



# The Center for Climate Strategies

Helping States and the Nation Tackle Climate Change

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TABLE IA. EMISSION TRADING SIMULATION AMONG FIVE WESTERN STATES IN YEAR 2020  
(million dollars or otherwise specified)

State	Before Trading Mitigation Cost	After Trading <sup>a</sup>			Cost Saving	Permits Traded	Emission Reduction	Emission Reduction
		Mitigation Cost	Trading Cost	Net Cost		(million tCO <sub>2</sub> e)	(million tCO <sub>2</sub> e)	(percent from baseline)
AZ	-1,455.44	-1,678.81	102.08	-1,576.73	121.28	12.81	60.11	37.50
CA	-449.17	-289.06	-190.54	-479.60	30.43	-23.91	200.16	33.15
NM	-280.41	-498.02	72.20	-425.83	145.42	9.06	20.66	22.41
OR	-138.38	-182.60	31.96	-150.63	12.25	4.01	23.45	25.97
WA	-72.37	-57.96	-15.70	-73.66	1.29	-1.97	33.22	32.44
!!								
Total	-2,395.77	-2,706.45	0.00	-2,706.45	310.68	25.88 <sup>b</sup>	337.60	32.18

<sup>a</sup> Permit Price = \$7.97/tonCO<sub>2</sub>e. This is the price of the last permit sold, which is also equal to the price of the last ton of CO<sub>2</sub>e mitigated (its *marginal* mitigation cost). It is the same for each state for a given case. The *average* mitigation cost per unit of CO<sub>2</sub>e equivalent in this simulation differs for each state. For CA, for example, it is -\$1.44/tonCO<sub>2</sub>e. Please note that the average mitigation

cost is related to mitigation level of a state, which for this case is 33.15% below the baseline level in 2020 for CA. Multiplying the average mitigation cost by the number of tons of CO<sub>2</sub> mitigated will equal the *total* mitigation cost for each state.

TABLE IB. EMISSION TRADING SIMULATION AMONG FIVE WESTERN STATES AND MINNESOTA IN YEAR 2020  
(million dollars or otherwise specified)

State	Before Trading Mitigation Cost	After Trading <sup>a</sup>			Cost Saving	Permits Traded (million tCO <sub>2</sub> e)	Emission Reduction (million tCO <sub>2</sub> e)	Emission Reduction (percent from baseline)
		Mitigation Cost	Trading Cost	Net Cost				
AZ	-1,455.44	-1,676.03	105.36	-1,570.66	115.22	12.47	60.45	37.71
CA	-449.17	-253.00	-239.13	-492.12	42.95	-28.30	204.55	33.88
NM	-280.41	-496.86	75.35	-421.52	141.11	8.92	20.80	22.56
OR	-138.38	-179.97	31.18	-148.79	10.41	3.69	23.77	26.32
WA	-72.37	-52.14	-22.64	-74.78	2.41	-2.68	33.93	33.14
MN	-275.65	-337.83	49.88	-287.95	12.30	5.90	49.13	26.73
!!								
Total!	-2,671.42	-2,995.82	0.00	-2,995.82	324.40	30.98 <sup>b</sup>	392.63	31.85

<sup>a</sup> Permit Price = \$8.45/tonCO<sub>2</sub>e. This is the price of the last permit sold, which is also equal to the price of the last ton of CO<sub>2</sub>e mitigated (its *marginal* mitigation cost). It is the same for each state for a given case. The *average* mitigation cost per unit of CO<sub>2</sub>e equivalent in this simulation differs for each state. For MN, for example, it is -\$6.88/tonCO<sub>2</sub>e. Please note that the average mitigation cost is related to mitigation level of a state, which for this case is 26.73% below the baseline level in 2020 for MN. Multiplying the average mitigation cost by the number of tons of CO<sub>2</sub> mitigated will equal the *total* mitigation cost for each state.

<sup>b</sup> Represents number of permits bought or sold.

