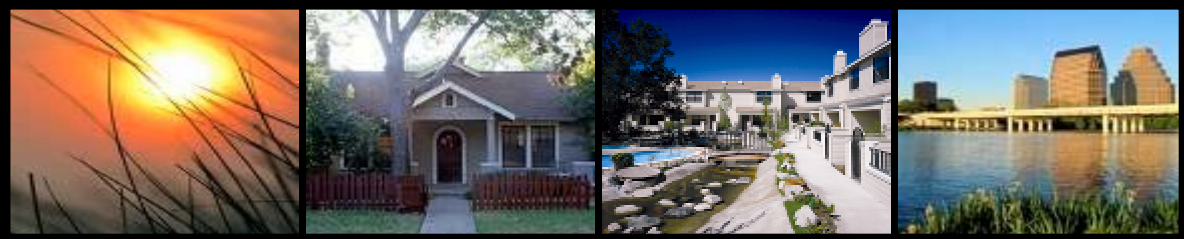
Putting Energy Efficiency to Work

Presented by
Fred Yebra, P.E.
March 5, 2008

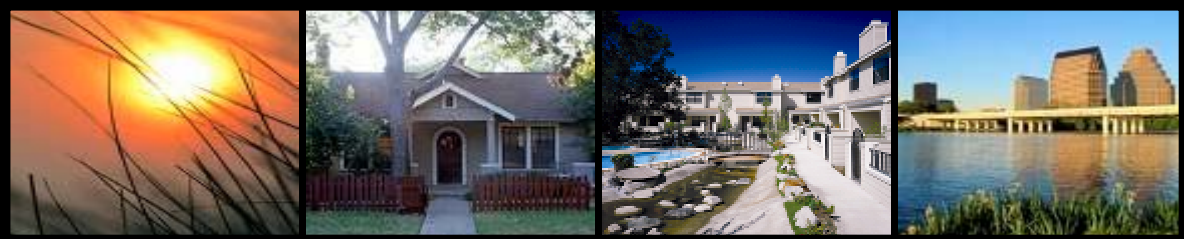
Power Saver™ Program

Saving Energy Together

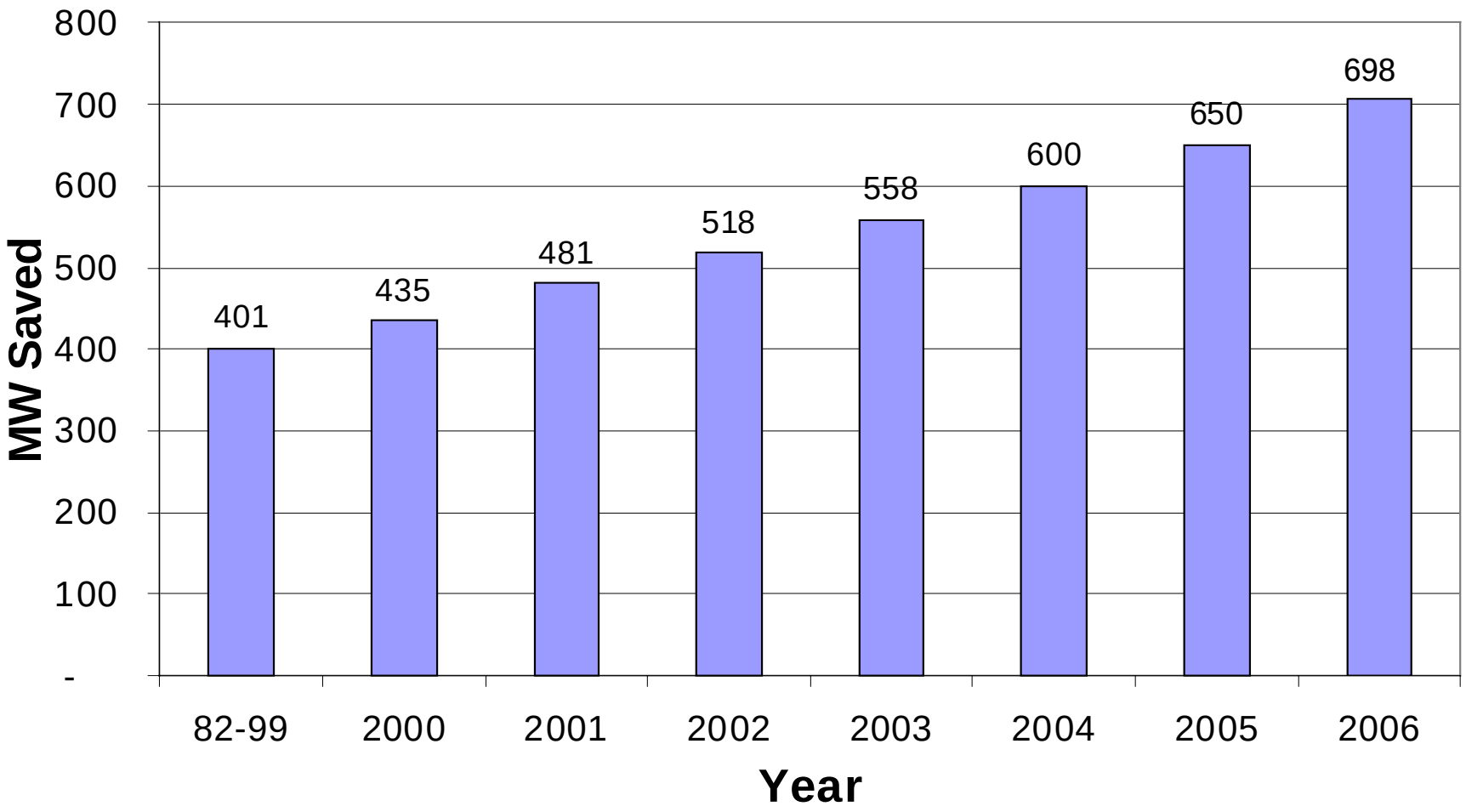


To Be Covered

- How do we evaluate DSM programs?
- FY06 DSM Performance Measures
- DSM forecasting
- DSM projected cash flow
- Achievements



DSM Cumulative Savings



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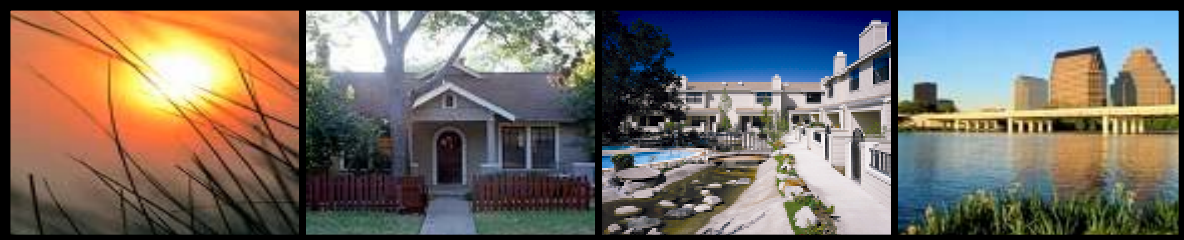
1999 Austin City Council

Resolution September 14, 1999

“Cost-effective conservation programs shall be the first priority in meeting new load growth requirements of Austin Energy. ”

Clean Energy Resolution August 28, 2003

… Austin Energy Strategic Plan to ensure Austin remains a national and international leader in the development and use of clean energy

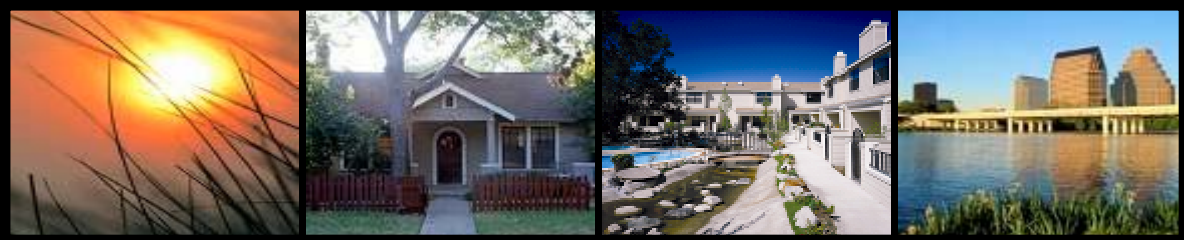


2003 Austin Energy's Response

AE Strategic Plan

Energy Efficiency is first priority

- 15% Demand-Side Management by 2020
- 20% Renewable Energy by 2020
- 100 MWs of Solar by 2020

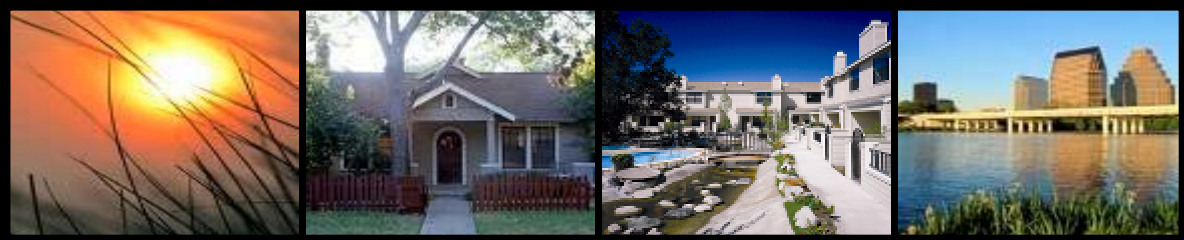


Austin Climate Protection Plan - 2007

Resolution on February 15, 2007

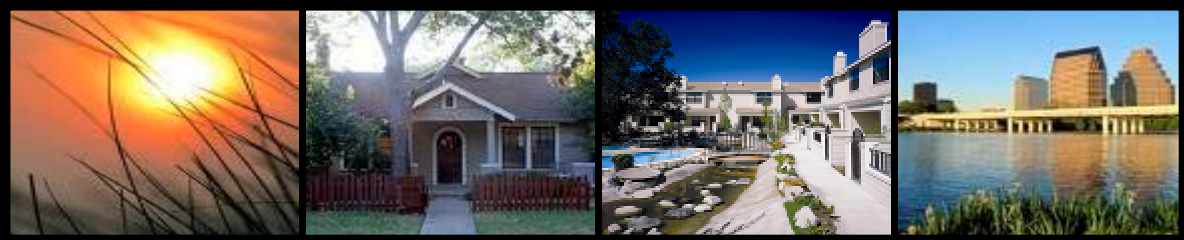
"Commit our City to addressing climate change and global warming"

Makes Austin a national leader among cities in the fight against global warming.



