

Energy Efficiency: Keeping Your Lights On In The Energy Crunch

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Community Science and Technology
Seminar Series

Columbia Basin College

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U.S. Department of Energy
Pacific Northwest National Laboratory

Placing Energy and Utility costs in proper perspective

| Income/ Expenses | 1990 | % of Income | 2000 | % of Income |
|--|----------|----------------|----------|----------------|
| Household Income  | \$35,000 | 100% | \$41,000 | 100% |
| New Auto  | \$15,500 | 44% | \$25,000 | 61% |
| Gasoline (2,000 gal/yr)  | \$2,000 | 6% | \$3,200 | 8% |
| Natural Gas (830 therms/yr) | \$500 | 1% | \$825 | 2% |
| Electricity (20,000 kWh/yr)  | \$800 | 2% | \$1,000 | 2% |
| Mocha Latte' (1/day)  | \$700 | 2% | \$1,200 | 3% |

Energy Efficiency: Keeping Your Lights On In The Energy Crunch

⚡ How did we get here from there

- ♦ the West Coast crisis

⚡ The changing utility

- ♦ a dramatic paradigm shift?

⚡ Energy efficiency and efficient technologies

- ♦ yesterday's "hero" and today's "helper"

⚡ Tomorrow's technologies

- ♦ more help is on the way -- with PNNL involvement



How did we get here from there?



"What a Revoltin' Development This Is!"
Chester A. Riley (1953-1958)

How did we get here from there?

A Combination of Compounding Events...

- ❖ Significant Regional economic and load growth
- ❖ Few new power plants: the “**BANANA**” principle 
- ❖ No new significant West Coast transmission lines creating critical bottlenecks
- ❖ Tight natural gas supplies + increased reliance on clean natural gas for power plants

How did we get here from there?

- ❖ Increasing A/C requirements in the Northwest
- ❖ Unpredictable (as always) weather and longer-term climate changes
- ❖ Decreasing investments in efficiency programs
- ❖ California (partial) deregulation – creating a dysfunctional market.

...All Colliding This Past Year!

- ❖ High(er) plant outages in CA
- ❖ Low rainfall in PNW
- ❖ Reliance on short-term purchases of electricity

Or—as one Californian explains it so adeptly...

The California energy problem explained...

“SO WE, LIKE, DECIDED DEREGULATION SHOULD BE LIKE THIS, YOU KNOW, **GALLERIA** WHERE THE STORES BUY THESE **TOTALLY** EXPENSIVE DESIGNER CLOTHES BUT THEY **CAN'T** SELL 'EM TO **US** FOR LESS THAN, LIKE, **80% OFF!**”

“I'M, LIKE, **SO NOT** ABOUT PAYING **FULL RETAIL!**”



David Horsey
Seattle Post Intelligencer
02/04/2001

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the changing utility

Deregulation Has Also Impacted Other States Resulting in Dramatic Changes Within Utilities!



the changing utility

Key Characteristics

- ❖ Shifting customer base
- ❖ More competition for limited supply
- ❖ Short(er)-term supply contracts
- ❖ Divestiture of generation and transmission systems
- ❖ Decreased spending on conservation/efficiency
 - ✓ CA utilities have decreased spending on efficiency from ~\$500 million in 1994 to ~\$275 million today.

= Probable “real” increase in electrical rates to PNW consumers

Energy Efficiency and Today's Efficient Technologies

Energy Efficiency Was And Will Remain The "Unsung Hero" Throughout the Crunch

- ❖ Prevented a much bigger disaster by saving:
 - ✓ 10,000 MW in CA in two decades (=10 million homes)
 - ✓ 2% of the load in CA the late 90s
 - ✓ Over 1200 MW in 20 years in the PNW (=1 nuclear power plant)
- ❖ Stayed the course while waiting for additional power supplies
- ❖ Environmentally preferable with positive social benefits
- ❖ Delivered directly to consumers through national and regional organizations, your servicing utility, local service providers and retailers down the street

