



## REGULATORY INTERVENTION TOWARDS THE EMPOWERMENT OF ELECTRIC UTILITIES AS AGENTS OF LIGHTING MARKET TRANSFORMATION IN THE PHILIPPINES

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### Abstract

The efficient lighting market in the Philippines suffers from an influx of sub-standard and black-market CFLs. According to market research that the SOLUZIONEA Philippines-run IFC/GEF Efficient Lighting Initiative (ELI) program conducted in early 2000, residential users preferred inefficient and sub-standard products to high-quality energy-efficient CFLs particularly at the time the retail price difference between high and low-quality CFLs reached 10:1 levels. To make matters worse, the market reach of the inferior quality products exceeded 60% of residential users in certain urban centers.

Although electric utility demand-side management (DSM) programs can be an effective tool for transforming the markets for energy-efficient products, a five-year old regulatory framework for DSM had not been effective in encouraging most of the country's 136 utilities to implement energy efficiency programs.

Therefore, in the year 2000, ELI Philippines identified agencies and organizations that could modify the existing regulatory framework so as to make it easier for electric utilities to implement DSM programs. As a result, the Philippines has developed an amended regulatory framework for DSM that assures utilities of recovery of program costs and lost revenue, plus additional incentives for those investing a larger portion of gross revenues in DSM. In parallel, ELI is working with the two large utilities to develop business plans for their respective Smartlight CFL leasing programs. These can serve as models for other utilities.

This paper provides an Asian model of electric utility regulatory interventions as a potent tool in promoting high-quality, energy-efficient lighting technologies.



## Background

### *The Lighting Market Scenario*

From time to time, the paper will be referring to three different types of compact fluorescent lamps (CFLs), differentiated primarily by the level of quality: the government certified, sub-standard, and ELI-qualified CFLs.

“Government certified” CFLs refer to CFLs that have been granted government certification. Before a regulated product (be it locally manufactured or imported) can be sold in the Philippine market, it must have been cleared by the Philippine Department of Trade and Industry (DTI) Bureau of Product Standards (BPS). For CFLs to be sold legally in the Philippines, they must pass standards specified in the Philippine National Standard (PNS) for Self-Ballasted Lamps for General Lighting Services Safety Requirements (PNS 603-1, equivalent to IEC 60968) and Performance Requirements (PNS 603-2, equivalent to IEC 60969).

“Sub-standard” CFLs refer to lamps that have not received certification by the Philippine government, primarily because they fail to meet minimum safety and performance standards, as specified in IEC 60968 and 60969. These CFLs are commonly sold in the black market at a much lower price, with some distributed as counterfeits of the Big Three brands, complete with counterfeit packaging and labeling. These products not only affect the sales of the government certified brands, but also unduly risk the lives of consumers by not providing any assurance of consumer safety or protection.

“ELI-Qualified” CFLs refer to CFLs that have met a relatively higher performance specification in lighting espoused by the Efficient Lighting Initiative (ELI) voluntary product qualification program. ELI, while it is largely based on safety and performance specification of IEC 60968 and 60969, promotes energy efficiency by adopting minimum levels of lighting efficiency, measured in “lumens per watt.” In any case, the global ELI program will always seek to uphold and advocate the government-mandated standards of safety and performance.

The following are some safety and performance data based on a random testing effort for CFLs of ELI Philippines:

Table 1. CFL Characteristics

| Characteristics           | Government-Certified CFL | ELI-Qualified CFL                                                               | Sub-standard CFL         |
|---------------------------|--------------------------|---------------------------------------------------------------------------------|--------------------------|
| Lumen Efficacy/Efficiency | no specification         | at least 45 lm/W (for <15W models) or 60 lm/W (for ≥15W models)                 | NO MINIMUM SPECIFICATION |
| Lamp Life (hrs.)          | no specification         | CFLs must have a minimum rated lifetime of 6,000 hours as defined in IEC 60969. |                          |
| Power Factor (%)          | no specification         | 0.5 or greater as defined by IEC 61000                                          |                          |