Austin Climate Protection Plan

- Makes COA facilities/fleets carbon neutral
- Makes Austin building codes most EE in nation
- Mechanisms for business to reduce carbon
- Austin Energy's GHG-reduction by 2020
  - Achieve 700 MW through energy efficiency
  - Meet 30% energy needs with renewable energy
  - Achieve carbon neutrality on new generation
  - Establish CO_2 cap for utility emissions



Promoting Energy Efficiency

- Cash rebates pay 20 – 30% of cost
- Up to 70% incentives for Small Business
- Direct install measures
- Free home and business energy audits
- Low-income Free Weatherization
- Public education & outreach efforts

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Free Home Weatherization

Energy Improvements

- Insulate Attics
- Duct Sealing
- Install CFLs
- Solar Screens
- Caulking and Weather-stripping
- Free Smoke & Carbon Monoxide Detector
- Minor Energy Related Repairs

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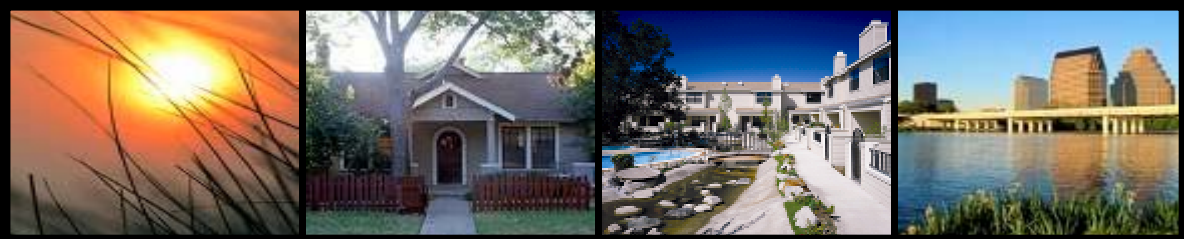

Power Saver Program

- FREE Energy Saving Products
- Lower energy costs
- 65,000 installed in homes, apartments
- 4,000 installed in commercial buildings

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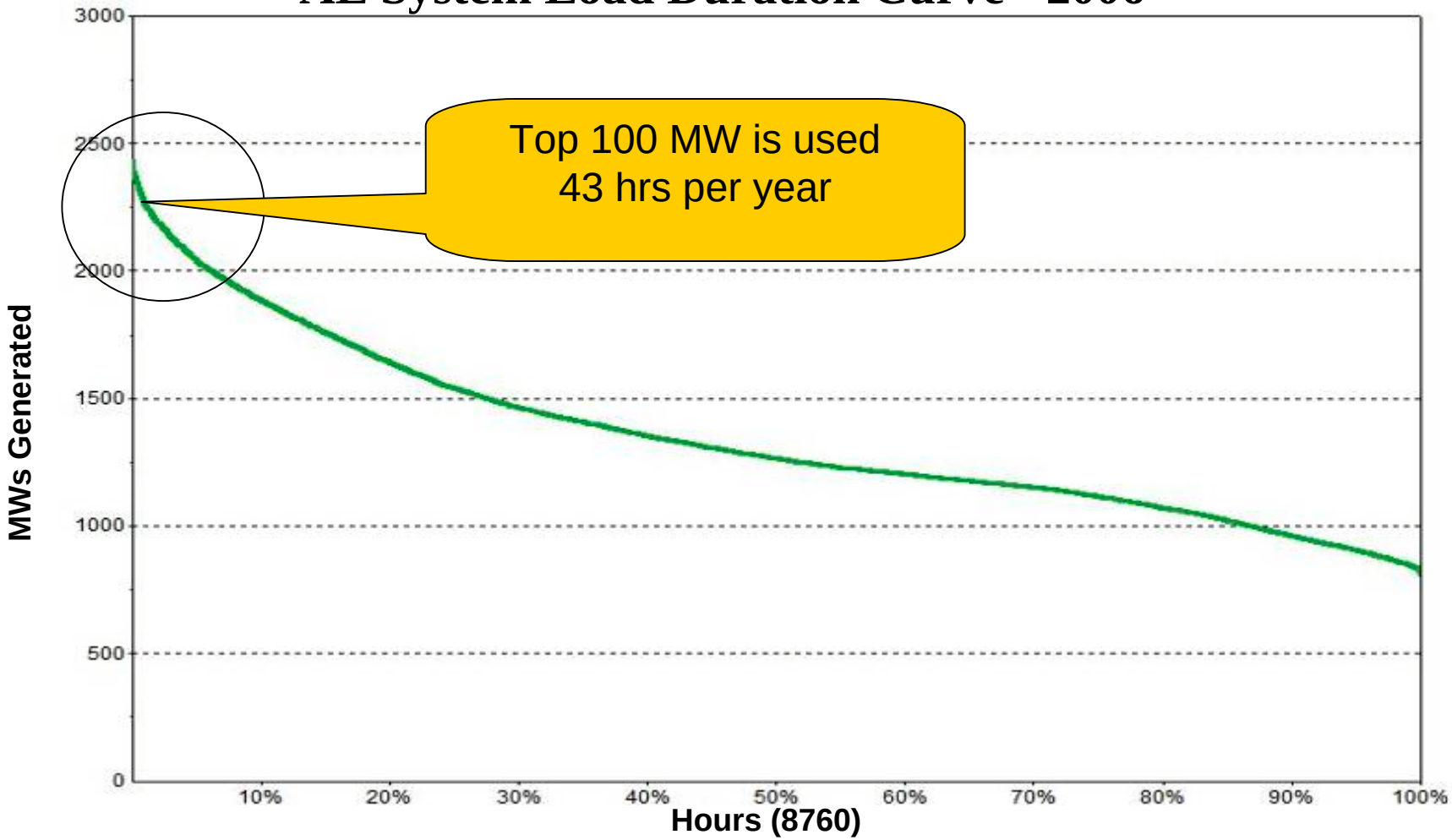
DSM Opportunity

AE System Load Duration Curve - 2006



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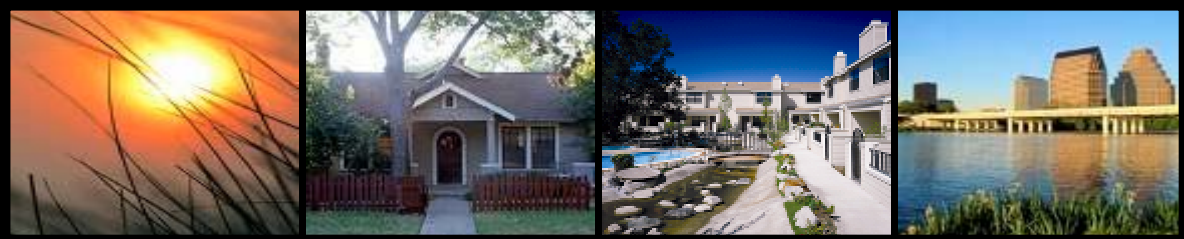
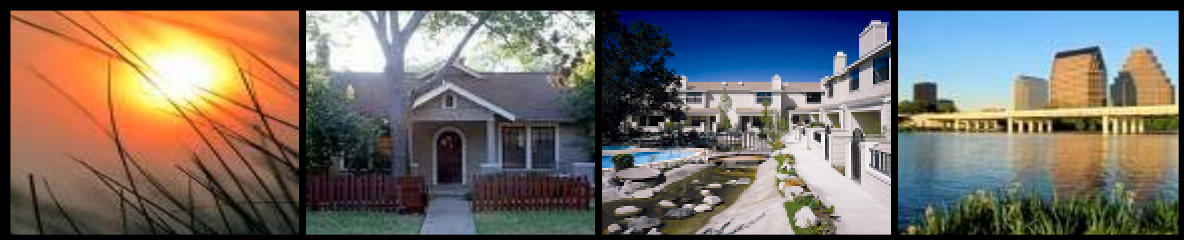
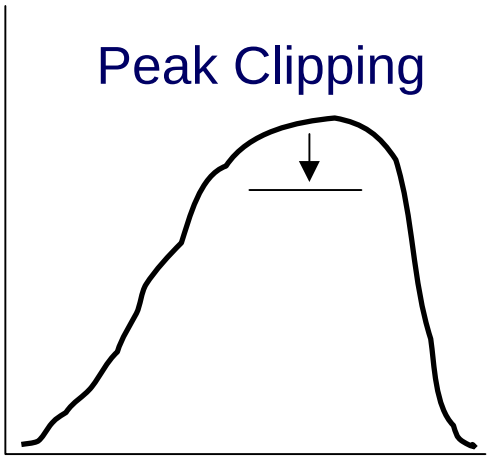


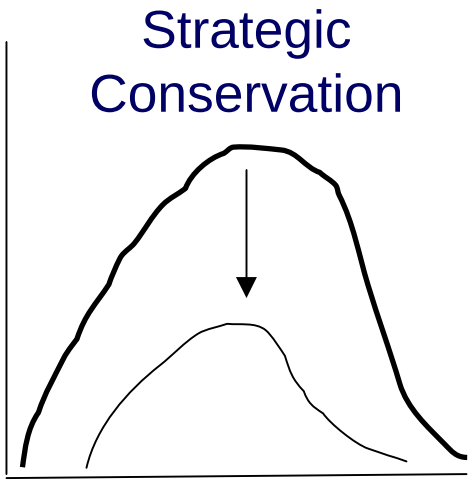
What is DSM?

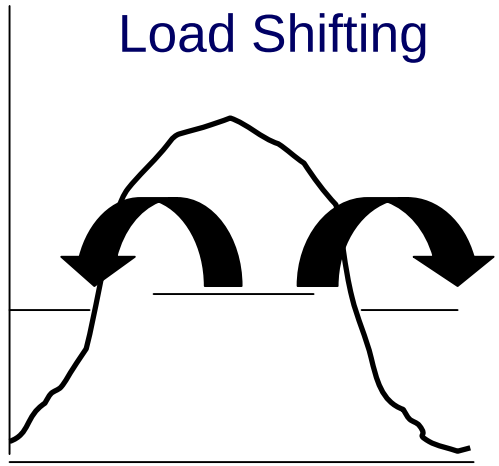
Utility initiatives which modify the ***level*** and ***pattern*** of electricity use by our customers.

