The presentation this week includes several simulations on expanded geographical configurations of Midwestern and Western states:

1. For the Midwestern states, we included North and South Dakotas in several simulations.

2. For the Western Climate Initiative, we ran economy wide simulations among all the WCI partners (including the two Canadian Provinces — British Columbia and Manitoba). We also ran some economy wide simulations that include five US states as WCI Observers.

3. We ran simulations that join the expanded Midwestern and Western states together only for economy wide scenarios. For now, the power sector simulations only cover the seven Midwestern States and the five basic WCI states (AZ, CA, NM, OR, and WA).

4. Again, we have very limited data on mitigation/sequestration options for most states at this time. Currently, we only have cost data for Arizona, New Mexico, Colorado, and Montana. Better data will yield improved results.

Economy-wide Cap and Trade Simulations

Option No.	Policy Option	Permit Price[2] ($/tCO$_2$e)	Largest Seller (million tCO2)	Largest Buyer (million tCO2)	MN Gain (%)	MN GHG Reductions (MMtCO$_2$e)	MN Cost-Effectiveness[1] ($/tCO$_2$e)
		2020	2020	2020	2020	2020	2020
C&T-1 (Multi-State C&T)	WCI (5 states)	9.37	CA 27.42	AZ 15.41	-	-	-
	WCI (all)	10.52	CA 37.57	AZ 14.61	-	-	-
	WCI (all + observers)	15.04	CA 74.86	CO 35.94	-	-	-
	Midwest (w/o Dakotas)	3.87	IL 11.77	MN 12.64	19.80	42.39	-8.94
	Midwest (w/ Dakotas)	4.66	IL 15.23	MN 11.47	16.39	43.56	-8.58
	Midwest (w/o Dakotas) + WCI (5 states)	6.90	IL 24.89	AZ 17.16	8.40	46.89	-7.57
	Midwest (w/ Dakotas) + WCI (5 states)	7.22	IL 26.22	AZ 16.93	7.47	47.35	-7.42
	Midwest (w/ Dakotas) + WCI (all)	7.97	IL 29.33	AZ 16.40	5.55	48.44	-7.09
	Midwest (w/ Dakotas) + WCI (all + observers)	10.64	IL 40.07	CO 37.29	1.01	52.25	-5.89

[1] This represents the average cost per tCO$_2$e mitigated/sequestered for Minnesota.
[2] This represents the marginal cost of the last tCO$_2$e mitigated/sequestered, and applies to all states involved in a trading arrangement.

Power Sector Cap and Trade Simulations

Option No.	Policy Option	Permit Price[2] ($/tCO$_2$e)	Largest Seller (million tCO2)	Largest Buyer (million tCO2)	MN Gain (%)	MN GHG Reductions (MMtCO$_2$e)	MN Cost-Effectiveness[1] ($/tCO$_2$e)
		2020	2020	2020	2020	2020	2020
C&T-1 (Multi-State C&T)	WCI (5 states)	6.71	CA 25.13	AZ 15.15	-	-	-
	Midwest (w/o Dakotas)	7.58	IL 11.18	MN 9.74	41.92	13.74	0.41
	Midwest (w/ Dakotas)	7.78	IL 11.77	MN 9.56	40.49	13.91	0.50
	Midwest (w/o Dakotas) + WCI (5 states)	7.16	CA 27.41	AZ 14.94	44.98	13.36	0.21
	Midwest (w/ Dakotas) + WCI (5 states)	7.27	CA 27.97	AZ 14.89	44.15	13.46	0.26

[1] This represents the average cost per tCO$_2$e mitigated/sequestered for Minnesota.
[2] This represents the marginal cost of the last tCO$_2$e mitigated/sequestered, and applies to all states involved in a trading arrangement.