| Characteristics       | Government-Certified CFL                                                                                                                                                    | ELI-Qualified CFL                                                                                                                                                                                                                                                       | Sub-standard CFL |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Lumen Maintenance (%) | after 2,000 hours of operation the luminous flux of CFLs must be 70% of initial levels                                                                                      | after 2,000 hours of operation the luminous flux of CFLs must be 80% of initial levels                                                                                                                                                                                  |                  |
| Color Rendering       | no specification                                                                                                                                                            | Color Rendering Index (CRI) of at least 80 for fluorescent lamps with a diameter less than 2.0cm, as defined in IEC 60969                                                                                                                                               |                  |
| Safety                | based on requirements specified in IEC 60968                                                                                                                                | CFLs must meet all local safety requirements and the requirements of IEC 60968                                                                                                                                                                                          |                  |
| Labeling and Warranty | Lamp packaging shall include (as a new requirement):<br>a. Rated average life, h at 230 V $\pm$ 2%;<br>b. Efficacy, lumens per watt<br>---<br>no specification for warranty | Lamp packaging shall include:<br>a. Lifetime<br>b. Power<br>c. Light Output<br>d. Labeling, Comparison CFL/GLS<br>e. Starting Temperature<br>f. Correlated Color Temperature<br>---<br>Purchaser may return the CFL to point of purchase with no explanation necessary. |                  |
| Price Range (EURO)    | 3.50-4.00                                                                                                                                                                   | 7.00-11.50                                                                                                                                                                                                                                                              | 0.75-2.25        |

Source: IEC 60968/60969, *Global ELI CFL Specifications (1 Nov 2001)*

Before ELI's market transformation efforts in the Philippine lighting market, the use of high-quality energy efficient lighting products, such as high-efficiency compact fluorescent lamps (CFLs), is gradually picking up, but not fast enough to immediately displace the massive proliferation of low-cost and sub-standard lighting products.



### ***Lighting Products Usage***

More than 9 out of every 10 households use at least one linear fluorescent lamp. This is true across all income brackets. In contrast, only 68% use at least one incandescent bulb while 64% use CFLs. CFLs have come to be associated with energy savings. Consumers acknowledge that this lamp gives good illumination. And based on a recent 2002 survey, CFLs have become known for the aesthetic value of the lamp itself, coming from its “new”, different look.

### ***Lighting Products Purchase Habits***

The neighborhood hardware store remains the outlet of choice for lighting product purchase. This is particularly true of incandescent bulbs, CFLs and linear fluorescent lamps.

Table 2. Lighting Products Outlet Choice, January 2002

|                             | <b>Incandescent Bulb(%)</b> | <b>Linear Fluorescent Lamp (%)</b> | <b>Compact Fluorescent Lamp (%)</b> |
|-----------------------------|-----------------------------|------------------------------------|-------------------------------------|
| Neighborhood hardware       | 70                          | 69                                 | 57                                  |
| Grocery / supermarket       | 10                          | 12                                 | 12                                  |
| Mall hardware               | 8                           | 9                                  | 15                                  |
| General store               | 8                           | -                                  | -                                   |
| Department store – hardware | 10                          | 13                                 | 20                                  |

Expectedly, incandescent bulbs are bought with greater frequency compared to both linear fluorescent lamps and compact fluorescent lamps.

Table 3. Frequency of Purchase, January 2002

|                             | <b>Incandescent Bulb(%)</b> | <b>Linear Fluorescent Lamp (%)</b> | <b>Compact Fluorescent Lamp (%)</b> |
|-----------------------------|-----------------------------|------------------------------------|-------------------------------------|
| Once in two to three months | 24                          | 2                                  | 3                                   |
| Two to three times a year   | 42                          | 24                                 | 21                                  |
| Once a year                 | 25                          | 52                                 | 59                                  |
| Less than once a year       | 6                           | 22                                 | 16                                  |

In contrast, the High to Middle income consumers buy CFLs less frequently – one a year or less often – compared to the Low income consumers, an indication that the former purchase the more expensive, longer-lasting models than the latter.

The households from different income brackets have similar inclinations to buy CFLs. Similarly, they are familiar with the various CFL brands and models, and their relative prices. Hence, the observed pattern of purchases stem more from the households’ purchasing power or ability to pay the purchased CFLs. While most recognize and perhaps wish to get quality CFLs, Metro Manila households buy the CFLs they can afford.



