

OVERVIEW OF THE SUSTAINABLE ENERGY UTILITY

Delaware Public Service Commission
Docket No. 59 (Decoupling)

John Byrne
Center for Energy and Environmental Policy
University of Delaware
June 20, 2007

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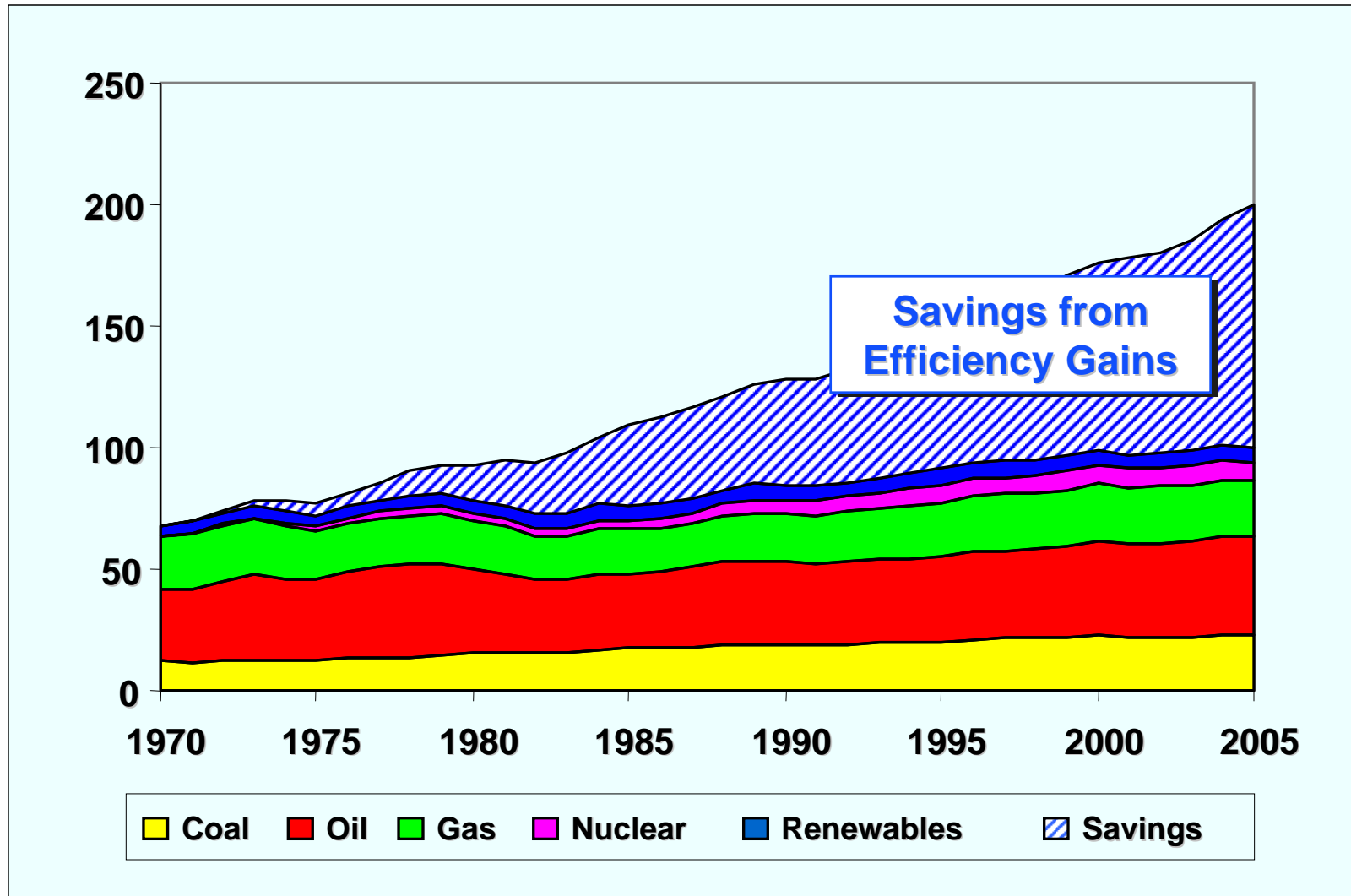
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U.S. Energy Supply by Source (Quadrillion Btu)

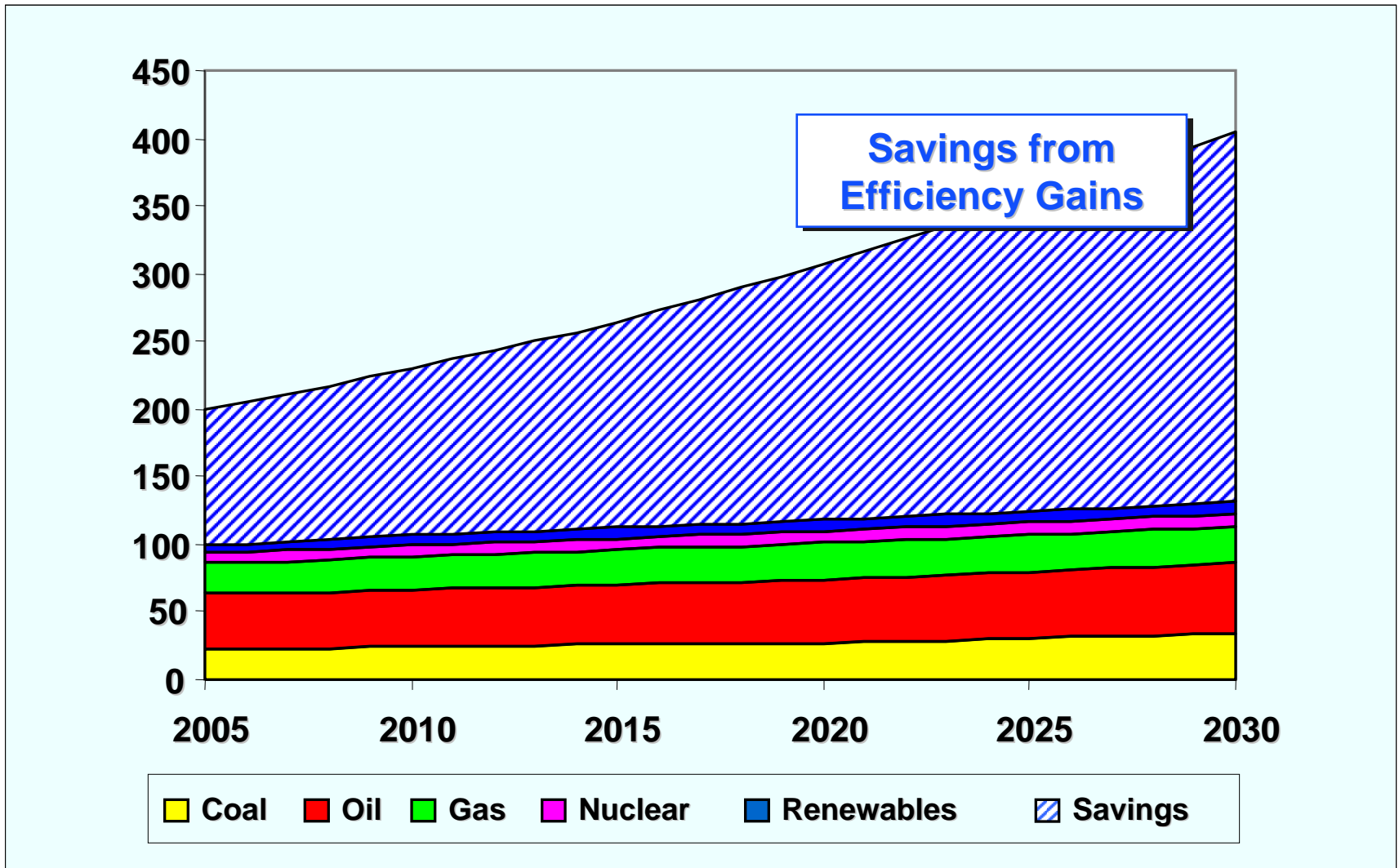


Note: Data from U.S. EIA, *Annual Energy Outlook (2007)*



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Projected U.S. Energy Supply by Source (Quadrillion Btu)