Summary of simulation findings of November 15, 2007:

1. For all simulations,, the total cost of achieving the carbon emission caps is negative for almost all the states in the economy wide scenarios. This means that compliance with the caps will result in overall cost savings. This result is due to the existence of an extensive range of cost-saving options such as improvements in energy efficiency. Though not included in this weeks' presentation, simulations that use a set of "upper-bound" cost estimates, which include only half as many cost-saving options as the base case, indicate positive costs of compliance. Note that the factors that have the greatest influence on all simulations are the absolute levels and the relative levels of the marginal mitigation/sequestration cost curves. The former has the greatest influence on the potential for cost savings, while the latter has the greatest influence on the variation across states, including whether each is a permit buyer or seller.

2. In all the simulations, Minnesota is better off joining a Cap and Trade program with other states than trying to reach its carbon cap on its own. The cost savings of compliance vary across policy instrument designs (scenarios). Overall, the gains from trading in percentage terms (see column "MN Gain (%)" in the summary tables) are higher for power sector only trading than the economy wide trading. Among the scenarios that cover all economic sectors, the gains are highest for the Midwestern States (without Dakota) configuration. Among the scenarios that cover only power sector, the gains are highest in a cap and trade configuration including both the Midwestern States (without Dakota) and the five WCI states.

3. The power sector scenario indicates a lower per unit cost of compliance compared with the economy wide scenario for the five WCI states configuration. One possible explanation is that economies of scale in mitigation of carbon in the electric power are greater than found in other sectors for these states. However, the power sector scenarios for Midwestern states indicate higher per unit costs of compliance than the economy wide scenarios, which reflects in higher permit prices.

4. Minnesota is a permit buyer in the simulations of all the geographic configurations. The biggest seller in the Western States simulations is California. The biggest seller in the Midwestern States simulations is Illinois. Illinois is also the biggest seller in the simulations that include both Western and Midwestern States. Minnesota is the biggest buyer among Midwestern states. Without WCI observers, the biggest buyer in the Western States simulations is Arizona. Colorado is the biggest buyer if the simulation includes the five WCI observers. It is also the biggest buyer in a comprehensive simulation that covers all WCI states (including observers) and Midwestern states.

5. Economy wide emission trading within Midwestern States (whether or not the Dakotas are included) results in a lower permit price than trading among any of the three WCI configurations: 1) the five Western States; 2) complete partners of WCI; 3) complete partners of WCI plus five US observer states. The first WCI configuration has the lowest overall mitigation/sequestration costs among the three; while the third WCI configuration yields the highest overall costs due to the high mitigation costs of states like Colorado and Wyoming. Generally speaking, the results indicate that the Midwestern States have

overall lower mitigation/sequestration costs than the WCI. As a permit buyer, Minnesota would be worse off joining the WCI trading market because it has to buy permits at a higher price. Note that including Dakotas in the Midwestern only trading will also increase the compliance costs of Minnesota, since Dakotas have higher mitigation costs compared with the other Midwestern states.

6. Interestingly, since the five WCI states have relatively lower mitigation costs in power sector than the Midwestern states, Minnesota would be better off to join the WCI trading market for power sector only cases, though the improvements would be only minimal.

TABLE IW1. ECONOMY-WIDE EMISSION TRADING SIMULATION AMONG FIVE WESTERN STATES IN YEAR 2020

(million dollars or otherwise specified)

State	Before Trading	After Trading[a]			Cost Saving	Permits Traded	Emission Reduction	Emission Reduction
	Mitigation Cost	Mitigation Cost	Trading Cost	Net Cost		(million tCO_2e)	(million tCO_2e)	(percent from baseline)
AZ	-1,348	-1,671	144	-1,527	179	15.41	61.07	37.86
CA	-394	-178	-257	-435	41	-27.42	212.89	35.26
NM	-279	-495	81	-413	135	8.69	21.07	22.85
OR	-90	-154	46	-108	19	4.87	23.45	27.38
WA	-84	-70	-15	-85	1	-1.56	38.21	32.85
Total	-2,195	-2,569	0	-2,569	374	28.98[b]	356.70	33.67

[a] Permit Price = \$9.37/tonCO_2e. This is the price of the last permit sold, which is also equal to the price of the last ton of CO_2e mitigated (its *marginal* mitigation cost). It is the same for each state for a given case. The *average* mitigation cost per unit of CO_2 equivalent in this simulation differs for each state. For CA, for example, it is -\$0.84/tonCO_2e. Please note that the average mitigation cost is related to mitigation level of a state, which for this case is 35.26% below the baseline level in 2020 for MN. Multiplying the average mitigation cost by the number of tons of CO_2 mitigated will equal the *total* mitigation cost for each state.