ELI's research suggests that household customers purchase CFLs primarily for the following reasons:

- Reduction in electricity consumption and increase in energy savings;
- Better illumination perceived from “brighter” daylight color temperatures than incandescent bulbs; and
- Longer lamp life.

However, the major deterrent to the further growth of CFL sales is price. The retail price difference between high and low quality CFLs reaches 10:1 levels. Another major barrier is consumers' lack of awareness of product options and availability.

The salient features of the Philippine CFL market (2000) are as follows:

- Number of Lamps: Over 50 brands
- Degree of Knowledge: About 3 out of 4 households are familiar with CFLs
- Market reach: About 64 percent of households and 77 percent of large firms
- New establishments: At least 50 importers
- Number of products tested: At least 18 CFL brands tested and certified by government; At least five brands qualified by ELI

The salient features of the Philippine Linear Fluorescent Lighting market (2000) are as follows:

- Market share – Lamps: T-12 Linear Fluorescent – 80%; T-8 and Other Linear Fluorescent – 20%
- Market share – Ballasts: Electromagnetic – 90%; Electronic – 10%
- Market reach: 100% of Commercial/Industrial sector

### **Philippine Market Response to Available Lighting Technologies**

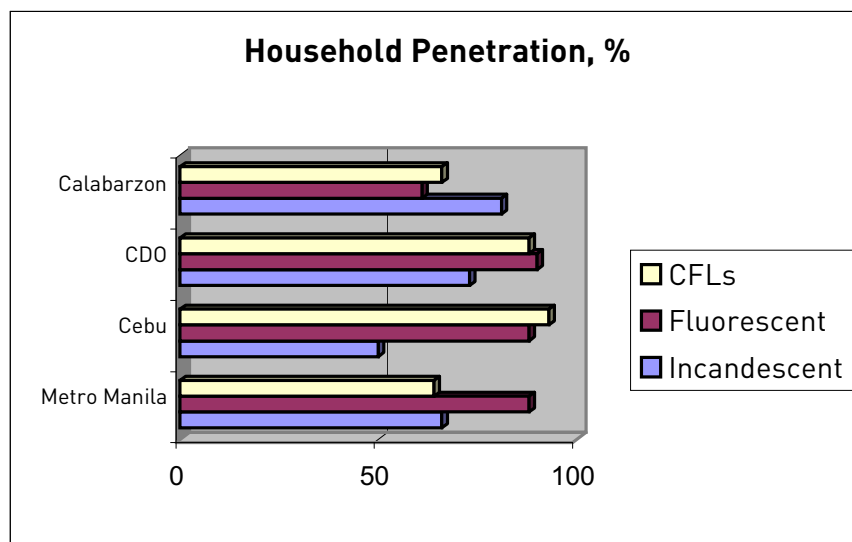
As little as five years ago, CFLs were almost unknown. Four out of every five residential customers were unfamiliar with CFLs, based on a study conducted in 2000 by the WB-ASTAE in 1996. The market grew quickly; market research on energy efficient lighting products conducted for ELI in selected Philippine urban centers (Metro Manila, Cebu City and Cagayan De Oro) indicates that about 64 percent of the target households have CFLs. Market reach of CFLs has caught up with incandescent lamps' 66 percent but still far behind linear fluorescent lamps' 88 percent. CFL market reach has improved significantly in the last half decade due partly to the influx of low-cost CFLs.

The study also revealed the existence of a strong black market for CFLs, with approximately 6 out of 10 CFLs sold in the Metro Manila market do not pass through the mandatory government certification process.

Most residential customers in Metro Manila use more linear fluorescent lamps than CFLs and incandescent lamps, while the cities of Cebu and Cagayan De Oro have higher levels of CFL market reach. In terms of quantity, however, Metro Manila households consume more CFLs than either incandescent or linear fluorescent lamps (Fig.1).



Fig 1. Distribution and Usage of Lighting Products by Area, 2000



Source: AA Survey and Analysis

It is also worth mentioning that the middle and upper classes in Metro Manila purchased 1.2 million CFL units out of 1.6 million units sold in 1999 (Table 4).

