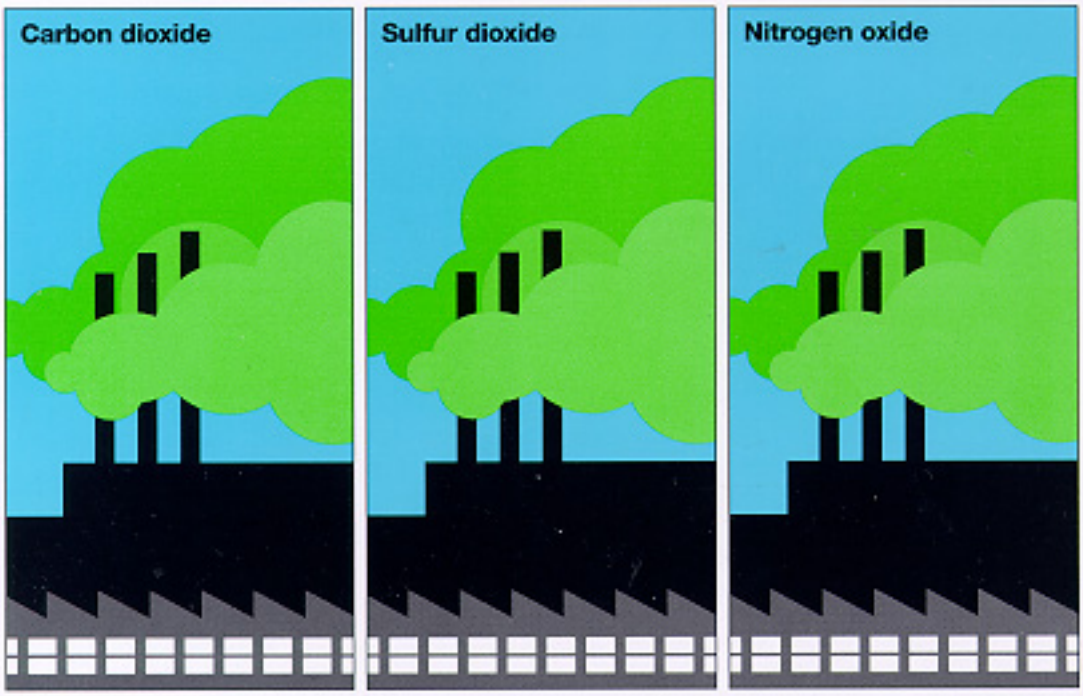
"To provide for improved energy efficiency..."



Greenhouse Gases in the United States

Energy conservation offers many benefits. Each step that America takes towards using less electricity reduces our consumption of nonrenewable resources, lessens our dependence on foreign oil and prevents emissions of carbon dioxide, sulfur dioxide and nitrogen oxide—greenhouse gases which can harm the ozone layer.

A Period of Transition

On October 24, 1992, the Energy Policy Act (EPACT) was signed into law. Only a small portion of this 440 page "act to provide for improved energy efficiency" deals with lighting, but implementation of the legislation will have an enormous impact on lamp and fixture manufacturers and users of lighting products. Many of the industry's most commonly used lamp types fail to meet EPACT's requirements and will no longer be manufactured. Anyone manufacturing *or importing* lamps which fail to comply with the new standards will be subject to stiff penalties. OSRAM SYLVANIA has prepared this guide to help you understand what EPACT requires, and to help you develop strategies to ensure compliance with current and future regulations.

