

Introduction

Lee Zwicker Presentation Notes

lee Zwicker

Here to talk about educating the general population about energy conservation and solar energy.

Rather than doing a lecture that from past experience I realize that I have a tendency to go off on tangents I think that with the time restrictions I will read from a prepared speech.

I also realize that in some ways I will be preaching to the choir but I hope that everyone get something new out of this talk.

First

This Talk will be broken into three parts

Part 1. How to make education appealing to political officials, business and the general public.

A. Educate politicians as to what educational programs are being used in other states. High school, college etc.

B. Explain how programs may be funded by grants

C. Keep political pressure on, with the use of green affiliated groups

D. Show business leaders how to both increase their bottom line and promote themselves as green companies

Part 2 Teach Adult Ed classes to home owners, and small businesses.

Part 3 Examples of products, informational papers, and handyman projects that are being done.

Part 1

A. Show officials that there is a need for high schools and technical schools to put greater emphasis on Green Education. First by teaching basic Energy auditing Technique, while using students enrolled in work experience classes to install weatherization materials. This can be done in conjunction with college students enrolled in energy auditing, energy star rating and LED certification classes. The work experience being performed on local buildings. Then promote these programs on the nightly news. Teach Hands on construction of P.V. panels, solar water heaters, solar ovens and wind

mills. Differ the cost of these classes by getting available grants and promotional materials from the fed government and manufactures. Again promote these in media releases showing these products in use. Examples being P. V. panels and wind mills in marine applications or in dwellings off the grid. Solar water heaters being used to augment their schools hot water systems.

Solar ovens being sent overseas to places like Haiti or the Sudan. Note, It is estimated that several tens of thousands more lives can be saved each year by doing this. Place Plaques on these high school projects to create competition and pride between classes.

Promote these classes by explaining how they can lead to career opportunity's or paths while lowering energy footprints. Explain how Hands on training may be used to help secure jobs in the future and Emphasize the practical benefits to building owners whose homes or buildings are used in the educational process.

B. Talk To manufacturers about getting promotional materials and apply for Federal grants

C. Get endorsements for these school projects from groups like sierra club, environmental coalitions, and Audubon society. Use these endorsements to support politicians who favor green education while increasing political pressure on any adverse groups.

D. It is imperative to Hold classes for businesses on energy efficiency and solar energy that emphasize increasing their bottom line and at the same time promote them as green businesses. To accomplish this, much of the information used in the regular adult ed classes can be used here but there other concerns, like showing that making a building more energy efficient can both increase employee out put and at the same time make a healthier environment to work in. Examples include lowering drafts, lowering mold spore count while improving overall bacterial infection rates. Explain how something as simple as appliance location can increase over all efficiency. An Example being say a restaurant positioning their freezers and refrigerators so as their sides are in contact with each other and out of direct sunlight in order to lower each units thermal exchange and thus improve over all efficiency. Show how roof mounted P. V. and solar water heating panels can also effect the air

conditioning energy draws by shading the roofs. Also emphasize When replacing storm damaged roofs the savings that can be seen by using either reflective roofing materials or Energy Star roofing materials.

Part 2 Teach Adult Ed classes to home owners, and small businesses on how to lower their energy footprints and save money at the same time. Examples being but not limited to painting homes with reflective paints to lower solid surface thermal exchange. Show How an exterior wall can be changed from an R1 rating to an R3 rating at almost no cost, Use inexpensive blown cellulose for attic insulation. Use Kill-A-Watt meters to identify both energy Kilowatt hours used and quality of the power coming into the building. Then show the impacts this can have on both their energy bills and the longevity of their appliances. Show savings made by using programmable thermostats and smart strips. Show how weatherizing their homes or buildings plus decreasing stacking effects will save on both heat and air conditioning. Show how the correct placement of trees and shrubs will lower air conditioning cost. Show the impact of what shading central air conditioners can have.

Show how building placement and orientation can effect the buildings energy use. Explain how the use of reflective films on windows can lower radiated thermal gain. Promote that taking these courses can teach people how to lower there over all home energy use by twenty to fifty percent Promote the low cost implementation of these improvements by letting the population know how A simple pay back of one year or less can be achieved if the work is done by the homeowner. Cover the negative effects of incorrect installations. An Example being using blown cellulose in exterior wall cavity's and the effect of the boric acid coming out of solution on any metal, including electrical boxes and fixtures.

