

Undertaking: U-1

Provide the work papers used to analyze Mr. Chernick's submission

The attached tables show Synapse's analysis of total COMFIT program costs under several different scenarios. This analysis was performed after Synapse filed its direct evidence but before Mr. Chernick filed his direct evidence. In our analysis we looked at four different resource mix scenarios and three different avoided cost scenarios. The assumed year of our analysis was 2018. The rate for biomass CHP was escalated to 2018 using an assumed annual escalation rate of 2.5%. We assumed a fully subscribed (100 MW) COMFIT program in all scenarios.

The low avoided cost is roughly based on fuel cost. The medium is based on generic replacement energy/capacity, and the high avoided cost is roughly based on the avoided cost used in NSPI's 2011 DSM plan (\$166 per MWh).

We believe that the High Large Wind and High Small Wind scenarios represent a likely resource mix if the COMFIT program were fully subscribed. The High Biomass and High Tidal scenarios seem less likely.

Summary of COMFIT Program Costs in each of Four Resource Mix Scenarios -- Million 2012\$

	High Small Wind Scenario	High Large Wind Scenario	High Biomass Scenario	High Tidal Scenario
Gross Cost	\$48	\$45	\$52	\$56
Net Cost with Low Avoided Cost	\$33	\$31	\$36	\$41
Net Cost with Med. Avoided Cost	\$18	\$16	\$19	\$26
Net Cost with High Avoided Cost	\$4	\$1	\$2	\$11

All scenarios assume a fully subscribed COMFIT program (100 MW)

Low avoided cost is 50 \$/MWh; medium is 100 \$/MWh; high is \$150.

See "Res Mix Calculations" worksheet for details.

Number of COMFIT Projects in each of the Four Resource Mix Scenarios

	High Small Wind Scenario	High Large Wind Scenario	High Biomass Scenario	High Tidal Scenario
Small Wind Projects	100	10	10	10
Large Wind Projects	56	59	52	55
Biomass Projects	3	3	8	3
Hydro Projects	3	3	3	3
Tidal Projects	3	3	3	15

MWs in each of the Four Resource Mix Scenarios

	High Small Wind	High Large Wind	High Biomass	High Tidal
Small Wind Projects	5.0	0.5	0.5	0.5
Large Wind Projects	84.0	88.5	78.0	82.5
Biomass Projects	6.2	6.2	16.4	6.2
Hydro Projects	3.0	3.0	3.0	3.0
Tidal Projects	1.5	1.5	1.5	7.5
Sum	99.7	99.7	99.4	99.7

High Small Wind/Low Avoided Cost Scenario

Cost of COMFIT Energy in 2018							
	Rate (\$/MWh)	Number of Projects	Avg. Size (MW)	Total (MW)	Avg. CF (%)	Total (MWh)	Total (2012\$)
Small Wind	\$452	100	0.05	5.0	23%	10,074	\$4,553,448
Large Wind	\$139	56	1.5	84	31%	228,110	\$31,707,346
Biomass CHP	\$169	3	2.1	6.2	70%	37,908	\$6,414,808
Hydro	\$140	3	1.0	3.0	55%	14,454	\$2,023,560
Tidal	\$652	3	0.5	1.5	37%	4,862	\$3,169,894
Totals		165		99.7		295,408	\$47,869,055
Avoided Cost	\$50					295,408	\$14,770,410
Net Cost							\$33,098,644

High Small Wind/Medium Avoided Cost Scenario

Cost of COMFIT Energy in 2018							
	Rate (\$/MWh)	Number of Projects	Avg. Size (MW)	Total (MW)	Avg. CF (%)	Total (MWh)	Total (2012\$)
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Tidal	\$652	3	0.5	1.5	37%	4,862	\$3,169,894
Totals		165		99.7		295,408	\$47,869,055
Avoided Cost	\$100					295,408	\$29,540,821
Net Cost							\$18,328,234

High Small Wind/High Avoided Cost Scenario

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Tidal	\$652	3	0.5	1.5	37%	4,862	\$3,169,894
Totals		165		99.7		295,408	\$47,869,055
Avoided Cost	\$150					295,408	\$44,311,231
Net Cost							\$3,557,823