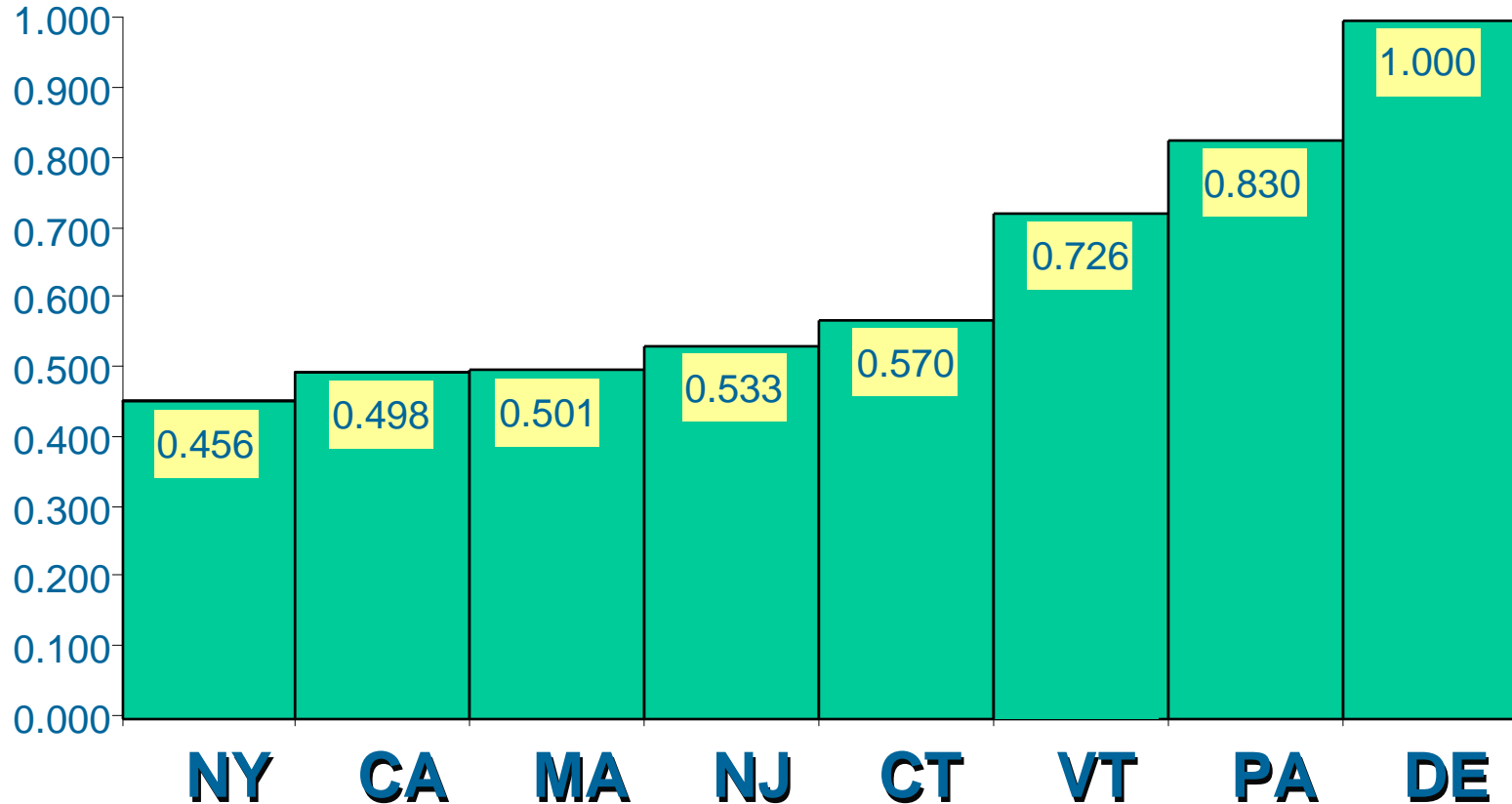
Note: Data from U.S. EIA, *Annual Energy Outlook* (2007)



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DELAWARE – A PORTRAIT OF UNSUSTAINABILITY

Residential Sector Electricity Intensity



Sources: Sustainable Energy Utility Task Force (2007)

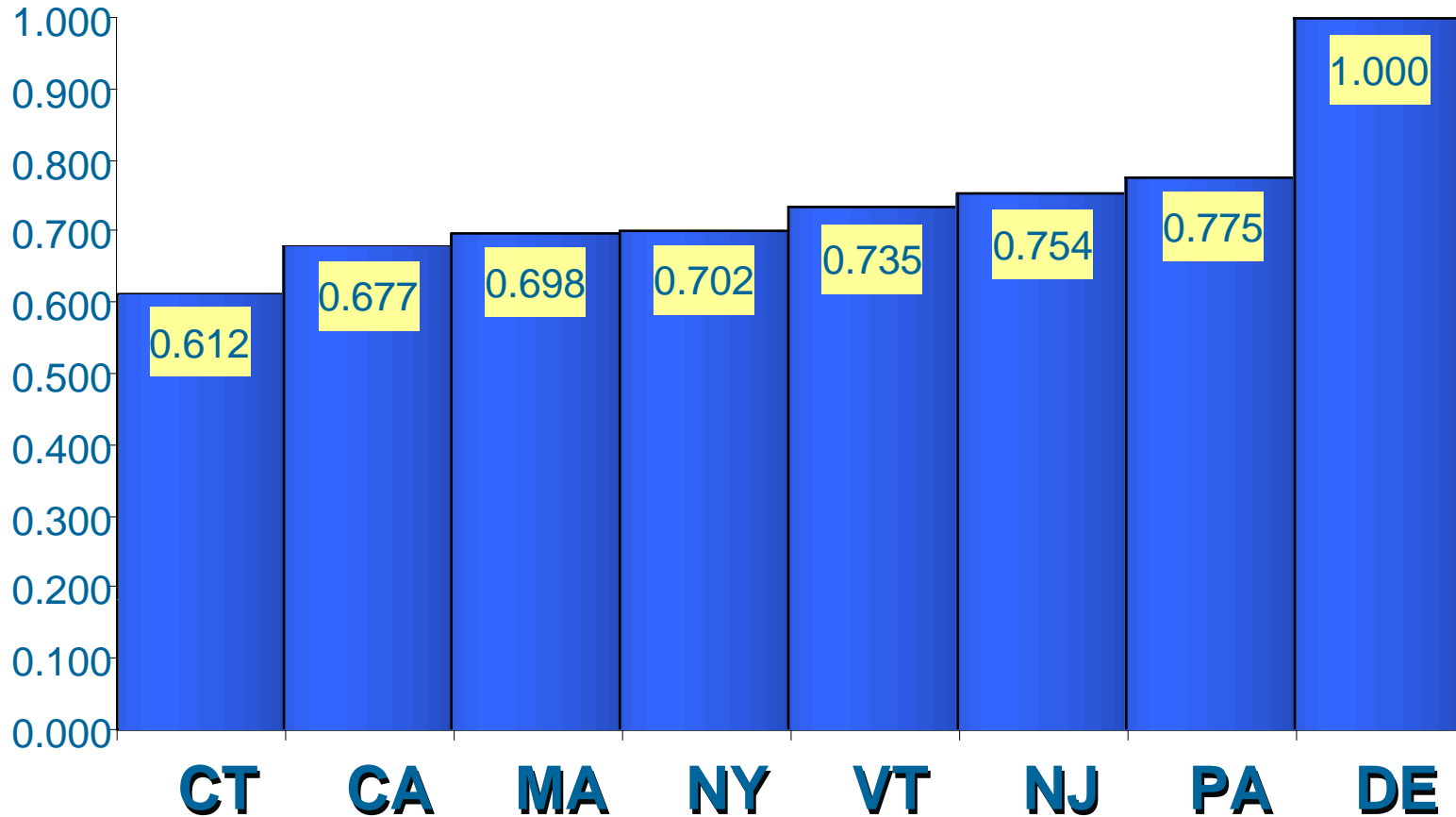
Available at: http://www.seu-de.org/docs/fina_report_brief.pdf

Statistical details available at:

http://www.seu-de.org/docs/IRP_submission_4-10-07.pdf (especially pp. 9-12).