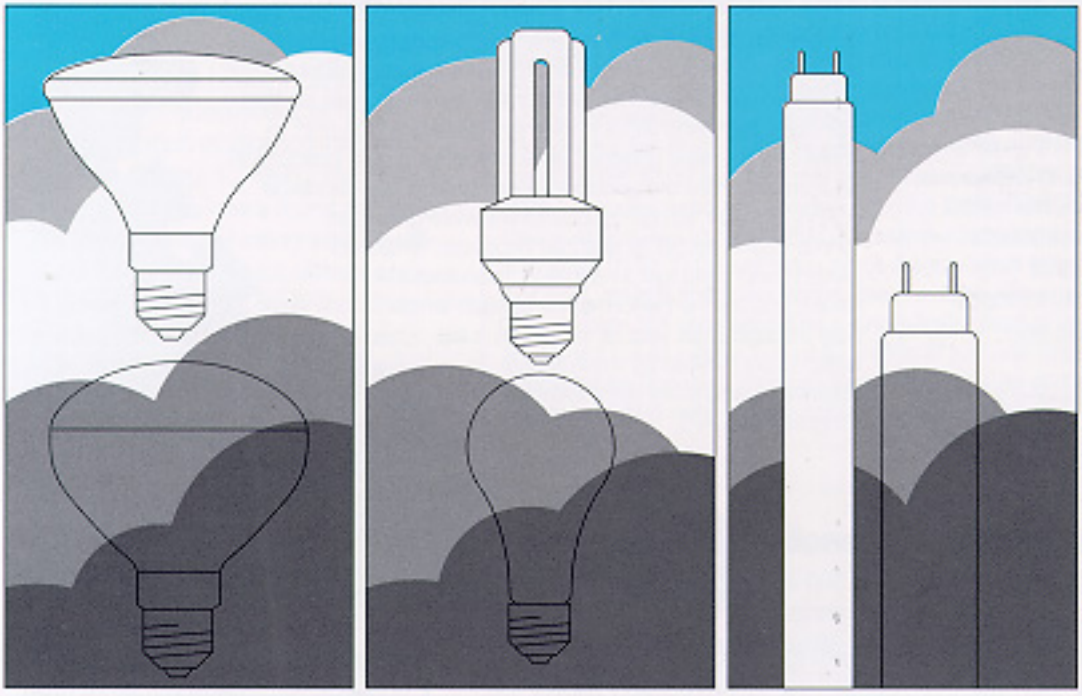
A Nationwide Problem

The problem which the Energy Policy Act of 1992 addresses is widespread. America is wasting energy in spite of the fact that new technologies in almost every industry make it possible to use energy more and more efficiently—cars can get better gas mileage, buildings can be better insulated and electric lamps can produce more light from less electricity. The problem is that older, less efficient technologies are still available and are usually less expensive to purchase. So each year, the demand for energy increases and the cost of producing that energy gets higher and higher. Worse still, we are forced to burn more fossil fuels, import more foreign oil and further deplete precious natural resources to meet the increased demand.

Lighting Can Make a Difference

According to the Department of Energy, 19 percent of all electricity consumed in the United States is used for lighting. For commercial buildings in particular, the figure can be as high as 50 percent, when lighting's impact on air conditioning load is considered. Furthermore, over half of that electricity is wasted due to continued use of inefficient technologies. If all American businesses made profitable upgrades to energy efficient lighting, it is estimated that national electricity demand could be reduced by a full 10 percent. This reduction would lower carbon dioxide emissions by 232 million tons—the equivalent of taking 42 million cars off the road. This tremendous potential for savings makes lighting an ideal choice for demand side management—if commercial users of electricity simply install more efficient lighting products.

Making Energy Conservation the Law



Highlighting Replacement Options

Although the language of EPACT is complex, the intent of the law is simple: to promote the use of more energy efficient lighting technologies. In general, this means replacing incandescent A19s with medium base halogen and compact fluorescent lamps, replacing incandescent PARs with halogen PARs, and using lower wattage, energy saver T12 or higher efficiency T8 fluorescent lamps instead of full wattage T12 types.