Other possible considerations are:

1. Involve trade unions apprentice programs when possible in green projects.
2. Mail outs or media adds that both educate the public and stimulate local sales. An example would be a mail out explaining Federal and State rebate or tax write off programs combined with say this upcoming Aprils Additional 20 percent rebates on energy star rated appliances. See "energysaver.gov and then type in rebates" Then add a list of Businesses in the area that sell these products along with any sales they may have. This

April will be especially effective as the combined thirty percent Federal tax deduction and the twenty percent federally funded state rebate program along with any sales will amount to upwards of sixty percent off of normal list pricing.

3. Special rebate sales days sponsored by the city or county where local business can display their rebate eligible products including appliances in either a trade show motif or green fair.

4. Promote green safety issues like using fire retardant foam that both increases a building efficiency's plus acts as a fire block not to mention helping as a rodent block.

5. Encourage local large scale arrays, wind farms and water turbines. Remember that fifty six percent of electricity transmitted through the Grid is lost before arriving at your meter. Another 4 perms "400,000,000,000,000 Btu's" of energy are wasted within homes Nationally each year.

Invite multi story office building and condominium board members or management people to forums or shows involving large building energy conservation and Federal rebate programs.

Make available information that will protect possible solar customers from predator companies and fraud.

list of helpful web sites and agency's

energysaver.gov

<http://hes.lbl.gov/>

DSIRE-data base

the California energy commission

green energy Florida

efficiency Maine

Questions to ask if you want to do solar

the best solar system on the market but very few of them will tell you why their system is the best.

The following document contains rock solid information that will help you clear the smoke and mirrors, so that you can make an educated decision on whose system truly offers the best investment for your money and what companies are most likely to be there years from now if you need their service. Every solar dealer is going to tell you that their system is the best! But would you really know the difference?

Since 1997 we've watched the solar electric industry grow from just a handful of reputable solar dealers to literally hundreds of inexperienced "Solar Newbies" that all have one thing in common, they all claim to have thices.

Asking these ten important questions can save you literally thousands of dollars and headaches on the purchase of a solar system for your home or place of business. (Updated on 8-16-2008)

Print and keep this document, it makes a great guide for protecting yourself when shopping for a solar system!

1. What is the minimum warranted power of the solar panels that the dealer/installer is trying to sell you? Most consumers are not aware of the fact that they could for instance be paying for 200 Watt solar panels and only be getting 180 Watt solar panels! The discrepancy is known as "peak tolerance rating", "minimum power max", "minimum warranted power" or "negative tolerance rating". When shopping for solar panels, what you want to look for is the highest minimum warranted power rating, the lowest negative tolerance rating or the lowest peak negative tolerance rating.

A solar panel manufacturer's claim of having a high efficiency rating is worthless if the solar panel has a poor minimum warranted power rating.

What all this means is that the solar panel manufacturer offers a warranty that states that their solar panel's actual power rating will not be less than a certain amount out of the box. So if a 200 Watt solar panel has a negative tolerance rating of 10% then their 200 watt panel is guaranteed not to have a power rating of less than 180 Watts right out of the box. In our opinion 10% or even 8% is not so great when you consider that other solar panel manufacturers have a negative tolerance rating of only 5%.

While shopping for a solar system, you may hear a dealer boast about their solar panel's high efficiency or higher PTC rating or better performance in hot weather but if that panel has a negative 10% tolerance rating, then in our opinion, those claims are worthless. IF YOU ONLY ASK ONE QUESTION OF YOUR SOLAR DEALER, YOU HAD BETTER MAKE IT THIS QUESTION, BECAUSE THE ONLY POWER THAT YOU'RE GUARANTEED TO GET FROM A SOLAR PANEL IS THE "MINIMUM WARRANTED" POWER RATING!

Smart Tip! When shopping for a solar electric system, always insist on seeing the solar panel's specification sheet and look for the minimum warranted power rating because that's all the power that you're guaranteed to get.

2. What is the PER WATT PTC rating of the solar panels that the dealer/installer is trying to sell you? In an effort to create a level playing field, the state of California as well as many other states require that all solar panel manufacturers submit their product's operating specifications. These specifications are compared to real world performance ratings that have been determined by an independent laboratory called PVUSA before they are approved for the state's program. PVUSA uses more stringent conditions than the manufacturer uses and assigns a PTC rating or (PVUSA Test Conditions rating)

So a solar panel that has a STC or (Standard Test Conditions rating) of 170 Watts might have a PTC rating of 149 watts. The PTC rating along with the efficiency rating of the inverter is what the state uses to determine the cash rebate. So the higher the PTC rating that a solar panel has, the higher the cash rebate that goes into your pocket. So needless to say not all solar panels are created equal.

