

# Energy Efficiency In A Needy State:

## How Efficiency Programs Helped the Vermont PSB Reduce the Burden of Electric Costs Even As Market Prices Rose

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# *One Minute, Four Sentences, About Why I Am at the Vermont Law's Institute For Energy & the Environment:*

*\* Energy policy is our world's most important environmental issue.*

*\* Environmental issues are the energy sector's most important challenge.*

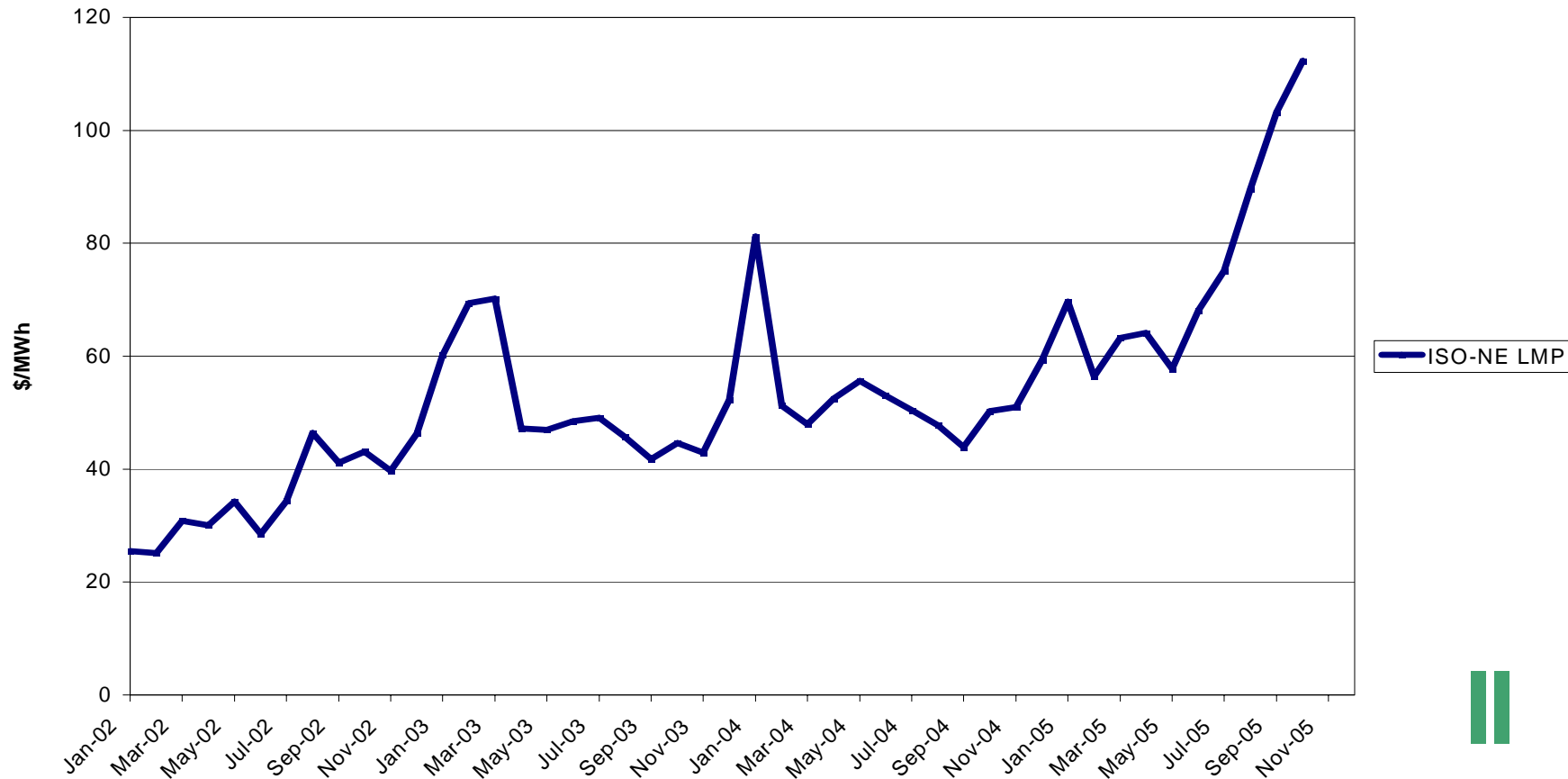
*\* America's legal system will critically affect how humanity deals with this*