[b] Represents number of permits bought or sold.

TABLE IW2. ECONOMY-WIDE EMISSION TRADING SIMULATION AMONG SIX WESTERN STATES AND TWO CANADIAN PROVINCES IN YEAR 2020

(million dollars or otherwise specified)

State	Before Trading	After Trading[a]			Cost Saving	Permits Traded	Emission Reduction	Emission Reduction
	Mitigation Cost	Mitigation Cost	Trading Cost	Net Cost		(million tCO_2e)	(million tCO_2e)	(percent from baseline)
AZ	-1,348	-1,663	154	-1,510	162	14.61	61.88	38.35
CA	-394	-77	-395	-473	79	-37.57	223.05	36.94
NM	-279	-491	88	-403	125	8.36	21.41	23.22
OR	-90	-146	43	-103	13	4.12	24.20	28.26
UT	30	-219	125	-94	124	11.89	25.70	26.74
WA	-84	-54	-34	-88	4	-3.25	39.90	34.30
BC	-165	-167	2	-165	0	0.18	20.75	26.99
MB	-47	-75	18	-58	11	1.67	6.47	25.47
Total	-2,377	-2,894	0	-2,894	517	40.82[b]	423.36	33.66

[a] Permit Price = \$10.52/tonCO_2e. This is the price of the last permit sold, which is also equal to the price of the last ton of CO_2e mitigated (its *marginal* mitigation cost). It is the same for each state for a given case. The *average* mitigation cost per unit of CO_2 equivalent in this simulation differs for each state. For CA, for example, it is -\$0.35/tonCO_2e. Please note that the average mitigation cost is related to mitigation level of a state, which for this case is 36.94% below the baseline level in 2020 for CA. Multiplying the average mitigation cost by the number of tons of CO_2 mitigated will equal the *total* mitigation cost for each state.

[b] Represents number of permits bought or sold.

TABLE IW3. ECONOMY-WIDE EMISSION TRADING SIMULATION AMONG ELEVEN WESTERN STATES AND TWO CANADIAN PROVINCES IN YEAR 2020

(million dollars or otherwise specified)

State	Before Trading	After Trading[a]			Cost Saving	Permits Traded	Emission Reduction	Emission Reduction
	Mitigation Cost	Mitigation Cost	Trading Cost	Net Cost		(million tCO_2e)	(million tCO_2e)	(percent from baseline)
AZ	-1,348	-1,624	173	-1,451	103	11.52	64.96	40.27
CA	-394	398	-1,126	-728	334	-74.86	260.34	43.12
NM	-279	-475	106	-369	90	7.05	22.72	24.63
OR	-90	-110	19	-91	1	1.25	27.07	31.60
UT	30	-185	139	-47	77	9.22	28.38	29.53
WA	-84	26	-143	-117	33	-9.51	46.16	39.68
BC	-165	-139	-31	-169	4	-2.03	22.96	29.87
MB	-47	-68	16	-52	5	1.08	7.05	27.77
CO	1,555	-1,344	540	-803	2,358	35.94	35.39	22.48
ID	-110	-106	-4	-111	0	-0.29	12.49	28.33
MT	-165	-164	-77	-242	77	-5.15	10.92	26.24
NV	291	-119	201	82	209	13.37	21.95	30.37
WY	188	-761	187	-574	763	12.41	15.42	22.23
Total	-618	-4,670	0	-4,670	4,052	91.84[b]	575.81	35.06

[a] Permit Price = \$15.04/tonCO_2e. This is the price of the last permit sold, which is also equal to the price of the last ton of CO_2e mitigated (its *marginal* mitigation cost). It is the same for each state for a given case. The *average* mitigation cost per unit of CO_2 equivalent in this simulation differs for each state. For CA, for example, it is \$1.53/tonCO_2e. Please note that the average mitigation cost is related to mitigation level of a state, which for this case is 43.12% below the baseline level in 2020 for CA. Multiplying the average mitigation cost by the number of tons of CO_2 mitigated will equal the *total* mitigation cost for each state.

