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APPLIANCES AND FIXTURES



Centre for Science and Environment
41, Tughlakabad Institutional Area, New Delhi 110 062, INDIA
Ph: +91-11-29956110 - 5124 - 6394- 6399 Fax: +91-11-29955879
E-mail: sakshi@cseindia.org Website: www.cseindia.org

GREEN BUILDING



ENERGY FIXING

Ruhi Kandhari

Down To Earth, June 15, 2011

Energy efficiency is often called the low hanging fruit of climate change. Each unit of electricity saved is considered a unit less generated, which means less greenhouse gases released into the atmosphere. Under the 11th Five Year Plan, programmes promoting energy efficiency aim to save five per cent of energy consumption, or avoiding a 10,000 MW addition in generation capacity.

The Bureau of Energy Efficiency (BEE) has claimed it is most likely to meet the Plan target since the avoided generation capacity recorded till December 2010 was 7,415 MW, equivalent to the generation capacity of two proposed ultra mega power plants in India (about 4,000 MW each). But experts say a closer look at the figure shows the actual saving is, in fact, much less.

According to Umashankar, energy researcher with Centre for Science and Environment (CSE), who studied the energy saving reports released by the BEE, more than two-thirds of the saving is due to the government scheme, Standards and Labeling (S&L). The scheme mandates star rating for some electrical appliances -- the most efficient appliance gets five stars and the least efficient, one star.

“The government assumes that without its labelling intervention the appliances would remain entirely inefficient in the market,” says Umashankar. The energy efficiency ratio of a one-star AC is 2.2. It was fixed in 2007 and was supposed to increase to 2.7 from 2010 onwards. But it has not yet been revised.

About half of the claimed 7,415 MW saving comes from air conditioners (ACs). But the Indian Association of Energy Management Professionals in Bengaluru believes the BEE claims are an “exaggerated estimation”. ACs sold today are compared to ACs that have zero-star, a market average before S&L started in 2007. “If BEE measures efficient appliances sold in a year against market study of average efficiency of the previous year, the real energy savings can be estimated,” says Sunil Sood, former president of the association. But BEE does not even make the market average consumption data available which is crucial to calculate the benchmark, he adds.

For example, Sood explains, in 2007-2008, the market average for refrigerators was three-star but the assumed baseline was one-star. The resultant avoided generation capacity would have been half of the claimed 245 MW. National Productivity Council, which audits BEE’s energy saving reports, recommended in the 2009-10 report that to improve data accuracy the bureau should use specific studies on market research and transformation. Tanmay Tathagat, who led the development of S&L at BEE, says apart from the benchmark there are two crucial factors that decide how much generation capacity has been avoided.

First, the assumption of the number of hours for which the appliances are used. “Since the

use of appliances is varied across the country, the number of hours is assumed,” he explains. The assumptions made by BEE, Tathagat says, appear to be too optimistic. For instance, it assumes that fans are used for 3,600 hours in a year. This is almost double of what Prayas energy group, a Pune-based non-profit, assumed in its 2010 report -- 1,600 hours in a year.

Similarly, the energy contribution of ACs would reduce considerably on using Prayas’ assumption of 720 hours in a year against BEE’s assumption of 1,200 hours.

Ajay Mathur, director general of BEE, says the number of hours has been assumed using many “reports and surveys”. Tathagat says the assumption should be an educated guess because there is shortage of such data in the country, and a conservative estimate is mostly closer to reality. Secondly, Tathagat points out faulty appliances can affect the energy savings substantially.

For example, in 2004-05 BEE conducted a random testing of ACs in the market. The written energy consumption in the brochure was lower by over 30 per cent than actual consumption by some appliances. “Such tests are supposed to be conducted every quarter by BEE but results are neither reported nor factored in the energy saving calculations,” says an energy consultant who does not want to be identified.

WATERTIGHT

Sakshi Chadha Dasgupta

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Tapasya Mohan, a 29-year-old executive in a telecom company, recently purchased a refrigerator. She did not go by looks but the five-star label on the fridge for energy efficiency. She did not mind paying more; the salesman convinced her she would save more in the long run on her electricity bills.

Mohan wishes there was a similar rating system to help her choose a water closet to replace the leaking cistern in her bathroom. She gets water supply for only two hours in her Gurgaon home near Delhi and the leaking cistern drains her storage tank by evening. Mohan will have to wait if she expects help in making an informed decision. Water efficient taps and closets are available in the market, but they are not graded.