DELAWARE – A PORTRAIT OF UNSUSTAINABILITY

Commercial Sector Electricity Intensity



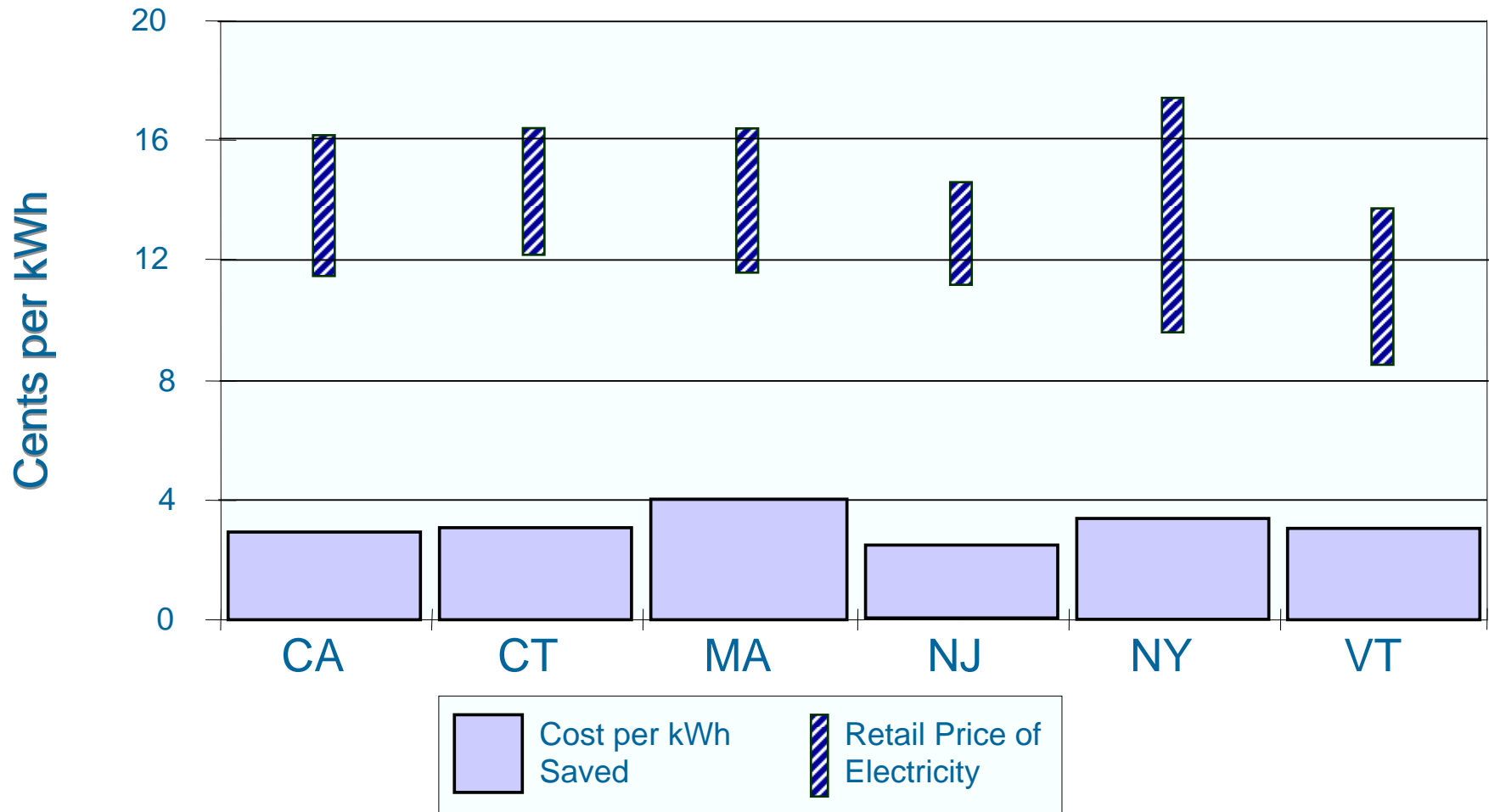
Sources: Sustainable Energy Utility Task Force (2007)

Available at: http://www.seu-de.org/docs/fina_report_brief.pdf

Statistical details available at:

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U.S. Cost per kWh Saved versus kWh Supplied



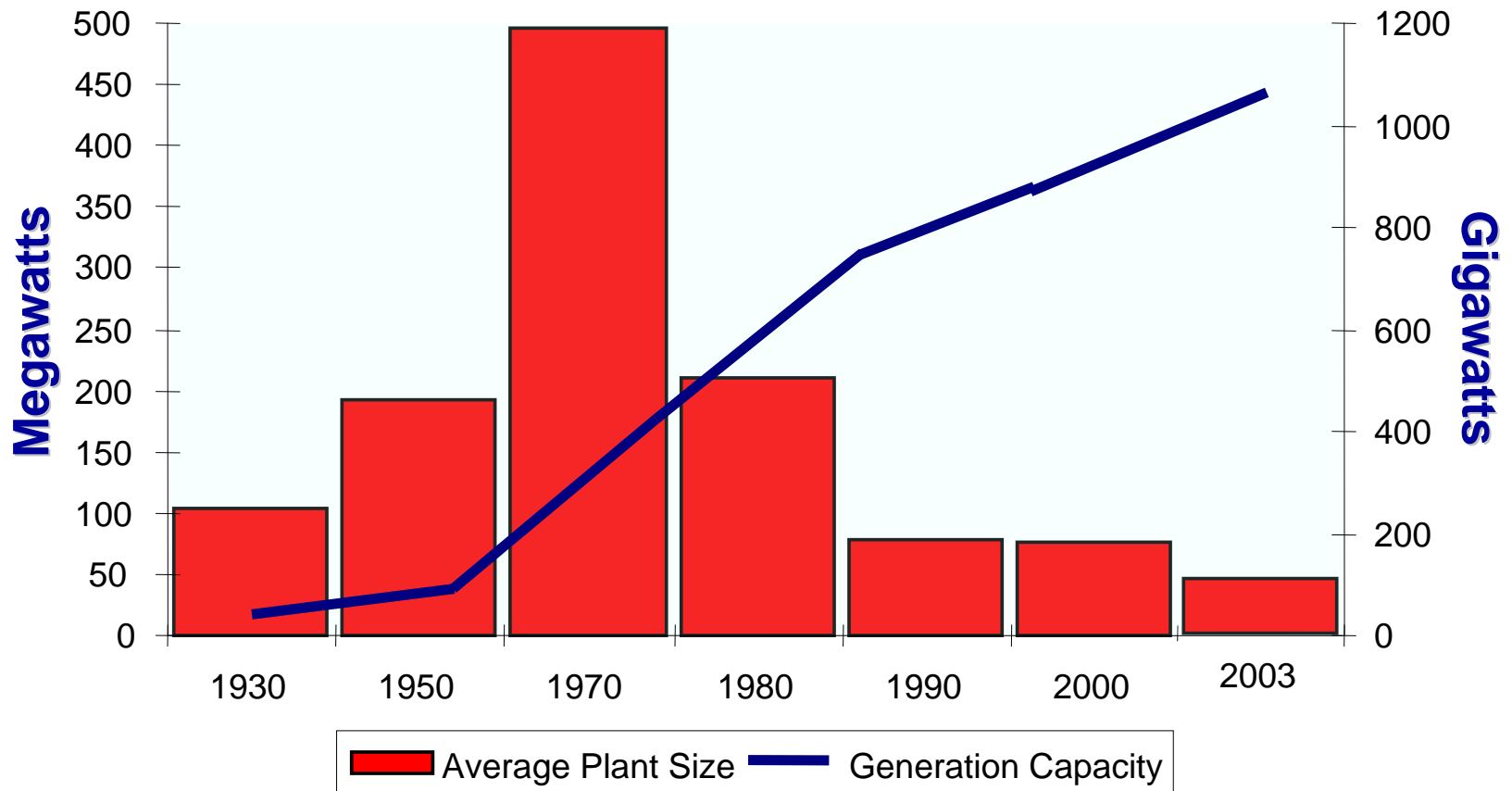
Source: Delaware Sustainable Energy Utility Task Force (2007)

http://www.seu-de.org/docs/Section_F.pdf http://www.seu-de.org/docs/Section_H.pdf and http://www.seu-de.org/docs/App_A.pdf



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U.S. Power Plant Capacity

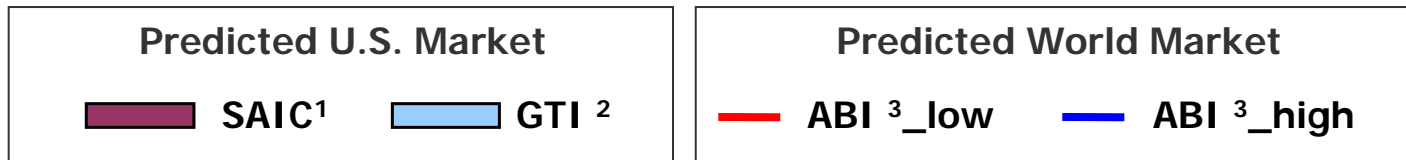
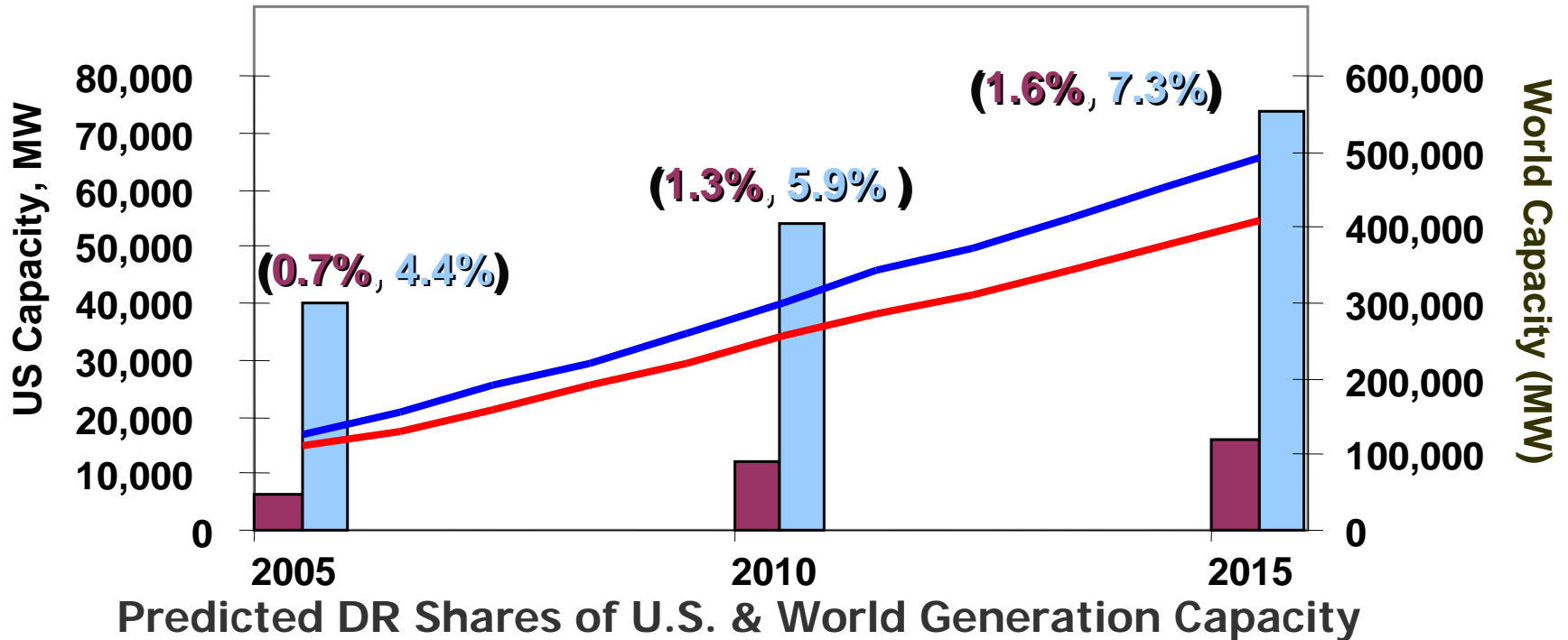