High Large Wind/Low Avoided Cost Scenario

Cost of COMFIT Energy in 2018							
	Rate (\$/MWh)	Number of Projects	Avg. Size (MW)	Total (MW)	Avg. CF (%)	Total (MWh)	Total (2012\$)
Small Wind	\$452	10	0.05	0.5	23%	1,007	\$455,345
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Tidal	\$652	3	0.5	1.5	37%	4,862	\$3,169,894
Totals		78		99.7		298,562	\$45,469,559
Avoided Cost	\$50					298,562	\$14,928,090
Net Cost							\$30,541,469

High Large Wind/Medium Avoided Cost Scenario

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Totals		78		99.7		298,562	\$45,469,559
Avoided Cost	\$100					298,562	\$29,856,181
Net Cost							\$15,613,379

High Large Wind/High Avoided Cost Scenario

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Tidal	\$652	3	0.5	1.5	37%	4,862	\$3,169,894
Totals		78		99.7		298,562	\$45,469,559
Avoided Cost	\$150					298,562	\$44,784,271
Net Cost							\$685,288

High Biomass/Low Avoided Cost Scenario

Cost of COMFIT Energy in 2018							
	Rate (\$/MWh)	Number of Projects	Avg. Size (MW)	Total (MW)	Avg. CF (%)	Total (MWh)	Total (2012\$)
Small Wind	\$452	10	0.05	0.5	23%	1,007	\$455,345
Large Wind	\$139	52	1.5	78	31%	211,817	\$29,442,535
Biomass CHP	\$169	8	2.1	16.4	70%	101,088	\$17,106,154
Hydro	\$140	3	1.0	3.0	55%	14,454	\$2,023,560
Tidal	\$652	3	0.5	1.5	37%	4,862	\$3,169,894
Totals		76		99.4		333,228	\$52,197,487
Avoided Cost	\$50					333,228	\$16,661,401
Net Cost							\$35,536,086

High Biomass/Medium Avoided Cost Scenario

Cost of COMFIT Energy in 2018							
	Rate (\$/MWh)	Number of Projects	Avg. Size (MW)	Total (MW)	Avg. CF (%)	Total (MWh)	Total (2012\$)
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Hydro	\$140	3	1.0	3.0	55%	14,454	\$2,023,560
Tidal	\$652	3	0.5	1.5	37%	4,862	\$3,169,894
Totals		76		99.4		333,228	\$52,197,487
Avoided Cost	\$100					333,228	\$33,322,802
Net Cost							\$18,874,685

High Biomass/High Avoided Cost Scenario

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Hydro	\$140	3	1.0	3.0	55%	14,454	\$2,023,560
Tidal	\$652	3	0.5	1.5	37%	4,862	\$3,169,894
Totals		76		99.4		333,228	\$52,197,487
Avoided Cost	\$150					333,228	\$49,984,204
Net Cost							\$2,213,284

High Tidal/Low Avoided Cost Scenario

Cost of COMFIT Energy in 2018							
	Rate (\$/MWh)	Number of Projects	Avg. Size (MW)	Total (MW)	Avg. CF (%)	Total (MWh)	Total (2012\$)
Small Wind	\$452	10	0.05	0.5	23%	1,007	\$455,345
Large Wind	\$139	55	1.5	82.5	31%	224,037	\$31,141,143
Biomass CHP	\$169	3	2.1	6.2	70%	37,908	\$6,414,808
Hydro	\$140	3	1.0	3.0	55%	14,454	\$2,023,560
Tidal	\$652	15	0.5	7.5	37%	24,309	\$15,849,468
Totals		86		99.7		301,715	\$55,884,323
Avoided Cost	\$50					301,715	\$15,085,770
Net Cost							\$40,798,553

High Tidal/Medium Avoided Cost Scenario

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Tidal	\$652	15	0.5	7.5	37%	24,309	\$15,849,468
Totals		86		99.7		301,715	\$55,884,323
Avoided Cost	\$100					301,715	\$30,171,541
Net Cost							\$25,712,783

High Tidal/High Avoided Cost Scenario

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Totals		86		99.7		301,715	\$55,884,323
Avoided Cost	\$150					301,715	\$45,257,311
Net Cost							\$10,627,012

Summary of COMFIT Program Costs in each of Four Resource Mix Scenarios -- Million 2012\$

	High Small Wind Scenario	High Large Wind Scenario	High Biomass Scenario	High Tidal Scenario
Gross Cost	\$48	\$45	\$52	\$56
Net Cost with Low Avoided Cost	\$33	\$31	\$36	\$41
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Totals		78		99.7		298,562	\$45,469,559
Avoided Cost	\$150					298,562	\$44,784,271
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High Biomass/Low Avoided Cost Scenario

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