[b] Represents number of permits bought or sold.

TABLE IM1. ECONOMY-WIDE EMISSION TRADING SIMULATION AMONG FIVE MIDWESTERN STATES IN YEAR 2020

(million dollars or otherwise specified)

State	Before Trading	After Trading[a]			Cost Saving	Permits Traded	Emission Reduction	Emission Reduction
	Mitigation Cost	Mitigation Cost	Trading Cost	Net Cost		(million tCO_2e)	(million tCO_2e)	(percent from baseline)
IA	-341	-389	21	-367	26	5.55	25.47	21.87
IL	-353	-323	-46	-368	15	-11.77	78.88	25.66
MI	-471	-457	-18	-475	4	-4.54	61.35	23.57
MN	-275	-379	49	-330	55	12.64	42.39	23.06
WI	-330	-324	-7	-331	1	-1.88	35.88	23.04
Total	-1,770	-1,871	0	-1,871	101	18.19[b]	243.97	23.83

[a] Permit Price = \$3.87/tonCO_2e. This is the price of the last permit sold, which is also equal to the price of the last ton of CO_2e mitigated (its *marginal* mitigation cost). It is the same for each state for a given case. The *average* mitigation cost per unit of CO_2 equivalent in this simulation differs for each state. For MN, for example, it is -\$8.94/tonCO_2e. Please note that the average mitigation cost is related to mitigation level of a state, which for this case is 23.06% below the baseline level in 2020 for MN. Multiplying the average mitigation cost by the number of tons of CO_2 mitigated will equal the *total* mitigation cost for each state.

[b] Represents number of permits bought or sold.

TABLE IM2. ECONOMY-WIDE EMISSION TRADING SIMULATION AMONG SEVEN MIDWESTERN STATES IN YEAR 2020

(million dollars or otherwise specified)

State	Before Trading	After Trading[a]			Cost Saving	Permits Traded	Emission Reduction	Emission Reduction
	Mitigation Cost	Mitigation Cost	Trading Cost	Net Cost		(million tCO_2e)	(million tCO_2e)	(percent from baseline)
IA	-341	-387	24	-363	22	5.07	25.95	22.28
IL	-353	-308	-71	-379	26	-15.23	82.35	26.78
MI	-471	-449	-30	-479	8	-6.46	63.27	24.31
MN	-275	-374	53	-321	45	11.47	43.56	23.70
ND	-287	-329	13	-317	30	2.69	10.09	21.03
SD	-80	-174	25	-149	69	5.33	10.25	22.02
WI	-330	-320	-13	-333	3	-2.87	36.87	23.67
Total	-2,137	-2,340	0	-2,340	203	24.56[b]	272.34	24.35

[a] Permit Price = \$4.65/tonCO_2e. This is the price of the last permit sold, which is also equal to the price of the last ton of CO_2e mitigated (its *marginal* mitigation cost). It is the same for each state for a given case. The *average* mitigation cost per unit of CO_2 equivalent in this simulation differs for each state. For MN, for example, it is -\$8.58/tonCO_2e. Please note that the average mitigation cost is related to mitigation level of a state, which for this case is 23.70% below the baseline level in 2020 for MN. Multiplying the average mitigation cost by the number of tons of CO_2 mitigated will equal the *total* mitigation cost for each state.

[b] Represents number of permits bought or sold.