Table 4. CFL Purchases of Metro Manila Households, 1999

| Market Segment | Volume, Thousands | Unit Price, EURO | Sales, Million EURO |
|----------------|-------------------|------------------|---------------------|
| High Income    | 338               | 4.25             | 1.45                |
| Middle Income  | 889               | 3.92             | 3.48                |
| Low Income     | 397               | 2.65             | 1.04                |
| Aggregate      | 1,625             | 3.67             | 5.97                |

With the lighting market driven by the purchasing power of the consumer, the local and regional economic decline forced the downward pressure on prices, which, in turn, drove manufacturers to push product lines with lower overall product quality, longevity and energy efficiency. The weakening demand for high-quality energy efficient lighting products was further exacerbated by the utility sector's natural resistance towards energy efficiency and its perceived business risks.

The demand and supply of energy efficient lighting products will continue to diminish unless the government and private sector intervene to arrest this unfavorable market trend. The situation calls for a market transformation aimed at accelerating the utilization of high-quality energy efficient lighting products.

This paper seeks to show how collaborative efforts between the government, private sector, and the utilities can break down traditional market barriers to increase usage of energy efficient lighting technologies. By increasing demand, improving the accessibility of capital, ensuring product availability, and fostering competition so as to produce downward pressure on prices, the market will experience a shift in supply and demand.



## Early Government Efforts to Institutionalize Demand Side Management

In a competitive electricity environment, electricity will be packaged not merely as a product, but a product with a full range of services. This new concept of electricity will bring about new business opportunities for the distribution utilities. One of these opportunities is demand side management (DSM). Current Philippine laws define DSM as measures undertaken by distribution utilities to encourage end-users in the proper management of their load to achieve efficiency in the utilization of fixed infrastructures in the system. Unlike the core business of delivering power to the points-of-sale, DSM focuses on the provision of energy efficiency services on the demand-side of the meter.

The policy of institutionalizing DSM originated a decade ago from the broad powers and functions of the energy planning and policymaking body which is the Philippine Department of Energy (DOE), as contained in the Department of Energy Act of 1992 (R.A. 7638), which states:

“Sec. 5 (a) Formulate policies for the planning and implementation of a comprehensive program for the efficient supply and economical use of energy consistent with the approved national economic plan and with the policies on environmental protection and conservation and maintenance of ecological balance, and provide a mechanism for the integration, rationalization, and coordination of the various energy programs of the government.

(g) Formulate and implement programs, including a system of providing incentives and penalties, for the judicious and efficient use of energy in all energy-consuming sectors of the economy.”

In 1995, the energy department issued DOE Circular No. 95-08-007, as amended by DOE Circular No. 95-11-011 which sets on the lone energy regulatory agency the mission of developing and implementing a regulatory framework to enjoin electric utilities to invest in DSM projects.

With the passage of Electric Power Industry Reform Act of 2001 (R.A. 9136), the relevance of DSM in the electric utility industry in a restructured environment has been maintained. The law provides :

“Section 2 (k): It is hereby declared the policy of the State to encourage the efficient use of energy and other modalities of demand side management.

“Section 43 (q): The ERC shall act on applications for cost recovery and return on demand side management projects.”

This shows that the lawmakers have recognized the need to continue DSM with the objective of promoting the efficient use of energy that is beneficial not only to the consumers and the electric utilities, but also to society as a whole.

Participating utility customers stand to expect direct reduction of electricity bills and maintenance expenses.

DSM will also enable electric utilities to develop a new business line, comply with regulatory requirements, bolster customer retention, defer costly capital expenditures for system upgrades, flatten load profiles (e.g., peak shaving with CFLs), and gather customer consumption data to aid in market research.



Mitigating global climate change and improving urban air quality through deferred development and operations of more power plants, as well as establishing energy efficiency as an integral part of the economy are among the key societal benefits of DSM.

As the electric power industry becomes increasingly deregulated and more competitive, the utilities will seize the opportunity to improve its reliability and efficiency by acquiring and using high-end infrastructures that will transform them into globally competitive energy providers of a variety of services.

### **IFC-Regulator Collaboration To Amend DSM Framework**

Since the approval and issuance of the original DSM Framework in 1996, only 33 out of the 136 electric utilities required to develop and file their DSM plans to the ERC have complied and submitted their plans.