Sources: T. R. Casten (1995) *The Energy Daily* (September 7), Hirsh, 1999: 274; and *EIA Electric Power Annual* (1981, 1990, 2000, 2003)



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Projected Growth in Distributed Generation



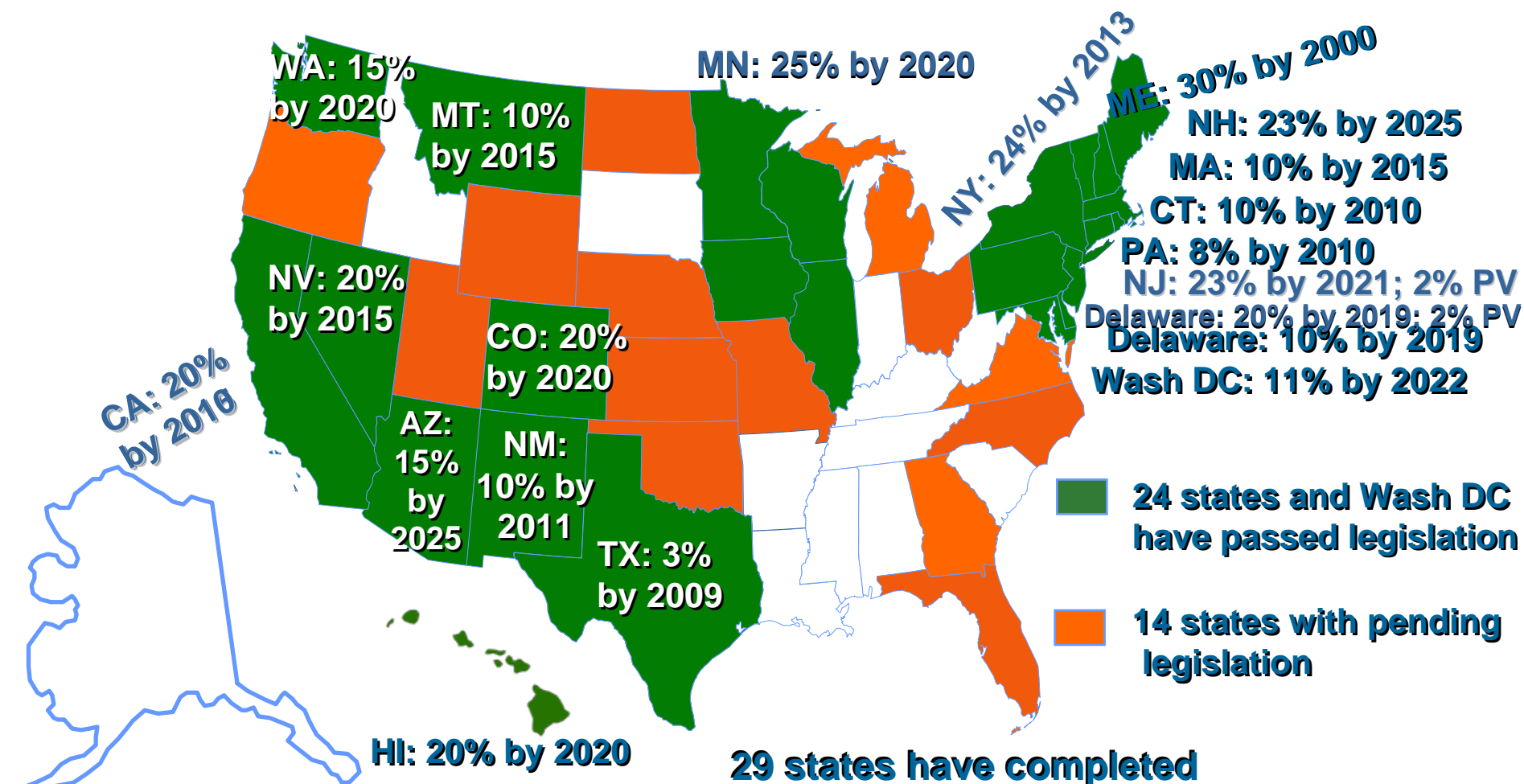
¹ Science Applications International Corp.

² Gas Technology Institute

³ Allied Business Intelligence



State Renewable Portfolio Standards in the U.S.



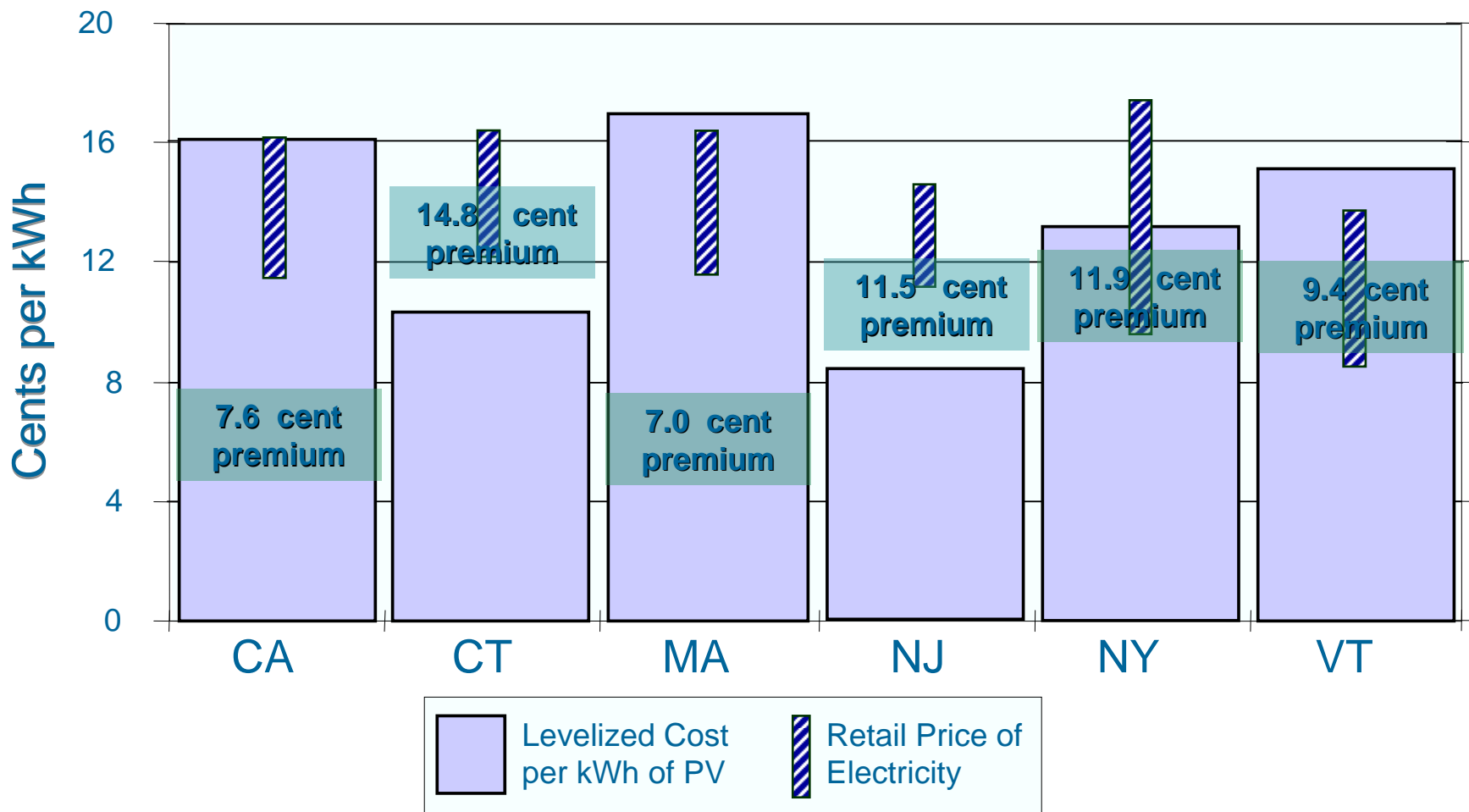
Sources: CEEP Survey, 2007;
DSIRE, 2007; UCS, 2007