TABLE IM1W1. ECONOMY-WIDE EMISSION TRADING SIMULATION AMONG FIVE MIDWESTERN STATES AND FIVE WESTERN STATES IN YEAR 2020

(million dollars or otherwise specified)

State	Before Trading	After Trading[a]			Cost Saving	Permits Traded	Emission Reduction	Emission Reduction
	Mitigation Cost	Mitigation Cost	Trading Cost	Net Cost		(million tCO_2e)	(million tCO_2e)	(percent from baseline)
AZ	-1,348	-1,685	118	-1,567	219	17.16	59.33	36.77
CA	-394	-363	-33	-395	1	-4.72	190.20	31.50
NM	-279	-500	65	-435	157	9.42	20.35	22.06
OR	-90	-167	45	-122	33	6.52	21.80	25.45
WA	-84	-101	15	-86	2	2.18	34.47	29.64
IA	-341	-379	26	-353	12	3.72	27.30	23.45
IL	-353	-252	-172	-424	71	-24.89	92.00	29.92
MI	-471	-418	-82	-500	29	-11.87	68.68	26.39
MN	-275	-355	56	-299	23	8.14	46.89	25.51
WI	-330	-303	-39	-342	13	-5.66	39.66	25.47
Total	-3,964	-4,524	0	-4,524	559	47.14[b]	600.67	28.84

[a] Permit Price = \$6.90/tonCO_2e. This is the price of the last permit sold, which is also equal to the price of the last ton of CO_2e mitigated (its *marginal* mitigation cost). It is the same for each state for a given case. The *average* mitigation cost per unit of CO_2 equivalent in this simulation differs for each state. For MN, for example, it is -\$7.57/tonCO_2e. Please note that the average mitigation cost is related to mitigation level of a state, which for this case is 25.51% below the baseline level in 2020 for CA. Multiplying the average mitigation cost by the number of tons of CO_2 mitigated will equal the *total* mitigation cost for each state.

[b] Represents number of permits bought or sold.

TABLE IM2W1. ECONOMY-WIDE EMISSION TRADING SIMULATION AMONG SEVEN MIDWESTERN STATES AND FIVE WESTERN STATES IN YEAR 2020

(million dollars or otherwise specified)

State	Before Trading	After Trading[a]			Cost Saving	Permits Traded	Emission Reduction	Emission Reduction
	Mitigation Cost	Mitigation Cost	Trading Cost	Net Cost		(million tCO_2e)	(million tCO_2e)	(percent from baseline)
AZ	-1,348	-1,684	122	-1,562	214	16.93	59.55	36.91
CA	-394	-342	-56	-397	3	-7.71	193.19	32.00
NM	-279	-500	67	-433	154	9.33	20.44	22.16
OR	-90	-166	45	-120	31	6.30	22.02	25.70
WA	-84	-97	12	-85	1	1.69	34.96	30.06
IA	-341	-377	25	-352	11	3.53	27.49	23.61
IL	-353	-243	-189	-432	79	-26.22	93.34	30.36
MI	-471	-412	-91	-504	33	-12.62	69.43	26.68
MN	-275	-351	55	-296	21	7.68	47.35	25.76
ND	-287	-327	17	-310	23	2.37	10.41	21.70
SD	-80	-171	34	-136	56	4.77	10.81	23.21
WI	-330	-301	-44	-344	15	-6.05	40.05	25.72
Total	-4,332	-4,971	0	-4,971	639	52.61[b]	629.04	28.89

[a] Permit Price = \$7.22/tonCO_2e. This is the price of the last permit sold, which is also equal to the price of the last ton of CO_2e mitigated (its *marginal* mitigation cost). It is the same for each state for a given case. The *average* mitigation cost per unit of CO_2 equivalent in this simulation differs for each state. For MN, for example, it is -\$7.42/tonCO_2e. Please note that the average mitigation cost is related to mitigation level of a state, which for this case is 25.76% below the baseline level in 2020 for MN. Multiplying the average mitigation cost by the number of tons of CO_2 mitigated will equal the *total* mitigation cost for each state.

