Technology Fact Sheet for Mitigation

Technology Fact Sheet – Linear Fluorescent Lamps [i]

Sector	Lighting (domestic)
Technology name	Linear fluorescent lamp
Subsector GHG emission (mn mt CO2 equivalent	CO_2 emission from power generation in 2005 was 11.9 mn mt. The ultimate supply of electricity is less than its output. How much the domestic sector is responsible for use of the supplied electricity seems to be not known with any precision. It is known however that the access by households to electricity supply is still limited, probably to 40% or so. And of the total supply, lighting probably accounts for somewhere within the range of 50-70 percent. The percent of households connected to the grid is around 40% or so and the highest percentage of household consumption for lighting in the capital city has been found to be 56. In villages, it must be much higher. On the whole, we may thus think of the over-all residential activities in 2005 to give rise to CO_2 emission of 4.7 mn mt. As lighting may account for more or less 50% of total electricity use in households, this means that nearly 2.4 mn mt of CO_2 emission was due to electrical lighting purposes.
Background/short description of technology	In Fluorescent lamps, mercury vapor is excited inside a tube by alternating current, and light is emitted by the gas. The light strikes the inner coating of the tube which is some type of fluorescent material, producing a soft glow. Traditionally fluorescent bulbs have long cylinders ranging from a few watts to 40 watts. New “parallel lengths” or PL lamps are now available that are much more compact. The PL lamps fold back the long cylinder to make a compact “H” shape, double “H” or quard PL lamps are also available. PL type lamps are available 5,7,9,13,18 or 24 and 36 watts. To operate from DC power, a ballast is needed to produce high frequency AC current.
Implementation assumption, how the technology will be implemented and diffused across the sub-sector	Fluorescent lamps are rather well-known. The problem is in price compared to incandescent lamps. Particularly, a LFL needs a ballast as well as a starter and also a holder. The nominal lumen capacity, relative efficiency and life lengths are 55-85 per watt, 65% and up to 24000 hours depending on particular designs. The lowest life is 7500 hours.
Reduction in GHG emission	LFLs are much more efficient than incandescent lamps. Lumens per kw for incandescent lamps are about 15-25 while for LFLs it has a range from 55-85. The LFLs are at least 3 times as efficient

	as incandescent bulbs. Thus, for the same lighting service, roughly two-thirds of the electricity is saved leading to a proportionate reduction in carbon di-oxide.
Impact Statements – How this option impacts the country development priorities	
Country social development priorities	With better lighting quality, study habits may change for the better leading to better education prospects as well as security.
Country economic development priorities	*Productivity* may increase as with better quality of light, workers' incentive to work may improve. Also security in the work place may become better. Better lighting in commercial establishments may attract better more customers in the evening than previously spurring higher sales and incomes. Poverty may be reduced because people may have more time to engage in income-earning activities due to better lighting. Impact on BoP is not likely to be impacted much either negatively or positively. Much of the demand for LFLs can be met from domestic production while a certain percentage is always likely to be imported which will have a low negative impact on BoP.
Country environment development priorities	Little direct impact on air pollution may result from the use of LFLs. But the disposal of unusable tubes may create a problem due to the presence of mercury in them which may be leaked to the air or may be leached into the ground water. There will be a fall in use of electricity for lighting for the same number of hours implying positive outcome on resource use.
Other considerations and priorities	-
Costs	
Capital costs	The costs of an incandescent bulb may vary from US$ 1-3 while for an LFL it ranges from US$ 2.5-6.
Operation and maintenance costs O&M	An LFL needs special ballast, a starter and holders while an incandescent bulb needs none. But an LFL lasts far longer 10-20 thousand hours compared to 750 hours-1200 or so for an incandescent lamp. Thus the latter needs to be replaced far often than an LFL. The O&M costs for the incandescent is high (roughly 20 times the purchase cost of an average 60 W bulb. For LFL is much less because it is infrequent but costlier each time.
Cost of GHG reduction	While many factors may impinge upon the actual emission

	reduction and the costs, it appears that the cost may not be high on a life cycle analysis basis.

[i] **This fact sheet has been extracted from TNA Report – Technology Needs Assessment and Technology Action Plans For Climate Change Mitigation– Bangladesh. You can access the complete report from the TNA project website http://tech-action.org/**