

## **Energy-Efficiency Potential Studies**

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## **Energy Efficiency Potential Studies Conducted**

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**Vermont Statewide Update – Achievable  
of Technical Potential**

➤ **for VT Department of Pubic Service  
(w/VEIC)**

**NW Vermont – Achievable of Technical**

➤ **for Vermont Electric Power Company  
(VELCO) (w/VEIC)**

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## **Energy Efficiency Potential Studies Conducted - continued**

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### **Michigan – Achievable of Economic**

- for MI Department of Consumer & Industry Services (w/VEIC)

### **Maine – Achievable of Technical**

- for ME Office of Public Advocate (w/VEIC)

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## **Energy Efficiency Potential Studies Underway**

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### **New York State – Technical/Economic/ Achievable of Technical/Program Funding Constrained**

- for NYSERDA (w/VEIC/ACEEE)

### **Long Island – Achievable**

- for Long Island Power Authority (LIPA) (w/VEIC)

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## **Summary of Electricity (or All Fuels) Savings Potential Studies**

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(from higher to lower estimates of savings potential)

- **Technical Potential = complete penetration of all measures analyzed in applications where deemed technically feasible from engineering perspective**
- **Economic Potential = technical potential of measures cost-effective when compared to supply-side alternatives**

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## **Summary of Electricity (or All Fuels) Savings Potential Studies - continued**

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- **Achievable Potential = technical or economic potential achieved over time under most aggressive program scenario possible**
- **Program Funding Constrained Potential = savings in response to specific program funding & measure incentive levels (includes projections of future codes & standards)**

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Area(s) Covered	Type of Savings Potential	Year Completed	Analysis Author(s)	Comments
California	Tech./Econ./Ach. of Econ./Prog.Fund.Constr.	2002	Xenergy	Integrated measures not addressed; agriculture included in industrial sector
Massachusetts	Achievable of Economic	2001	RLW Analytics/SFMC	Excludes non-utility impacts & low income savings/sales
Michigan	Achievable of Technical	2002	OEIWEI	Residential savings also for natural gas
NJ, NY, PA	Achievable of Economic	1997	ACEEE	Residential savings are for all fuels, not just electricity
AZ, CO, NV, NM, UT, WY	Achievable of Economic	2002	SWEEP/ACEEE/Tellus	Also 18-year scenario
Vermont	Achievable of Technical	2002	OEIWEI	Includes fuels switching; also 5-year scenario
VT Electric Power Co.	Achievable of Technical	2002	OEIWEI	Excludes measures with little peak demand, that require regional coordination, and emerging technologies; includes fuels switching; also 5-year scenario
New York City	Achievable of Technical	2003	Resource Insight	
National	Program Funding Constrained	1997	U.S. DOE	Addresses all fuels; also 23-year scenario
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Area(s) Covered	Estimated Consumption Savings as % of Sales				Estimated Summer Peak Demand and Savings as % of Total Capacity	Years to Achieve Estimated Savings Potential
	Residential	Commercial	Industrial	Total		
California	21% 15% 10% 8%	17% 13% 10% 7%	19% 12% 11% 4%	19% 14% 10% 6%	25% 16% 10% 6%	10
Massachusetts	25%	16% -C&I		N.A.	N.A.	5
Michigan	10%	19%	6%	12%	N.A.	10
NJ, NY, PA	35%	35%	41%	N.A.	N.A.	14
AZ, CO, NV, NM, UT, WY	14%	20%	19%	18%	N.A.	8
Vermont	30%	32% -C&I		31%	37%	10
VT Electric Power Co.	18%	17% -C&I		17%	23%	10
New York City	4%	9%	<1%	8%	N.A.	5
National	9%	8%	11%	10%	14%	13
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## **VT Statewide Energy Efficiency Potential Study Scope**

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- **Mid-term (10 years)**
- **Electricity (includes fuel switching & accounts for fossil fuel & water)**
- **All sectors & markets**
- **Available technologies / emerging technologies / retail products**

## **Residential Analysis Approach**

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**Analysis built “from the ground up”:**

- **End use disaggregation**
- **ID & characterize measures (e.g., per unit energy savings/cost, demand savings, duration of savings)**
- **Characterize markets (new const., retail, retrofit)**
- **Estimate baseline & efficiency market penetrations**

