

DE 17-136 EERS

Benefit/Cost Working Group. June 13, 2018 1:30 – 4:30 pm

Proposed Changes to B/C Modelling for the 2019 Plan Update

Currently (in the 2018 – 2020 Plan), the following benefits are included in benefit cost screening

Benefit	Units	Source	Percent (2018 Eversource)
Capacity	\$/kW	2015 AESC Update	11.1%
Transmission	\$/kW	EDC Calculation	1.8%
Distribution	\$/kW	EDC Calculation	7.2%
Winter Peak	\$/kWh	2015 AESC Update	20.9%
Winter Off Peak	\$/kWh	2015 AESC Update	18.3%
Summer Peak	\$/kWh	2015 AESC Update	8.2%
Summer off Peak	\$/kWh	2015 AESC Update	6.2%
DRIPE (Own)	\$/kWh	2015 AESC Update	0.5%
Gas	\$/MMBtu	2015 AESC Update	0.9%
Gas DRIPE (Own)	\$/MMBtu	2015 AESC Update	0.0%
Other Fuels	\$/MMBtu	2015 AESC Update	14.6%
Water	\$/Gallon	EDC Estimate	1.3%
NEIs	10% of Energy AC	N/A	9.0%
TOTAL			100.0%

Proposed Changes for the 2019 Plan Update based on the 2018 Avoided Energy Supply Cost (AESC) Update

- **Update all the current (table above) avoided costs based on the 2018 AESC.** As is current practice, only count zone-on-zone (NH Own) DRIPE values.
- **Oil DRIPE (Zone-on-Zone):** this new benefit was identified in the 2018 AESC. Based on Table 82, 2018 AESC, the value of Oil DRIPE (Zone-on-Zone) is approximately **\$0.01/MMBtu**.
- **Pooled Transmission Facilities (PTF):** new benefit identified in 2018 AESC Based on Chapter 10, 2018 AESC, the value is **\$94/kw-year**. Per 2018 AESC, utilities will need to review current Transmission avoided cost calculation (approximately \$20/kW-year) to confirm that there is no double counting i.e. that the current transmission avoided cost estimate is based only on non-PTF projects.
- **Reliability (generation):** new benefit identified in 2019 AESC
Based on chapter 11, 2018 AESC, the value of generation reliability is approximately **\$3.90/kW-year** (10 year levelized cost) assuming a 50:50 ratio of cleared/uncleared assets and a value of lost load (VoLL) of \$24/kwh (midpoint of \$12/kWh and \$37/kWh estimates from 2018 AESC).
- **Capacity DRIPE:** the utilities will incorporate zone-on-zone Capacity DRIPE. Note that this is not a new benefit. Rather, it was estimated to be zero in the 2016 Update of the 2015 AESC. The estimated value of zone-on-zone capacity DRIPE is **\$21.60/kw-year** for 2019 assuming a 50:50 ratio of cleared/uncleared assets.
- ~~**Incorporate Southern New England Gas:** 2018 AESC (Appendix C) provides natural gas avoided costs for southern New England and northern New England.~~

Because much of the NH natural gas territory is geographically close to Southern New Hampshire (Massachusetts) and is connected to the Tennessee Gas Pipeline, a weighted average of Northern New England (~~\$7.07/MMBtu~~ 10 year levelized) and Southern New England (~~\$7.49/MMBtu~~) will be used (LDCs to determine ratio). This approach was generally supported by Max Chang (Synapse) during the April 11th B/C working group. Based on additional Synapse research, marginal gas comes from northern pipelines. Therefore, this proposal is off the table.

- Environmental for fossil fuel:** Based on AESC 2018 Table 62, the avoided (imbedded) emissions cost (avoided cost of Renewable Portfolio Standard (RPD) compliance) is \$4.94/MWh (15 year levelized value). The corresponding non-embedded emissions value is \$42.23/MWh. Therefore, the percent of electric emissions currently included in B/C screening is $4.94 / (4.94 + 42.23) = 10.47\%$. Based on this, the Companies proposed to use 10% of the \$100/ton carbon, and 10% of the \$31,000/ton for NOx for fossil fuels.
 - ✓ Using a CO2 emissions factor of 116.6 pounds/MMBtu, and a NOx emission factor of 0.09135 pounds NOx/MMBtu, the natural gas avoided emissions would be ~~\$0.967/MMBtu~~ (using the AESC calculator in Appendix D). **\$0.64/MMBtu. Note that this change is because there was a mistake in the AESC Appendix D calculator which overstated the value of Nitrogen.**
 - ✓ Using a similar methodology, the value for oil is ~~\$1.35/MMBtu~~; propane is ~~\$1.28/MMBtu~~. **(NEED TO UPDATE, expect similar decreases as gas based on the Synapse correction)**