[b] Represents number of permits bought or sold.

TABLE IM2W2. ECONOMY-WIDE EMISSION TRADING SIMULATION AMONG SEVEN MIDWESTERN STATES, SIX WESTERN STATES, AND TWO CANADIAN PROVINCES IN YEAR 2020

(million dollars or otherwise specified)

State	Before Trading	After Trading[a]			Cost Saving	Permits Traded	Emission Reduction	Emission Reduction
	Mitigation Cost	Mitigation Cost	Trading Cost	Net Cost		(million tCO_2e)	(million tCO_2e)	(percent from baseline)
AZ	-1,348	-1,680	131	-1,549	201	16.40	60.08	37.24
CA	-394	-289	-117	-406	12	-14.68	200.15	33.15
NM	-279	-498	73	-426	147	9.11	20.66	22.40
OR	-90	-162	46	-116	26	5.80	22.52	26.29
UT	30	-234	107	-127	157	13.46	24.14	25.12
WA	-84	-89	4	-84	0	0.54	36.11	31.04
BC	-165	-179	12	-167	2	1.48	19.46	25.31
MB	-47	-79	16	-63	16	2.01	6.13	24.13
IA	-341	-374	25	-349	8	3.08	27.94	23.99
IL	-353	-219	-234	-453	100	-29.33	96.45	31.37
MI	-471	-399	-115	-514	43	-14.38	71.19	27.36
MN	-275	-343	53	-291	15	6.59	48.44	26.35
ND	-287	-327	18	-309	21	2.28	10.50	21.89
SD	-80	-169	37	-133	52	4.61	10.97	23.55
WI	-330	-294	-56	-349	20	-6.97	40.97	26.30
Total	-4,514	-5,334	0	-5,334	820	65.36[b]	695.70	29.28

[a] Permit Price = \$7.97/tonCO_2e. This is the price of the last permit sold, which is also equal to the price of the last ton of CO_2e mitigated (its *marginal* mitigation cost). It is the same for each state for a given case. The *average* mitigation cost per unit of CO_2 equivalent in this simulation differs for each state. For MN, for example, it is -\$7.09/tonCO_2e. Please note that the average mitigation cost is related to mitigation level of a state, which for this case is 26.35% below the baseline level in 2020 for MN. Multiplying the average mitigation cost by the number of tons of CO_2 mitigated will equal the *total* mitigation cost for each state.

[b] Represents number of permits bought or sold.

TABLE IM2W3. ECONOMY-WIDE EMISSION TRADING SIMULATION AMONG SEVEN MIDWESTERN STATES, ELEVEN WESTERN STATES, AND TWO CANADIAN PROVINCES IN YEAR 2020

(million dollars or otherwise specified)