## **50 Residential Technologies – 90 Measures**

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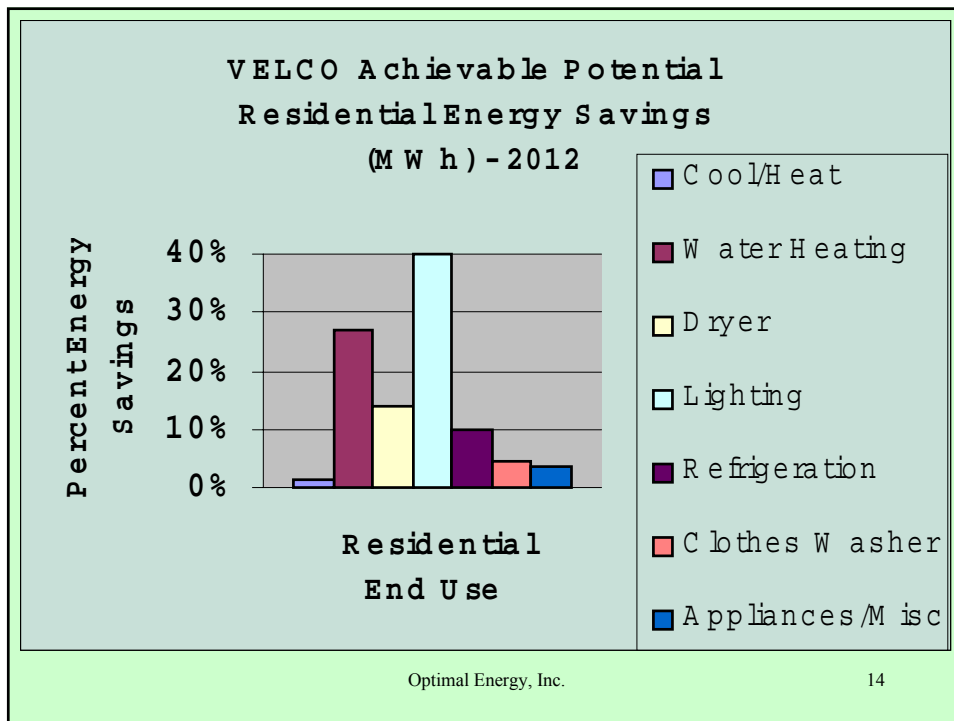
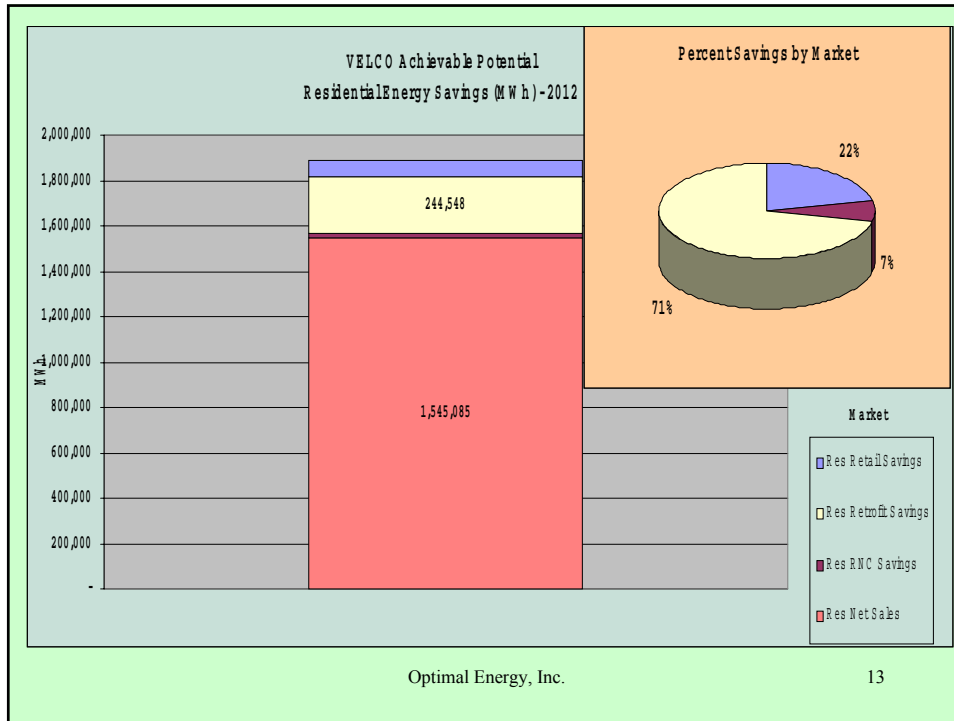
- Heating / Cooling / Heat Pump (emerging technology)
- Water Heating
- Refrigeration
- Lighting
- Clothes Washing / Dishwashing / TVs / Pools
- Miscellaneous (e.g., Consumer Electronics – emerging technology)