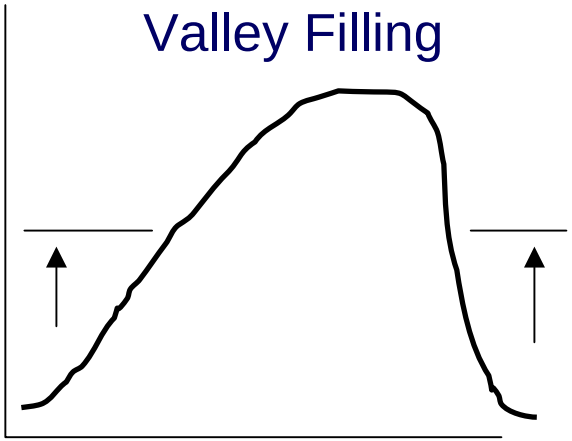


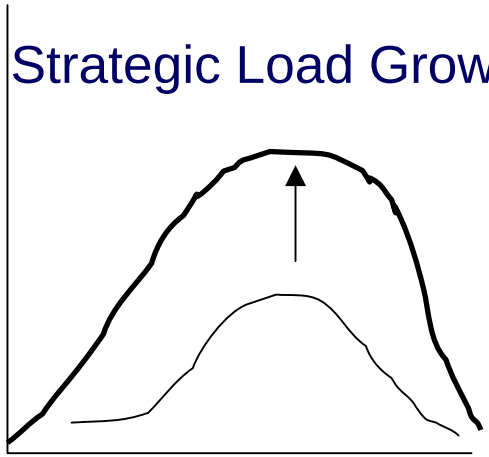
Energy Use Modification

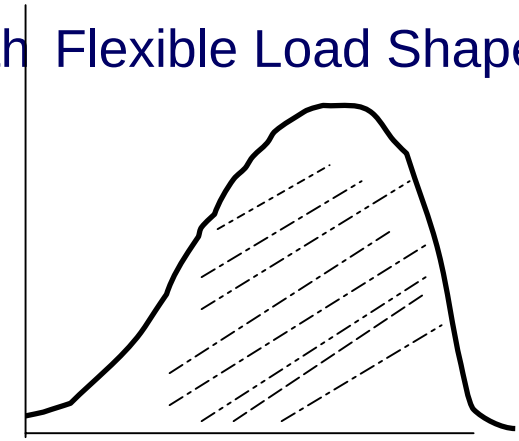












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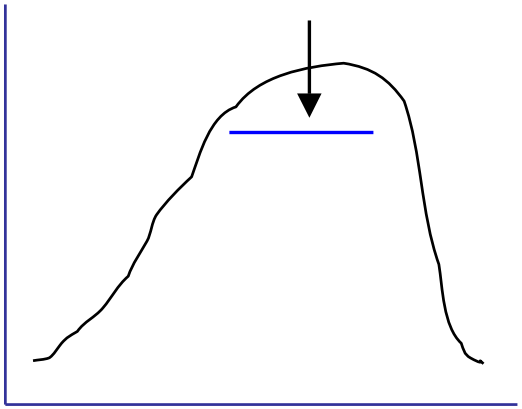
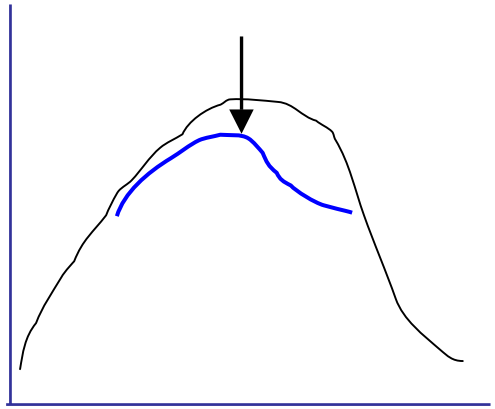
Energy Use Modification

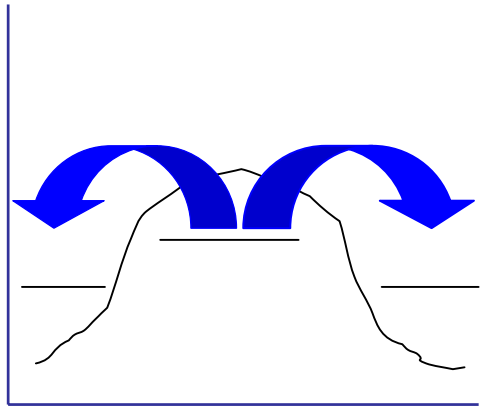
Peak Clipping



Strategic Conservation



Load Shifting



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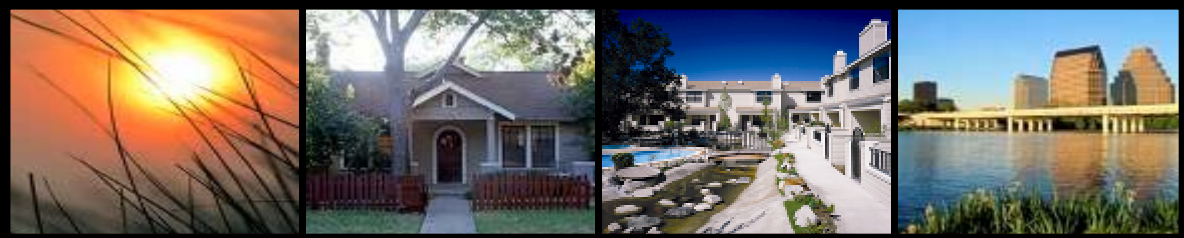
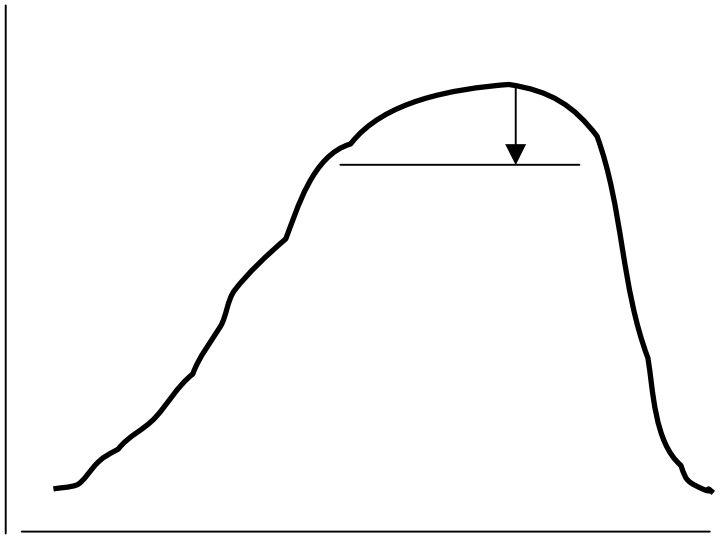


Peak Clipping Strategy

Peak Clipping



Power Saver Programs:

A/C Cycling

W/H Cycling

Demand Response

Volunteers

Represent 36% of new DSM program mix

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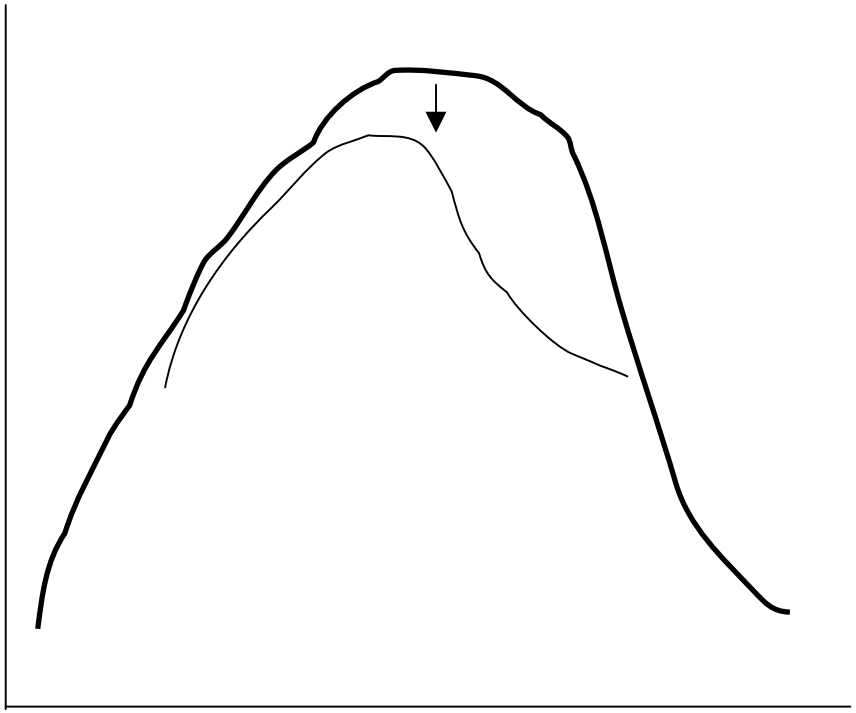
Strategic Conservation