A Worthwhile Investment

An upgrade to energy efficient lighting offers more than a simple way to address energy issues—it's also a great way to save money. Compared to most strategies for reducing energy use, lighting requires very little capital outlay and provides a quick and dramatic return on that investment. For example, upgrading a luminaire by replacing T12 lamps with T8 lamps and an electronic ballast can save up to $200 in energy costs over the life of the first set of T8 lamps. And since installation of T8 fluorescent systems—or compact fluorescent lamps—often qualifies for cash rebates from utility companies, the payback can be even greater.

Promoting Efficient Products

There are two ways to persuade end users to install more efficient lighting. First, legislation can simply eliminate the least efficient products from the marketplace. Second, users can be educated about the benefits of energy saving technologies. This involves getting people to think in terms of light output (lumens) instead of power input (watts). Once they recognize that a 20W compact fluorescent lamp can produce just as much light as a 75W soft white standard incandescent lamp, they will learn that savings in energy costs can easily exceed the higher purchase price of a more efficient lamp. Both of these strategies are employed by the Energy Policy Act.

Legislating Lamps

A Comprehensive Bill

The Energy Policy Act of 1992 is a broad-ranging attempt to promote energy efficiency. In addition to lamps, the bill regulates luminaires (light fixtures), office equipment, windows, appliances, electric motors and plumbing products. EPACT also calls for electric utilities to promote energy efficient products and requires state governments to incorporate efficiency standards into building codes.

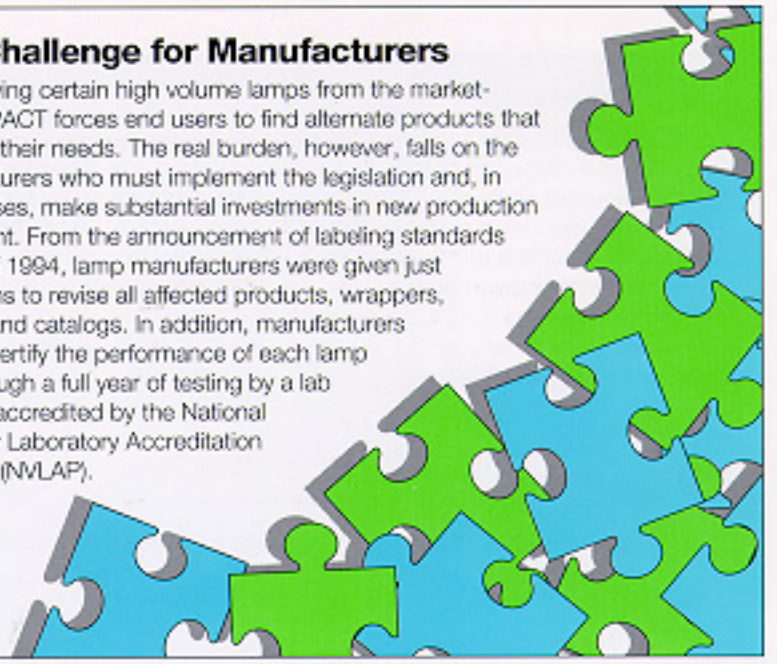
For lamps in particular, EPACT mandates performance standards and labeling requirements. These measures—which are outlined below—are intended to help users "select the most energy efficient lamps which meet their requirements." The inside rear cover of this brochure features more detailed information about the lamp types that are covered by the law and the dates when manufacture or import of these lamps will be prohibited. *(Any products already in inventory can be sold without restriction.)*

Fluorescent Lamps

The new legislation contains complex performance requirements for general service fluorescent lamps, setting standards both for lumens per watt and color rendering. The requirements apply to 4-foot medium bi-pin lamps, 2-foot U-shaped lamps, 8-foot slimline lamps and 8-foot high output lamps. In general, full wattage (40W, 75W, 110W) lamps will be eliminated in order to encourage the use of energy saving (34W, 60W, 95W) types. As of May 1, 1994, manufacturers have already ceased production of many full wattage 8-foot slimline and full wattage 8-foot high output T12 fluorescent lamps. Restrictions on other types of general service fluorescent lamps take effect November 1, 1995.