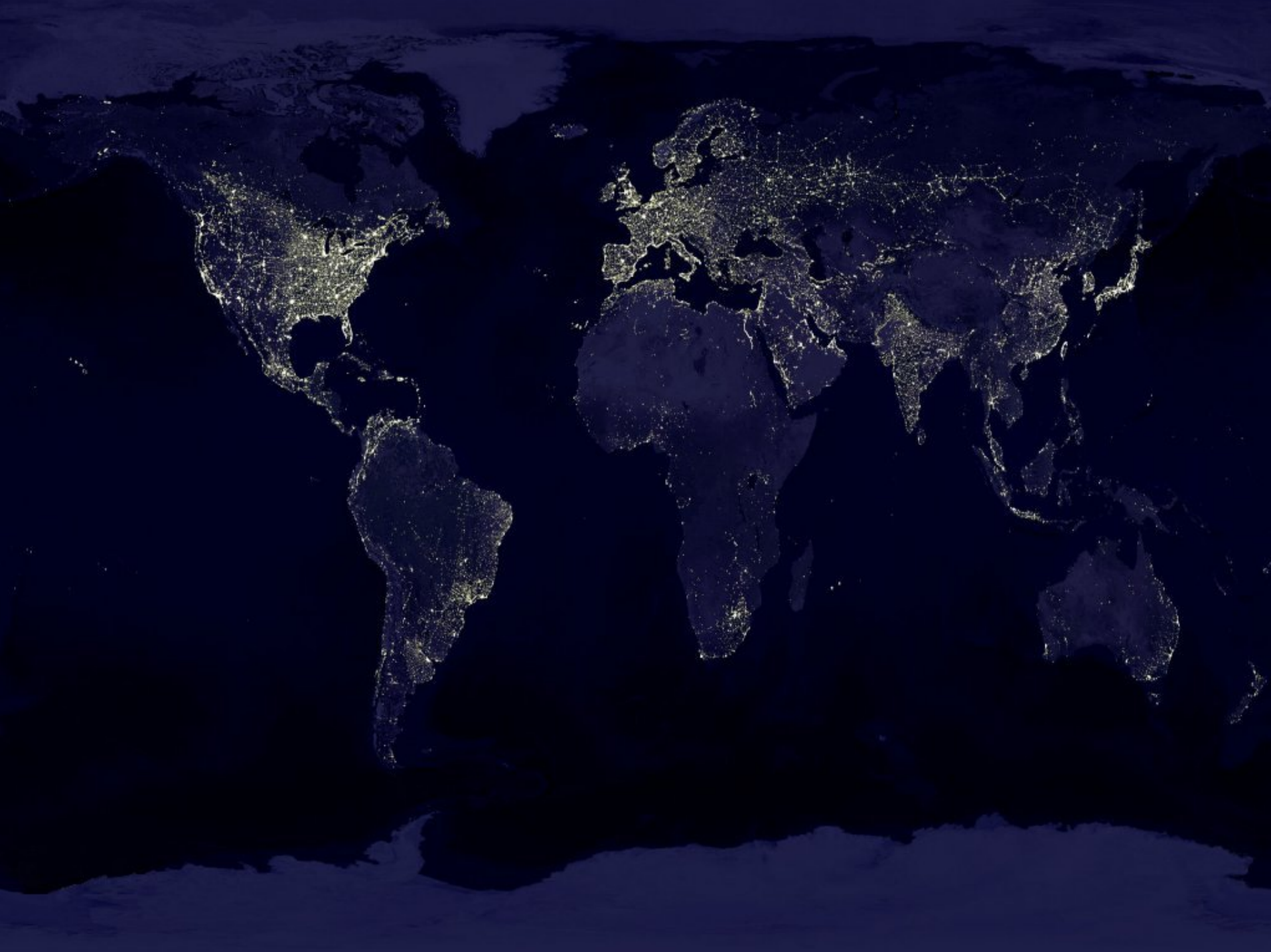
*\* Vermont Law teaches people how to work with -- and improve -- that system.*

# Why Invest in Efficiency ?

Here are recent prices for wholesale electric power (not including delivery!)

## ISO-NE Locational Marginal Price Jan 2002 - Oct 2005





Why Will Energy Prices Stay High ?