Total Home Efficiency

Small Business Efficiency

Green Building Program

Appliance Efficiency

Multi-family Rebates

Commercial Rebates

Refrigerator Recycling

Free Weatherization

Municipal Conservation

Air Duct Sealing

Represent 58% of new DSM program mix

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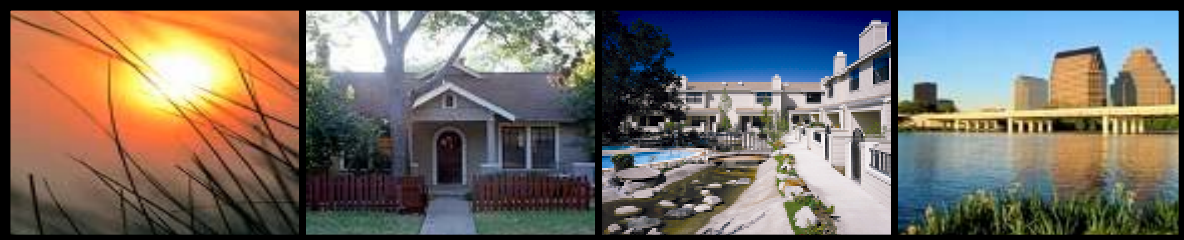
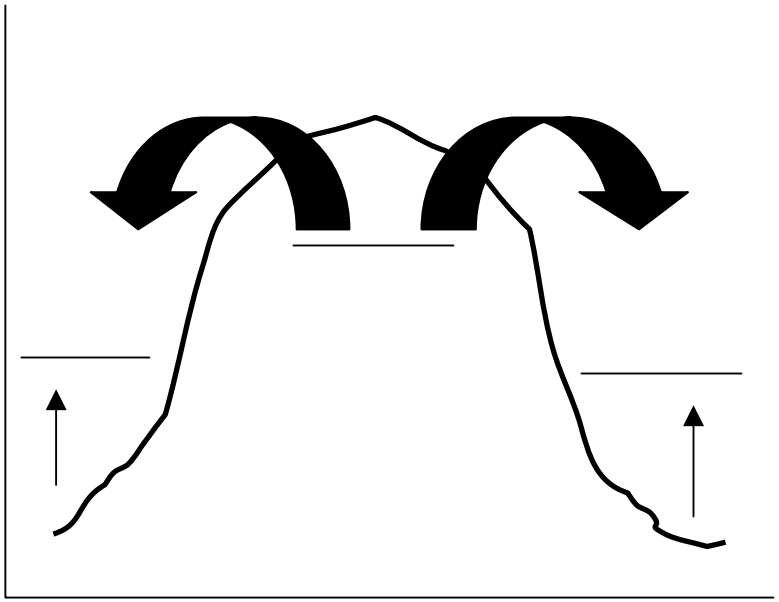


Load Shifting Strategy

Load Shifting



Time-of-Use Rate

Thermal Energy

Storage Systems

Represent 6% of new DSM program mix

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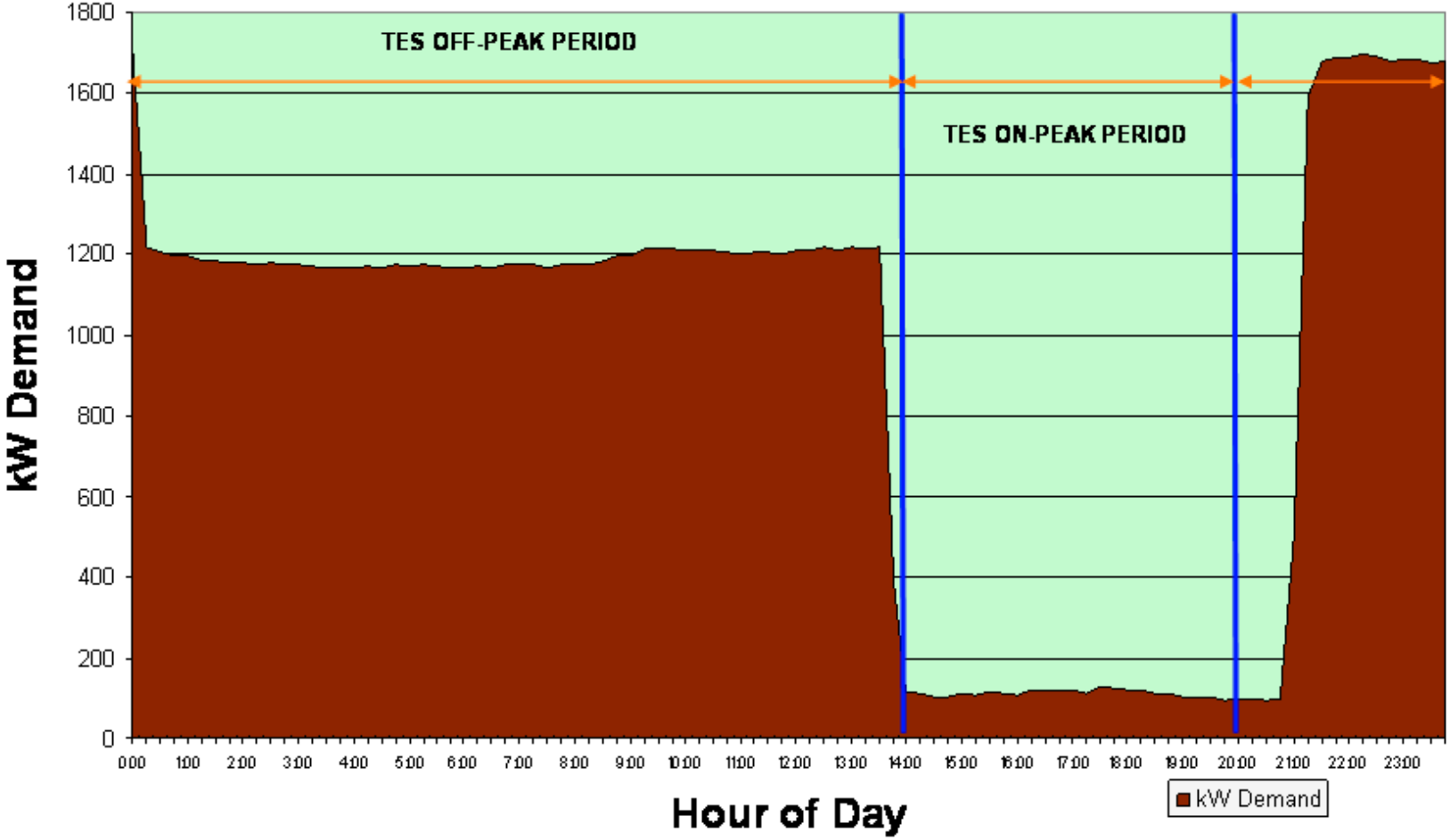
Load Shifting

ABIA Thermal Energy Storage Profile – August 2000



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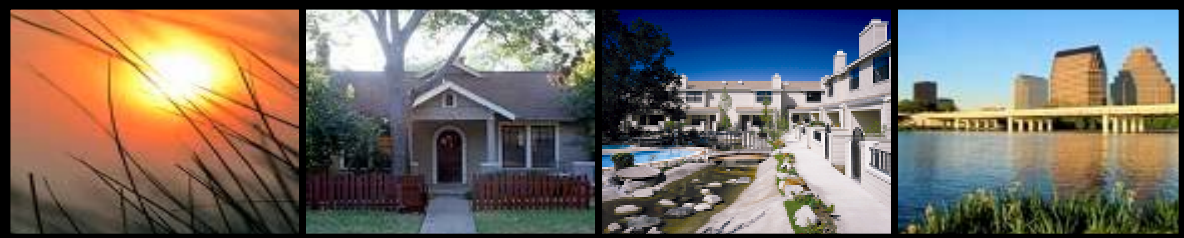
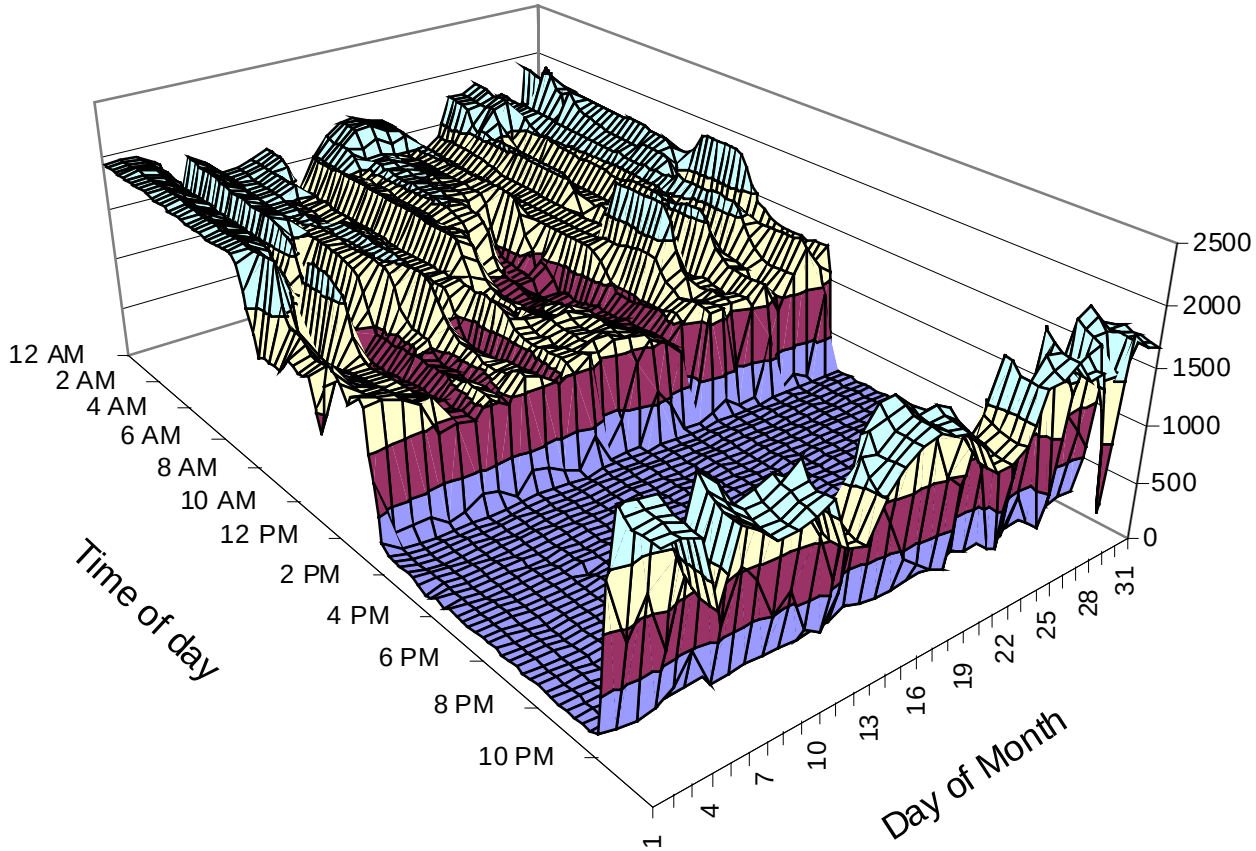