The Challenge for Manufacturers

By removing certain high volume lamps from the marketplace, EPACT forces end users to find alternate products that will meet their needs. The real burden, however, falls on the manufacturers who must implement the legislation and, in some cases, make substantial investments in new production equipment. From the announcement of labeling standards in April of 1994, lamp manufacturers were given just 12 months to revise all affected products, wrappers, cartons and catalogs. In addition, manufacturers have to certify the performance of each lamp type through a full year of testing by a lab which is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).



By setting standards for color rendering, the law effectively allows the cheaper halophosphor colors—such as warm white and cool white—only in reduced wattage or energy saver types. Full wattage types will only be available in rare earth (triphosphor) colors which offer both higher efficacy and superior color rendering. (T8 fluorescent lamps of any wattage are in full compliance with EPACT. When used with electronic ballasts, a system using T8 lamps offers tremendous flexibility and provides the best combination of energy savings and color quality.)

All general service fluorescent lamps will also have to comply with new labeling standards. By May 1, 1995, some combination of catalog information and product labeling is likely to require lumen output, color rendering, lamp life and an estimate of lumens per watt (LPW) efficacy.

Incandescent Reflector Lamps

As of November 1, 1995, it will be illegal to manufacture or import incandescent reflector lamps that do not produce a specified number of lumens per watt. The standards effectively encourage the use of halogen PAR lamps instead of conventional incandescent reflector and PAR lamps—most R30, R40 and incandescent PAR30 and PAR38 lamps will be eliminated. Users who select more efficient halogen PARs will enjoy substantially lower energy costs and a longer service life. The efficiency standards in the bill apply to all medium base R and PAR shaped lamps of 40 watts and above. In addition, incandescent reflector lamps must be relabeled according to EPACT's guidelines by May 1, 1995. New labels are likely to require estimated LPW efficacy, beam angle, maximum intensity and rated lamp life.

The Impact of EPACT

Incandescent & Compact Fluorescent Lamps

EPACT's only mandate on general service (medium base) incandescent and compact fluorescent lamps is the prescription of labeling requirements as of May 1, 1995. The object is to make consumers more aware of the cost benefits of using energy efficient lighting. The exact details are still pending, but it is likely that the lumen output of a lamp, its efficacy (in lumens per watt) and some indication of its yearly energy cost may be specified through a combination of packaging, catalogs and point-of-purchase materials.

HID Lamps

The Energy Policy Act currently does not set any requirements for high intensity discharge lamps. The legislation does, however, call for the Department of Energy to develop "economically justified and technically feasible" standards for HID lamps to be implemented in 1999. Regulations will probably restrict the use of mercury lamps and thereby promote the more efficient metal halide and high pressure sodium types.

Building Codes

Another way in which the legislation affects the lighting industry is through changing building codes for new construction and major renovation projects. By November 1994, State governments must amend existing laws to incorporate ASHRAE/IES lighting standards for commercial buildings, and CABO Model Energy Code standards for residential buildings. By restricting the power available for lighting, these codes effectively mandate the use of the "Most Efficient" systems listed on the inside rear cover of this brochure.

Potential Penalty—$4 Million Per Day

EPACT contains very strict enforcement penalties for domestic manufacturers and importers. Because the law is an amendment to the earlier Appliance Efficiency Act, enforcement provisions are the same for lamps as they are for the much larger equipment covered by the previous bill: $100 per item, per day. That means a single item—manufactured or imported after the implementation date—which fails to meet EPACT's standards could incur a fine of up to $100 for each day since the law went into effect. For high volume items like lamps, the numbers can add up very, very quickly. It's estimated that a single trailer load of non-complying lamps could incur a fine of $4 million in just one day. *(Remember, however, that product in inventory as of the law's implementation date can be sold without limitation.)*

Numerous Exemptions

The Energy Policy Act does not currently cover all of the thousands of different kinds of lamps in widespread use. For instance, no mention is made of low voltage reflector lamps—they are so efficient that they are automatically in compliance and therefore not affected. Many other lamp types are exempt because they are designed for some special purpose or application where the function of the lamp is deemed to be more important than the need for energy efficiency. (Detailed listings of these exemptions are on the inside rear cover.) For most users, however, the exemptions are unimportant. They will enjoy the greatest benefit by simply using the most efficient lamps that meet their needs.