When shopping for a system you will rarely see two systems that use solar panels with exactly the same wattage ratings. For example, one system might use (20) 175 watt panels and have a total DC Watt rating of 3,500 watts and another system might use 170 watt panels and have total DC watt rating of 3,400 watts. So how do you compare the each system's true CEC performance and the amount of rebate per watt when two different wattage rated panels are used.

Simply visit the California Energy Commission's website at <http://www.gosolarcalifornia.ca.gov/equipment/pvmodule.php> and look up each individual panel's PTC rating. For example the 170 Watt panel might have a PTC rating of 152.5 Watts and the 175 Watt panel might have a PTC rating of 154.9 Watts. Simply take the 170 Watt panel's PTC rating of 152.5 and divide it by 170 watts and you'll get a ratio of .897. Next do the same for the 175 Watt panel. 154.9 divided by 175 Watts gives you a ratio of .885. Obviously the higher the ratio, the higher the per watt CEC rating.

Along with a high PTC rating it is also important to check what the manufacturer is guaranteeing that you'll receive. Again, if you're buying 190 watts but the manufacturer is only guaranteeing that you'll receive 171 watts due to a poor negative tolerance rating, then the PTC rating is meaningless.

Smart Tip! When shopping for a solar electric system, always check the PTC rating and the warranted minimum power rating of the solar panels that are used in the system.

3. What is the power production warranty of the solar panel that the dealer/installer is trying to sell you? Nowadays, standard monocrystalline and polycrystalline solar panels both have established proven track records with life expectancies that exceed 40 years. Manufacturers of these proven technologies are now comfortable offering warranties of 25 years or more.

Recently, relatively new technologies have been developed that have not been on the market long enough to establish a performance record, so sometimes you'll see solar panels with warranties of less than 25 years. You may be thinking 20, 25 years what's the difference? But what you need to ask yourself is, in such a competitive market, why would a manufacturer offer a 20 year warranty when everyone else is offering a 25 year warranty. When you consider that established technologies should last 40 years, the answer should be pretty obvious.

Smart Tip! While on the subject of new technologies. Although we're all in favor of innovation, obviously we're against using customers as guinea pigs on new unproven technologies. Nowadays a lot of manufacturers and their dealers are making some pretty lofty claims about performance which may be true in the lab, but remember you are investing a lot of money into the purchase of a product that will sit in the blazing sun, the pouring rain and the relentless wind for the next 30 to 40 years.

Conventional silicon solar cell technologies have proven track records which have spanned decades. Many of the new technologies that some of our competitors are offering have comparatively no track record. And are being offered by manufacturers that have appeared on the solar market out of nowhere in the last two or three years.

In the past ten years we've seen many solar dealers and manufacturers come and go, leaving the poor consumer who purchased their products with no support and no warranties. You have to ask yourself, since the average solar panel's life expectancy is up to 30 to 40 years, is it worth the risk of investing in a product that might give you a 2 or 3 percent performance gain when it is being manufactured by a company that have only been in business 2 or 3 years? In our opinion, the way many of these companies come and go, it's simply not worth the risk. Sticking with established manufacturers with proven track records that use conventional high performance technologies is the safest way to protect your investment.

Smart Tip ! When shopping for a solar electric system, always look for the solar panels that have the longest factory warranties possible. 25 years should be the minimum. And beware of dealers that offer their own warranties beyond the manufacturers warranty. A 30 year dealer warranty may sound good at first glance, but do you really believe for a moment that any dealer will be around 30 years from now !

4. What is the efficiency rating of the solar panels that the dealer/installer is trying to sell you ? Solar panel efficiency ratings are important because the higher the panel's efficiency, the more power the panel will produce per square inch of active cell material which results in less roof area that is needed to produce the same amount of power. Typically the highest efficiencies come from solar cells that are cut from solid ingots of silicon. A few manufacturers have developed technologies that avoids the high cost of cutting solar cells from solid ingots of silicon, but they do so at the cost of efficiency.

