flow.
  - Residual Pressure – The pressure available at the fixture or water outlet after allowance is made for pressure drop due to friction loss, head, meter, and other losses in the system during maximum demand periods.
- Private or Private Use – Applies to plumbing fixtures in residences and apartments, to private bathrooms in hotels and hospitals, and to restrooms in commercial establishments where the fixtures are intended for the use of a family or an individual.
- Public or Public Use – Applies to plumbing fixtures that are not defined as private or private use and their use is unrestricted.
- Standard – A document, the main text of which contains only mandatory provisions using the word “shall” to indicate requirements and which is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions shall be located in an appendix, footnote, or fine print note and are not to be considered a part of the requirements of a standard.
- Thermostatic (Temperature Control) Valve – A mixing valve that senses outlet temperature and compensates for fluctuations in incoming hot or cold water temperatures.
- Water Supply Fixture Units – A numerical factor on an arbitrarily chosen scale assigned to intermittently used fixtures in order to calculate their load producing effects on the water supply system.
- Water Supply System – The building supply pipe, the water-distributing pipes, and the necessary connecting pipes, fittings, control valves, backflow prevention devices, and all appurtenances carrying or supplying potable water in or adjacent to the building or premises.
- Quality of Fixtures. Plumbing fixtures shall be constructed of dense, durable, non-absorbent materials and shall have smooth, impervious surfaces, free from unnecessary concealed fouling surfaces. Except as permitted elsewhere in this code, fixtures shall conform in quality and design to nationally recognized applicable standards.
- Metered Faucets. Self-closing or self-closing factory calibrated metering faucets shall be installed on lavatories intended to serve the transient public, such as those in, but not limited to, service stations, train stations, airports, restaurants, and convention halls. Metered faucets shall deliver not more than one (1) liter (0.26 gal.) of water per use.
- Prohibited Fixtures. Water closets having an invisible seal or an unventilated space or having walls which are not thoroughly washed at each discharge shall be prohibited. Any water closet that might permit siphonage of the contents of the bowl back into the tank shall be prohibited. Drinking fountains shall not be installed in public toilet rooms.
- Prohibited Urinals. Trough urinals and urinals with an invisible seal shall be prohibited.

#### **Annexure – IV: Definitions (Extracts from GPCS-I 2010)**

- Alternate Water Source - Nonpotable source of water that includes gray water, on-site treated water, rainwater, and reclaimed (recycled)water.
- Gray Water–Untreated waste water that has not come into contact with toilet waste, kitchen sink waste, dishwasher waste or similarly contaminated sources. Gray water includes waste water from bathtubs, showers, lavatories,clothes washers and laundry tubs.
- Kitchen and Bar Sink Faucets– A faucet that discharges into a kitchen or bar sink in domestic or commercial installations.Note: Supply fittings that drain into other type sinks, including clinic sinks, floor sinks, service sinks and lavatory trays are not included.
- Lavatory Faucet– A faucet that discharges into a lavatory basin in a domestic or commercial installation.
- On-Site Recycled Water–Nonpotable water that that has been collected and treated on-site and is suitable for direct beneficial use. The level of treatment and quality of the on-site recycled water shall be approved by the public health Authority Having Jurisdiction.
- On-Site Treated Nonpotable Water – Nonpotable water, including gray water that has been collected, treated, and intended to be used on-site and is suitable for direct beneficial use. The level of treatment and quality of the on-site reclaimed (recycled) water shall be approved by the public health Authority Having Jurisdiction.
- Self Closing Faucet–A faucet that closes itself after the actuation or control mechanism is deactivated. Note: The actuation or control mechanism can be mechanical or electronic.

## Annexure 7: Minutes of the 3<sup>rd</sup> Stakeholders Meeting

### 3<sup>rd</sup> Stakeholders Meeting on Roadmap for Rating System for Water Efficient Fixtures in India, 27<sup>th</sup> March 2011

The 3<sup>rd</sup> stakeholders meeting on the rating system for water efficient fixtures was held at the Centre for Science and Environment's office on 27<sup>th</sup> March 2011. This meeting had participation from various stakeholders who have been a part of the core group formed after the 1<sup>st</sup> stakeholders meeting in September 2010. Ms. E. P Nivedita, Director (water supply and local self government), Ministry of Urban Development was also present.

CSE is a Centre of Excellence (CoE) on sustainable water management, has been given the task of preparing roadmap and drafting rating system for water efficient fixtures in India. This document were presented and discussed during the meeting. The fixtures categories covered water closets, urinals, showerheads, faucets (including kitchen faucets), hand-held bidets, dishwashers and clothes washers. The roadmap document provides a framework and process for its implementation. The recommendations made by CSE include setting up of Inter-Ministerial Steering Committee with representation from Ministry of Water Resources, Ministry of Urban Development, Ministry of Power (from Bureau of Energy Efficiency), Ministry of Consumer Affairs, Food and Public Distribution (from Bureau of Indian Standards) amongst others. It also suggests setting up of a technical advisory sub-committee, with experts from various fields who would provide technical, legal, regulatory, management and economic based inputs to facilitate inter ministerial committee. As recommended in the roadmap these committees could initiate processes towards setting up of a Bureau of Water Efficiency to undertake water conservation and efficiency reforms in all sectors including a system for rating the water efficient fixtures. In addition, a Water Conservation Act is also recommended. It is primarily to institutionalise and regulate water efficiency which requires a strong legal support in terms of a comprehensive and visionary act, that would ensure water efficiency in every sector including domestic, agriculture and industrial.

