

Poland Shows What a Little Light Bulb Can Do

By Frank A. Campbell

Time: Autumn 1995. Place: Poland. Observation: Scarcely a word in the daily newspapers about compact fluorescent lamps (CFLs). Fast forward to December 1997. Now, yes, there are 11 advertisements and 18 articles on the subject.

Even more striking than the increase, though, is the change in tone and content of the media coverage. In 1996, CFLs are reported as a “new” phenomenon. A year later, they are an “expensive but viable” option for Polish householders. Another year passes and they are a “popular” form of lighting, with many benefits to the people, the country and the global environment.

What we have just described is one of the most remarkable market transformations of our time. In 1995, on average, you had to visit 10 Polish homes to find a compact fluorescent lamp. By 1998, one out of every three Polish homes was fitted with one. “Clearly, the market has changed,” according to an evaluation of the Poland Efficient Lighting Project (PELP), “and such a dramatic increase in CFL penetration suggests that this change is permanent.”

The Global Environment Facility (GEF) financed the project credited with this transformation and the World Bank’s private-sector-lending arm, the International Finance Corporation (IFC), administered PELP. Through PELP, CFL prices were subsidized as was product promotion – through two major advertising campaigns featuring a specially prepared PELP logo.

Most importantly, it used consumer education to generate widespread adoption of CFLs in the residential sector. This educational effort reached into the nation’s school system. The Polish Ministry of Education declared: “It is apparent that as a result of the project large numbers of students and teachers have gained useful insight into the use of energy and its impact on the environment.” GEF energy expert Dr. Eric Martinot thinks that “the trade aspect of the project is minor” when compared to such outputs as consumer education.

The impact of PELP extended to the Polish economy. For one thing, PELP provided a more significant market for the country’s CFL manufacturers. Previously all the products of Poland’s highly developed CFL industry had been exported. The project also led to a reduction in the pollution from coal mining and electricity generation. Compact fluorescent lamps consume less energy than traditional incandescent bulbs.

The energy savings resulting from the installation of more than 1.6 million new CFLs – 1.2 million as a direct result of PELP activities -- also made a small contribution to the

health of the global environment. It was calculated that the emission of some 2.755 million tons of carbon dioxide into the atmosphere would be avoided during the life of the project. This avoidance cost the GEF about \$1.40 per ton – a figure that compares very favorably with those achieved during similar undertakings in such places as Denmark, Mexico and the United Kingdom.

GEF became involved in funding this project precisely because of the potential for reduced CO₂ emissions as well as the opportunity to present a model efficient lighting project. The project perhaps made a small dent also in Poland's then-reputation, which included being the 12th largest source of CO₂ among the world's countries and the third largest greenhouse gas (GHG) producer among ex-communist countries, according to 1994 estimates. Poland's electricity generation, which relies heavily on coal, accounts for 41 percent of the country's GHG emissions. GHGs have been credited with disadvantageous changes in the world's climate. Many scientists believe these emissions can cause global devastation in a foreseeable future.

How could such a little thing as a compact fluorescent lamp make a meaningful difference to Poland's pollution profile? What is a CFL, anyway? How is it different from a normal incandescent light bulb?

Fluorescent lamps have been around for more than half a century. The last 15 years or so have seen rapid progress in the technology. This progress—smaller sizes, brighter lights, and so on—have culminated in the development of the compact fluorescent lamp. “The CFL,” the PELP project document explains, “is a fluorescent lamp that incorporates a compact tube and miniaturized electronics into a package small enough to be screwed into a socket designed for an incandescent lamp.”

CFLs last eight to ten times longer than normal incandescent electric bulbs and consume only a quarter of the electricity. “Over its life,” according to the project document, “one 15-watt CFL replacing ten 60-watt incandescent lamps can avoid the need to burn 350-400 pounds of coal or almost one barrel of oil in a power plant. This in turn avoids the release of 600-800 pounds of CO₂.”

So, this is what a single little light bulb can do!

Despite these benefits and the fact that Poland was exporting CFLs to other countries, a number of barriers prevented these products from being embraced by Polish householders. One barrier was insufficient knowledge. Another was what project planners called a “first-cost barrier.” Though economical in the long run, a CFL required an upfront investment of as much as US\$15.00. At that time in Poland, an incandescent bulb cost about 40 cents.

GEF's contribution was intended to remove such barriers by providing investments not likely to come from within Poland any time soon. So far, GEF, which was established by the Rio Earth Summit to fill such investment gaps in the interest of global environmental health, has provided about US\$1 billion just through energy-efficiency and renewable-

energy projects – more than 70 of them in about 50 countries. The overall value of these energy projects, counting both GEF inputs and investments from other sources, is over \$5 billion.

PELP, one of the most celebrated of these projects, has been described by the IFC as “a \$5-million initiative designed to reduce electricity consumption in Poland by stimulating the consumer market for efficient lighting products.” One of the things that made PELP different from most other energy projects – apart from the tremendous success in customer education – was the skillful way price incentives were used.