TABLE IIA. EMISSION TRADING SIMULATION AMONG FIVE WESTERN STATES IN YEAR 2020  
(million dollars or otherwise specified)

State	Before Trading	After Trading <sup>a</sup>			Cost Saving	Permits Traded	Emission Reduction	Emission Reduction
	Mitigation Cost	Mitigation Cost	Trading Cost	Net Cost		(million tCO <sub>2</sub> e)	(million tCO <sub>2</sub> e)	(percent from baseline)
AZ	1,205.32	-340.56	602.61	262.04	943.28	32.92	40.00	24.96
CA	513.92	1,252.55	-895.13	357.42	156.50	-48.90	225.15	37.29
NM	638.88	-83.06	278.43	195.36	443.52	15.21	14.51	15.73
OR	206.41	54.64	116.81	171.45	34.96	6.38	21.08	23.34
WA	110.62	200.54	-102.71	97.83	12.79	-5.61	36.86	36.00
!! Total!	2,675.16	1,084.11	0.00	1,084.11	1,591.05	54.51 <sup>b</sup>	337.60	32.18

<sup>a</sup> Permit Price = \$18.31/tonCO<sub>2</sub>e. This is the price of the last permit sold, which is also equal to the price of the last ton of CO<sub>2</sub>e mitigated (its *marginal* mitigation cost). It is the same for each state for a given case. The *average* mitigation cost per unit of CO<sub>2</sub>e equivalent in this simulation differs for each state. For CA, for example, it is \$5.56/tonCO<sub>2</sub>e. Please note that the average mitigation cost is related to mitigation level of a state, which for this case is 37.29% below the baseline level in 2020 for CA. Multiplying the average mitigation cost by the number of tons of CO<sub>2</sub> mitigated will equal the *total* mitigation cost for each state.

<sup>b</sup> Represents number of permits bought or sold.

TABLE IIB. EMISSION TRADING SIMULATION AMONG FIVE WESTERN STATES AND MINNESOTA IN YEAR 2020  
(million dollars or otherwise specified)