World Fundamentals Will Drive Oil & Gas Prices

Oil & Gas Will Drive Coal and Uranium Pricing

**6.1 Billion People in the world of 2000**

**0.6 Billion averaging 10,000 kWh/household (US level ca. 12,000)**

**2.0 Billion averaging 5,000 kWh/household (typical Latin/Eastern Eur)**

**2.0 Billion averaging 1,000 kWh/household (typical Asia, Africa)**

**1.5 Billion without electricity**

**What happens if 5.5 billion people want 5,000 kWh/ year in 2025 ?**

**Answer: about 200% of 1990s' electricity demand**

**What happens if 9 billion people want 5,000 kWh/year in 2030 ?**

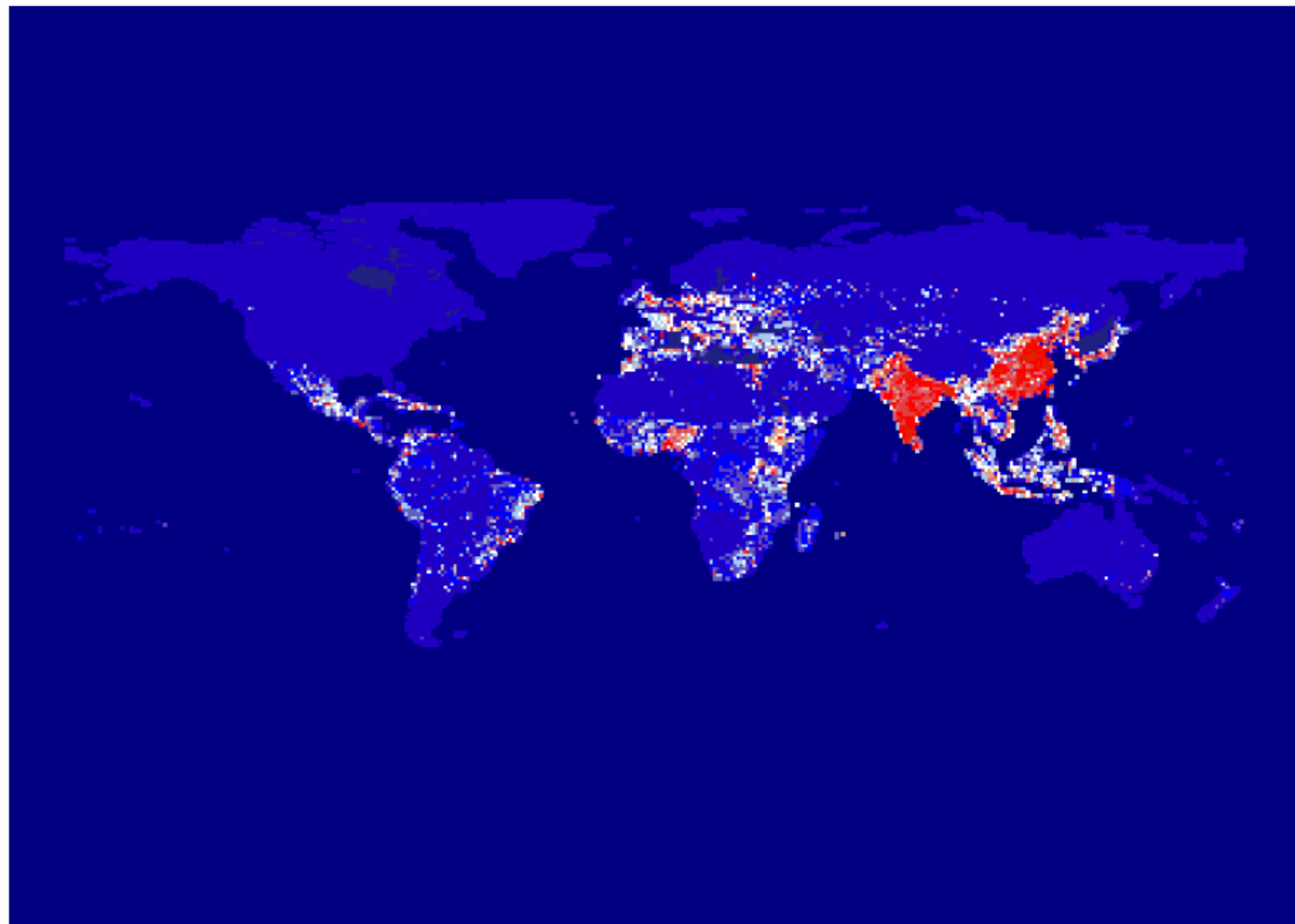
**Answer: almost 300% of 1990s' electricity demand**

**What happens if 9 billion people want 10,000 kWh/year in 2030 ?**

**Answer: over 500% of 1990s' electrical demand.**

Pareto assumption – new need met without reducing current usage levels of 600mm

Increases in light flux if everyone outside USA lit like USA (1996-7),  
Or latent electricity demand, blue to white to red color ramp



Source: Nadja Makarova Victor & Jesse Ausubel, 2004

Between 1999 and 2005 Vermont doubled its commitment to strong energy efficiency programs. The result?

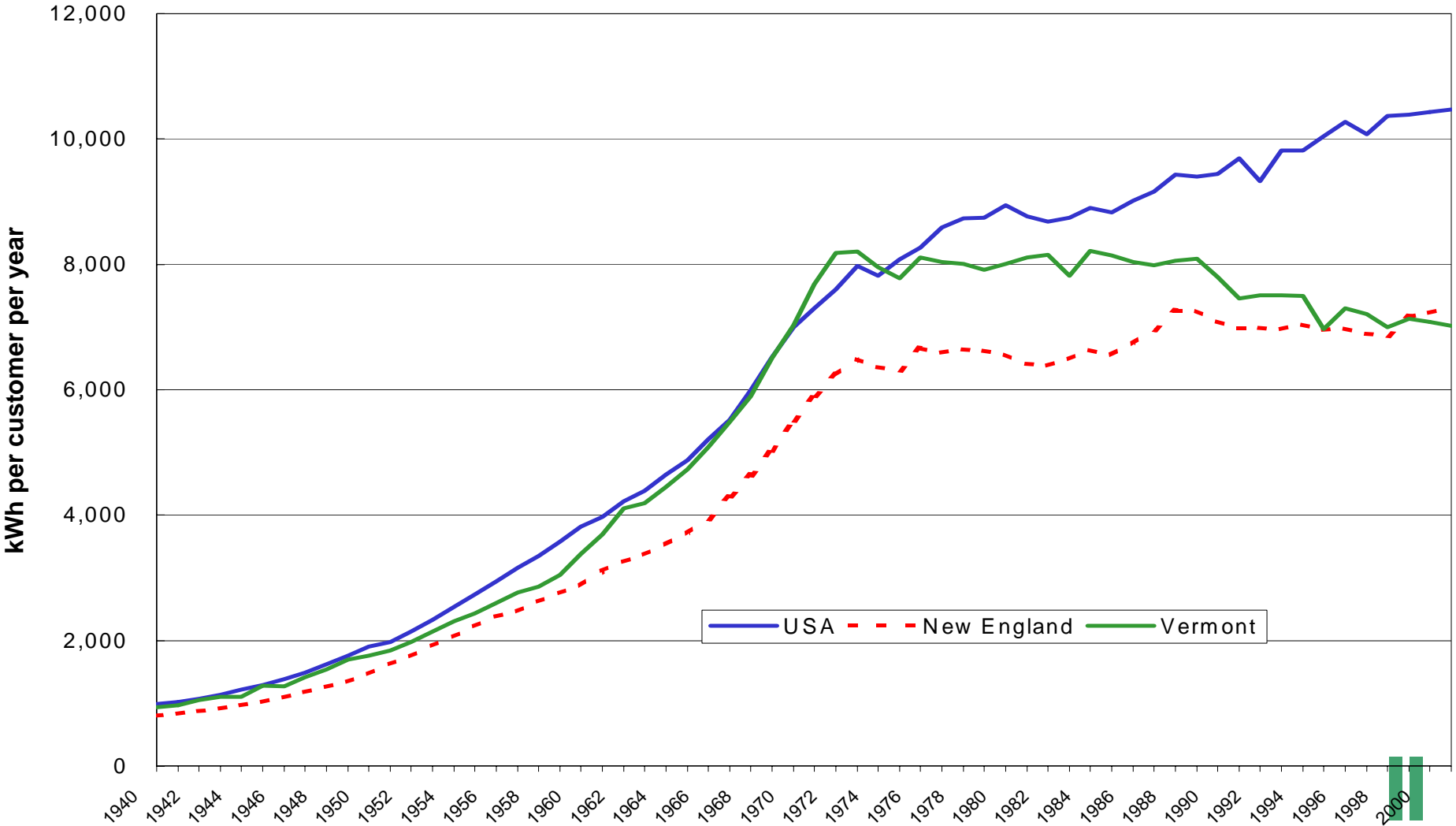
**Lowering the burden** of electric costs for Vermont residents and businesses:


In 1999, Vermont and NY had highest electric rates of seven north-eastern states; by 2005 we had the lowest such rates.

More importantly than rates, the burden went down.

- Commercial & Industrial electric costs dropped from 1.9% of Gross State Product to less than 1.6%.
- Residential electric bills dropped from 3.9% of disposable personal income to 3.3%.

# Residential Electricity Use kWh per customer per year, 1940-2001





**Since it was established, Vermont's Energy Efficiency Utility has cut Vermont's rate of electricity load growth by 50%.**

**Efficiency Vermont is now meeting 5% of Vermont's electricity needs and is on path to meet well over 10% of our requirements by 2012.**



What is:

# Efficiency Vermont

The nation's first energy efficiency utility

Established by regulatory order and supporting legislation

Implements energy efficiency as a least-cost resource to meet Vermont's electric power needs



# Key Design Features

Funded by a “System Benefits Charge”  
(~2% of bills)

A single, statewide administrator, acting as:  
“Efficiency Vermont”

Selected through competitive performance  
bidding

Independent, non-utility contractor, under a  
multi-year, performance-based contract with  
the Vermont Public Service Board, with  
significant \$ holdback



# The Performance Contract

Competitively bid (for most savings, not for lowest price)

Initial 3-year term with \$27 Million budget; Extended 3 more years for \$45 Million more; just extended by my successor for “3 + 3” at \$17.5 Million per year (\$104 mm).

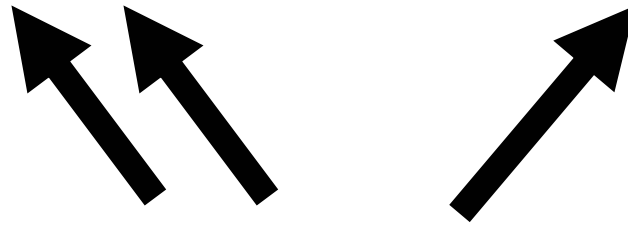
Performance contract is based on a set of carefully chosen, measurable and verifiable indicators.