A price incentive as a way of promoting CFLs is nothing new. Since 1987, more than 80 programs sponsored by utilities in 14 European and North American countries have offered such incentives. Normally, though, an incentive is attached directly to the retail price of a product. So, for example, if a product retails for \$12, a GEF price incentive of \$1.50 would take the price down to \$10.50.

Under PELP, however, GEF’s incentives were administered through manufacturers and linked directly to the manufacturer’s price. Moreover manufacturers had to engage in competitive bidding to be part of the program and this led to pledges of additional manufacturers’ discounts. A manufacturer’s discount of, say, 50 cents, would mean that a GEF incentive of \$1.50 would lead to a reduction of \$2.00.

There’s more. Let’s say that the original manufacturer’s price was \$6.00. With \$2.00 in incentives and a manufacturer discount, the price to the wholesaler is now only \$4.00. Now the wholesalers’ and retailers’ markups, as well as value-added tax, are calculated on a lower original price. So instead of a manufacturer’s price of \$6.00 leading to a retail price of \$12.00, we have a manufacturer’s price of \$4.00 leading to a sales price of only \$8.00. Although most of the foregoing figures are used here for illustration only, in fact, every \$1.00 of GEF subsidy produced a price drop of about \$2.76.

Manufacturers told survey interviewers that this reduction was one of the key ways in which this GEF’s project influenced the adoption of CFLs over incandescent bulbs. The PELP approach added considerable leverage to GEF’s inputs, generating substantial direct investments by manufacturers, wholesalers, retailers, and consumers. This approach helps explain why CO2 reduction under PELP has been so much more economical than under other programs.

Another important feature of this project was the role played by the private sector in managing the project itself. PELP was the first GEF projects aimed at mitigating climate change in which the private sector was the principal channel of delivery. The day-to-day execution of the project was contracted out to Netherlands Energy Efficient Lighting B.V. This firm worked closely with a large number of partners in the private sector, government, NGO community, and lighting utilities.

A small pilot activity carried out under PELP used CFLs to introduce demand-side management to lighting utilities. Demand-side management pursues energy efficiency by

encouraging consumers to reduce or adjust their energy demands, especially during peak periods, rather than by merely increasing supply to meet peak consumption levels.

This pilot project within PELP was intended to show that, by persuading large numbers of people to use CFLs, Poland could reduce the need for investments in extending electric grids or central power stations. This objective was achieved, according to IFC's Senior Projects Officer Russell Sturm, who, as a consultant at the time PELP was being developed, had played a major role in its design. "Under the pilot," Mr. Sturm said, "CFLs were installed intensively in several high-rise apartment buildings, all drawing power from a single substation. The plan was to have six CFLs per apartment. This reduced peak demand on the substation by some 15 percent."

Moreover, the concentrated use of CFLs created no measurable negative impact on power quality in the distribution system. This was in contrast to the concerns of some utilities considering large-scale CFL promotion at the time.

Two of the most heartening things about all these positive results emanating from PELP are what development professionals call sustainability and replication. That these benefits are sustainable can be seen from the fact that three years after the official end of the project, CFL prices have not returned to their traditionally high levels. In fact, prices for the most frequently sold CFLs have fallen from 38 zloty (about US\$12.00) to 25 zloty (about US\$8.00), a decrease of about 33 percent.

Early in 1998, during the first buying season after the project, manufacturers joined in a co-operative advertising campaign, with a small advertising grant from GEF. This time there were no GEF price incentives, but manufacturers voluntarily reduced their prices during the three-and-a-half-month campaign. An additional 430,000 CFLs bearing the PELP logo were sold during this period.

As further evidence of sustainability, positive media reports on CFLs continue. Also, CFLs today are sold in a larger number – and a greater variety – of shops than before the project. On the demand side, almost all CFL purchasers –97 percent -- have said they will replace any burned-out CFLs with other CFLs rather than return to incandescent bulbs.

As successful as PELP has been, it could not by itself hope to prevent climate change. This is where replication comes in. Fortunately, through a project called the IFC/GEF Efficient Lighting Initiative (ELI), activities reminiscent of PELP are already underway on four continents – Africa, America, Asia, and Europe. According to a document on the World Bank website, "During and after PELP, many other countries approached IFC about hosting CFL promotion activities using GEF funding."

Through the Bank, IFC persuaded the GEF Council to finance the new \$15-million initiative. Countries participating in the initiative – Argentina, Peru, South Africa, Czech Republic, Hungary, Latvia, and the Philippines – are employing many of the tools used

by PELP, including the PELP logo, with the hope of repeating the success attained by that earlier project.

PELP comes closer than most development projects to demonstrating what designers of such projects often can only hope for -- sustainability of results. It also comes fairly close to achieving an even rarer characteristic -- "attribution" or the ability to link post-project impact to project activities. "While direct causality cannot be unambiguously established," says the IFC, "the independent PELP evaluation determined that it is highly unlikely that the dramatic sales increases, price decrease, and other effects would have occurred without PELP. In summary, there is strong evidence of a widespread and sustainable change in the residential market for CFLs in Poland."

With the project well on the road towards replication, the positive lessons from Poland about what a little light bulb can do are sure to inspire many similar initiatives in other parts of the world.

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