Load Shifting

ABIA Profile – July 1999



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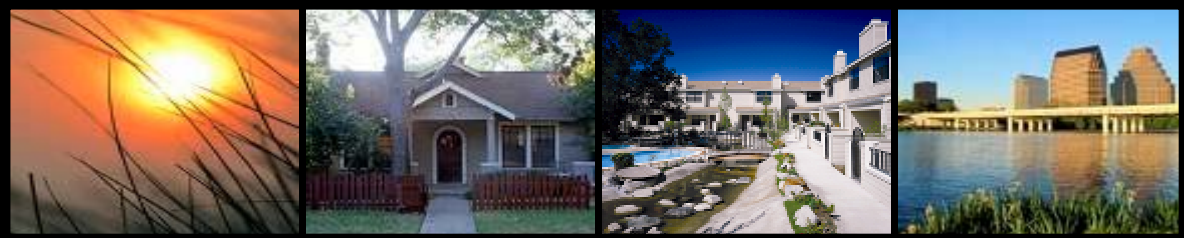
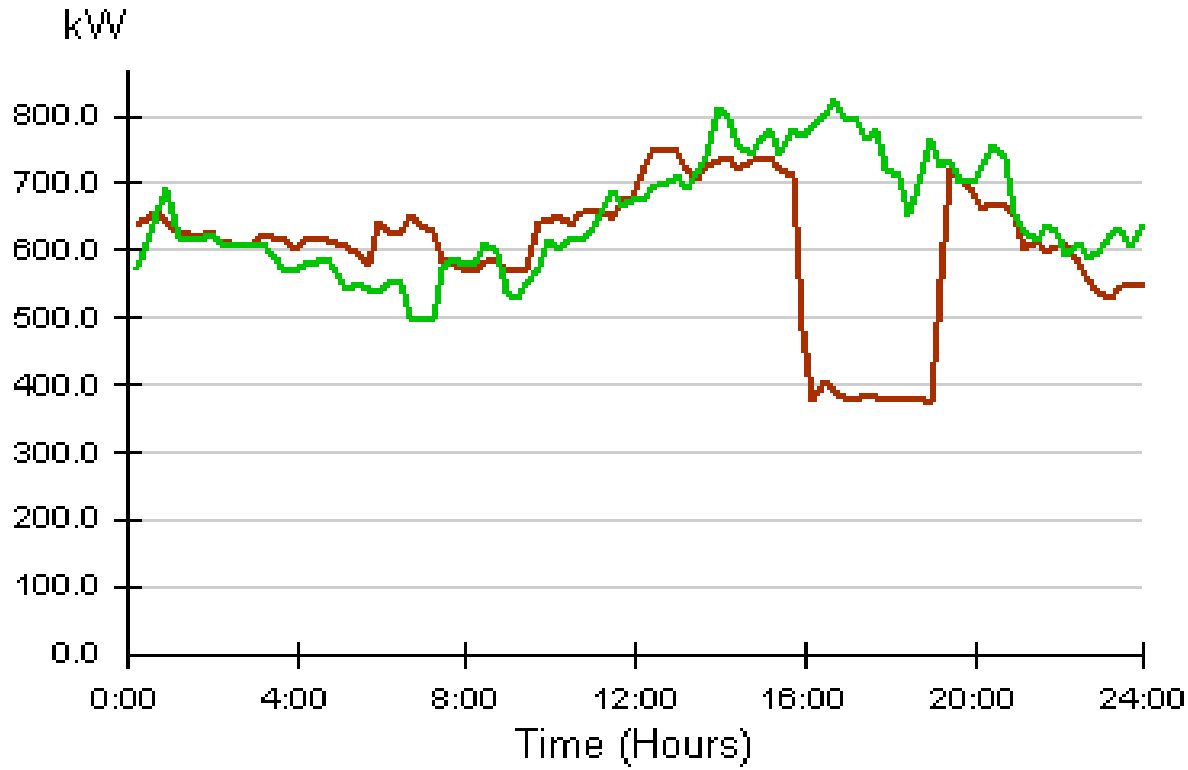


Demand Response

June 15, 2005



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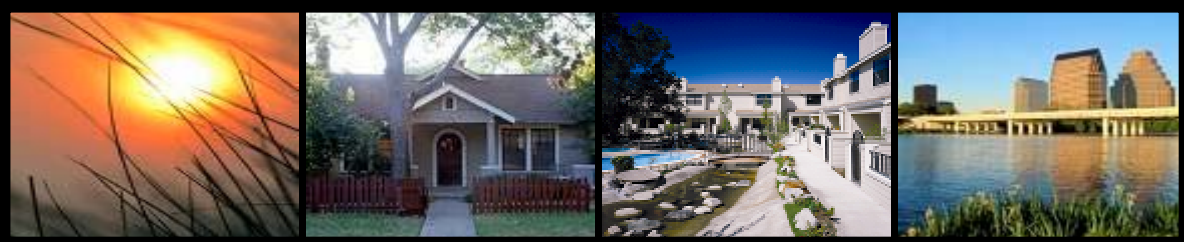
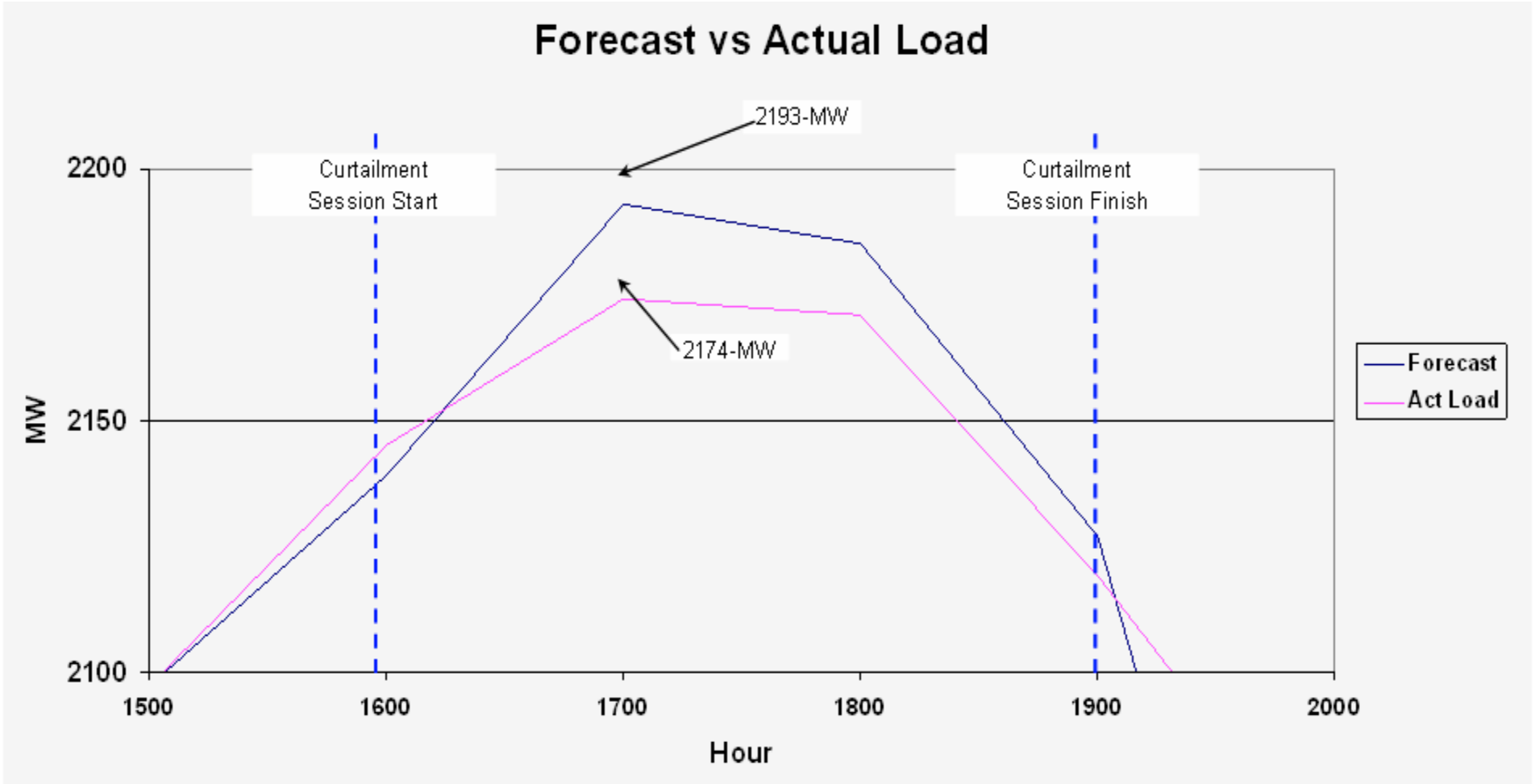


Peak Clipping Impact

Wednesday, June 15, 2005



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Strategic Conservation Impact

Traffic Signal Conversion to LED

Goal: 5,500 traffic signals

Existing incandescent lamps	**135 watts**
New LED lamps	**15 watts**
Energy savings per lamp	**120 watts**

= 90% energy reduction

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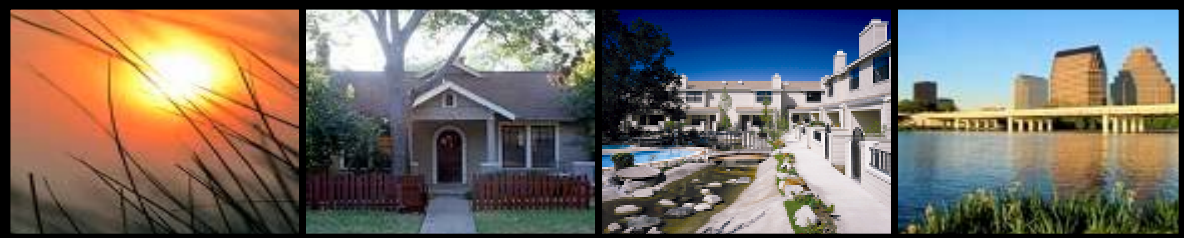
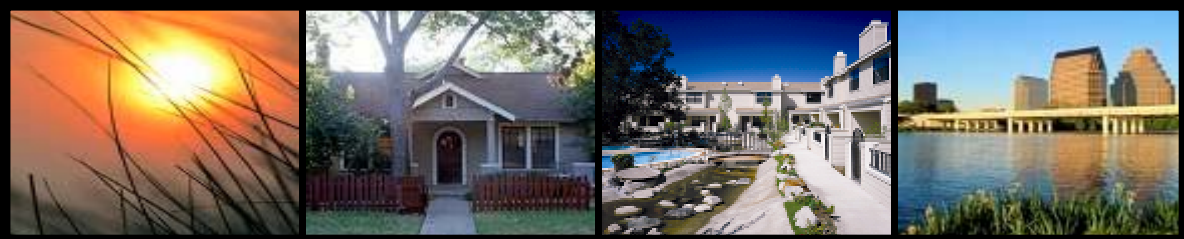