Today's Efficient Technologies – refrigerators

Apartment-Sized Super-Efficient Refrigerator

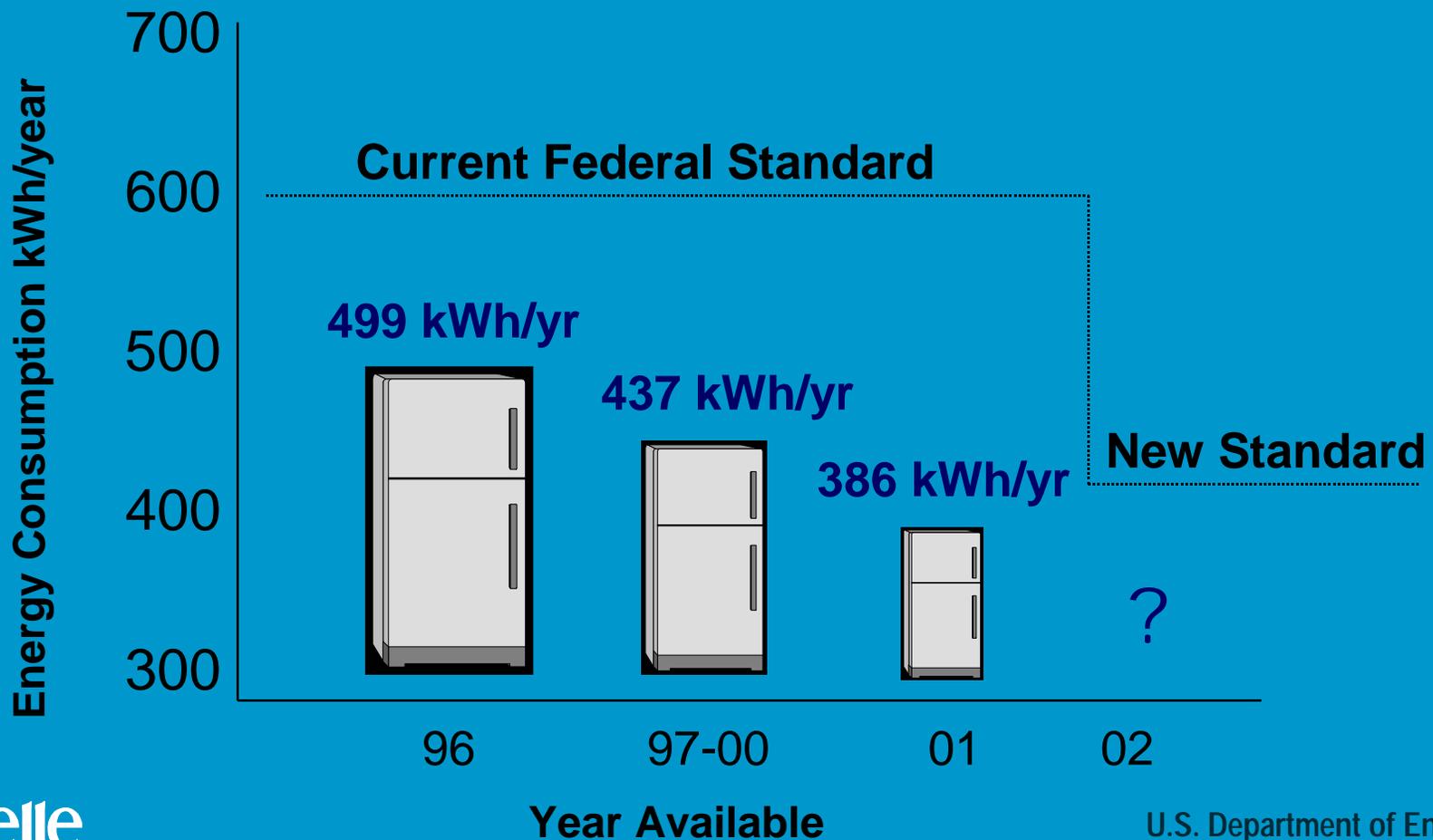
| | |
|--|------------------------|
| ❖ Size | 15ft ³ |
| ❖ Efficiency (better than standard) | 40% |
| ❖ Savings/year* | 900-1300 kWh/\$54-\$78 |
| ❖ Retail price | <\$400 |
| ❖ Price premium (over standard 15ft ³) | \$0-\$20 |

*Compared to a 10 year old similar-sized refrigerator.