**29 states have completed
Climate Change Action Plans**
<http://yosemite.epa.gov/oar/globalwarming.nsf/content/ActionsStateActionPlans.html>



Center for Energy and Environmental Policy

U.S. Cost per kWh Saved versus kWh Supplied



Source: Delaware Sustainable Energy Utility Task Force (2007)

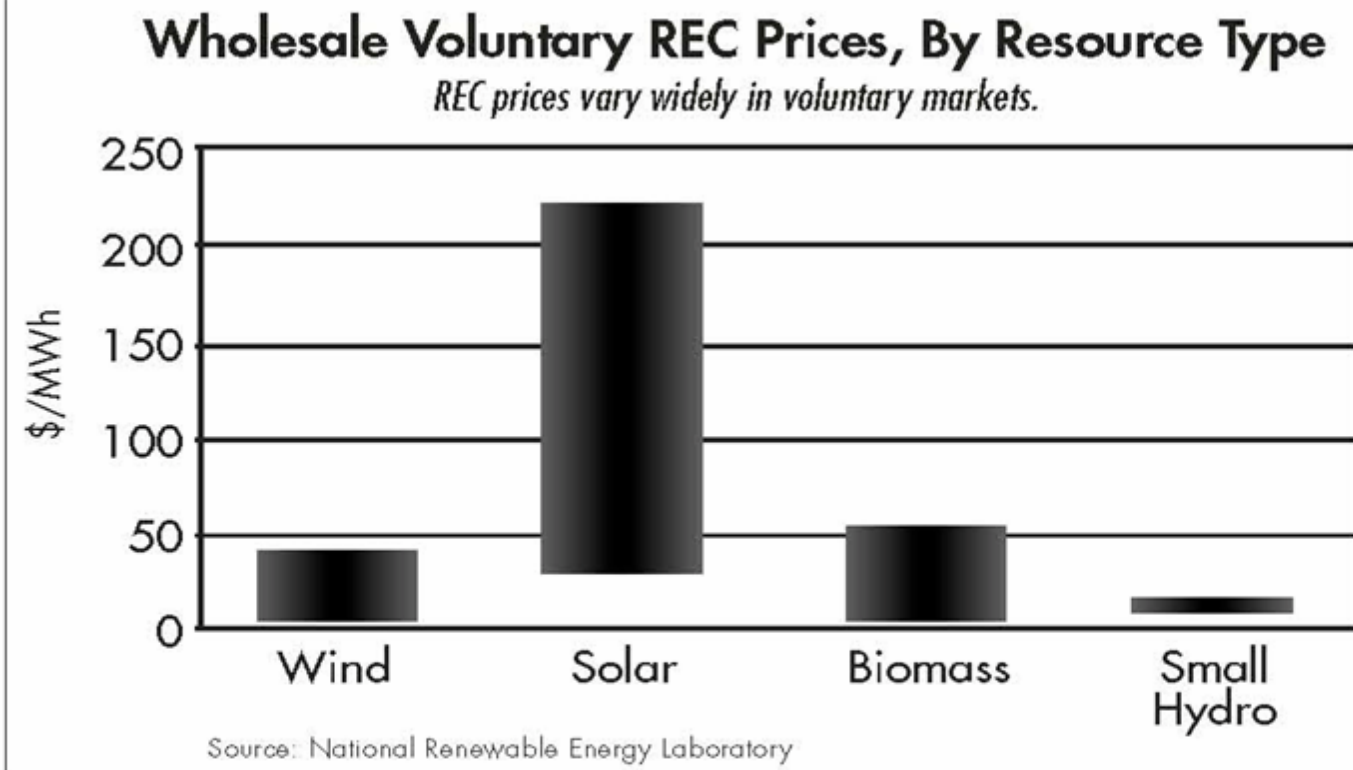
http://www.seu-de.org/docs/Section_F.pdf http://www.seu-de.org/docs/Section_H.pdf and http://www.seu-de.org/docs/App_A.pdf



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Renewable Energy Credits (RECs) Markets for Sustainable Energy

Figure 1



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New Direction – Goals of a Sustainable Energy Utility



By 2015

- ◆ Participating Delaware residents and businesses cut conventional energy use by 30%: ALL FUELS, ALL SECTORS
 - Utilize Market Transformation Rebate Programs: pay the incremental cost difference between standard and high-efficiency models
 - Create a Green Buildings Initiative: reward green renovations of existing buildings and provide tax and other incentives for new construction that contributes to Low/No Emissions Buildings
 - Adopt a Sustainable Transport Plan: set Clean Energy Vehicle Portfolio Standards; reward Employee Commute Planning; incent Carsharing

By 2019

- ◆ 20% of electrical generation serving the State to come from Renewables
 - Upgrade the Renewable Portfolio Standard (RPS) to 20% by 2019
 - Include a Solar Carveout of 2% by 2019 with High-Value Solar RECs
 - Encourage a Renewable Energy Credits (RECs) Market, providing a revenue stream to customer-sited renewables

Both Goals = 25-30% reduction in Delaware's carbon footprint



New Direction – Funding a Sustainable Energy Utility



◆ **Green Energy Fund (GEF)**

- Support Rebates for customer-sited renewables, energy efficiency & affordable energy services from a Public Benefit Charge on electricity use (\$0.000356 /kWh)
- Cost increase for the average consumer of 18 cents per month

◆ **Sustainable Energy Bond**

- Authorize \$30 million in Sustainable Energy Bonds that creates jobs, lowers energy bills and improve the environment

◆ ***Reinvest through Shared Savings and RECs***

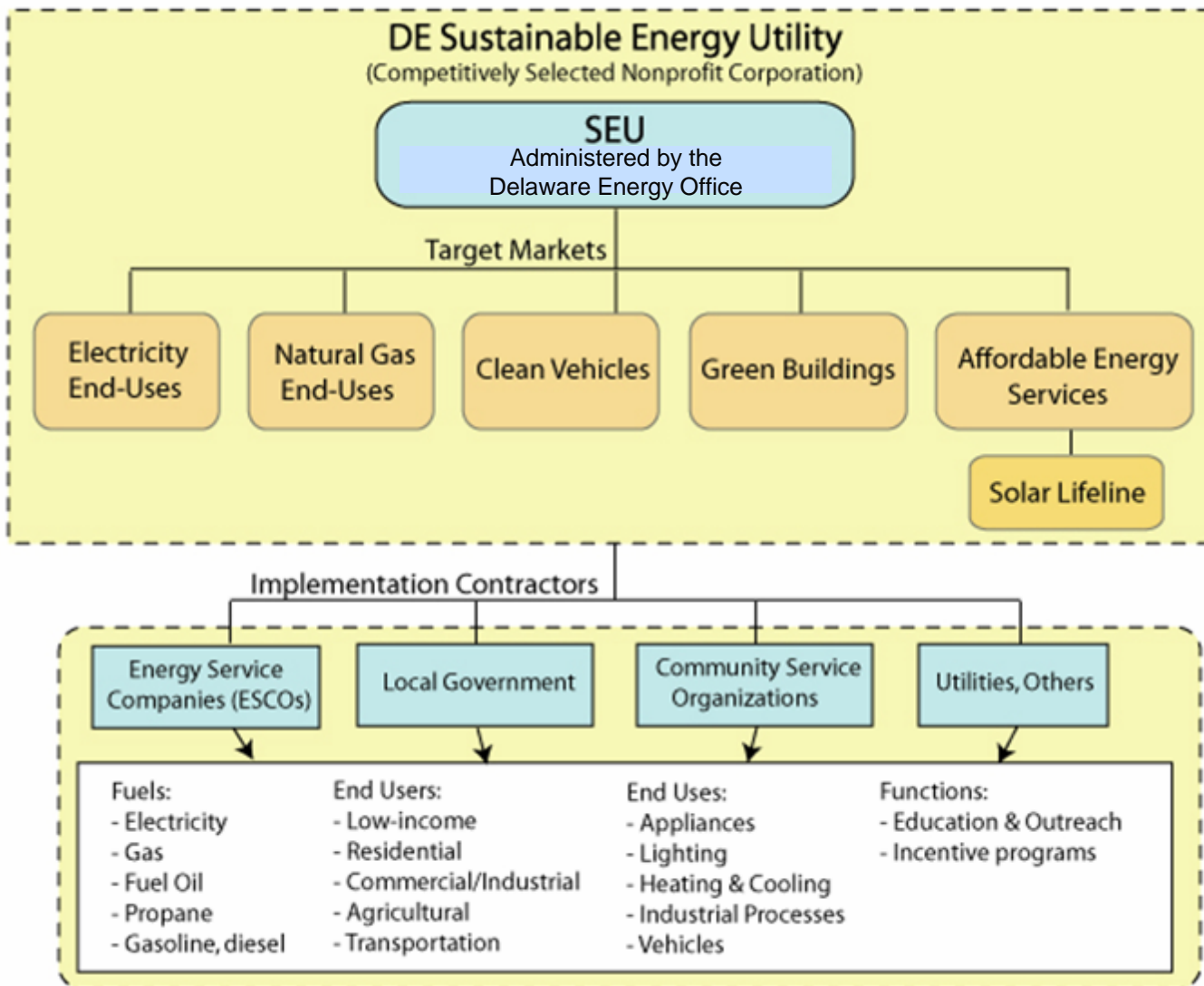
- In return for assumption of initial capital cost of Sustainable Energy investments, sign agreements with participants to share savings (e.g., 33% for 5 years) and REC revenues (e.g., 25% for 8 years)
- Encourage implementation contractors to acquire volume discounts in return for SEU market development and share benefits with the SEU