Existing regulation does not adequately and effectively attract the 17 private and local government electric utilities and 119 rural electric cooperatives to push energy efficiency programs such as the DSM programs. While under the existing framework the utilities are already allowed cost recovery, lost revenues and financial incentives, the mechanisms are ambiguous and unresponsive to the needs of the electric utilities to encourage them fully to invest in DSM programs.

The resistance of the utilities to implement DSM is due to lack of clear-cut and more responsive regulatory policy to incentivize the promotion of DSM program.

To address this issue, the existing regulatory framework for DSM should be amended to assure the utilities of cost recovery, lost revenues and financial incentives.

The rationale for amending the framework is the removal of the perceived barriers to DSM implementation. These barriers that have to be addressed in the framework are as follows:

First is the issue of ***lost revenues***. The common perception is that when electricity consumers buy and install efficient lighting technologies, the impact is that their electricity bill will be reduced. Consequently, a decrease in kWh electricity consumption may translate into lower sales, and in turn, lower profits for the utilities. By decoupling sales from profits, the utilities are allowed to recover revenue losses. The idea here is to remove existing disincentives that make energy efficient programs inconsistent with the utility's profit-maximizing strategy. Also, by adopting the revenue cap regulation, investing in the demand-side will also be profitable as investing in the supply-side.

Second is the issue on ***financing***. The local regulatory agency adopts by practice, not as a requirement by law, an accounting process which treats DSM program costs as allowable expenses only when these are actually incurred, before the utilities are allowed by the regulator to recover said expenses through rates. To further entice the utilities to implement DSM, the regulator should authorize the adoption of a balancing of account system and securitization of a DSM revenue stream to finance DSM program investments.

Third is the issue on ***customers with minimum bill***. These customers are not in the position to benefit from energy savings out of their current minimum or below minimum consumption. With the passage of the latest power law (R.A. No. 9136), which restructured the Philippine electric industry, it is no longer possible to eliminate the minimum bill because of the provision for lifeline rates. Hence, the customers who install CFLs should be given financial incentives by charging a lower minimum bill.



Fourth is the *pilot project syndrome*, which refers to the general tendency of project managers and implementors to precede a project with a scaled-down pilot. Pilot testing of DSM should no longer be necessary if it has already been proven to be feasible and effective. Hence, the electric utilities should be weaned from this habit of undertaking pilot projects as a natural prerequisite to full project implementation.

Fifth is the *disclosure of DSM costs as a separate line item on the bill*. While this makes the bill more transparent, it is “politically” unfeasible to do so because of the negative connotation of the term “costs” gets, similar to Purchased Power Adjustment (PPA). The PPA is a separate item in the electricity bill of consumers which has drawn strong criticism because it almost approximates the cost of basic rate.

Sixth is the issue on *excess capacity*. This means that marginal or avoided costs are low because the operational costs of existing supply are more expensive than the costs associated with energy efficiency. As such, excess capacity should not pose as a barrier to implementing DSM.

These are the possible solutions to the issues raised during the previous collaborative assemblies that should land in the final draft of the regulatory framework.

On 10 April 2001, the Philippine energy regulatory agency, the Energy Regulatory Board, now re-organized under recent legislation as the Energy Regulatory Commission or ERC, entered into a Memorandum of Agreement with SOLUZIONE Philippines (then Iberpacific) to review, amend and improve as may be appropriate the DSM Regulatory Framework in the Philippines.

ELI is a private sector-led energy efficiency program funded by the Global Environment Facility (GEF), and is administered globally by the International Finance Corporation (IFC) as a feasible quick response solution towards the reduction of greenhouse gas emissions. The GEF through the IFC has committed a 17.3 million EURO trust fund for climate change mitigation through a three-year lighting market transformation in seven countries, including the Philippines.

The Spanish firm SOLUZIONE Ingeniería entered into contract with the IFC to regionally implement the program in two of the seven countries, namely South Africa and the Philippines. SOLUZIONE Philippines (formerly known as Iberpacific, Inc.) was engaged in 2000 to locally manage the program.

ELI Philippines, whose budget is 2.85 million EURO, will work in a number of ways to increase consumer awareness of the benefits for energy-efficient lighting to create immediate and direct impacts through increased market reach of efficient lighting. One such activity is a provision for technical assistance to the local regulators to promote DSM reforms – such as lost revenue adjustment mechanisms – to wipe away any real and perceived disincentives for energy efficiency.