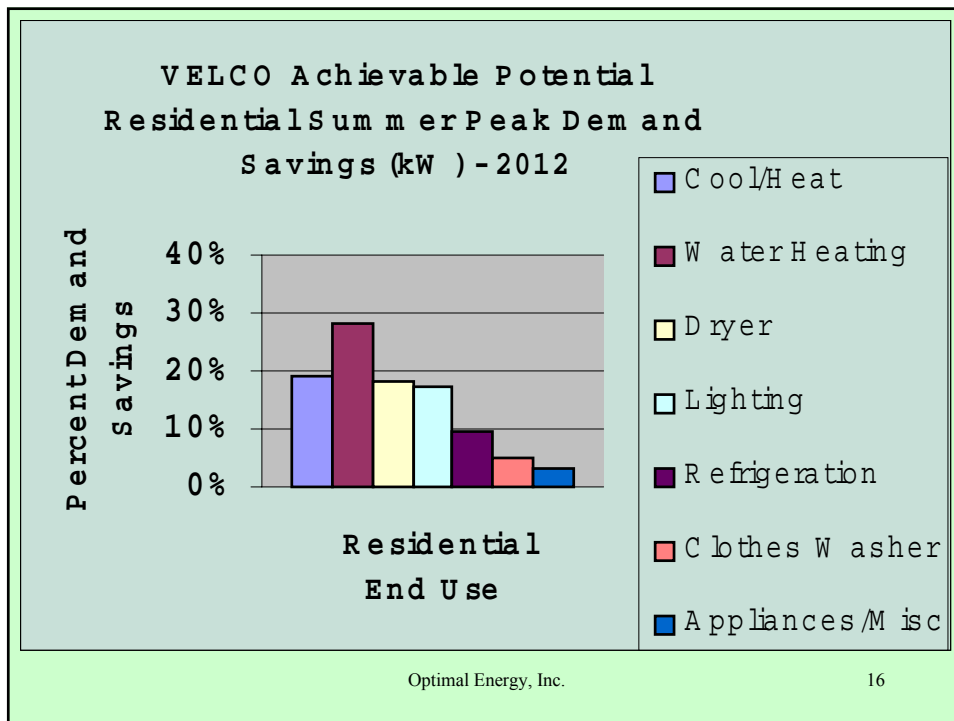
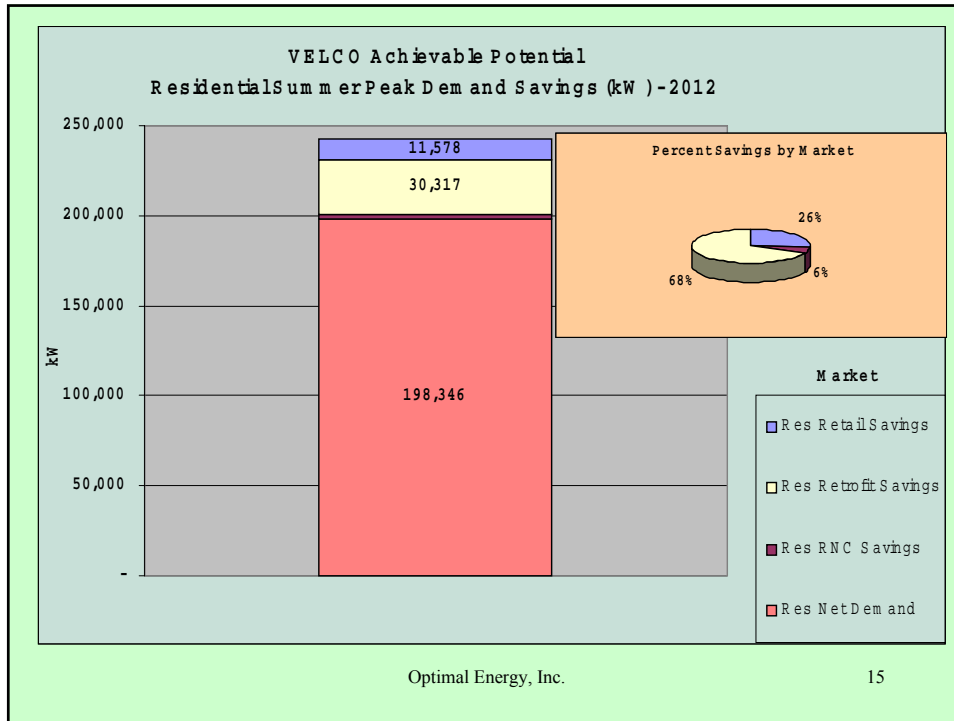
## **Residential Analysis Information Sources**

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### **VT Statewide Update:**