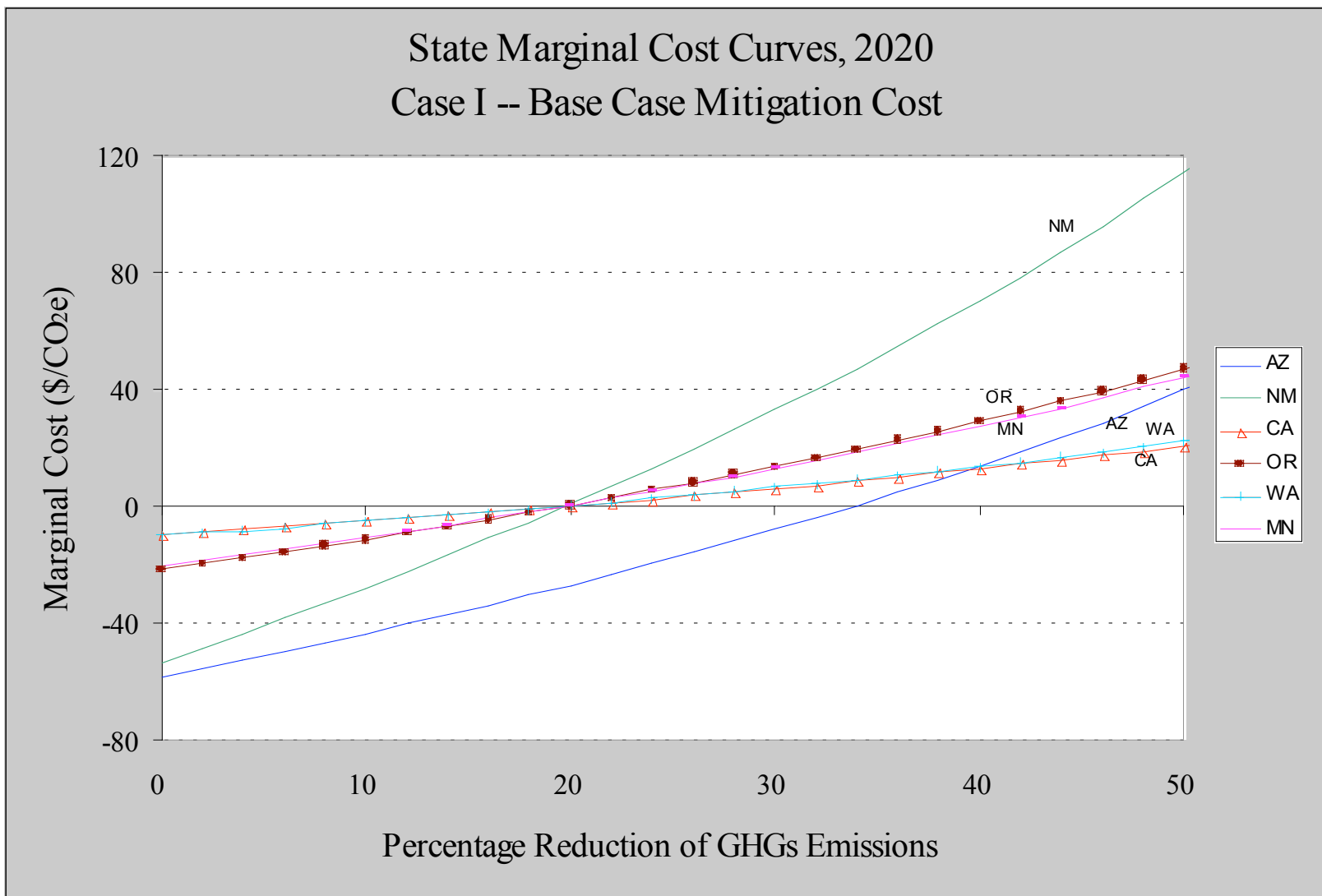
State	Before Trading	After Trading <sup>a</sup>			Cost Saving	Permits Traded	Emission Reduction	Emission Reduction
	Mitigation Cost	Mitigation Cost	Trading Cost	Net Cost		(million tCO <sub>2</sub> e)	(million tCO <sub>2</sub> e)	(percent from baseline)
AZ	1,205.32	-328.85	621.94	293.10	912.23	32.29	40.63	25.34
CA	513.92	1,381.28	-1,073.70	307.58	206.34	-55.75	232.00	38.42
NM	638.88	-78.02	287.74	209.72	429.16	14.94	14.78	16.03
OR	206.41	65.39	111.86	177.25	29.16	5.81	21.65	23.98
WA	110.62	221.62	-129.68	91.95	18.67	-6.73	37.99	37.10
MN	370.88	153.28	181.83	335.12	35.76	9.44	45.59	24.80
!! Total!	3,046.04	1,414.72	0.00	1,414.72	1,631.32	62.48 <sup>b</sup>	392.63	31.85

<sup>a</sup> Permit Price = \$19.26/tonCO<sub>2</sub>e. This is the price of the last permit sold, which is also equal to the price of the last ton of CO<sub>2</sub>e mitigated (its *marginal* mitigation cost). It is the same for each state for a given case. The *average* mitigation cost per unit of CO<sub>2</sub>e equivalent in this simulation differs for each state. For MN, for example, it is \$3.36/tonCO<sub>2</sub>e. Please note that the average mitigation cost is related to mitigation level of a state, which for this case is 24.80% below the baseline level in 2020 for MN. Multiplying the average mitigation cost by the number of tons of CO<sub>2</sub>e mitigated will equal the *total* mitigation cost for each state.