The objective of this ELI-ERC collaborative effort was to encourage and facilitate DSM activities by utility companies. The framework will make explicit the cost recovery methodologies/mechanisms for DSM program expenses and lost revenues, and provide for incentive mechanisms for the conduct of DSM activities.

A number of collaborative meetings, spearheaded by SOLUZIONE Philippines and attended by the regulators, relevant government agencies such as the Department of Energy and the Department of Trade and Industry, the government-run transmission company, the utilities, power producers, non-government organizations, consumer groups, and the academe, were conducted during a four-month period beginning July 2001 for the purpose of discussing the merits of the amendments and the drafting of agreements that signified the collaborative assembly’s majority and unanimous support of the incorporation of the proposed amendments.



In the new framework, the electric utilities are required to either submit a customized DSM Plan, or adopt a standard DSM Plan or implement a default DSM Plan. A customized DSM Plan is a plan that is tailored-fit for the electric utility. The utility is free to choose which DSM programs will address its specific DSM load shape objectives.

Under the new scheme, a utility can opt to use the standard DSM Plan, which can be assembled from a menu of nine given DSM activities. Three of the nine DSM options are efficient lighting programs. These are:

- High Efficiency Compact Fluorescent Lamp Lighting Program which aims to replace the less efficient incandescent lamp with High Efficiency CFLs in the residential and commercial sectors;
- High Efficiency Linear Fluorescent Lighting Program which aims to promote the use of high efficiency linear fluorescent lamps with high-frequency low-loss electronic ballasts in the residential and business sectors; and;
- High Efficiency Streetlight Lighting Program which aims to encourage the use of high-pressure sodium lamps instead of mercury vapor lamps.

The standard DSM plan developed collaboratively by ELI Philippines, the ERC and key power sector stakeholders includes a list of standard DSM programs that are cost effective and feasible to implement in most areas, a standard DSM cost recovery plan reflecting the estimated cost of each standard DSM program plus utility specific net lost revenues, and a standard program evaluation.

The default DSM Plan imposes upon the utilities that fail to submit either a customized or standard DSM Plan, to implement all four (4) DSM programs, namely:

- High Efficiency Compact Fluorescent Lamp Lighting Program;
- High Efficiency Linear Fluorescent Lighting Program;
- Power Factor Correction Program; and,
- Consumer Efficiency Awareness Program.

During the planning and development of the standard and default DSM plans, the collaborative assemblies consistently voted to include efficient lighting programs as the primary DSM activity of choice.

The general preference for efficient lighting DSM programs, especially the High Efficiency CFL program, is due to the relative ease of implementation from a utility's perspective, and its implementation has a direct and immediate impact on the load profile objectives of the utility, as the efficient use of lighting almost always swiftly clips the early evening peak demand.

This translates to a rapid lowering of consumption on a major scale if implemented over the entire residential class. Meralco, the Philippines' largest utility, could gain annual savings of over 150 GWh and a 20 MW reduction in peak demand with the complete replacement of incandescent lamps with CFLs.

ELI Philippines saw this opportunity for a direct and immediate impact in promoting efficient lighting over a broad spectrum of customers, and paved the way for the collaborative efforts with the regulators, government agencies and the power sector stakeholders to amend the framework for demand side management.



## **Electric Utilities as Agents of Lighting Market Transformation**

DSM is a utility-driven activity. The utilities are primarily responsible in implementing the DSM programs and educating the public on the use of energy-efficient technologies.

Each utility is required to meet the following responsibilities:

- It shall be responsible for developing its DSM plans. Electric utilities shall be free to set their DSM goals and choose which DSM load shape objective is most appropriate for their specific circumstances;
- It shall prepare and submit to ERC for approval the utility's DSM plan and program implementation schedule;
- It shall execute ERC's approved plan in accordance with the program implementation schedule; and
- It shall annually examine and evaluate its achievements in attaining its objectives and update its plans when deemed necessary.

To encourage the utilities to discharge their responsibilities, they must be empowered. And the key to empowering the electric utilities as agents of lighting market transformation is to incentivize the DSM program implementation and to present DSM as a viable business opportunity.