Typically, manufacturers that avoid using solar cells that are cut from a solid ingot of silicon are simply trying to reduce manufacturing cost. This would be great if the savings were passed on to the consumer, but in many cases the dealers that offer these lower efficiency solar panels use their lower cost to improve their margins instead of offering their customers a lower price. Why pay the same or more in many cases for a system that includes lower efficiency solar panels when you can buy a system that uses higher efficiency solar panels.

One such manufacturer of solar panels that does not use solar cells that are cut from solid ingots of silicon, currently makes the claim that their solar panels have one of the "quickest energy paybacks". What they mean by this that they use less energy in the manufacture of their product when compared to conventional solar panels, so their panels will have to spend less time in the sun in order to recover the energy that it took to manufacture their panel.

That does not mean that your payback as a consumer will be shorter if you buy their panel. I bring this up because we have talked to several customers who were either misinformed or misinterpreted the manufacturers claim to mean that they would recover their investment sooner. That is simply not the case !

Also be careful when a manufacturer or dealer uses terminology like "Highest efficiency to date" or "Highest efficiency yet" or "Highest efficiency so far" especially when they don't bother to mention what that efficiency level is.

Do they mean, "Highest efficiency to date" for their product only ? (which may not be saying much when compared to other technologies) or are they saying that their product offers the highest efficiency in the industry, who knows ? The best thing to do is ask the dealer what the efficiency is of the module that they're using in the system that they're offering you.

Smart Tip ! Always ask your dealer to provide you with a factory printed specification sheet that lists the solar module efficiency, not individual cell efficiency. If the dealer cannot or will not provide you with a factory printed specification sheet that lists the total module efficiency, then shop elsewhere !

5. What is the efficiency rating of the inverter that the dealer/installer is trying to sell you ? Inverter efficiency ratings are important because the higher the inverter's efficiency, the higher the cash rebate from the state ! All inverters that have been approved for the State's program have been tested and have been given a weighted efficiency rating by the State. Inverter efficiencies range from a low of 89% to a high of 96%. That may not seem like a wide range but when you consider that a 7% difference in a moderately sized system can mean a rebate difference of up to \$700.00 to \$800.00.

Smart Tip ! When shopping for a solar electric system, always try to buy the highest efficiency inverter that you can get your hands on ! Doing so will mean more rebate money in your pocket and more power production over the life of the system !

6. Does the inverter that the dealer/installer is trying to sell you, use high frequency transformers or does it use a 60Hz copper wound transformer ? In an effort to be competitive, many dealers have begun to offer lower cost inverters that do not use 60 Hz copper wound output transformers. Copper is expensive but its time tested performance in inverters is undeniable ! Before making a buying decision, always ask your dealer whether or not his inverter has a heavy duty, copper wound output transformer or better yet ask the dealer how much his inverter weighs, then ask to see the inverter's specification sheet to be sure. For example, a typical 3 kilowatt inverter with a heavy duty, copper transformer will weigh about 85 pounds !

Smart Tip ! If two dealers are offering similarly priced system, but one is offering a lightweight inverter and the other is offering a heavier inverter with a copper wound output transformer, then it is our opinion, based on years of experience in operating one of California's largest inverter repair centers, it is best to choose the dealer who is offering the inverter with the heavy duty copper wound output transformer.

7. Are the mounting racks that the dealer is trying to sell you professionally manufactured medium to heavy duty products or will the dealer/installer provide you with home made or light duty racks ? Would you know the difference between a home made or light duty mounting rack and a professionally engineered heavy or medium duty mounting rack ? We see this sometimes with dealers that perform installations. The quotation will list a specific brand of engineered aluminum mounting racks, and the installer will show up with a chop saw and a bunch of

inexpensive steel galvanized U-channel. Sure it will work, but watch out in high winds or years down the road when the frames on the solar panels begin to corrode.

In the last couple of years a few new manufacturers have come on the scene offering to sell solar dealers and installers mounting racks at a much reduced cost. Great for the dealer/installer but as you'll see, maybe not so great for the consumer. What these manufacturers offer are light duty racking systems that used far less aluminum and were far more flimsier than the heavier duty versions. I don't know about you but the last thing that I would want securing tens of thousands of dollars worth of solar panels on my roof is a set of lighter duty racks. In addition to using lighter gauge aluminum, these type of racks typically require many more penetrations through your roof in order to beef up the racks rigidity.

