

**Energy Efficiency and
Combined Heat & Power (CHP)
Potential Assessment:
Preliminary Regional Findings**

Council Consultants

MA EE Advisory Council Meeting

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Introduction and Caveats

- MA assessment of potential coming in June
- Presentation/memo summarize recent energy efficiency and CHP studies for Northeast U.S.
- Summary of state goals/legislative mandates
- Studies tend to be conservative
- Market results in some cases exceed study estimates for the same area at the same time
- Efficiency potential is NOT a finite resource (NY potential 30% in 1989 and 33% in 2003), despite 2 decades of significant programs.

Sources of Bias

- **Arbitrary constraints**
 - Market (e.g. lost opportunity only)
 - Program (e.g. design, funding or incentive levels)
- **Ignore technology advancement** (e.g. LED)
- **Ignore benefits** (e.g. DRIPE, full O&M)
- **Simplify by exclusion** (e.g. set unknowns at zero)
- **Ignore all system interactions**
- **Understate rate of early replacement capture**

Electric Energy Efficiency Potential

State	Year of Study	Analysis Period (yrs.)	Technical Potential (% of total forecast load)	Economic Potential (% of total forecast load)	Achievable * (% of total forecast load)	Average Annual Achievable** (% of total forecast load)	Source
Connecticut	2009	10	36.4%	33.1%	22.5%	2.3%	KEMA
Maine	2002	10	N/A	18.0%	14.0%	1.4%	Exeter/OEI
Maryland	2008	17	N/A	N/A	29.0%	1.7%	ACEEE
Mass (Nstar only)	2007	10	N/A	N/A	17.9%	1.8%	OEI
Massachusetts	2001	5	N/A	24.0%	N/A		RLW
Mid-Atlantic (NY/NJ/PA)	1997	14	N/A	N/A	37.0%	2.6%	ACEEE
New England	2004	10			23.0%	2.3%	OEI
New Hampshire	2009	10	27.6%	N/A	22.7%	2.3%	GDS
New Jersey	2003	17	N/A	17.0%	N/A		KEMA
New York	2003	20	35.1%	32.7%	N/A	N/A	OEI
Rhode Island	2008	10	28.0%	24.0%	N/A		KEMA
Vermont	2003	10	N/A	38.4%	30.7%	3.1%	OEI
Vermont	2007	10	34.6%	N/A	22.0%	2.2%	GDS
Averages		11.8	32.3%	26.8%	24.3%	2.2%	

Figures are net savings, exclusive of codes & standards savings and CHP.

Electric CHP Potential

State	Year of Study	Analysis Period (yrs.)	Technical Potential (% of total forecast load)	Economic Potential (% of total forecast load)	Achievable Potential (% of total forecast load)	Average Annual Achievable* (% of total forecast load)	Source
Massachusetts	2006	Instantaneous	62.0%	N/A	N/A	N/A	U of MA, Amherst
Massachusetts (NSTAR Only)	2007	10	N/A	N/A	3.2%	0.3%	OEI
New York	2002	10	40.4%	N/A	10.5%	1.1%	Energy Nexus
Averages		10	51.2%	N/A	6.9%	0.7%	

Figures are net savings.

Gas Energy Efficiency Potential

State	Year of Study	Analysis Period (yrs.)	Technical Potential (% of total forecast load)	Economic Potential (% of total forecast load)	Achievable * (% of total forecast load)	Average Annual Achievable** (% of total forecast load)	Source
Connecticut	2009	10	29.0%	25.0%	17.0%	1.7%	KEMA
New Hampshire	2009	10	29.2%	N/A	21.1%	2.1%	GDS
New Jersey	2003	17	N/A	30.0%	N/A		KEMA
New York	2006	10	N/A	28.3%	19.0%	1.9%	OEI
Averages		11.8	29.1%	27.8%	19.0%	1.9%	

Figures are net savings, exclusive of codes & standards savings and CHP.

Energy Efficiency Resource Standards

State	Date Established	Goal	Target End Date	Implied Annual % savings* (% of total forecast load)
Texas	2007	20% of load growth	2010	0.5%
Vermont	2008	2.0% per year (contract goals)	2011	2.0%
California	2004	EE is first resource to meet future electric needs ¹	2013	2.0% +
Hawaii	2004	.4% - .6% per year ²	2020	0.5%
Pennsylvania	2008	3.0% of 2009-2010 load	2013	0.6%
Connecticut	2007	All Achievable Cost Effective ³	2018	2.0% +
Nevada	2005	0.6% of 2006 annually ⁴	n/a	0.6%
Washington	2006	All Achievable Cost Effective	2025	2.0% +
Colorado	2007	1.0% per year	2020	1.0%
Minnesota (elec & gas)	2007	1.5% per year	2010	1.5%
Virginia	2007	10% of 2006 load	2022	2.2%
Illinois	2007	2.0% per year	2015	2.0%
North Carolina	2007	5% of load ⁵	2018	0.4%
New York (electric)	2008	10.5% of 2015 load ⁶	2015	1.5%
New York (gas)	2009	15% of 2020 load ⁶	2020	1.5%
New Mexico	2009	All achievable cost-effective, minimum 10% of 2005 load	2020	1.0% +
Maryland	2008	15% of 2007 per capita load ⁷	2015	3.3%
Ohio	2008	2.0% per year	2019	2.0%
Michigan (electric)	2008	1.0% per year	2012	1.0%
Michigan (gas)	2008	0.75% per year	2012	0.8%
Iowa (electric)	2009	1.5% per year	2010	1.5%
Iowa (gas)	2009	0.85% per year	2013	0.3%
Massachusetts	2008	All Achievable Cost Effective		2.0% +
New Jersey (electric & gas)	2008	20% of 2020 load ⁸	2020	≤2.0%
Rhode Island	2008	All Achievable Cost Effective		2.0% +

Preliminary Conclusions

- Findings vary, and generally can be viewed to be conservative estimates of the true potential.
- Including efficiency and CHP, electric potential appears likely to be around 3.0%/yr or more, and sufficient to meet requirements of GCA and GWSA.
- Vermont annual electric efficiency achievements = 2.5% statewide and 4.5% in geo-targeted areas.
- Numerous states in the region have set goals for savings of 1.5% or 2% per year or more.
- Gas efficiency appears to be in the range of 2.0%
- MA assessment of potential coming in June