Mandated Revisions

The existing performance standards and labeling requirements were signed into law in October of 1992. However, EPACT contains provisions which mandate that these standards will be revised in the future. The bill sets deadlines for "rulemaking procedures" to determine if the standards in the existing bill should be amended... and goes on to set further deadlines for amending the amended standards! In all, one can expect the rules to continue to change until at least 2005. These changes will be refinements and expansions of the existing bill—performance standards may be adjusted, exemptions may be dropped, but the intent of the existing regulations will not change. End users who opt for the most efficient solutions available will probably not have problems with future compliance.

Strategies for Compliance

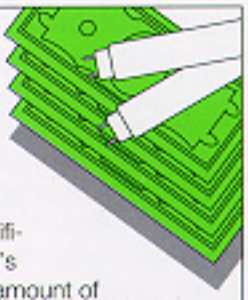
Remember the Intent

EPACT is a complex piece of legislation, full of detailed performance standards and numerous specialized exceptions to its rules. However, the intent of the legislation is simple—to promote the use of the most energy efficient lighting. From a user's perspective, then, the best way to ensure compliance is simply to focus on this intent. Pursue the most efficient fluorescent technologies whenever possible. Choose T8 lamps driven by electronic ballasts instead of T12 lamps. Replace all incandescent R and PAR lamps with halogen PARs or low voltage (MR16) types. And choose medium base compact fluorescent lamps as replacements for standard incandescent lamps wherever it's appropriate.

The Right Lamp for the Job

By outlawing manufacture or import of certain inefficient lamps, the Energy Policy Act merely restricts the number of choices—the user must still choose a lamp, and the most efficient lamp (in lumens per watt) is not always the best lamp. Lighting a painting, for example, would be possible with a linear fluorescent lamp which offers very high lumens per watt efficacy. However, since fluorescent lamps disperse light in all directions, considerable light output would be wasted. A halogen reflector lamp—which may be less efficient in terms of LPW—will actually deliver more light where it is needed for a lower wattage and is therefore a much better choice. Other good strategies include using the wide variety of compact fluorescent lamps to get high lumen output from extremely tight spaces and taking advantage of the many options available that employ the latest T8 fluorescent technology. T8 systems are extremely efficient and offer a range of color temperatures that can complement halogen and incandescent lamps throughout an installation. By selecting the right lamps for the job, users can enjoy consistent, high quality illumination throughout a facility, save energy and comply with EPACT.

Return On Investment—Up to $200 Per Fixture



The most common luminaire used in commercial applications is the 2-foot by 4-foot lensed troffer, and most of these fixtures are wasting energy. When lamped with soon-to-be-restricted full wattage T12 fluorescent lamps, the lamp/ballast system typically runs hot and light output is significantly reduced. Energy saver T12 lamps improve the system's efficiency and use less energy to produce virtually the same amount of light. Using average kWh rates, the energy reduction from this simple retrofit will save $48 per fixture. Upgrading the luminaire with T8 lamps and electronic ballasts offers even more benefits—the savings for a single fixture is up to $200 over the life of the first set of T8 lamps! In addition, the reduced heat output of the T8 system provides long term savings in air conditioning costs.

Planning for the Future

Current regulations will be amended. If anything, performance standards will be made stricter and exemptions will be eliminated. There is a danger, therefore, in adopting a strategy of minimum compliance. A user could go to the time and expense of relamping an installation, only to have to perform additional retrofits when the restrictions are increased. Once again, the best strategy is to pursue the intent of the legislation and make an investment in the most energy efficient technologies available. The energy savings will ultimately pay for the upgrade, and your installation will remain in compliance for years to come.