Smart Tip! Always insist on a professionally engineered and manufactured medium to heavy duty mounting system. Never allow an installer to talk you into his or her brand of home made mounting racks without the proper engineering. Simple steel U-channel rails were not specifically designed to mount solar panels. If something were to go wrong with this type of mounting system, and your solar array detached itself and became air born you would be wholly liable. Always look for the manufacturers sticker or label on the mounting system and specify only medium to heavy duty mounting racks and components.

8. Does your dealer operate out of a commercial facility? In other words does he work from at least an office with a warehouse area. Or does he operate from a spare bedroom, automobile or worse? Does the dealer have a true service center with a full time factory trained technician at their facility? Does the dealer have any support staff at all?

One of the biggest mistakes that a consumer can make is to buy a solar system from a company without visiting the companies place of business. Customers will simply set up an appointment in their home, listen to a short presentation, write a check and sign on the dotted line, never looking into the company that their buying from. Is the company even for real?

Is the company financially solvent enough to honor the purchase agreement when it come time for delivery? Does the company even stock the products that you've just paid them for? Sure it might be convenient to purchase your solar system from the comfort of your home, but how could you possibly have even a glimpse of who your really dealing with without visiting the companies facility.

To make matters worse, some manufacturers are attracting new dealers by boasting that they'll ship their products directly to the customer's doorstep alleviating the dealer's need to warehouse any inventory. Do you really want to buy from a company who can't afford to warehouse inventory? Remember these systems typically have 30 to 40 year life expectancies. When shopping for a solar system, always search out dealers that exhibit the financial strength today that increases the likelihood that they'll be around tomorrow.

Putting film on windows

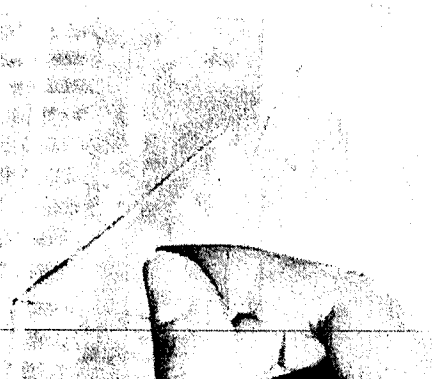
Energy Film Insulation

Energy-Saving Window Film. Make single pane windows as energy-wise as double pane!

Lower your utility bills up to 18% with Energy Film!

Do rising utility costs have you worried? Energy film insulation makes single pane windows as energy efficient as double pane! The US Department of Energy estimates that the average home wastes 25-40% of energy due to poor *window insulation*. Instead of going to the trouble and expense of replacing windows, use this energy-saving film!

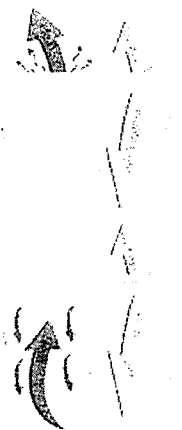
Energy Film makes your home more comfortable during every season while bringing home instant, year-round savings! Cut your heating and air conditioning bills by up to 18% without darkening the room or spoiling the look of your window treatments. Ultra-affordable and ultra-easy – you won't have to hire someone to make expensive renovations, and you don't have to be handy around the house to install it – this energy-efficient film applies to smooth glass fast and easy – without adhesives. Just peel it off and stick it on! Made in USA.



Energy Film Insulation at Solutions®

Energy Film is easy to install!

Energy Film is so easy to use! Just measure a thin, flexible sheet of energy efficient film. Trim it with a utility knife to fit smaller windows, or combine it with more sheets to fit larger windows. Add a few drops of dish detergent to a spray bottle filled with cold water and spritz the window you want to insulate. Peel the energy film from the plastic backing and apply the energy film insulation to the wet window. No hair dryer needed – just use the included squeegee to smooth away excess water and air bubbles. Voila! It's that easy to get energy-saving window insulation! And because this energy film insulation doesn't use adhesives, you won't have to scrape sticky residue off the windowpane when you want to take it down again – just peel the film off the window and roll it up until you're ready to use it again. Works best on windows with a smooth, glass surface.



Energy Film Insulation

Keep out cold winter winds and hot summer sun!

Energy saving window film works to keep your home comfortable and your utility bills low by blocking out sun and preventing heat or cool air loss. According to the US Department of Energy, more than \$30 billion of energy is lost through single pane windows every year. Energy film is an easy, inexpensive way to make homes and offices more energy efficient – your air conditioner won't have to work as hard because energy film insulation repels 97% of UV rays and 70% of solar energy. During cold weather, energy film blocks up 38% of heat loss – so your heating bill will be up to 18% lower!