- US EPA Energy Star® Program results
- VT DPS Residential Energy Assessment
- US EIA Residential Energy Consumption Survey (RECS)
- Historical VT DSM program experience







## Commercial & Industrial Analysis Approach

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Analysis takes a “top-down” approach:

- Forecast disaggregation into building types and end use categories
- ID & characterize measures (e.g., per unit energy savings/cost, demand savings, duration of savings)
- Characterize markets (new constr. & existing)
- Technology factors applied to building type / end use sales

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## Commercial & Industrial Analysis Basic Methodology

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**Annual Measure Achievable Potential**  
(T8 vs. T12 fixture remodel)

<b>Building End Use Sales Per Year</b>		<b>100,000</b>
<b>MWh</b>		
× <b>Applicability Factor</b>	<b>80%</b>	<b>80,000</b>
× <b>Feasibility Factor</b>	<b>100%</b>	<b>80,000</b>
× <b>Turnover Factor</b>	<b>6.7%</b>	<b>5,333</b>
× <b>Savings Factor</b>	<b>20%</b>	<b>1,067</b>
× <b>Annual Net (Achievable Base Case) Penetration</b>	<b>10%</b>	<b>106.7</b>

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## **Commercial & Industrial Analysis Penetration & Stock Turnover**

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- **Base case penetrations individually estimated for each measure**
- **Existing construction markets interact & effect stock turnover model**
- **Overlapping & interacting measures accounted for**

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## **Commercial & Industrial Analysis Information Sources**

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### **VT Statewide Update:**

- **Utility sales data by SIC**
- **US EIA Commercial Building Energy Consumption Survey**
- **National organizations (e.g., ACEEE, LBNL, NBI)**
- **Utility, statewide and regional baseline & market assessments for Northeast US**
- **RER hourly load shapes by building type & end use**
- **CEC energy efficiency database**
- **Manufacturers / Vendors**

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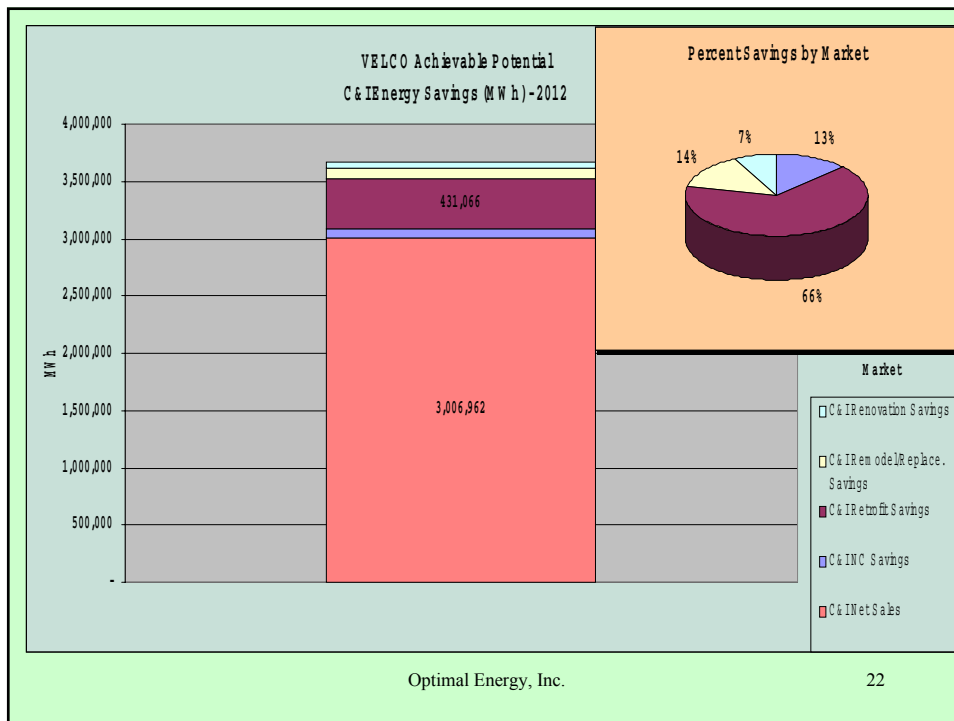
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## 84 Commercial & Industrial Technologies – 2,430 Measures

- 4 markets:
  - New construction
  - Existing (Renovation; Remodel / Replacement; Retrofit)
  
- 11 Building Types – Agriculture, Education, Grocery, Health, Industrial, Lodging, Office, Restaurant, Retail, Warehouse, Other
  
- 9 End Uses – Cooling, Exterior Lighting, Interior Lighting, Office Equipment, Refrigeration, Space Heating, Water Heating, Whole Building, Miscellaneous

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