Relamping America

More efficient lighting can save a tremendous amount of energy. The only way to truly realize this potential, however, is to change the way all of us—manufacturers, specifiers, installers and end users—think about lamps. Over a century of advances in manufacturing has made common lamp types extremely affordable—both to buy and replace. Decades of cheap and abundant electricity have allowed people to ignore the energy used by lighting. In fact, the efficient technologies promoted by the Energy Policy Act have been available for years, so we should not really view the new law as a set of restrictive prohibitions. EPACT simply provides another reason to do something about the nation's pressing energy problem, help the environment and save the majority of lamp users a great deal of money.

Implementation Problems—Case Studies from November 1995?

Case #1 Ignoring Other Technologies

A user carefully studies the legislation, making special note of the various exceptions. When it's time to replace the 40W T12 fluorescent lamps in the warehouse, she seeks out exempted full wattage lamps designed for use in color critical applications (CRI>82). The lamps are more expensive, but they are in compliance with EPACT. The problem? These lamps, designed for use in highly specialized circumstances, deliver less light and don't save energy. The user would be much better off upgrading her fixtures to electronic ballasts and T8 lamps. Then she would enjoy better quality illumination as well as dramatic energy savings. The language of EPACT doesn't impact the implementation of T8 lamps and electronic ballasts because they are the best available technology.

Case #2 Allowing Incompatible Lamp/Ballast Combinations

A distributor decides that he doesn't need to know about EPACT. After all, manufacturers are required to stop making non-complying lamps, so they will simply stop sending them, right? One day, a customer comes in looking for 4-foot fluorescent lamps for the shop lights in her garage. Unable to match the full wattage lamps which came with the fixture, the distributor sends her home with some 34W Super Saver lamps. The problem? The shop light is an inexpensive fixture with an uncorrected power factor ballast. The different electrical characteristics of the energy saving lamps make the lamp/ballast system unstable and the fixture seriously overheats. If in doubt, users should check with the ballast manufacturer regarding suitable lamp types.

Case #3 Wasting Lumens

A family has a number of recessed fixtures in the living room. One by one, the 75W incandescent R30 lamps begin to fail. When they go to the store, all they can find are halogen PARs which are more expensive, and compact fluorescent lamps which will not fit in the fixture. Unaware of the better performance and long term savings potential of the more efficient products, and unwilling to pay the extra money, the family relamps with standard A19 incandescent lamps. The problem? They need to use 100W or 150W lamps in the fixtures to get sufficient light output and end up using substantially more energy to illuminate the living room—precisely what EPACT's regulations are intended to avoid.

Case #4 Cutting Corners

An electrical contractor is behind schedule and over budget on a big project when he finally has time to purchase lamps. When he goes to the distributor he has only one question: "What can you give me that's cheap?" The distributor has nothing but EPACT compliant lamps, and the contractor goes away disappointed. Shortly thereafter, someone approaches the distributor with a truckload of full wattage T12 lamps produced after the effective date at a price that seems too good to be true. The lamps were intended for an overseas market, but had somehow returned to the U.S. Remembering the contractor, the distributor eagerly makes a deal. The problem? By accepting gray market goods and making them available for sale, the distributor has, according to EPACT, become "the importer of record." It is the distributor, therefore, who is subject to the fines of up to $100 per lamp per day. Worse still, the enforcement action might require the location and destruction of the offending lamps.

Don't Let It Happen to You

Many special applications raise questions about how to comply with EPACT. OSRAM SYLVANIA has a network of commercial engineers who have been specially trained to help customers understand the impact of the new legislation. If you have questions that aren't answered by this brochure, contact the commercial engineer or sales representative at the nearest OSRAM SYLVANIA sales office listed on the rear cover.