Objectives Deliberately Pull in Different Directions

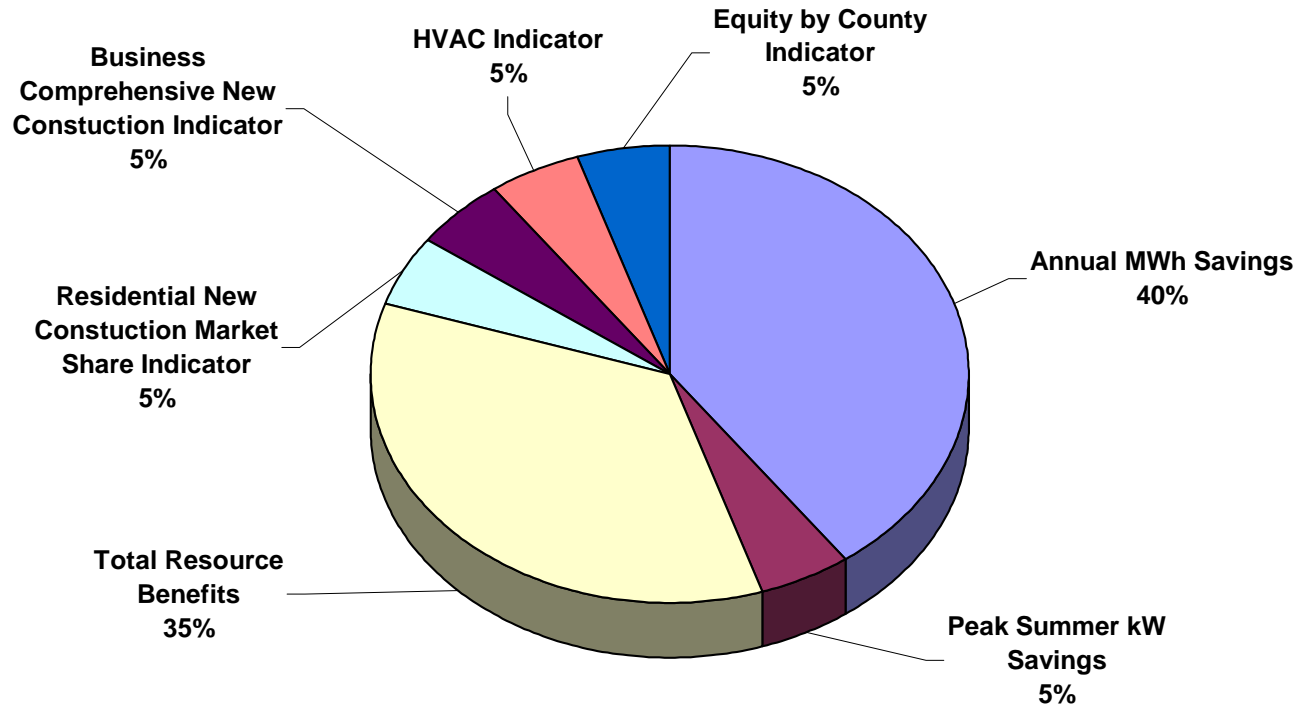
**More Resource  
Acquisition**

**More Participation  
& Equity**

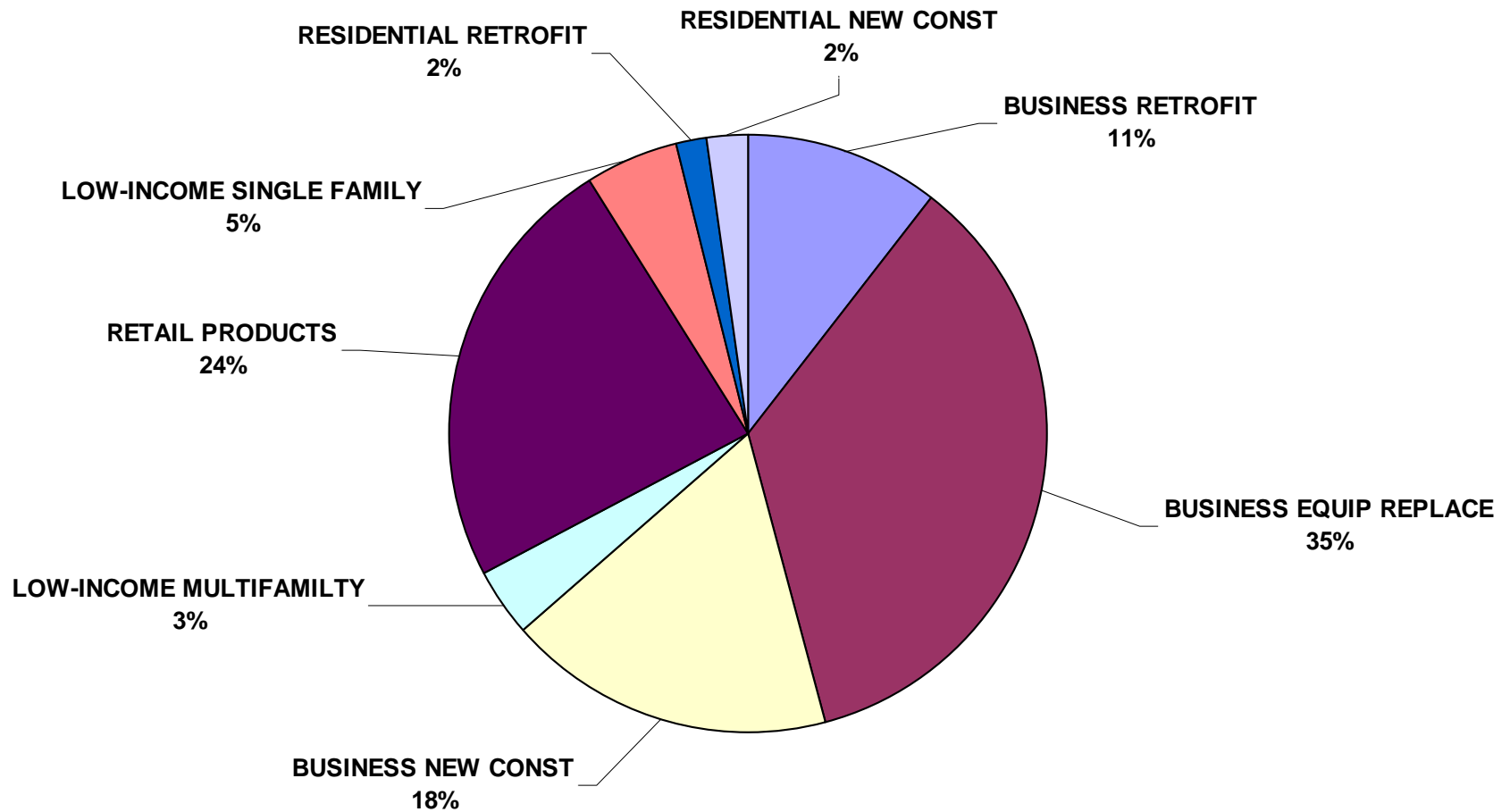


**More Market  
Impacts**

# Weighting of Performance Indicators



# 2004 Savings Distribution



# Statewide Participation and Results through 2003

- **98,000 Participants**
  - **30%** of all electric customers
- **156 Million kWh/yr Being Saved (3%)**
- **Peak Savings:           19MW Summer**  
**34MW Winter**
- **\$143 Million Economic Value**