◆ ***Pioneer New Policies for Investment in Sustainable Energy***

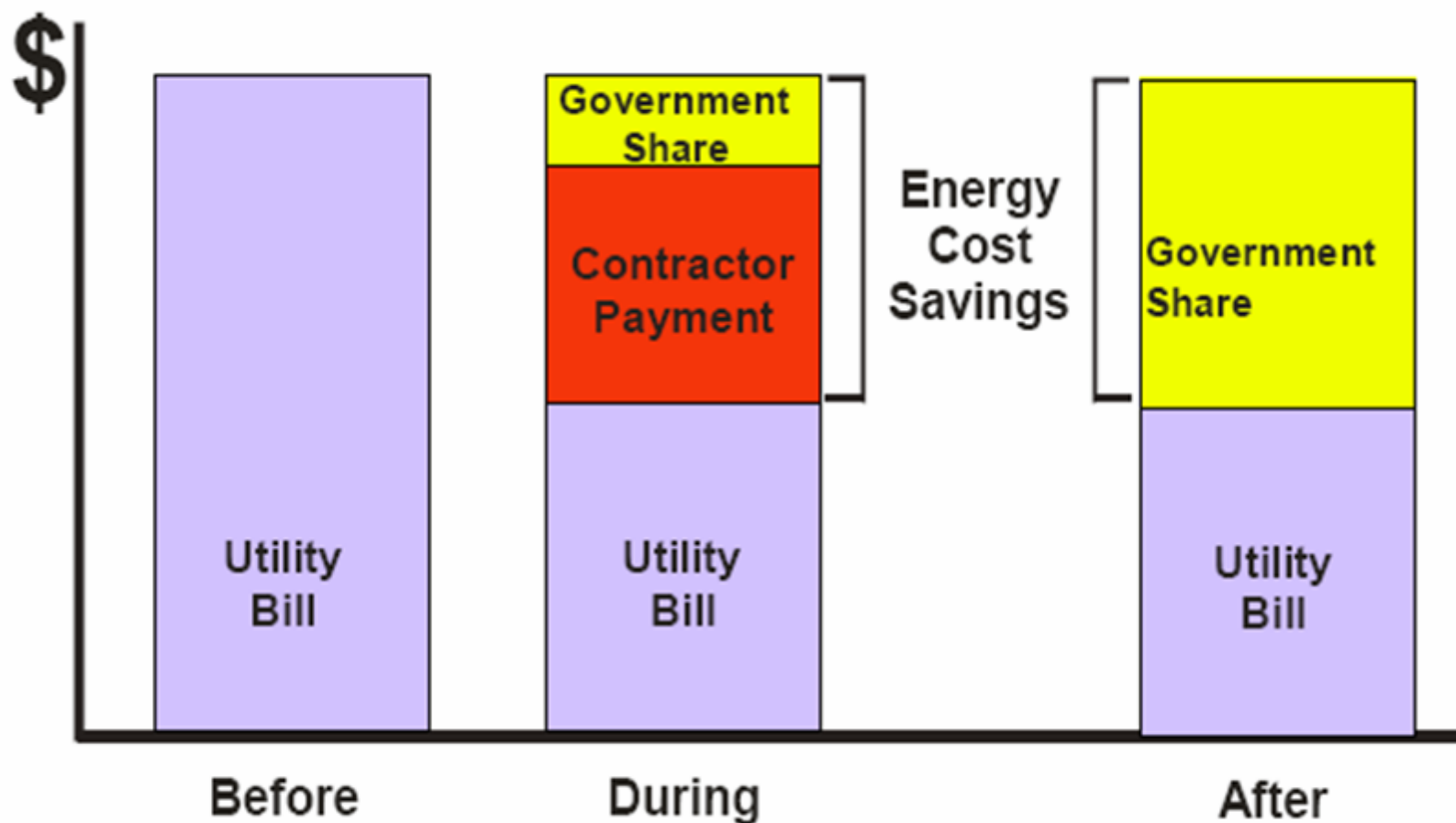
- Energy Efficiency Portfolio Standards across end-use sectors
- Develop Energy Savings Certificates
- Create Carbon Reduction Certificates



New Direction – A Sustainable Energy Utility



Performance Contracting



Source: King, 2003



Center for Energy and Environmental Policy

Municipal Securities Division of a Major US Banking Company

Reviewed the SEU *pro forma* and concluded it is financeable by a private activity bond at investment grade.

Incentive Estimation Detail: Example of Efficiency Upgrades in Residential Electricity-Using Equipment

Year	Consumption (million MWh)	Participation Rate	Savings Target (million MWh)	Incremental Cost of High Efficiency Option	Public \$ for EE Incentives	Implementation		
						Cost/Unit-Saved	Costs & Rate of Return for Contractors	Incentives & Implementation Costs
2008	4.425575976	0.03	0.039830184	\$0.030	\$1,194,906	\$1,075,415	\$268,854	\$1,344,269
2009	4.474257312	0.035	0.046979702	\$0.035	\$1,644,290	\$1,479,861	\$369,965	\$1,849,826
2010	4.523474142	0.04	0.05428169	\$0.040	\$2,171,268	\$1,737,014	\$434,254	\$2,171,268
2011	4.573232358	0.04	0.054878788	\$0.040	\$2,195,152	\$1,756,121	\$439,030	\$2,195,152
2012	4.623537914	0.043	0.059643639	\$0.045	\$2,683,964	\$1,878,775	\$469,694	\$2,348,468
2013	4.674396831	0.044	0.061702038	\$0.045	\$2,776,592	\$1,943,614	\$485,904	\$2,429,518
2014	4.725815196	0.046	0.06521625	\$0.045	\$2,934,731	\$2,054,312	\$513,578	\$2,567,890
2015	4.777799163	0.052	0.074533667	\$0.048	\$3,577,616	\$2,504,331	\$626,083	\$3,130,414
totals		0.33	0.457065957			\$14,429,443	\$3,607,361	\$18,036,803
2016	4.830354954	0.05	0.072455324	\$0.048	\$3,477,856	\$2,434,499	\$608,625	\$3,043,124
2017	4.883488859	0.045	0.0659271	\$0.048	\$3,164,501	\$2,215,151	\$553,788	\$2,768,938
2018	4.937207236	0.04	0.059246487	\$0.050	\$2,962,324	\$2,073,627	\$518,407	\$2,592,034
2019	4.991516516	0.035	0.052410923	\$0.050	\$2,620,546	\$1,834,382	\$458,596	\$2,292,978
totals		0.5				\$22,987,102	\$5,746,775	\$28,733,877

¹ Based on U.S. EIA State Energy Data System (SEDS) data.

² Based on SEU target of 30% savings through energy efficiency upgrades multiplied by the appropriate participation rate.