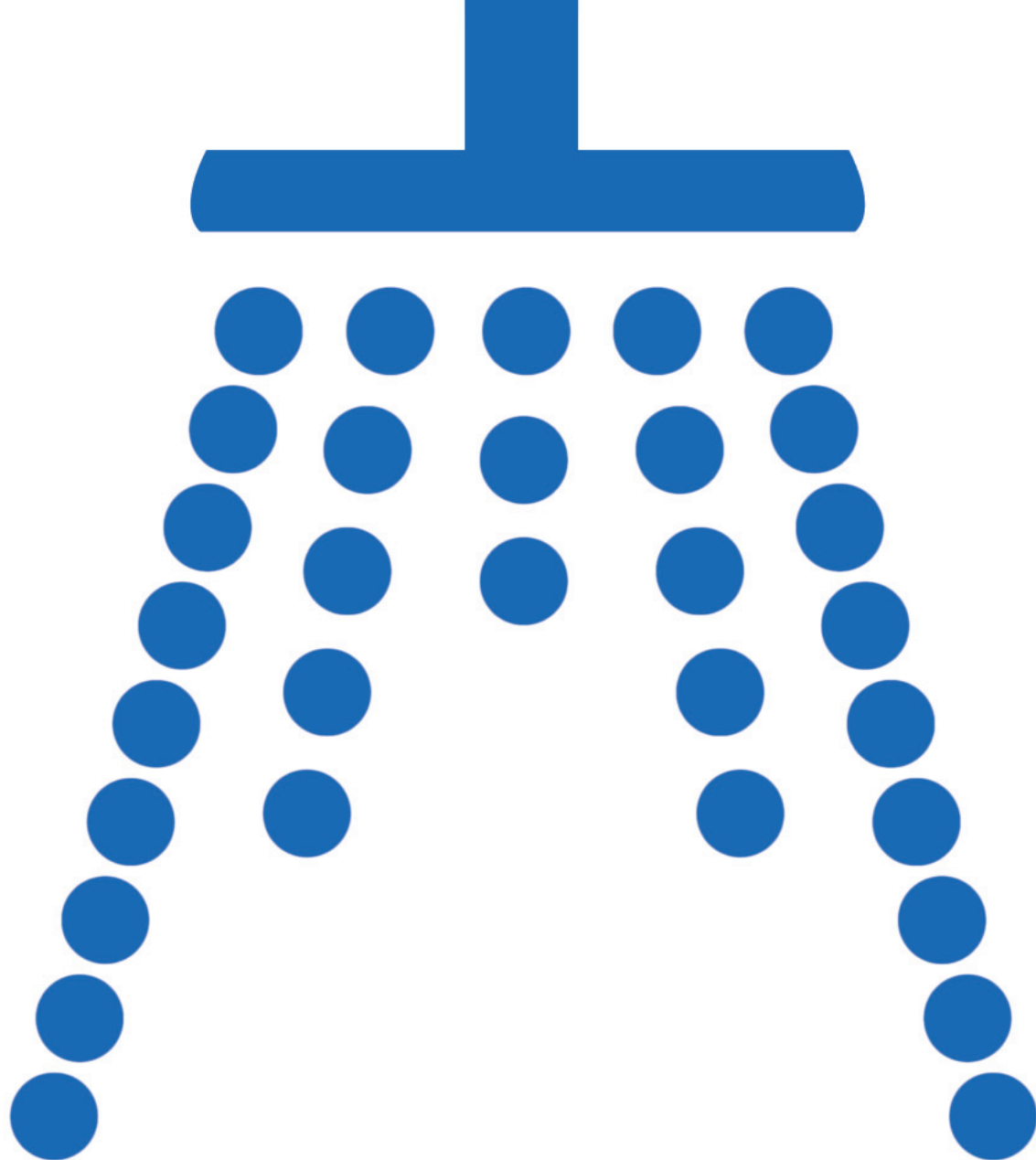
The document also provides framework for implementation of rating system, which includes objectives, technical specifications for rating system, protocols and testing facilities, strategies for sustaining rating systems, Integration of Product Standardization and Water Efficiency, water-energy convergence and awareness campaigns. The roadmap suggest that rating system could be initiated on a voluntary basis and could be made mandatory in a later stage in a time bound and systematic manner with least inconvenience to the relevant stakeholders. Short, medium and long-term goals for implementation have also been suggested in the roadmap.

The roadmap document was discussed in the meeting with the core group members. Ms. Nivedita, Director MoUD agreed to take forward the dialogue process with the relevant ministries and organisations including water resources, BIS, BEE and CSE in the near future to implement the proposed roadmap. The core group also agreed on the need disseminate and advocate water efficiency on the lines of energy efficiency ratings.

**List of Members in the Core Group- 3<sup>rd</sup> Stakeholders Meeting**

- Ms. E. P. Nivedita, Director, (WS), Ministry of Urban Development- Government of India
- Mr Ramani Iyer, Forbes Marshall Ltd.
- Mr. C.S.Gupta, Secretary, IPA
- Mr. R. K Somany, Chairman and MD Hindware (Hindustan Sanitaryware & Industries Limited)
- Mr. S G Deollalikar, SaSanitary Engineer & Ex President, Chairman Emeritus, Indian Plumbing Association (IPA)
- Mr. Subash Deshpande, Director, Education and Certification, International Association of Plumbing & Mechanical Officials India
- Mr. Sandeep Goyal, Spectral Services Consultants Ltd.
- Dr. Suresh Rohilla, Senior Coordinator- Water Unit, Centre for Science and Environment (CSE)
- Ms. Sakshi C. Dasgupta, Deputy Coordinator- Water Unit, Centre for Science and Environment (CSE)





**Centre for Science and Environment**

41, Tughlakabad Institutional Area, New Delhi-110062

Phones: 91-11-29955124, 2995125 Fax: 91-11-29955879

Email: [cse@cseindia.org](mailto:cse@cseindia.org) Web: [www.cseindia.org](http://www.cseindia.org)