Use of Energy-Control Window Films in ESCO Projects

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Re-Introduction To Window Films

- ✓ $5 billion market potential for retrofitting existing energy-inefficient windows with energy-control films
- ✓ 5% - 10% total building energy savings (kwhr & kw) for “well-identified opportunities”
- ✓ Savings and rebates provide for excellent returns, less than 4 years in many cases, 2-3 year paybacks not uncommon in CA with high electricity rates
- ✓ Used in numerous Performance Contracts nationwide by most NAESCO ESCOs and other non-NAESCO ESCOs – in all building markets

Re-Introduction To Window Films

- ✓ Eligible for utility company rebates (all major CA utilities and many others nationwide)
- ✓ Endorsed by the CA Energy Commission as an effective energy and demand savings product
- ✓ Allows for providing a more comprehensive energy solutions package to your customers, including a significant building envelope solution
- ✓ Improves total project scope, overall project payback, your competitive advantage, and your relationship with customers

Re-Introduction To Window Films

- Additional Benefits – LEED Points
  - Significantly improves occupant comfort
  - Reduces glare
  - Improves occupant view to outdoors by reducing need for closed blinds/shades

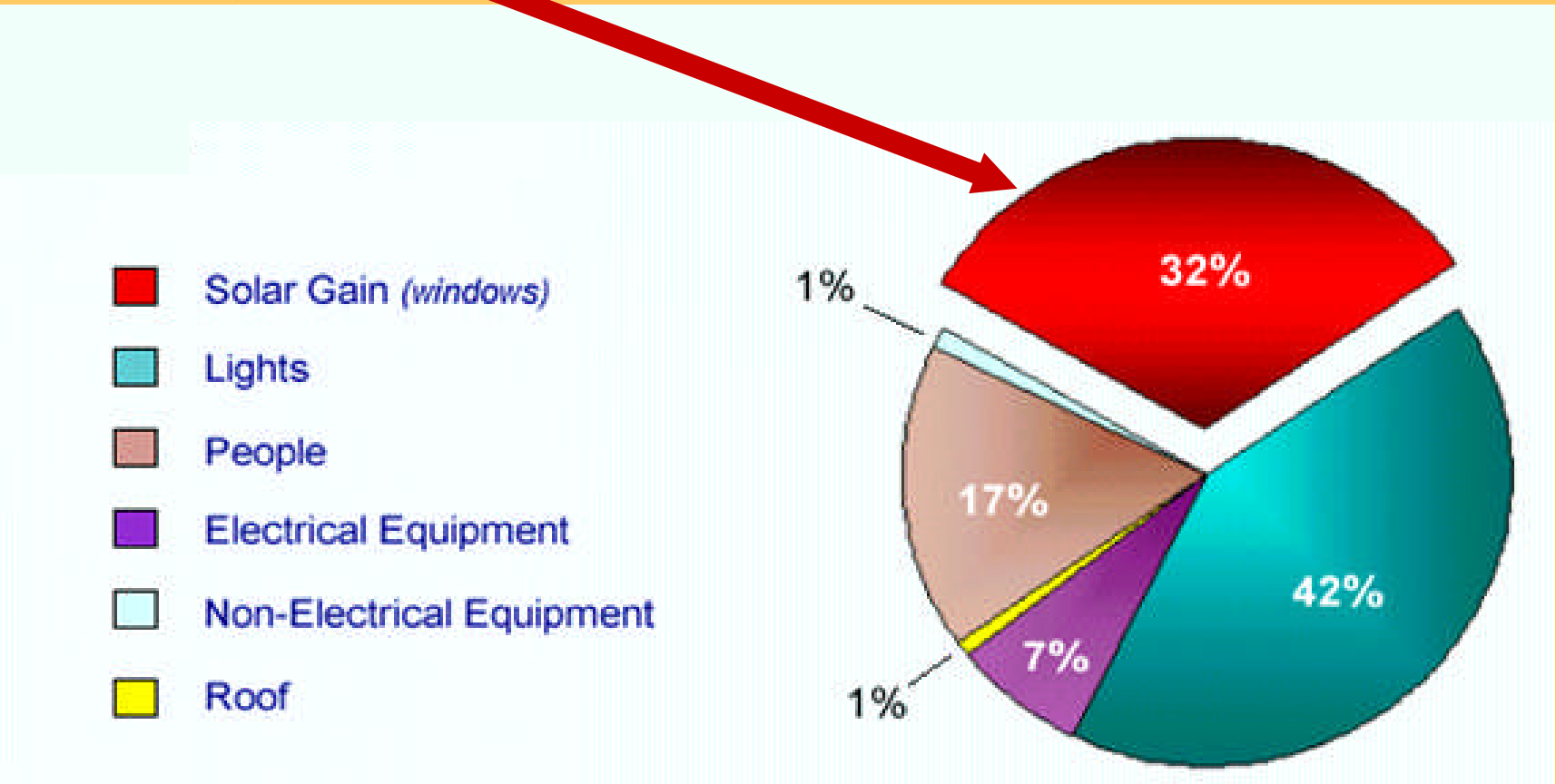
Why a "Re-Introduction"