³ Based on survey of 6 'best practice' States. See SEU Task Force Briefing Book, Sections F-H. Available at: <http://www.seu-de.org/documents.html>

⁴ 100% rebate equal to the incremental cost of the high efficiency option (capped by size/capacity of the device in order not encourage purchase of above-average equipment). Taken from 'best practice' State survey. See SEU Task Force Briefing Book, Sections F-H. Available at: <http://www.seu-de.org/documents.html>

Revenue Estimation Detail: Example of RECs

	Year	Installed Capacity From Rebate Program (kW)	Cummulative Capacity From Rebate Program (kW)	Cummulative Electricity From Rebate Program (MWh)	REC Price (\$/MWh)	REC Sales (\$)	SEU Aggregation Fee	SEU REC Income (\$)
PV RECs	2008	80	700	1,002.40	\$200	\$200,480	0.25	\$50,120
	2009	178	878	1,257.51	\$200	\$251,502	0.25	\$62,876
	2010	315	1,193	1,708.65	\$200	\$341,729	0.25	\$85,432
	2011	2,127	3,320	4,754.28	\$180	\$855,770	0.25	\$213,943
	2012	3,741	7,061	10,110.92	\$170	\$1,718,856	0.25	\$429,714
	2013	7,617	14,678	21,018.78	\$150	\$3,152,816	0.25	\$788,204
	2014	11,992	26,670	38,191.90	\$125	\$4,773,987	0.25	\$1,193,497
	2015	16,683	43,354	62,082.24	\$100	\$6,208,224	0.25	\$1,552,056
	Sub-totals		42,734				\$17,503,365	
	2016	20,778	64,131	91,836.00	\$75	\$6,887,700	0.25	\$1,721,925
	2017	27,332	91,463	130,975.58	\$50	\$6,548,779	0.25	\$1,637,195
	2018	39,679	131,143	187,796.12	\$50	\$9,389,806	0.25	\$2,347,452
	2019	43,897	175,039	250,656.51	\$25	\$6,266,413	0.25	\$1,566,603
Totals		174,419				\$46,596,063		\$11,649,016

	Year	Installed Capacity From Rebate Program - Non-PV Renewables (MW)	Cummulative Capacity From Rebate Program - Non-PV Renewables (MW)	Cummulative Electricity From Rebate Program (non-PV RE) (MWh)	REC Price (\$/MWh)	REC Sales (\$)	SEU Aggregation Fee	SEU REC Income (\$)
Wind, Geothermal, Solar Thermal and Other RE RECs	2008	7	20	52,727.80	\$35	\$1,845,473	0.25	\$461,368
	2009	14	34	89,840.13	\$35	\$3,144,404	0.25	\$786,101
	2010	19	53	138,888.70	\$35	\$4,861,105	0.25	\$1,215,276
	2011	22	75	196,320.08	\$30	\$5,889,603	0.25	\$1,472,401
	2012	25	100	262,567.46	\$30	\$7,877,024	0.25	\$1,969,256
	2013	28	128	336,881.62	\$30	\$10,106,449	0.25	\$2,526,612
	2014	31	159	419,159.99	\$25	\$10,479,000	0.25	\$2,619,750
	2015	34	194	509,357.59	\$25	\$12,733,940	0.25	\$3,183,485
	Sub-totals		181				\$56,936,996	
	2016	38	231	607,964.26	\$20	\$12,159,285	0.25	\$3,039,821
	2017	40	272	713,611.87	\$15	\$10,704,178	0.25	\$2,676,044
	2018	51	323	848,383.90	\$15	\$12,725,759	0.25	\$3,181,440
	2019	56	379	995,389.84	\$10	\$9,953,898	0.25	\$2,488,475
Totals						\$102,480,117		\$25,620,029

Note: Installed capacity of PV systems is based on the proposed Solar Carveout to be submitted as an amendment to the State's current RPS policy. Installed capacity of non-PV renewable energy systems is based on the proposed upgrade of the RPS schedule, also to be submitted as an amendment to current policy.

SEU Cash Flow Detail

(not including Sustainable Energy Bond)

Year	Expenditures				Revenues	Balance	
	SEU Contract	SEU Program Costs (Rebates, Incentives, EM&V, etc.)	SEU / DEO Education & Marketing	Bonus Fund	Expenditure Totals	SEU Revenues: 0.25RECs + 0.33SS (yrs 1-5) + GEF Revenues	Annual Cash Balance
2008	-\$800,000	-\$5,953,981	-\$300,000	-\$100,000	-\$7,153,981	\$3,140,411	-\$4,013,569
2009	-\$816,000	-\$8,823,059	-\$300,000	-\$175,000	-\$10,114,059	\$7,630,898	-\$2,483,161
2010	-\$832,320	-\$10,520,922	-\$300,000	-\$192,962	-\$11,846,205	\$12,864,141	\$1,017,936
2011	-\$848,966	-\$17,429,788	-\$261,447	-\$288,291	-\$18,828,492	\$19,219,402	\$390,910
2012	-\$865,946	-\$21,628,684	-\$432,574	-\$392,609	-\$23,319,812	\$26,173,902	\$2,854,090
2013	-\$909,243	-\$32,364,351	-\$647,287	-\$664,624	-\$34,585,505	\$33,231,192	-\$1,354,313
2014	-\$954,705	-\$38,569,611	-\$771,392	-\$759,003	-\$41,054,712	\$37,950,155	-\$3,104,557
2015	-\$1,002,440	-\$42,212,500	-\$844,250	-\$841,412	-\$44,900,602	\$42,070,590	-\$2,830,012
Sub-totals	-\$7,029,621	-\$177,502,896	-\$3,856,950	-\$3,413,900	-\$191,803,367	\$182,280,690	-\$9,522,677
2016	-\$1,052,562	-\$41,052,588	-\$821,052	-\$937,295	-\$43,863,498	\$46,864,759	\$3,001,262
2017	-\$1,105,191	-\$44,887,443	-\$897,749	-\$1,020,003	-\$47,910,386	\$51,000,162	\$3,089,776
2018	-\$1,160,450	-\$45,173,259	-\$903,465	-\$1,068,534	-\$48,305,708	\$53,426,697	\$5,120,989
2019	-\$1,218,473	-\$42,744,016	-\$854,880	-\$1,123,466	-\$45,940,835	\$56,173,305	\$10,232,470
Totals	-\$11,566,296	-\$351,360,203	-\$7,334,096	-\$7,563,199	-\$377,823,794	\$389,745,614	\$11,921,820

SEU Prospectus

Year	Net SEU Revenues (before Debt Service)	SEU Bond Debt Service							Net SEU Revenue (after Debt Service & Bond Retirement)	SEU Bottom Line
	Balance of SEU Costs and Revenues	Tax Exempt Bond Floats	Annual Interest Cost for Bond 1 (Yield = 5.20%)	Annual Interest Cost for Bond 2 (Yield = 5.0%)	Annual Interest Cost for Bond 3 (Yield = 4.90%)	Annual Interest Cost for Bond 4 (Yield = 4.90%)	Bond Management	Debt Totals	SEU Balance + Bond Interest Cost + Bond Principal	Cumulative Cash Flow
2008	-\$4,013,569	Bond 1: 5 yr Maturity Yield = 5.20% \$7,700,000	-\$400,400						\$3,132,031	\$3,132,031
2009	-\$2,483,161		-\$400,400					-\$400,400	-\$2,883,561	\$248,469
2010	\$1,017,936	Bond 2: Yield = 5.00% \$0	-\$400,400	\$0			\$0	-\$400,400	\$617,536	\$866,006
2011	\$390,910	Bond 3: Yield = 4.90% \$0	-\$400,400	\$0	\$0		\$0	-\$400,400	-\$9,490	\$856,515
2012	\$2,854,090	Bond 4: 8 yr Maturity Yield = 4.90% \$15,300,000	-\$400,400	\$0	\$0	-\$749,700	-\$306,000	-\$1,456,100	\$8,997,990	\$9,854,505
2013	-\$1,354,313			\$0	\$0	-\$749,700		-\$749,700	-\$2,104,013	\$7,750,492
2014	-\$3,104,557			\$0	\$0	-\$749,700		-\$749,700	-\$3,854,257	\$3,896,235
2015	-\$2,830,012			\$0	\$0	-\$749,700		-\$749,700	-\$3,579,712	\$316,523
Sub-totals	-\$9,522,677		-\$2,002,000	\$0	\$0	-\$2,998,800	-460000	-\$5,460,800	\$316,523	
2016	\$3,001,262			\$0	\$0	-\$749,700		-\$749,700	\$2,251,562	\$2,568,084
2017	\$3,089,776			\$0	\$0	-\$749,700		-\$749,700	\$2,340,076	\$4,908,161
2018	\$5,120,989			\$0	\$0	-\$749,700		-\$749,700	\$4,371,289	\$9,279,450
2019	\$10,232,470			\$0	\$0	-\$749,700		-\$749,700	-\$5,817,230	\$3,462,220
Totals	\$11,921,820		-\$2,002,000	\$0	\$0	-\$5,997,600	-460000	-\$8,459,600	\$3,462,220	