***Incentivizing DSM*** means that the utility's prudent DSM investment costs must be reflected in the rate structure. The utility must also be assured of a fair and reasonable return on its DSM investments. To further encourage the utilities, the regulator should develop a scheme by which utilities are recognized and incentivized in accordance with their level of efficiency. Therefore, to win the recognition of the regulators and of their peers, successful implementation of a DSM program should be made an indispensable requirement.

## **Results and On-Going Efforts**

The implementation of DSM continues to evolve with the Energy Regulatory Commission since its inception five years ago. Twenty-two percent (22%) of the electric utilities have already filed their DSM applications, half of which have already implemented their respective programs. And with the amendment of the regulatory framework in its final stages of acceptance, more utilities will embark on DSM.

The ELL-implemented Smartlight CFL Program with two utilities (a pilot with Cepalco and a business plan for Meralco, the Philippines' largest utility) is a CFL leasing-type activity. In this program, the utility would be leasing CFLs to its customers at approximately 0.35 EURO a month over a period of 18 months for a CFL costing 6.30 EURO.

Using the shared savings scheme, the consumer benefits from the energy savings gained from leasing CFLs, and the utility is able to recover the cost of the lamp as well as the administrative and financing costs, including a return on its investment.

A cost comparison between using a 50-watt incandescent lamp and an 11-watt CFL is shown below:



Table 5. Incandescent Bulb-CFL Cost Comparison, 2002

|                                                | <b>50-watt<br/>Incandescent<br/>Bulb</b> | <b>11-watt<br/>CFL</b> |
|------------------------------------------------|------------------------------------------|------------------------|
| Initial Cost (in EURO)                         | 0.51                                     | 5.90                   |
| Avoided Lamp Replacement Cost                  | 2.56                                     | none                   |
| Operating Cost (6,000 hrs @ 0.132<br>EURO/kWh) | 39.57                                    | 8.70                   |
| <b>Total Lifecycle Cost (in EURO)</b>          | <b>42.64</b>                             | <b>14.60</b>           |

For 6,000 burning hours, the customer is expected to experience net savings in the amount of 28.04 EURO, while benefiting from comparable illuminance.

Enhanced customer awareness on the Smartlight CFL Program will enable customers to appreciate and realize the economic gain by allowing the utility to knock down the first-cost barrier.

ELI Philippines' promotion of consumer awareness of energy efficient lighting technology is crucial at this stage of development of the Philippine lighting market. It provides public education, product labeling with the ELI logo, tri-media campaign, professional education and enhancement of academic curriculum.

Moreover, the Fuels and Appliance Testing Laboratory of the Philippine DOE provides product testing services for the Bureau of Product Standards (BPS) that issues both the Product Quality and Product Safety marks for CFLs and other consumer items. ELI Philippines has provided the funds necessary to acquire over 230,000 EURO worth of testing equipment to bolster FATL's capabilities of testing legally imported CFLs. The IFC believes that a true lighting market transformation could only be sustained with the use of a globally-accepted standard of product quality.

In addition, ELI Philippines will fund testing of CFLs, including counterfeits, and the results will be used for the educational campaign.

## Conclusion

Based on the WB-ASTAE report in October 1996, the economic savings potential of CFLs in the Philippines is estimated at 280 GWh per year and 110 MW of peak demand. Efficiency improvement in linear fluorescent lamps and ballasts could save an additional 400 GWh per year and 75 MW of peak demand, for a total lighting savings potential of 680 GWh per year and 185 MW of peak demand.

Transforming the electric utilities as agents of lighting market transformation requires regulatory intervention. With the amended version of the DSM regulatory framework, the utility will no longer be hesitant to push its own DSM program.

This will lead to the eventual development of self-empowered electric utilities whose motivation to implement DSM will ultimately not be regulatory compulsion, but the exigency of staying competitive in a deregulated business environment.

Through regulatory reforms, government has made high-quality lighting available through utility-led energy efficiency programs that provide for financing schemes beneficial for the residential sectors.



Such a scenario cascades to the manufacturers' anticipation of bulk procurement by utilities, which in turn sets greater downward pressure on wholesale and retail prices of energy efficient lighting products.

This regulatory intervention effort is seen to be the decisive factor in transforming the lighting market in the Philippine setting. The authors are certain that there are other economies with similar market conditions that can employ this strategy.

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