Not your father's/mother's window film

- ✓ Many more product choices now available – not just reflective products
  - ✓ Metallic alloys – various color options, reduced reflectance
  - ✓ Precious metals - low-e films with improved window insulating properties
  - ✓ Ceramic coatings - reduced reflectance
  - ✓ Spectrally-selective products - high visible light transmission, low visible reflectance, good IR rejection
- ✓ Advances in adhesives technologies – no loss of film adhesion to glass
- ✓ 99.9% UV Blockage – improved product longevity and occupant protection

Buildings - Cooling Load Sources

On average: 1/3 of a building's cooling load is due to solar heat gain through the building's windows



Source: DOE Buildings Energy Databook 1/05

Energy-Inefficient Windows

Over 75% of the windows in non-residential buildings are "energy-inefficient" – doing little to reduce solar-heat gain:

Single-pane clear
Dual-pane clear
Single-pane tinted

Source: DOE BED 1/05

Energy-Inefficient Windows

Not Just Clear Windows

Fresno State Education Building
ESCO: NORESCO

Both projects involved darkly tinted single-pane glass. Paybacks were less than 3 years in both cases.

San Diego Police Dept HQ Bldg
ESCO: Onsite Energy

How Energy-Control Window Film Saves Energy

- **Reduced Solar Heat Gain -** reduces:
  - Cooling Load
  - Peak KW Demand
  - kwhr energy usage
- **Low-E Insulating window films**
  - Reduce Solar Heat Gain
  - Improve insulation value of window glass (as much as 34%)
  - Added cooling season savings and often heating season savings

Typical Savings and Payback

- ✓ Energy Savings of 5% to 10%
  - ✓ Annual electricity costs
  - ✓ peak kW
  - ✓ kwhr usage
- ✓ Simple Payback of 2-4 years in many cases

Independent M&V Study

ENERGY SERVICE COMPANY (ESCO) CASE STUDY

Commercial Office Building, Rockford, Illinois

ENERGY SAVINGS MEASURED AND VERIFIED

In order to clearly demonstrate the energy-saving properties of our energy-control window film, CPFilms Energy Solutions Division joined forces with Johnson Controls, a leading global Energy Service Company (ESCO), to mount a well-defined and controlled study.

The location and duration of the study were deliberately chosen to demonstrate energy savings over both the cooling and heating seasons. The study also clearly demonstrated that energy-control window films are not a 'warm-climate only' product. LLumar® E-1220 Low-E solar control and insulating film was installed on an eight-story commercial office building near Chicago (Rockford, Illinois). The building has a conditioned space of 59,000 square feet and its windows are single-pane bronze tinted glass. Heating and cooling is provided through all-electric unit ventilators.

Prior to film installation, CPFilms created a computer-driven model which simulated energy savings, using the U.S. Department of Energy analysis method (DOE-2) to serve as a benchmark.

Over the next twelve months, Johnson Controls measured energy savings using IPMVP Option C, a methodology fashioned by IPMVP Inc. (International Performance Measurement and Verification Protocol), a worldwide non-profit organization which develops products and services to aid in the measurement and verification of energy savings from energy efficiency projects. IPMVP Option C measured energy savings of 8.8% were noted, yielding a payback in less than three years. This compared favorably with the simulated DOE-2 analysis (IPMVP Option D) which had shown 8.4% energy savings and a return of the initial investment also within three years.

The analytical experiment unquestionably demonstrated that substantial energy savings can be obtained through the installation of energy-control window film with the reasonable expectation that, in many cases, the initial investment can be cost-effectively retrieved. Moreover, energy savings can be accurately predicted using DOE-2 computer simulation methods. For more detailed information concerning this case study, please send an e-mail to EnergySolutions@CPFilms.com.

LLumar WINDOW FILM

WORLD ENERGY ENGINEERING CONGRESS
26TH WEEC
HIGH PERFORMANCE FACILITIES EXPO
Georgia World Congress Center
Atlanta, Georgia
November 12-14, 2003

Independent M&V Study

- ✓ CPFilms estimate of energy savings verified independently by Johnson Controls

✓ CPFilms DOE-2 Estimate:	2.8 year payback 8.4% annual savings
✓ JCI measured savings:	2.7 year payback 8.8% annual savings

Window Films
Warranties and Maintenance

- Most films warranted for 10-15 years (materials and labor)
- Typical product life 15-20+ years
- Maintained with normal window cleaning methods and solutions

St. Mary's College
Chevron Energy Solutions

Fresno State University
NORESCO

LA Unified School District

San Diego Police Dept HQ
Onsite Energy

Summary
Energy-Control Window Films

- Large market potential
- Excellent savings and payback
- Recognized as an effective demand and energy savings solution by utilities - rebates
- Proven technology - successfully used in numerous Performance Contracts nationwide
- Excellent addition to ESCO portfolio of technologies

Questions

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