L3 GENERAL SERVICE HALOGEN IR LAMP

Description of Technology

Halogen infrared reflecting (HIR) lamps look like conventional incandescents but contain a tungsten halogen filament with a multi-layer film coating on the inside of the halogen capsule. The coating reflects infrared energy back onto the lamp filament, which makes the lamp burn hotter and in turn increases lamp efficacy. HIR lamps have been available for reflector lamps since the early 1990s and are now sold in sufficient quantities to no longer be considered an emerging technology in reflector-lamp applications. This analysis focuses on general service, screw-in, globular, HIR replacements for conventional A-lamp incandescent bulbs, which are appropriate in low to medium-use residential applications (higher-use applications should generally use CFLs).

Current Status of Measure

In the late 1990s, the U.S. Environmental Protection Agency and Department of Defense made informal offers to major manufacturers, such as General Electric, Osram Sylvania, and Philips, to manufacture the technology. However, the manufacturers showed little interest (Rubinstein 2003). The government agencies sent out a Request for Technical Proposal (RFTP) to manufacturers, but did not receive any serious bids. A European procurement initiative also did not result in any serious offers to develop the product. Osram Sylvania did eventually develop an HIR A-lamp, but has had difficulty selling the product. The lamps are priced at $6–7 each, significantly more than a typical incandescent, which sells for $1 or less. Sylvania has unsuccessfully marketed the product based on energy savings for direct replacement of high wattage lamps (Bockley 2003). General Electric has also developed HIR A-lamps, but it is uncertain if the company will proceed in commercializing the product in the near future. The large incremental cost (~$5.50/lamp) relative to incandescent lamps is a major concern for the company (Shepard 2003).

Energy Savings and Costs

This analysis assumes that the HIR A-lamps would be applicable in 100% of current low-use residential applications (i.e., less than 3 hours per day). Low-use applications represent 35% of residential lighting energy use (Vorsatz et al. 1997). In computing savings, Sylvania compared the energy use of HIR 60 Watt A-lamps to the energy use of standard 75 Watt incandescents. HIR 60 Watt A-lamps can provide 20–25 lumens per Watt, higher than most 75 Watt incandescents. Energy savings at 3 hr/day amount to 16 kWh/year when compared to a 75 Watt incandescent.

Key Assumptions Used in Analysis

General service HIR A-lamps were expected to be used in cases where CFLs would not be cost effective due to low operating hours. However, as CFLs become smaller and cheaper, they are becoming real alternatives to standard incandescent lamps, even for low-use applications. For the about the same price, one can buy a CFL that has twice the lumens/Watt and a longer life than a HIR A-lamp. HIR A-lamps face great challenges as prices for CFLs decline (Rubinstein 2003). For HIR A-lamps to compete, their costs will have to come down substantially, but manufacturers do not consider this likely.

Recommended Next Steps

At this time, manufacturers have little interest in pursuing this technology. As CFLs become more competitive with incandescent lamps, the business case for developing the technology is not very strong. We do not have any recommended next steps for this technology at this time.

L3 General service halogen IR reflecting lamp

Description	Screw-in lamp, IR coating reflects energy to filament; replaces incandescents			
Market Information:				
Market sector	RES			
End-use(s)	LIGHT			
Energy types	ELEC			
Market segment	NEW, ROB, RET			
Basecase Information:				
Description	Standard 75 Watt lamp			
Efficiency	75	watts, 15 LPW		
Electric use	82	kWh/year	3 hours/day	
Summer peak demand	0.005	kW		
Winter peak demand	0.015	kW		
Gas/fuel use				
New Measure Information:				
Description	Lamp with IR coating that reflects energy onto filament			
Efficiency	60	watts		
Electric use	66	kWh/year	3 hours/day	
Summer peak demand	0.004	kW		
Winter peak demand	0.012	kW		0.0348
Gas/Fuel use				
Current status	COMM		Carried in GE catalogue as "decorative,"	
Date of commercialization	ca. 2000		Because of CFL competition, mainstream unlikely	
Life	5	years	Estimated, based on Lighting Market Sourcebook 1997	
Savings Information:				
Electricity	16	kWh/year		
Summer peak demand	0.001	kW		
Winter peak demand	0.003	kW		
Gas/Fuel		MMBTU/year		
Percent savings	20%			
Feasible applications	12%		Low-medium level use in residential applications (< 3hrs/day)	
2020 Savings potential	7,356	GWh		
2020 Savings potential	74	TBtu (source)		
Industrial savings > 25%	NO			
Cost Information:				
Projected Incre. Retail Cost	$5.5	2003 $	HIR lamps are $6-7	
Other cost/(savings)	($1.00)	$/year	Less bulb changing	
Cost of saved energy	$0.025	$/kWh		
Cost of saved energy	$2.44	$/MMBtu		
Data quality assessment	B	(A-D)		
Likelihood of Success:				
Major market barriers	Current price is too costly; Prices have come down for CFLs, its competition			
Effect on utility	Less frequent bulb changing			
Current promotion activity	None			
Rating	2	(1-5)		
Rationale	High cost, competition with CFL			
Priority / Next Steps				
Priority	Low			
Recommended next steps	None			
Sources:				
Savings	Vorsatz et al 1997; DOE 2002			
Peak demand	HMG 1999, PGE 2000			
Cost	Vorsatz et al. 1997			
Feasible applications	Based on Ton et al 2003, Kendall & Scholand 2001, LumiLed 2003, DOE 2003			
Measure life	Vorsatz et al. 1997			
Other key sources	E-STAR; F Rubenstein, LBNL, 510-486-4096, E Bockley, Sylvania, 978-777-1900			
Principal contacts	Mark Shepard, GE 216-266-3595			
Notes	HIR lamps are appropriate in all low- and med-use residential applications where they can compete with CFLs.			