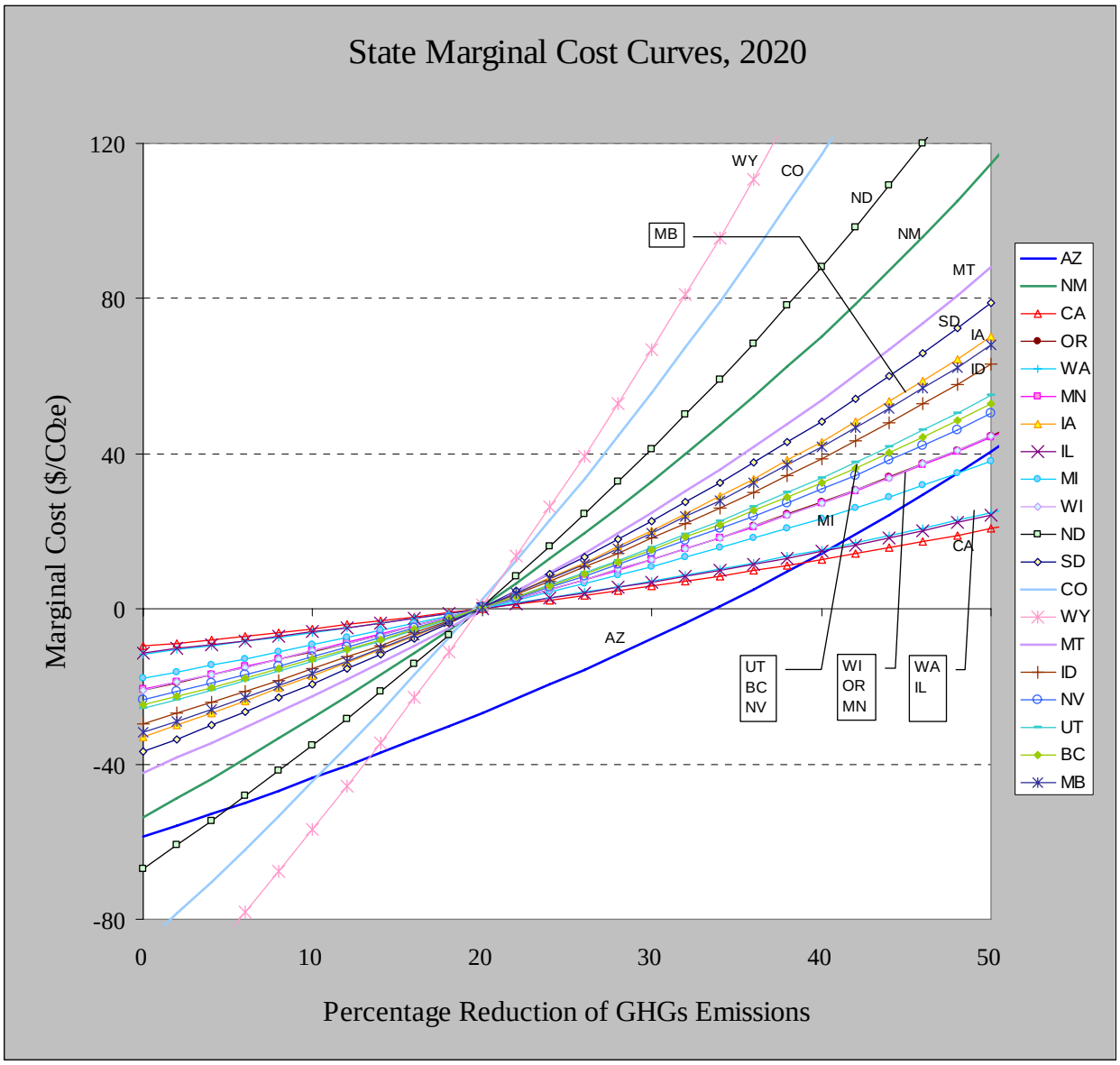
State	Before Trading	After Trading[a]			Cost Saving	Permits Traded	Emission Reduction	Emission Reduction
	Mitigation Cost	Mitigation Cost	Trading Cost	Net Cost		(million tCO_2e)	(million tCO_2e)	(percent from baseline)
AZ	-1,348	-1,662	155	-1,508	160	14.53	61.96	38.40
CA	-394	-67	-410	-477	83	-38.58	224.06	37.11
NM	-279	-491	89	-402	124	8.32	21.45	23.25
OR	-90	-146	43	-103	13	4.04	24.28	28.34
UT	30	-219	126	-93	123	11.82	25.77	26.82
WA	-84	-52	-36	-88	4	-3.42	40.07	34.45
BC	-165	-166	1	-165	0	0.12	20.81	27.07
MB	-47	-75	18	-58	11	1.65	6.48	25.53
CO	1,555	-1,361	397	-964	2,519	37.29	34.04	21.62
ID	-110	-120	8	-112	1	0.76	11.44	25.94
MT	-165	-173	-47	-221	56	-4.43	10.19	24.49
NV	291	-146	165	19	272	15.49	19.83	27.44
WY	188	-767	137	-630	818	12.89	14.93	21.53
IA	-341	-359	16	-343	2	1.51	29.51	25.35
IL	-353	-119	-426	-546	193	-40.07	107.19	34.86
MI	-471	-342	-219	-560	90	-20.55	77.36	29.73
MN	-275	-308	30	-278	3	2.78	52.25	28.43
ND	-287	-324	21	-303	16	1.95	10.83	22.57
SD	-80	-164	43	-121	41	4.05	11.53	24.77
WI	-330	-264	-108	-372	43	-10.17	44.17	28.36
Total	-2,755	-7,325	0	-7,325	4,570	117.22[b]	848.14	30.72