Your view stays crystal-clear!

Window insulation blocks energy loss – not your view or the daylight! The energy film is a thin, completely transparent window film that lets you see through it with outstanding optical clarity. Practically invisible, its non-reflective surface's slight tint doesn't show while the film is on the window, but blocks harmful UV rays, reducing glare while letting in the maximum amount of light. This means less strain on the eyes!

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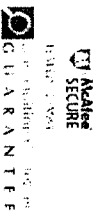
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- Home Appliances
- Home Improvement
- Lighting
- Personal Care
- Pets
- Storage & Organizers
- Travel & Auto
- Yard, Garden & Patio
- Specialty Books
- Bedroom
- Bedroom
- Dining Room
- Garage
- Home Office
- Kitchen
- Laundry Room

GIFT CENTER

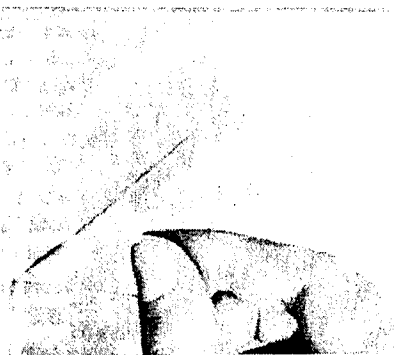
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AS SEEN ON TV

TOP FINDS UNDER \$20

OFFER

- Wash & Dry 16 Loads
- Wash List
- G.H. Fridge
- Product Finder
- Gift Cards
- Catalog Quick Order
- Online Catalog
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Energy-Saving Window Film
Make single pane windows as energy-wise as double pane!
Buy 2 & Save!

Just peel and stick—it's that easy to insulate your windows from cold in winter and heat in summer. An affordable way to make your home more comfortable—instantly!

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82685 **24"X48" Energy-Saving Window Film**

In Stock

Qty: 0

Price \$19.95

Buy 2 or more for \$18.95 each.

82686 **36"X48" Energy Film**

In Stock

Qty: 0

Price \$26.95

Buy 2 or more for \$28.95 each.

82687 **48"X84" Energy Film**

In Stock

Qty: 0

Price \$39.95

Buy 2 or more for \$38.95 each.



*You don't need to replace your windows—lower your heating bills with this amazing film! Practically invisible, yet it retains interior heat in winter and repels solar heat in summer...also blocks 97% of UV rays. Easy to apply and remove—no adhesive. Comes with a squeegee for easy application.

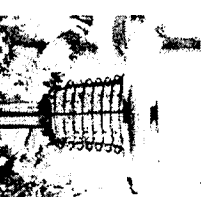


You may also like:

Choose from 8 designs!
 Protect privacy or hide an unsightly view while still letting light filter through.
 \$24.95



Magnetic Vent Covers
 Seal vents to help shrink energy bills.
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Mosquito protection from solar-powered lights!
 Was: \$79.95
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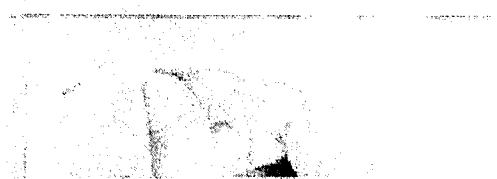
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302853195

2025 RELEASE UNDER E.O. 14176

More doing.



Artscapc 36 In. x 48 In. Energy Film Window Film
Model 01-0136
\$26.98/EA Each

Quantity: 1

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Description

Energy Film is a thin, transparent window film that provides immediate year-round energy savings by retaining interior heat in the winter and blocking solar heat in the summer. Energy film is an inexpensive and easy way to make the home or office more energy efficient while providing UV protection. It is easy to apply and uses no adhesives.

- Summer/Winter insulating film
- Saves up to 12-18% of annual energy costs
- 97% UV Rejection, 77% Light Transmission, Solar Heat Rejection
- Easy application without adhesives
- MFG Brand Name : Artscapc
- MFG Model # : 01-0136
- MFG Part # : 01-0136

Specifications

- ADA Compliant : No
- Assembled Depth (In Inches) : 2 In.
- Assembled Height (In Inches) : 48 In.
- Assembled Weight (In LBS) : 2.00
- Assembled Width (In Inches) : 2 In.
- Color / Finish : None
- Energy Star Compliant : No
- Length : 48 In.
- Width : 36 In.