Energy Savings are Calculated Estimates

(Baseline efficiency) – (Rated efficiency) = kW Savings

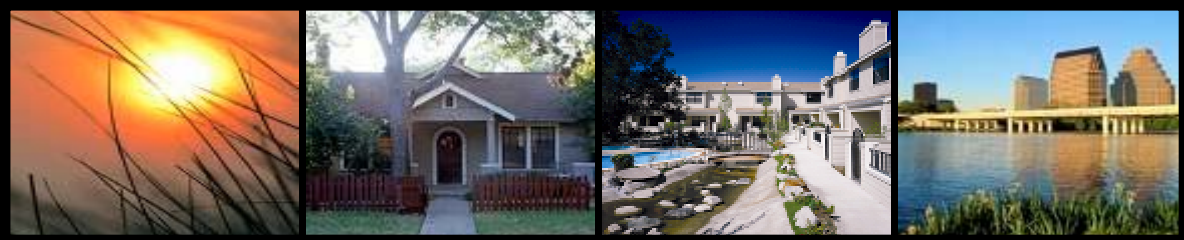


KW Savings Calculation

Example Calculation:

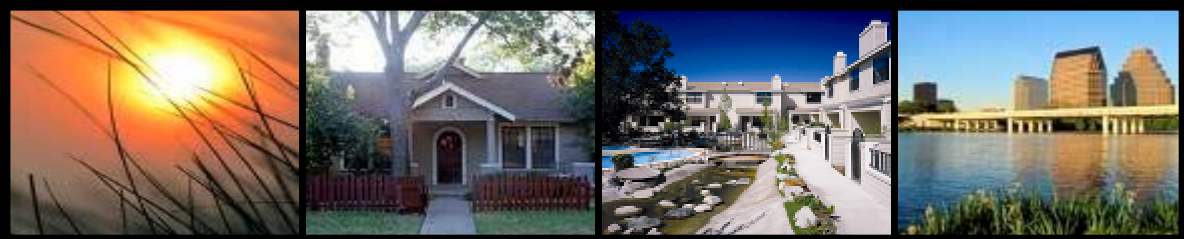
Replace a standard 3-lamp T12 fluorescent fixture = 112 Watts*
with a new 3-lamp T8 fluorescent fixture = 75 Watts*

(112 watts – 75 watts) = 37 watts of energy saved per fixture.



Lighting Retrofits
Persistence of Savings

- Require permanent fixture modifications
- Modifications last for 12 years
- Modifications make it **incompatible** to go back to standard fluorescent lamps.



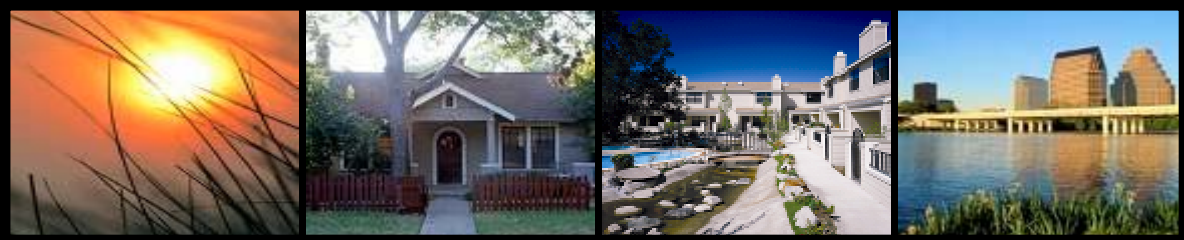
A/C Energy Savings Calculation

Example:

Replace old inefficient a/c unit (EER=8) with new high efficiency system (EER = 12).

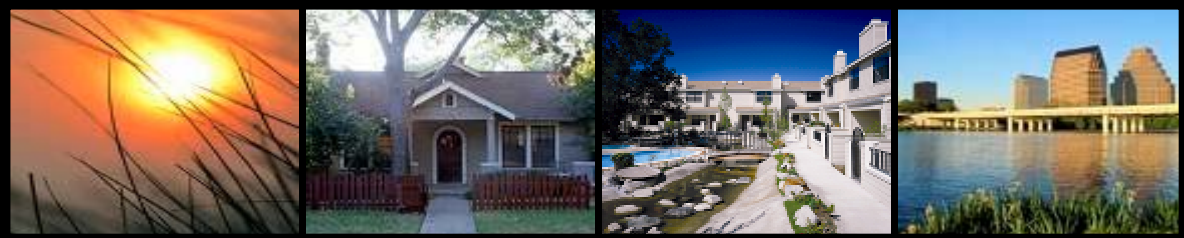
A/C Size x 12 x DF/OF x ($1/EER_{EX} - 1/EER_{NEW}$) = kW saved.

75 tons x 12 x 0.9/1.25 x (1/8 – 1/12) = **27 kW Saved**



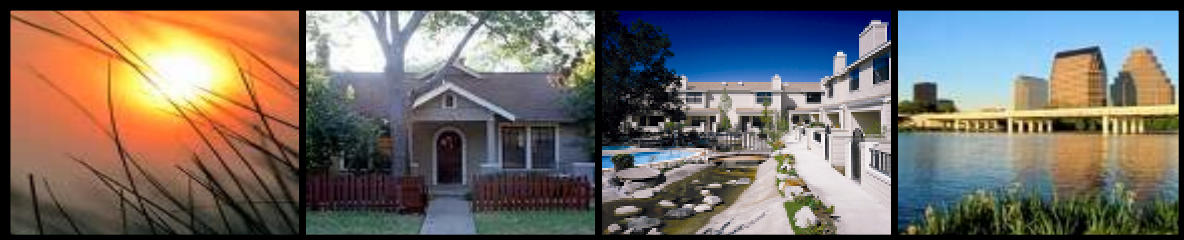
National/Independent Efficiency Rating Organizations

- ARI: American Refrigeration Institute
- ANSI: American National Standards Institute
- IESNA: Illuminating Engineering Society of North America
- NEMA: National Electrical Manufacturer's Association
- ASTM: American Society of Testing and Measurements



How do we know DSM works?

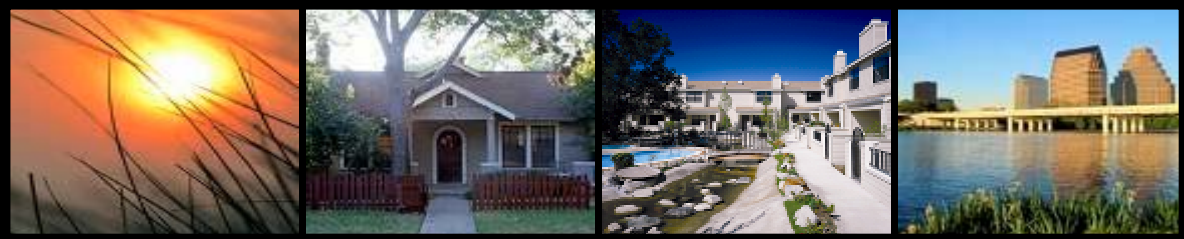
- Equipment changes – **“<u>not”</u>** behavior modification
- Inspection of installation work
- Consumption verification
- Independent evaluations



DSM focuses on technology upgrades, not behavioral changes

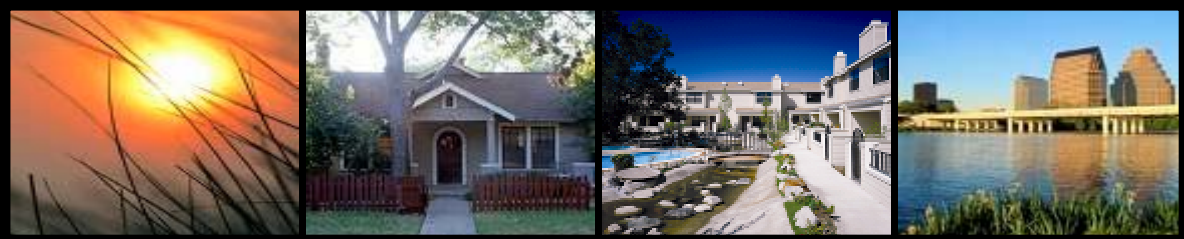
- Eligible technologies
  - High efficiency ventilation and air conditioning (HVAC)
  - Air Duct Sealing & Improvements
  - Energy efficient lighting equipment
  - Premium efficiency motor
  - Home weatherization

- **In**eligible Conservation Measures
  - Behavior changes
  - Maintenance and operation changes
  - Turning off equipment
  - Removing equipment
  - Down-sizing equipment