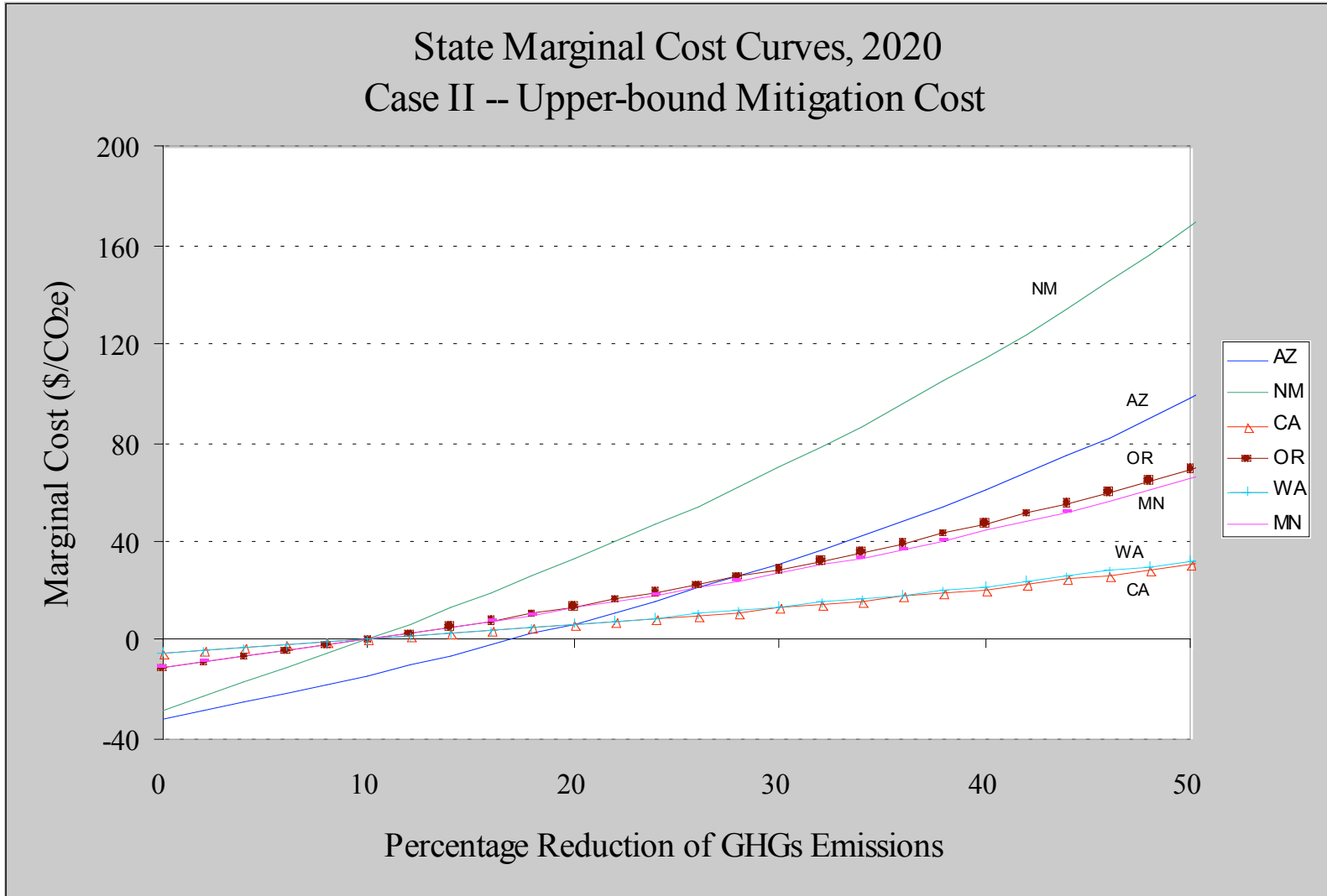
<sup>b</sup> Represents number of permits bought or sold.

DATA TABLE

State	Cap: 15% Below 2005 Emissions in 2020 (million tCO <sub>2</sub> e)	Baseline 2020 Gross Emissions (Consumption-based) (million tCO <sub>2</sub> e)	GHG Mitigation Goal in 2020 (relative to baseline emissions)	Autarkic Marginal Mitigation Cost (dollars per tCO <sub>2</sub> e)		Gross State Product in 2020 (million 2000 dollars)
				Case I	Case II	
AZ	87.38	160.3	45.49%	27.35	80.09	343,077
CA	427.55	603.8	29.19%	5.45	12.05	2,646,412
NM	62.45	92.2	32.23%	40.82	79.17	72,944
OR	62.84	90.3	30.41%	14.15	29.47	173,774
WA	71.12	102.4	30.52%	6.66	13.82	422,766
MN	128.78	183.8	29.94%	12.65	26.94	376,731
Total	840.12	1,232.7				4,035,704



Note: These marginal cost curves are presented for a range of mitigation levels, including those much higher than required to meet the cap in year 2020. We anticipate that there will be technology innovations in the future, i.e., the marginal cost curves will shift downward over time before higher levels of mitigation are necessary.



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