Product Reviews



Review and Rate Products

Share your opinion about products you've purchased with others. Write reviews and rate products on a scale from 1 to 5. It's easy and takes only a few minutes.

Review Writing Guidelines:

Focus on the product features and your experience with them. Provide details about why you like or dislike the product.

Things to avoid:

- Obscenities, discriminatory language, or other language not suitable for public forums
- Advertisements, "spam" content, or references to other products, offers or Web sites
- E-mail addresses, URLs, phone numbers, physical addresses or other forms of contact information
- Critical or spiteful comments on other reviews posted on the page or their authors

Warranty

Warranty

For warranty information on this product, please call our Internet Customer Service Center at 1-800-435-4654

InternetCatalog # 100592107

Store SKU# 945801

Most orders ship out in 2-3 business days. Allow an additional 3-7 days for Standard Ground Delivery

Items must match the item or are in the same collection.

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PERFORMANCE DATA	ENERGY FILM	ENERGY FILM WITH GLAZE CONTROL
Visible Light Transmitted	77%	38%
Total Solar Energy Reflected	48%	72%
Thermal Energy Reflected	70%	81%
UV Reflected	97%	98%
Glare Reduction	13%	57%
Luminous Efficacy	1.3	1.2
Shading Coefficient	.60	.32
Solar Heat Gain Coefficient	.52	.28

Visible Light Transmitted - Measures the average percentage of visible light which passes into the interior of the room. The higher the number, the more visible light enters the space for artificial lighting.

Total Solar Energy Reflected - Measures the average percentage of UV, visible, and near infrared solar energy reflected. The higher the number, the more heat and solar rays in this spectrum are rejected.

Thermal Energy Reflected - Measures the average percentage of solar energy rejected in the total infrared spectrum. The higher the number, the more heat radiating solar rays in this spectrum are rejected.

UV Reflected - Measures the total percentage of ultraviolet solar energy rejected. UV rays cause fading and deterioration of interior finishes and fabrics. The higher the number, the more solar UV rays are rejected.

Glare Reduction - Measures the average percentage of visible solar energy that is rejected.

Luminous Efficacy - Measures the ratio of visible light transmitted to shading coefficient. A measure of the film to provide a desired level of transmitted energy at a minimum efficacy greater than 1.0 is considered especially effective.

Shading Coefficient - Measures the ratio of solar heat gain to the window film to the solar heat gain without the window film. Lowly transmittive glazes on films with a shading coefficient of .50 or better.

Solar Heat Gain Coefficient - Measures the average amount of solar energy that passes into the interior of the room over a 24-hour period. The lower the number, the better.

Visible Light Transmitted average measured from 400 to 800 nm.

Total Solar Energy Reflected average measured from 250 to 2500 nm.

Thermal Energy Reflected average measured from 1000 to 7500 nm.

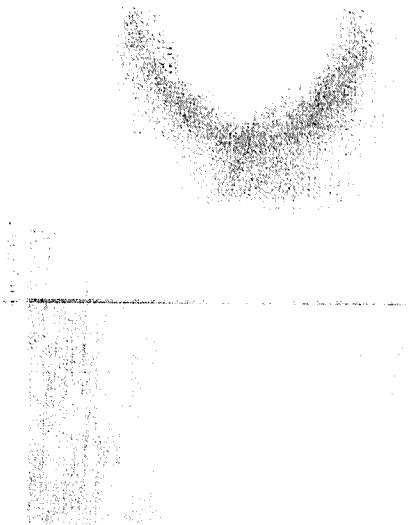
UV Reflected average measure from 350 to 400 nm.

Glare Reduction average estimated from 400 to 800 nm.

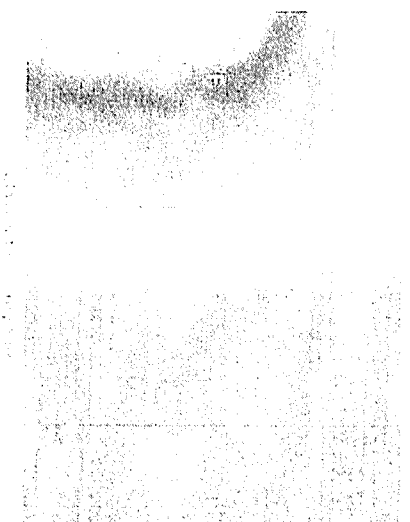
*All data obtained from production films and are subject to standard manufacturing tolerances for the type of film used.
Tests were performed using a spectrophotometer.*