Inspections

- Pre-Inspection
- Post-Inspection
- Rebates payment based on post-inspection

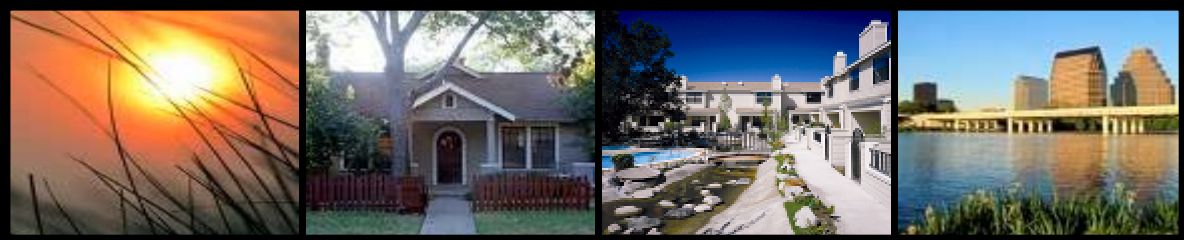


Independent Evaluations

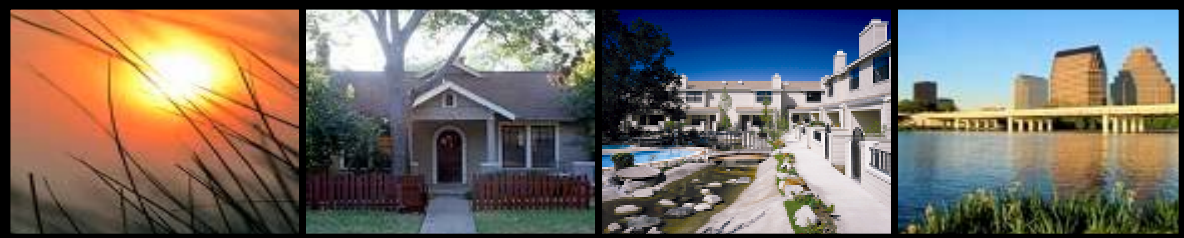
- Historical evaluations:
  - SRC (Synergic Resource Corporation, 1988)
  - B & C, Inc. (Barakat & Chamberlin, Inc. 1994)
  - B & C, Inc. (Measurement & Verification, 1996)
  - ESOURCE, Inc. (2001)
  - ICF Consulting, Inc. (2004)

- "Through the use of actual billing histories, the programs do indeed save KWH and kW."

- Program evaluations through measurement and verification were eliminated in 1998.

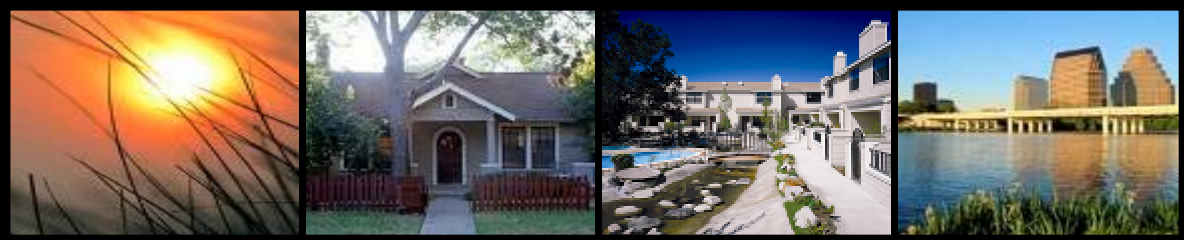


What is the cost-effectiveness of the DSM programs?



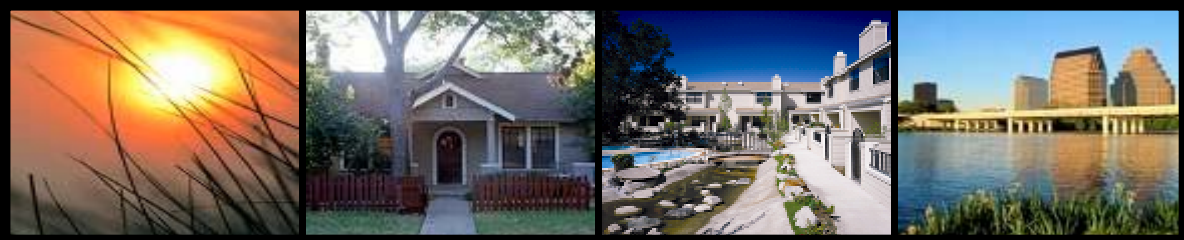
DSM Cost-Effectiveness Model

- "***Standard Practice for Cost-Benefit Analysis of Conservation and Load Management Programs***", first published 1983.
- Used to compare DSM program costs to supply-side options.
- DSM is a lower cost option than supply-side options
- Residential DSM Cost: $439 per peak kW saved
- Commercial DSM Cost: $272 per peak kW saved



Cost-Effectiveness Tests for DSM

- **Participant Test:** measures benefits to the customer.
- **Utility Revenue Requirement Test:** measures the net costs of DSM program incurred by the utility.
- **Total Resource Cost Test:** measures the net costs of DSM based on total costs to all participants and the utility.
- **Rate Impact Measure Test:** measures what happens to customer rates due to DSM program.



Cost-Effectiveness Tests

(Benefits $ / Costs $ > 1)

- The Participant Test = NPV of

  Savings on electric bill + financial rebate

  Customer's additional cost incurred to participate

- The Utility Test = NPV of

  Avoided (fuel + power plant operating & maintenance + capacity cost)

  DSM program administrative cost + financial rebates

- Ratepayer Test = NPV of

  Avoided (fuel + power plant operating & maintenance + capacity cost)

  DSM program administrative cost + financial rebates + revenue losses

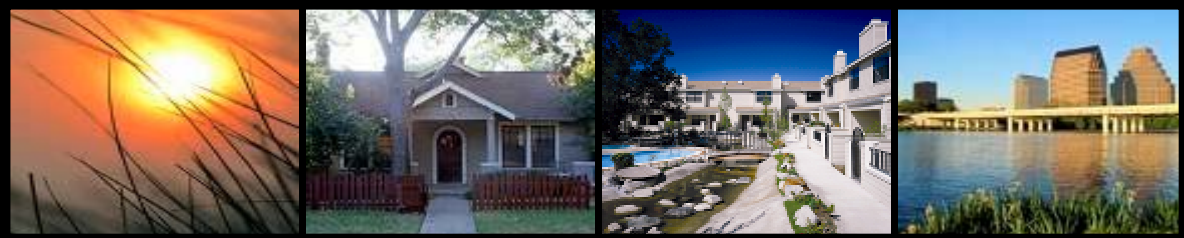
- The Total Resource Test = NPV of

  Avoided (fuel + power plant operating & maintenance + capacity cost)

  DSM administrative cost + Customer's additional cost incurred

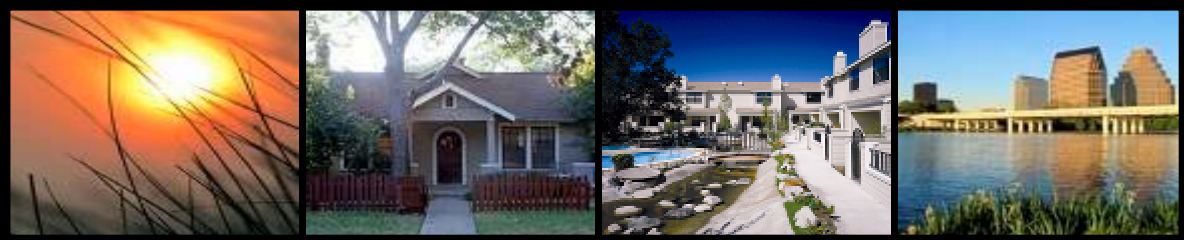



How do we incorporate DSM into the load forecast?

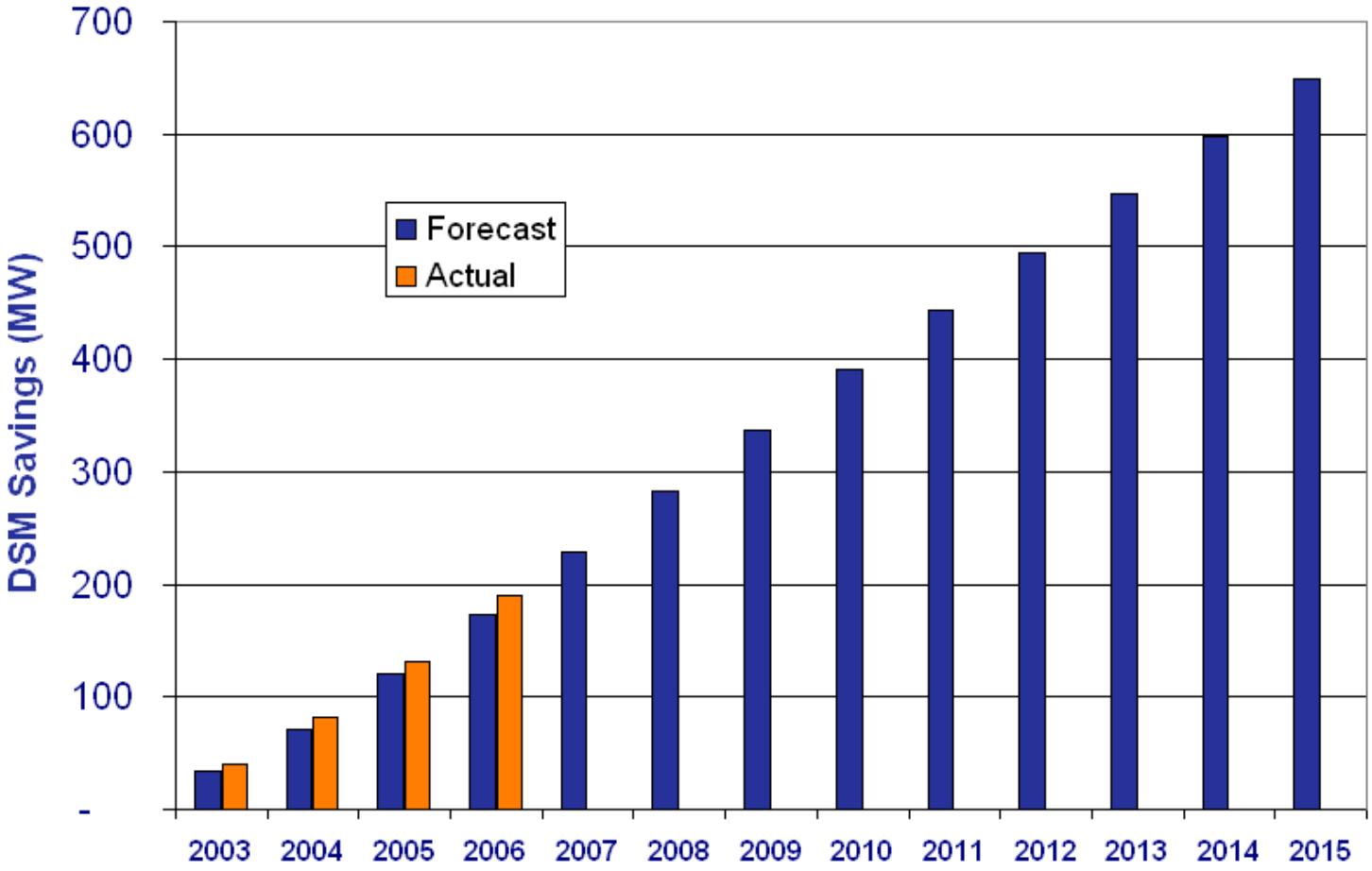


Modeling DSM Programs in Load Forecast

- Hourly electric load shapes are created for DSM
- Hourly KW savings are determined using computer models.
- Participation budgets are established annually.
- DSM impacts are included in load forecast.