* Revenue Assumptions

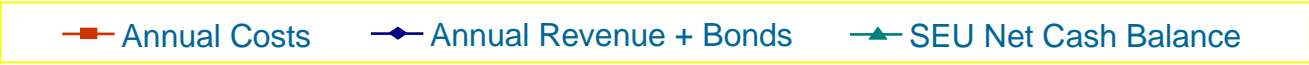
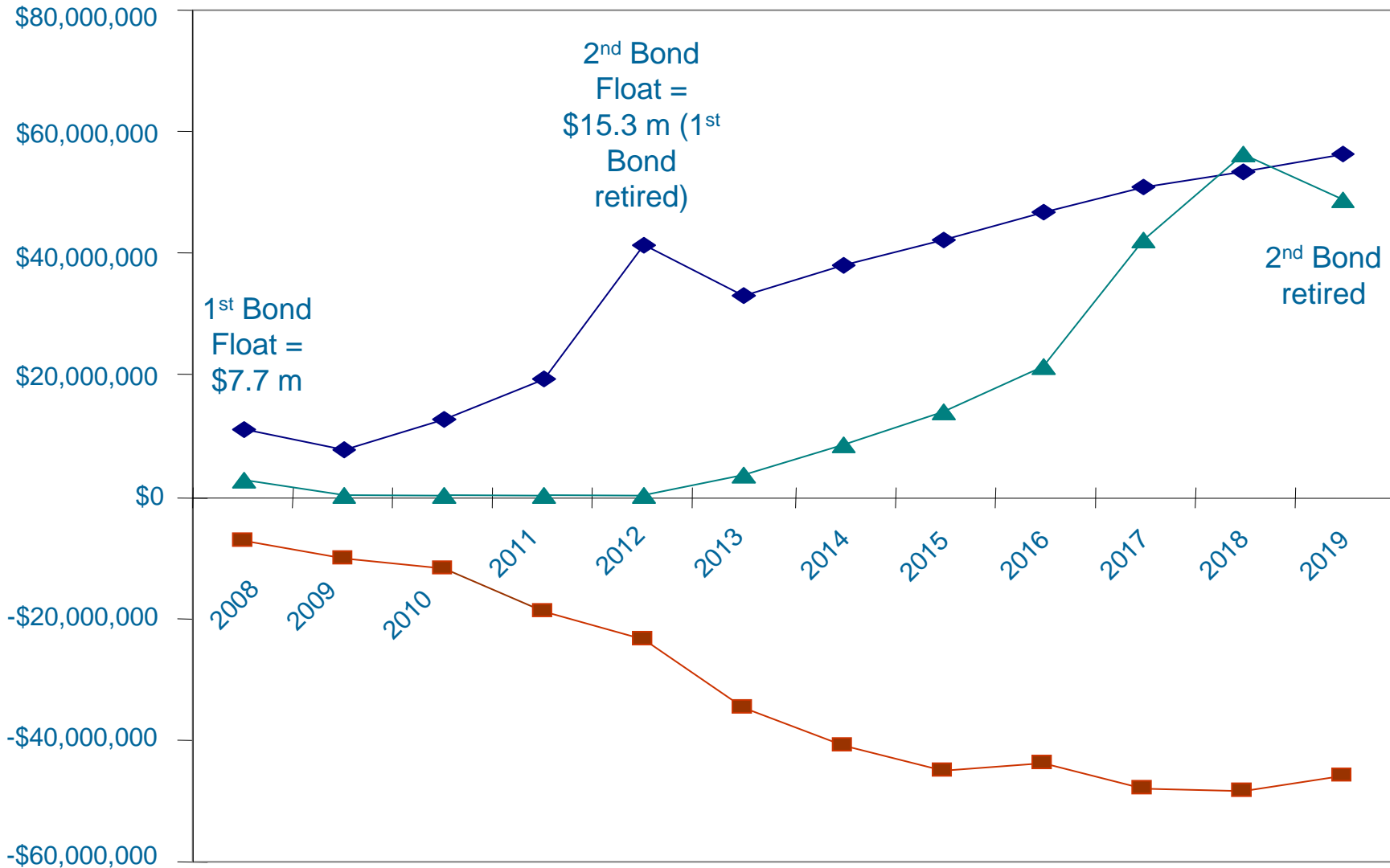
\$25 million in Sustainable Energy Special Purpose Revenue Bonds are authorized.

GEF mill rate is doubled.

REC revenues are based on declining price schedule.

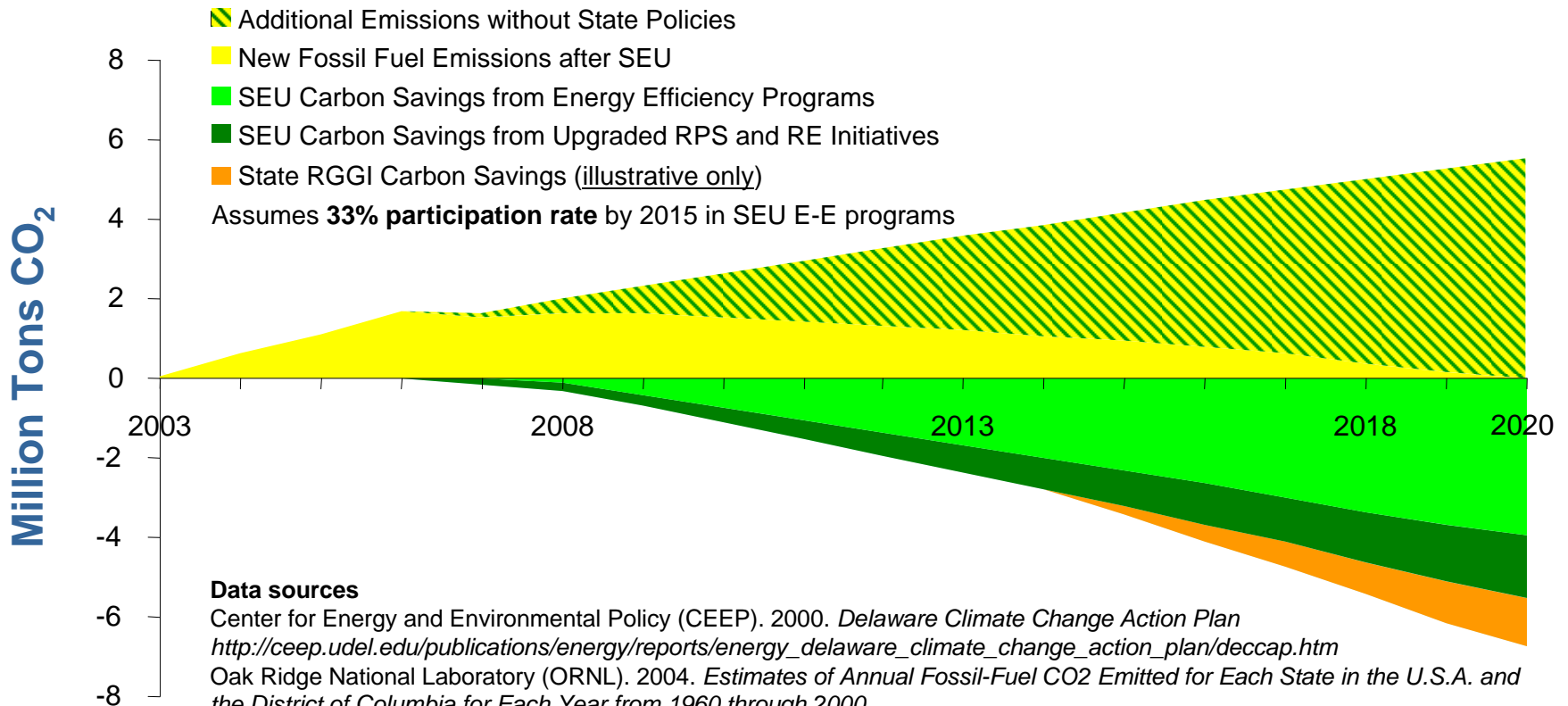
All Bond Interest	-\$7,999,600
Total Bond Float	\$23,000,000

SEU Annual Costs, Revenues & Cash Balance



Delaware Sustainable Energy Utility

Our Best Environmental Policy



Data sources

Center for Energy and Environmental Policy (CEEP). 2000. *Delaware Climate Change Action Plan*

http://ceep.udel.edu/publications/energy/reports/energy_delaware_climate_change_action_plan/deccap.htm

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Estimates prepared for the Sustainable Energy Utility Task Force by the Center for Energy & Environmental Policy, University of Delaware.



Policy Agenda



◆ Renewable Portfolio Standard (RPS)

- Upgrade to proven ‘best practice’: 20% by 2019
- Add 2% Solar Carveout

◆ Green Energy Fund (GEF)

- Support customer-sited renewables & energy efficiency
- Cost to the average residential customer = ~ 18 cents per month

◆ Net Metering Standards

- Enable commercial and industrial customers to generate up to 2 MW
- Enable residential customers to generate up to 25 kW
- Net meter customer generation at full retail rates (including generation and T&D)

◆ Authorize a Sustainable Energy Bond

- Authorize the State to initially invest \$30 million in a Sustainable Energy Future that creates jobs, lowers energy bills and improves the environment

◆ Create the Delaware Sustainable Energy Utility

- An incentive-based institution that utilizes performance contracting,
- Offers one-stop, comprehensive sustainable energy services to all

Sustainable Energy Utility

Website: <http://www.seu-de.org>

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