The Incredible Shrinking Refrigerator Energy Consumption!

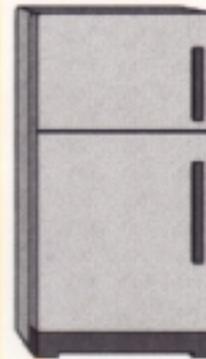
15 ft³ Apartment-Sized Super-Efficient Refrigerator



Super-Efficient Refrigerator Advertisement for CA Utility

Save Money with New Highly Energy Efficient Refrigerators

Now you and your tenants can save money on the cost of new ENERGY STAR® apartment-size refrigerators, and your tenants can save \$100 per year or more on their electric bill.



Maytag's 15 ft³ and 18.5 ft³ Magic Chef®

are among the lowest cost ENERGY STAR® refrigerators and are 31% more efficient than standard models, making these the most efficient ENERGY STAR® refrigerators of their size.

These durable refrigerators were specifically designed for apartment use and are backed by the Maytag warranty and service agreement.

Special Offer

Maytag's 15 ft³ Magic Chef®
Model #CTN1511

\$384⁰⁰

plus \$15 delivery

Maytag's 18.5 ft³ Magic Chef®
Model #CTN1911

\$492⁰⁰

plus \$20 delivery

How do I get this Refrigerator?

You and your tenants may purchase these refrigerators at these low prices by mentioning your apartment association name and that you are a SCE customer.



Builder's Appliance Supply, Inc.

1745 N. St. Thomas Circle
Orange, CA 92865
(714) 637-0420



For more information

Call toll free at: 1-888-792-8468

E-mail to: Theresa.Odell@pel.gov, or

Log on at: <http://www.energystar.gov/products>

Today's Efficient Technologies – dishwashers

ENERGY STAR® Built-In Dishwasher

| | |
|---------------------------------------|----------------------|
| ❖ Efficiency (better than standard) | 35% |
| ❖ Savings/year (electric hot water)* | 352 kWh/\$21 |
| ❖ Savings/year (gas hot water)* | 29 kWh+11therms/\$10 |
| ❖ Water savings/year* | 644 gallons/\$1 |
| ❖ Retail price | <\$200 |
| ❖ Price premium (over standard model) | \$0 |

*Compared to a 9 year old dishwasher

@ 6 cents/kWh, 80 cents/therm and \$2/1,000 gal water.



ENERGY STAR Dishwasher Advertisement for CA Utility

Water and Energy Efficient Dishwasher Saves You Money

Amana



Save Money 2 Ways!

The new **ENERGY STAR®** dishwasher is among the lowest cost dishwasher made, plus you can save over \$40⁰⁰ per year.

Special Price

\$198⁰⁰

Model #DWA22A
(Height 33 1/4", Width 23 7/8", Depth 24 1/4")

delivery and hookup available

Where can I purchase this dishwasher?

This dishwasher is available at this special low price for Association Members.



**Builder's
Appliance
Supply, Inc.**

1745 N. St. Thomas Circle
Orange, CA 92665
(714) 637-0420



For more information

Call toll free at: 1-888-792-8468

E-mail to: Theresa.Odell@gsf.gov, or

Log on at: <http://www.energystar.gov/products>

Today's efficient Technologies – Lighting

ENERGY STAR Subcompact Fluorescent Light Bulbs (Sub-CFLs)

- ❖ Common Wattages 11W-30W
- ❖ Replace these incandescent light bulbs 40-125W
- ❖ Savings/year/lamp replaced* ~200 kWh/\$12
- ❖ Retail price \$4-\$8
- ❖ Price premium (over common CFLs) **No!** \$2-\$12 LESS

*12 hours/day operation; 15W CFL replaces 60W light bulb @ 6 cents/kWh.