DSM Savings Forecast



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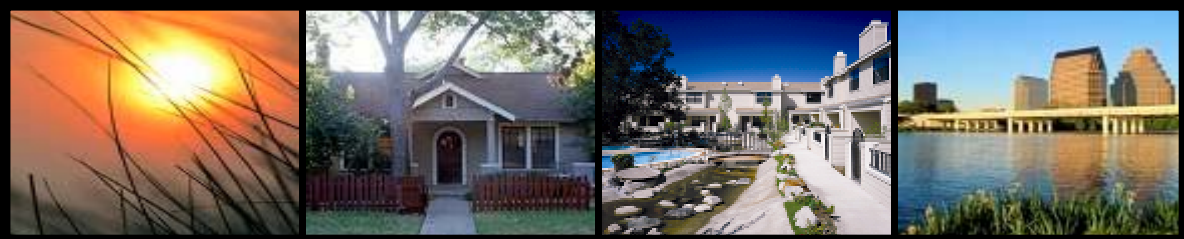
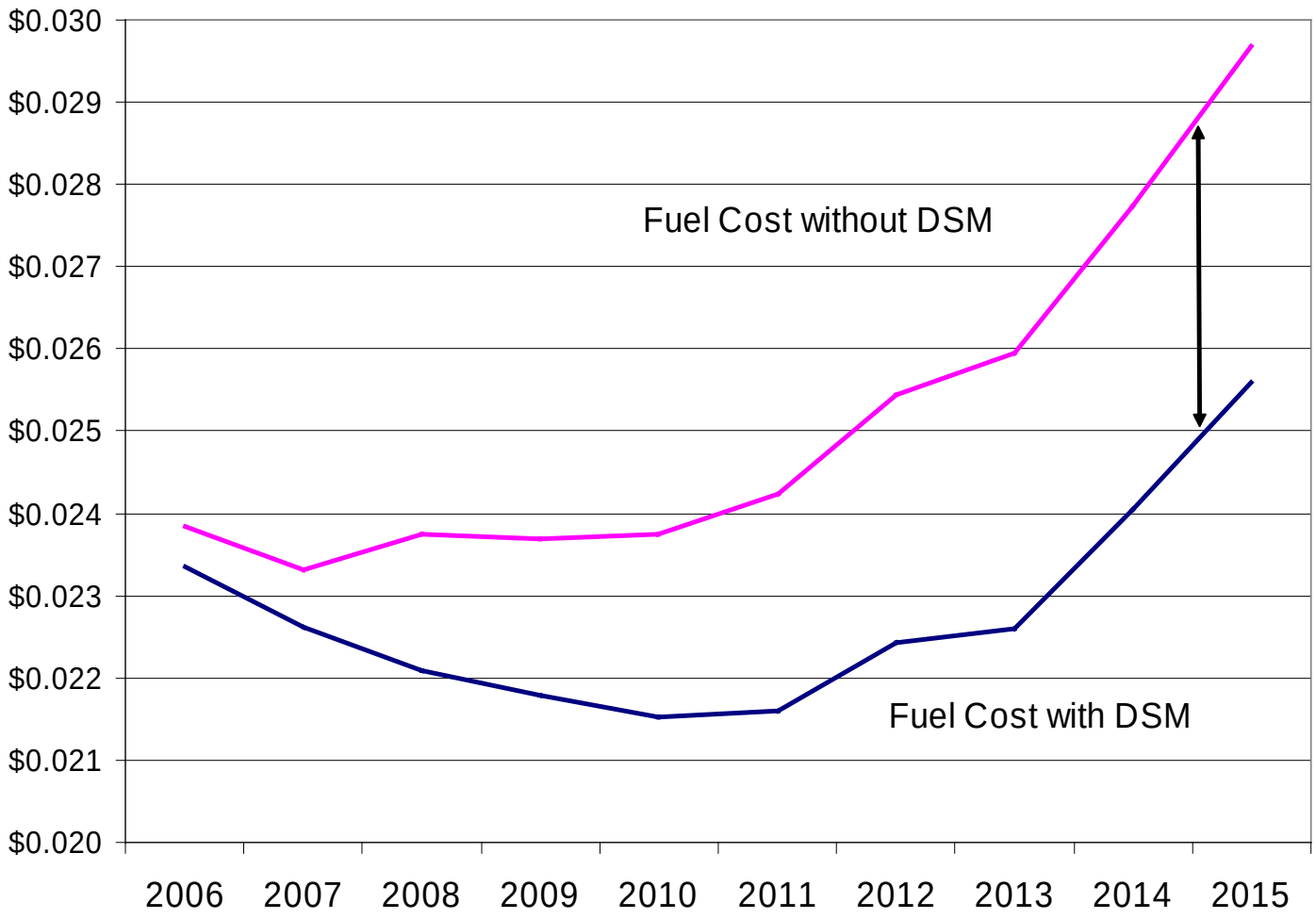


DSM Reduction in Fuel Costs



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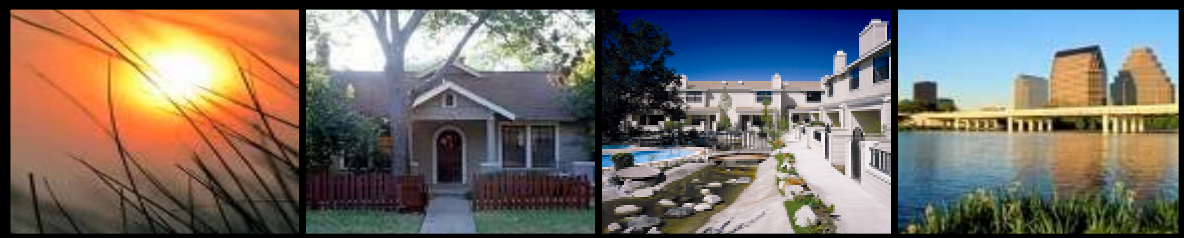

Cash Flow Projection of DSM

	CURRENT FORECAST	
DSM Analysis	2007	2008
Base Revenue Reduction	(12,000,000)	(16,000,000)
Fuel Revenue Reduction	(13,000,000)	(15,000,000)
Customer Savings (Bill Reduction)	(25,000,000)	(31,000,000)
Fuel Cost Reduction	13,000,000	15,000,000
Potential Off-system Capacity Sales	9,000,000	
TCOS Expense Reduction	900,000	1,000,000
GFT Reduction	2,000,000	3,000,000
Program Cost	(23,000,000)	(23,000,000)
Recovery through Base Rates	15,000,000	15,000,000
AE's Net Income Impact	(8,100,000)	(20,000,000)
Deferred Cost of Capacity		12,000,000
AE's Net Cash Impact	(8,100,000)	(8,000,000)

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FY 2006 Achievements

Energy Savings			
Programs	MW		% of Goal
	Saved	Goal	
Residential	12.6	11.5	110%
Commercial	15.4	12.1	127%
Demand Response	14.6	15.6	94%
Solar	0.55	0.60	93%
Grand Total	**43.2**	**39.8**	**108%**

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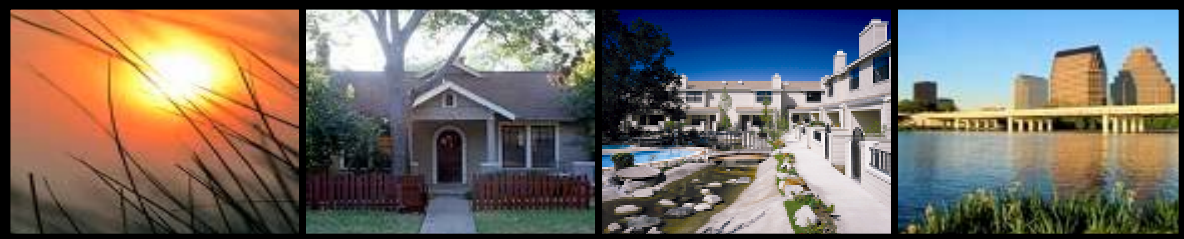

Energy Savings Comparison
FY2005 to FY2006

Programs	MW Saved	
	FY2005	FY2006
Residential	11.9	12.6
Commercial	15.3	15.4
Demand Response	11.6	14.6
Solar	0.6	0.55
Grand Total	**39.4**	**43.2**

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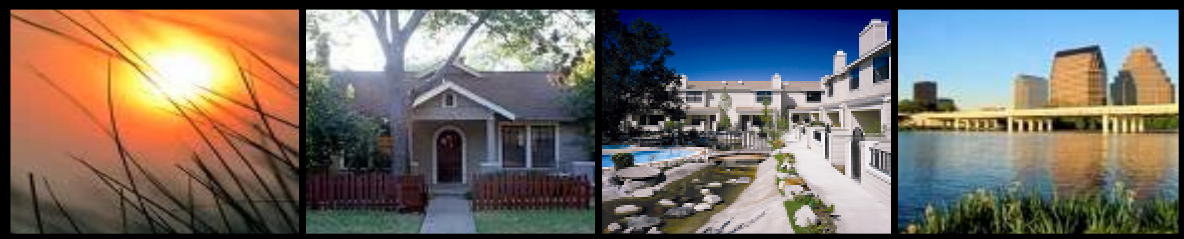

DSM Summary

- DSM programs are saving peak kW & kWh.
- Cost-effectiveness analyses include full program costs.
- DSM goals and budgets should vary to support AE resource plan requirements.




Thank you!

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