Makers of sanitary ware and fixtures rely more on sleek design and looks to attract customers. “Only one in 20 customers visiting our outlet enquires about water use. Most customers are only bothered about looks, design and cost,” said Gautam Dhingra, sales head of a Parryware Roca showroom in a posh locality in Delhi.

LOW AWARENESS, LOW DEMAND

Parryware’s sales manager for northern India, Pankaj Rai, said it is mostly hotels and new office buildings that use water efficient fixtures.

Known brands like Parryware and Hindware now sell dual-flush toilet models where the user can opt to press the half-flush button that flushes three litres or the full-flush button that empties six litres (see table). The single flush cisterns use 10 to 13 litres of water. A good number of customers still buy big cisterns, said Rai.

How to save 415 litres of water in a day

Most sanitary ware outlets stock water-efficient fixtures

Fixture	Water use in standard fixtures	Water-efficient fixture	Water saved
Toilets	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 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	10-25 litres/minute	Flow restrictors	4-20 litres/minute

Source: Parryware Roca and others

Other available water-efficient fixtures include taps with aerators and flow fixtures, sensor taps that shut off in a few seconds, showers with flow regulators and waterless urinals. A person using faucets with aerators (to spread the water flow into small droplets rather than a jet stream) and flow controls can reduce water usage by 50 to 60 per cent.

If Mohan were to get her kitchen and bathroom fitted with water-efficient fixtures, she could save 415 litres water a day, if one goes by Tata Consulting Engineering's 2009 study of households. The saving is high considering the average water availability in India is just 100 litres per person a day (lpcd) against the prescribed standard of 135 lpcd. Of this, nearly 30 per cent water is used for flushing and about 50 per cent is used for bathing, washing and cleaning.

The informal market that caters to 50 per cent customers in small towns and cities also provides water-efficient fixtures. Nitin Jain, proprietor of Prayag Sanitarywares, a dealer in Delhi's Paharganj area near the walled city, said dual flush pvc cisterns are now available in 5/10 and 3/6 litre models for Rs 570 to Rs 670; a branded cistern costs Rs 800 upwards. Government offices are increasingly buying dual flush cisterns, said Jain. Other products like sensor taps and waterless urinals are not very popular because they are costly, he said.

The Municipal Corporation of Delhi is still debating the viability of the waterless urinals it has installed at several locations in the city.

BUILDERS NOT KEEN

Rating water fixtures for water efficiency could be the most effective way to promote them among the average Indian consumer, said Aruna Grover, professor at the School of Planning and Architecture in Delhi. She said the majority of builders and architects do not promote water-efficient fixtures.

This is evident from the fact that just 117 buildings in India have been certified green under the voluntary LEED India rating programme, promoted by the Indian Green Building Council, an industry initiative. The majority of the new office and commercial buildings and residential estates do not apply for green rating.

"Declining availability of water may lead to an attitudinal change," said Grover. Rating systems are enforced in several countries. For instance, Australia's Water Efficiency Labelling and Standards system aims to save about 100,000 million litres annually and the WaterSense programme in the US helped save 136,274 million litres water in 2009.

In India, the Bureau of Indian Standards (BIS) has set standards only for manufacturing processes and product quality, not for water efficiency. What's more, these standards are voluntary. Manufacturers claimed they conduct durability and efficiency tests on their own. For instance, Hindware says each of its toilet models are put through seven tests to check flushing performance. The company refused to say more about its testing facilities.

Head of BIS's civil engineering department, A K Saini, said it may not be possible to replicate water-efficiency standards in India. He said water-efficient fixtures should have complementary sewerage system, which can maintain pressure and flow even with reduced water usage.

Vijayaraghavan Chariar, a professor at IIT-Delhi, contradicted Saini. "The Indian sewerage system is usually designed as a combined system which carries water from toilets, bathrooms and kitchens, leading to excess flow of wastewater. Therefore, installation of water efficient fixtures would not affect flow," he said. The National Building Code also does not provide guidelines or standards for water efficiency.

NO AGENCY FOR WATER EFFICIENCY

The BIS and city civic authorities could take their cue from the Bureau of Energy Efficiency (BEE), under the Union Ministry for Power, which mandates star labelling for several electrical appliances. A bureau official said many factors worked in favour of star rating in the energy sector like rational electricity pricing, an energy conservation act and a dedicated monitoring agency. The price of water is too low for people to care about its conservation, said Karuna Shree, resident of Delhi and geography lecturer in Delhi University. Mohan of Gurgaon said it is water shortage and not her water bill (of Rs 400) that set her thinking about reducing water wastage.

A bureau of water efficiency might help.