ENERGY STAR Subcompact Fluorescent Light Bulb Advertisement for CA Utility

Limited Supply at these Low Prices

Unhappy with Rising Electric Bills?

Save Money with Sub-CFLs

GUARANTEED! **FREE shipping and delivery**
\$1⁸⁵ to \$3⁰⁵ each*

Subcompact fluorescent light bulbs (Sub-CFLs) fit standard sockets in existing fixtures, last 8-10 times longer than standard light bulbs and can be used in interior and exterior applications. They come with a 1-year manufacturer warranty.

| Incandescent Light Bulb | Sub-CFL Equivalent |
|-------------------------|--------------------|
| 40-60 Watts | = 15 Watts ▲◆● |
| 75 Watts | = 16-20 Watts ▲◆ |
| 90-100 Watts | = 23-26 Watts ▲◆ |

Factory Direct — Call Toll Free

- ▲ JKRL-USA 1-877-543-6127
- ◆ Sunpark International 1-866-478-6775
- SURYA 1-877-226-4784

SAVE \$95 up to \$88/year per socket for lights on 24 hours/day*

Pacific Gas and Electric Company is providing this pilot program for its Multi-Unit Dwelling electric customers.

For more information call the Smarter Energy Line at 1-800-933-9555. *Visit the Web site at www.pnl.gov/sub-cfls for lamp prices, order forms and savings information.

This program is funded by California utility customers and administered by Pacific Gas and Electric Company, under the auspices of the California Public Utilities Commission.

LAST DAY TO ORDER MARCH 20, 2001

today's Efficient Technologies – Lighting



A Quick Response to the “Crunch”

Subcompact Fluorescent
Light Bulbs (sub-CFLs)
That Fit Most Fixtures
and are Low Cost!

Dagmar Eggleston of Rose Villa Retirement
Community in Portland, Oregon finds sub-CFLs
convenient and practical.

Today's Efficient Technologies - Clothes Washers

ENERGY STAR High Performance Clothes Washer

| | |
|---------------------------------------|------------------|
| ❖ Savings/year (gas hot water)* | 33-40 therms |
| ❖ Savings/year (electric hot water)* | 500-800 kWh |
| ❖ Water savings/year* | 5,000-10,000 gal |
| ❖ Retail price | \$600-1400 |
| ❖ Price premium (over standard model) | \$250-1050 |

*Compared to a standard clothes washer in a single family residence



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Today's Efficient Technologies – Clothes Washers

Typical High Performance Clothes Washer *Savings** (Over a 15-Year Machine Life)

💧 100,000 gallons water = **\$200** (@\$2/1,000 gal)
enough water for typical household water use for nearly 2 years

⚡ 400 kWh electricity = **\$240** (@6 cents/kWh)
enough electricity to power a new refrigerator for nearly a year

\$ Total lifetime savings = \$440
enough to pay back the additional cost of a high performance
clothes washer in ~7yrs

*Compared to a standard washer

Today's efficient Technologies – Clothes Washers

High Performance Clothes Washers



Commercial Coin Operated Model Shown

Handy internet sources for efficiency information

www.eren.doe.gov [DOE Energy Efficiency & Renewable Energy]

www.energystar.gov [EPA/DOE Energy Star Program]

www.nwalliance.org [Northwest Energy Efficiency Alliance]

www.bpa.org [Bonneville Power Administration]

www.energy.wsu.edu [WSU Cooperative Extension Energy Program]

www.pnl.gov/buildings [PNNL Buildings Efficiency]

www.pnl.gov/cfls [PNNL/DOE Sub-CFL Program]

www.ci.richland.wa.us/ups/respage.html [City of Richland]

www.bentonrea.org [Benton Rural Electric]

www.franklinpud.com [Franklin Public Utility District]

www.bentonpud.org [Benton Public Utility District]

www.pacificorp.com [Pacific Power]

Today's efficient technologies – Energy Star

When in Doubt...