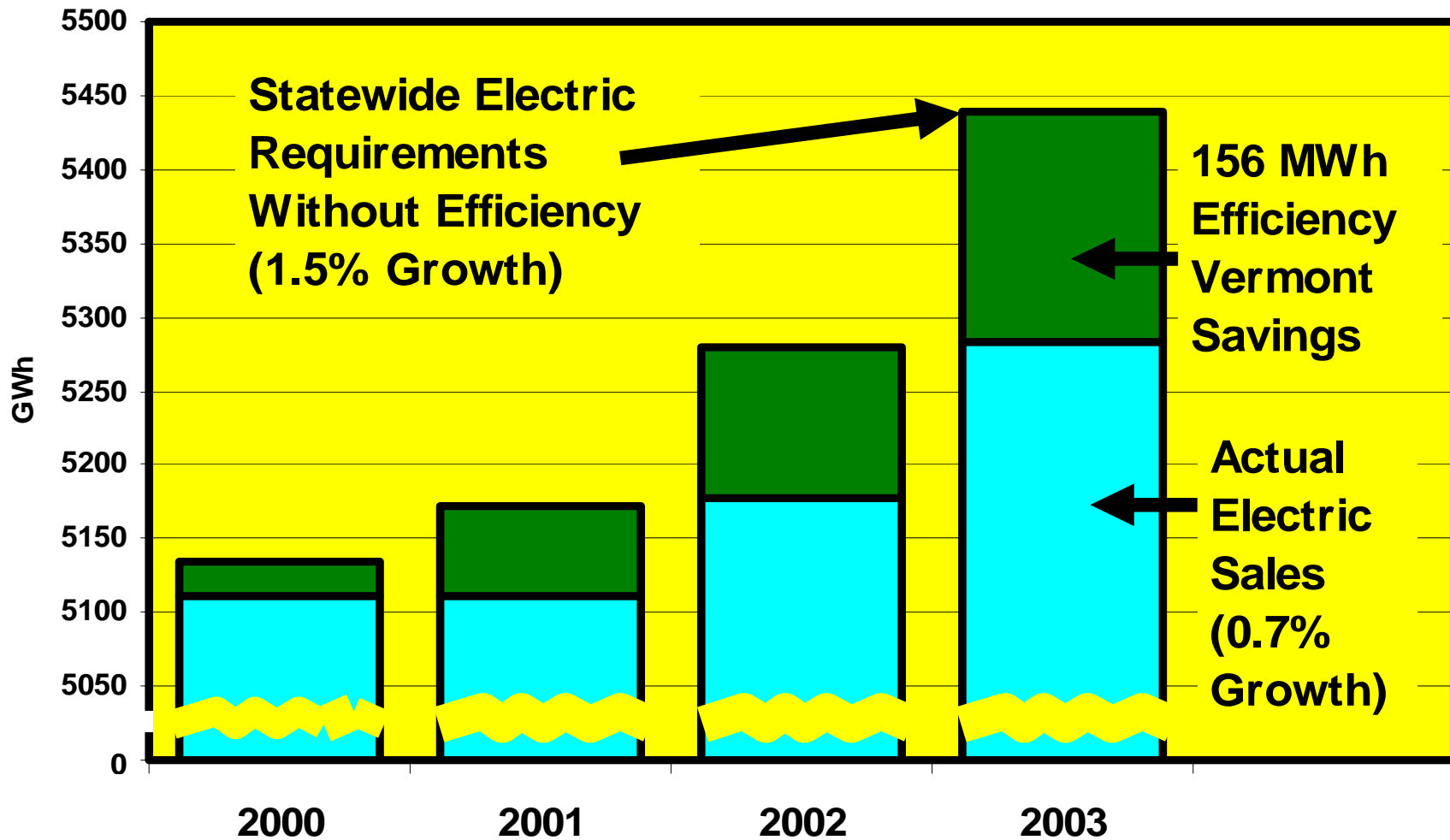


## DISTRIBUTION OF PARTICIPATION AND BENEFITS BY COUNTY 2000 – 2003

LEGEND: GREEN: % DISTRIBUTION OF EFFICIENCY VERMONT PARTICIPATION | RED: LIFETIME ECONOMIC BENEFIT FROM EFFICIENCY INVESTMENTS