02.12.09

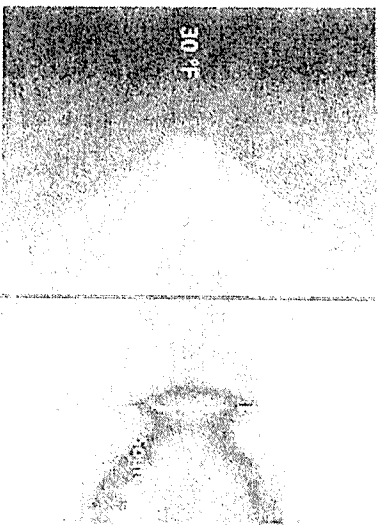
Empty NARA roll film 3 Paper 1 sheet 4-1-10



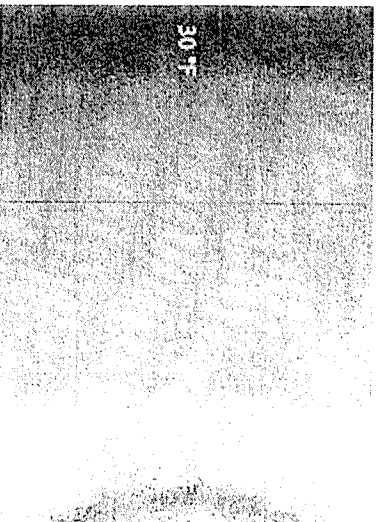
High contrast scan of sheet 4-1-10



Empty film strip per frame 10 frames



Empty film strip per frame 10 frames



30°F

30°F

Store Locator:

Store State ME

Your Zipcode 04605

Within Miles 50 Miles

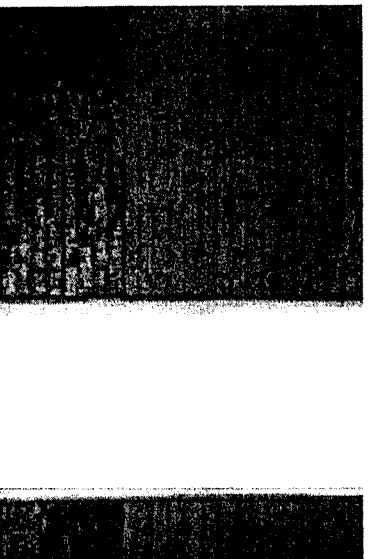
Home > Home & Garden > **Green Your Home for Winter: Apply Low-E Window Film**

Green Your Home for Winter: Apply Low-E Window Film

Jasmin Malik Chua, Jersey City, USA



By **Jasmin Malik Chua**
Jersey City, NJ, USA | Sun Mar 23 17:21:00 EDT 2008



Unknown.

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If you haven't socked away enough money for new, energy-efficient windows-or you're a renter who doesn't have the latitude to make major home improvements-consider applying one of several types of window film to your panes for instant energy savings.

A plastic film with low-emissivity (low-E) coating, which can reduce heat loss through old windows by 30 percent to 50 percent, provides a thin metallic coat the blocks off heat and ultraviolet rays. Apply the low-E film to the inside pane of your window to trap heat indoors in the winter. When the mercury begins to rise, flip the film over to the outside pane to keep the sun's heat out of your domicile. Plus, according to [LowE's](#), insulating window films will pay for themselves in less than a year in reduced utility bills.[Do-it-yourself window film](#) is available in rolls or in precut kits, but you might want to consult the professionals on very large windows. Here are some companies that manufacture energy-saving window films:

1. Bekaert
2. CP Films
3. Film Technologies
4. Madico

5. Plastic View International

[Via ::The Daily Green]

Difficulty level: Easy to moderate

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Do you a) want to save money on your heating bills, b) make your home greener, and c) enact a childhood fantasy where you have future-vision like the Terminator? Plus, you'll have the option of uttering "I'll be back" when you run to grab the tape measure you left in the car, even if it is only under your breath.

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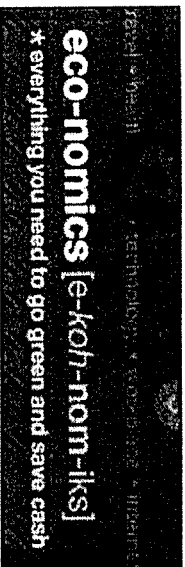
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