Table 62. Avoided cost of RPS compliance, aggregated by new and existing, by state, 2018\$/MWh

	CT	ME	MA	NH	RI	VT
Class 1/New	\$2.82	\$0.21	\$1.72	\$1.51	\$2.39	\$0.53
MA CES	NA	NA	\$0.45	NA	NA	NA
All Other Classes	\$0.94	\$0.31	\$1.44	\$3.43	\$0.03	\$1.46
Total	\$3.76	\$0.51	\$3.61	\$4.94	\$2.42	\$1.99

Note: Each state has multiple Classes or Tiers. Rhode Island and Maine have two, Connecticut and Vermont have three, and Massachusetts and New Hampshire have four. For simplicity, we sum avoided costs for all non-Class 1/New RPS policies together in the "all other classes" row.

Impact on proposed Changes (Eversource 2018 example)

	a	b	c = b - a	d = c / b	e = c / \$92,753	
Benefit	2018 Eversource (2015 AESC Update) (\$000)	2018 Eversource (2018 AESC) (\$000)	Change in Benefit (\$000)	% Change	Overall Percent Change	
Capacity	\$10,310	\$5,367	-\$4,944	-47.9%	-5.3%	
Transmission	\$1,656	\$1,656	\$0	0.0%	0.0%	
Distribution	\$6,709	\$6,709	\$0	0.0%	0.0%	
Winter Peak	\$19,340	\$16,802	-\$2,538	-13.1%	-2.7%	
Winter Off-Peak	\$16,995	\$15,473	-\$1,522	-9.0%	-1.6%	
Summer Peak	\$7,640	\$6,005	-\$1,635	-21.4%	-1.8%	
Summer Off-Peak	\$5,786	\$4,913	-\$873	-15.1%	-0.9%	
Electric DRIPE	\$425	\$1,209	\$783	184.2%	0.8%	
Natural Gas	\$792	\$721	-\$71	-9.0%	-0.1%	
Natural Gas DRIPE	\$6	\$22	\$16	285.5%	0.0%	
Other Fuels	\$13,567	\$15,821	\$2,254	16.6%	2.4%	
Water	\$1,205	\$1,205	\$0	0.0%	0.0%	
Sub-Total	\$84,431	\$75,902	-\$8,529	-10.1%	-9.2%	
Capacity DRIPE	\$0	\$2,174	\$2,174	na	2.3%	
PTF	\$0	\$7,598	\$7,598	na	8.2%	
Reliability	\$0	\$341	\$341	na	0.4%	
Oil DRIPE (Own)	\$0	\$4	\$4	na	0.0%	
Fossil Emissions	\$0	\$645	\$645	na	0.7%	
NEW AESC Sub-Total	\$0	\$10,763	\$10,763	na	11.6%	
10% Adder	\$8,323	\$8,481	\$159	1.9%	0.2%	
Total with 10% Adder	\$92,753	\$95,146	\$2,392	2.6%	2.6%	
Discount Rate, Inflation Adjustment*	na	-\$3,195	-\$3,195	na	-3.4%	
TOTAL Benefits with Discount Rate	\$92,753	\$91,950	-\$803	-0.9%	-0.9%	

Impact on Gas (Liberty 2019 Example)

Type of Benefit	Current (2015 AESC Update) (\$000)	2018 AESC (\$000)	Change (\$000)	Percent Change	Percent Change Overall	
Winter Peak kwh	\$127	\$104	(\$23)	-17.9%	-0.1%	
Winter Off Peak kwh	\$127	\$106	(\$20)	-16.1%	-0.1%	
Summer Peak	\$8	\$6	(\$2)	-21.0%	0.0%	
Summer off Peak	\$10	\$8	(\$1)	-13.4%	0.0%	
Electric DRIPE	\$1	\$2	\$1	37.3%	0.0%	
Gas	\$14,712	\$13,372	(\$1,340)	-9.1%	-7.9%	
Gas DRIPE	\$110	\$543	\$432	391.7%	2.6%	
Water	\$270	\$270	\$0	0.0%	0.0%	
Fossil Emissions (10%)	\$0	\$991	\$991	na	5.9%	
NEI (10%)	\$1,510	\$1,414	(\$95)	-6.3%	-0.6%	
TOTAL AESC Change	\$16,875	\$16,819	(\$57)	-0.3%	-0.3%	
Discount Rate Adjustment		\$16,318	(\$500)	na	-3.0%	
TOTAL with Discoun Rate Adjustme	\$16,875	\$16,318	(\$557)		-3.3%	