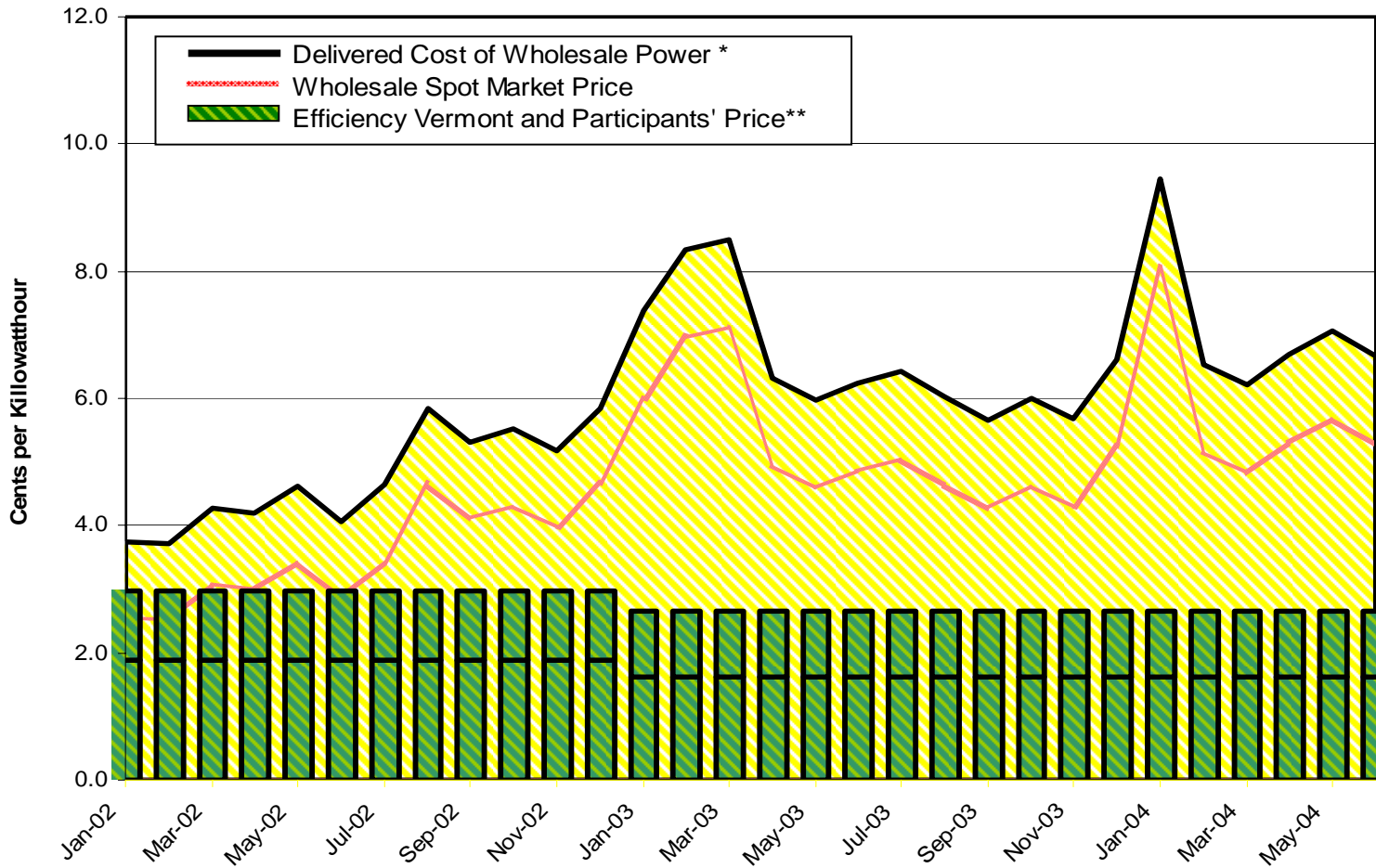


# Impact on Vermont Energy Use



# Power Costs vs. Efficiency Vermont Costs, 2002 - 6/2004

## NE-ISO Average Monthly Price



**Efficiency Savings:**  
 from  
 <1 cent/KWh  
 (Jan 2002),  
 to more than  
 6 cents/KWh  
 (Jan 2004).

\* Delivered cost = Wholesale cost (actual monthly) plus 1.38 cents/kWh delivery cost (2003 average)

\*\* Includes customer credit; bar is split between 1) EVT contract and 2) participant / 3rd party costs (based on year-long avg)

# Market Potentials– and Results

## **Nation-Leading Market Shares**

- Highest 2002 Efficient Residential Air Conditioning Share (61%)
- Highest 2003 Efficient Washer Share (62% in 3<sup>rd</sup> Quarter)
- 2002 Share for Energy Star Homes: 25%

## **High Participation of Lighting and Appliance Dealers**

## **High Participation in Key Markets**

- Affordable Housing
- Commercial and Industrial New Construction



# What might be worth consideration for you?

## Statewide labelling:

- Allows customer-based approach
- Widespread availability / equity really is important to address - for social/political acceptance (something for everyone)
- Can greatly reduce difficulties of coordinated parallel delivery
- Cost savings
- *Strong emotional appeal for many citizens !*
- **Alternative:** Statewide Label and Multi-Utility Advertising:
  - How Does Ark-Efficiency sound ?



# What might be worth consideration for replication in other states?

## **Performance-based \$ holdback**

Focuses on performance results and improves performance relative to costs

- Establishes a high level of accountability
- Reduces regulatory costs; puts responsibility for achieving priorities at daily decision point
- Multi-year commitment provides some stability for planning and longer-term strategies
- Option for third-party or for utility ‘below the line’



What might be worth consideration for replication in other states?

## **Business Structure for efficiency efforts**

- **A single administrator for statewide efforts ?**
- **Not part of State government**
- **Or:**
- **Utility Staff (Cost of Service or ‘Below Line’)**
- **Utility Affiliates / Subsidiaries**
- **Multi-Utility Joint Venture**



## *Do Business Structures Matter ?*

*Yes....but....not as much as commitment to success.*

There are lots of ways to seek energy efficiency.