Look for products, homes and buildings with the
ENERGY STAR label

Today's? efficient technologies

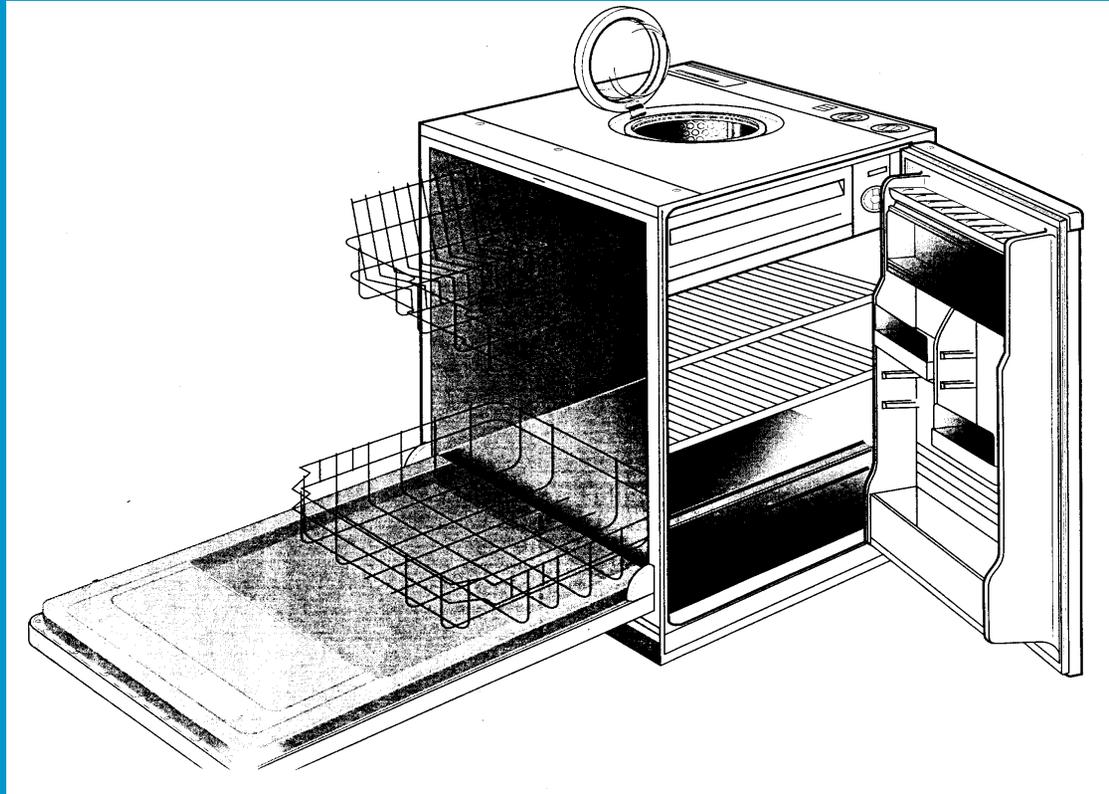


The latest efficient technology confuses even Dogbert – the high priced consultant!

Tomorrow's efficient technologies

| | |
|-----|---|
| 1-2 | Shorter & lower cost CFL reflector lamps Efficient recessed can fixtures for homes |
| 3-4 | High(est) efficiency rooftop air conditioner "Smart" household appliances |
| 4-5 | More efficient and affordable fuel cells |
| 5+ | Miniature heating/cooling equipment & other micro technologies |

Tomorrow's efficient technologies – the ultimate space & energy saver



"Washn'Fridge"