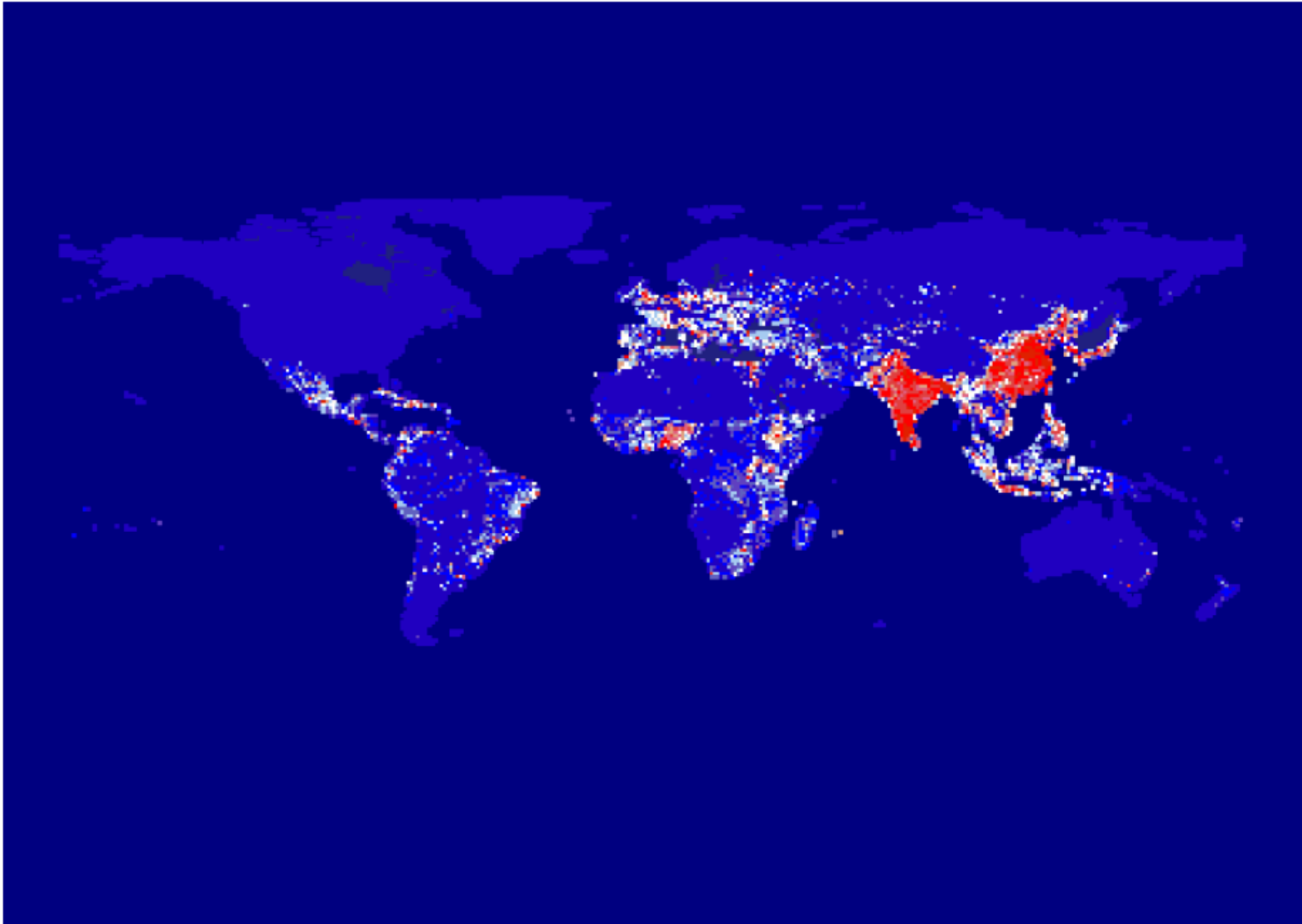
But the differences among the different ways of doing it aren't as big as the difference between doing it any reasonable way and not doing it at all.

So.... Its more important to get started with pretty good programs than to take a decade trying to find the perfect program through theoretical analysis.

We learned more by trying than by theorizing...and we saved energy and dollars as we learned.



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# What “Resources” Do You Need ?

## Situational Resources

### Need

- Rising Power costs
- Rising Infrastructure costs and impacts
- Environmental Concerns (especially GHG)

### Opportunity/Potential

- New Technologies
- Unused Expertise
- Social Willingness
- Regulatory Backbone

### Decisions/Questions

- State wide vs utility/region
- Prime actor: utility, 3d party, governmental
- Goals/Targets....
- Commitment (term: 3+ 3? Ten years?)

## Resource Tools

### Legal

- Model Statute (or existing authority)
- Model Regulations
- Model Order

### Business

- Model RFP or Notice of Proposed Order/Rule
- Model Performance-Contract or Acquisition Mandate
- Financing or Rate-Order

### Implementation

- Skilled People !!!!!
- Software (do NOT underestimate this)
- Customer usage data
- Offices



# What “Resources” Do You Need ? Content for the Abstraction

## Situational Resources

### Need

Rising Power costs  
Rising Infrastructure costs and impacts  
Environmental Concerns (especially GHG)

Marginal cost, delivery charges and losses, reserves, etc  
T & D stresses over \$ x billion  
kWh Generation as key to fossil fuels

### Opportunity/Potential

Under-Used Technologies  
Unused Expertise  
Social Willingness  
Regulatory Backbone

Super T8/LED, variable motors, insulation  
Design, Awareness, Assessment  
Care, knowledge, aggregation  
Expertise re avoided costs, risks in future, nodal point

### Decisions/Questions

State wide vs utility/region  
Prime actor: utility, 3d party, governmental  
Goals/Targets....  
Commitment (term: 3+ 3? Ten years?)

Symbolism, Marketing, Jurisdiction,  
Incentives, expertise, acceptability  
Technical, C/E, Achievable:: Flat or dropping kWh/kW  
Effectiveness, financing, training, incentives/PBR

## Resource Tools

### Legal

Model Statute (or existing authority)  
Model Regulations/Rules  
Model Order

Public Benefits, Avoided Costs, Necessity & Convenience  
??  
Vt 1990, Calif stacking order 2005, BPA/NWPCC ?

### Business

Model RFP or Notice of Proposed Order/Rule  
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Nat En Effic Action Plan Draft NOPR  
Vt PSB/EVt Contract, Calif PSC Order  
ESCO/BizRep, ERAM/ACE, Lost Rev

### Implementation

Skilled People !!!!!  
Infrastructure  
Software (do NOT underestimate this)  
Customer data  
Offices

Incentives to draw them: finance..education.. motive  
Trade partners, skilled professionals, distribution chains  
Referrals, financials, CSR support, payback, back office  
Usage, contact, offers, achievement, Customer Service  
Presences, Credibility, Example!