[a] Permit Price = \$10.64/tonCO_2e. This is the price of the last permit sold, which is also equal to the price of the last ton of CO_2e mitigated (its *marginal* mitigation cost). It is the same for each state for a given case. The *average* mitigation cost per unit of CO_2 equivalent in this simulation differs for each state. For MN, for example, it is -\$5.89/tonCO_2e. Please note that the average mitigation cost is related to mitigation level of a state, which for this case is 28.43% below the baseline level in 2020 for MN. Multiplying the average mitigation cost by the number of tons of CO_2 mitigated will equal the *total* mitigation cost for each state.

[b] Represents number of permits bought or sold.

DATA TABLE

State	Cap: 15% Below 2005 Emissions in 2020 (million tCO_2e)	Baseline 2020 Gross Emissions (Consumption-based) (million tCO_2e)	GHG Mitigation Goal in 2020 (relative to baseline emissions)	Autarkic Marginal Mitigation Cost (dollars per tCO_2e)	Gross State Product in 2020 (million 2000 dollars)
AZ	84.8	161.3	47.41%	33.3	343,077
CA	418.3	603.8	30.72%	6.4	2,646,412
NM	62.5	92.2	32.28%	41.0	72,944
OR	57.3	85.7	33.06%	17.1	173,774
UT	58.5	96.1	39.12%	32.1	158,412
WA	79.7	116.3	31.51%	8.3	422,766
BC	55.9	76.9	27.23%	10.9	131,513
MB	17.3	25.4	32.03%	23.8	33,872
CO	86.1	157.4	45.31%	154.3	376326.19
ID	31.9	44.1	27.67%	13.8	63226.463
MT	35.9	41.6	13.86%	-14.1	30675.348
NV	37.0	72.3	48.87%	47.9	130218.06
WY	41.5	69.4	40.12%	143.6	27074.727
IA	85.4	116.4	26.64%	13.2	150,136
IL	240.3	307.5	21.83%	1.3	1,152,878
MI	203.4	260.2	21.83%	2.1	619,495
MN	128.8	183.8	29.94%	12.6	376,731
ND	35.2	48.0	26.64%	27.0	30,307
SD	31.0	46.6	33.46%	31.1	53,541
WI	121.7	155.7	21.83%	2.4	316,708
Total	1,912.5	2,760.6	30.72%		7,310,087



Note: Marginal cost curves other than for AZ, CO, and MT are developed based on NM curve. 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.

TABLE IW1P. POWER SECTOR EMISSION TRADING SIMULATION AMONG FIVE WESTERN STATES IN YEAR 2020

(million dollars or otherwise specified)

State	Before Trading	After Trading[a]			Cost Saving	Permits Traded	Emission Reduction	Emission Reduction
	Mitigation Cost	Mitigation Cost	Trading Cost	Net Cost		(million tCO_2e)	(million tCO_2e)	(percent from baseline)
AZ	-35	-417	102	-315	280	15.15	25.02	34.18
CA	13	126	-169	-42	55	-25.13	57.02	43.50
NM	90	-7	37	30	59	5.49	4.76	16.69
OR	56	0	30	31	25	4.52	6.25	19.71
WA	11	11	0	11	0	-0.03	6.84	29.85
Total	135	-285	0	-285	420	25.16[b]	99.88	34.75

[a] Permit Price = \$6.71/tonCO_2e. This is the price of the last permit sold, which is also equal to the price of the last ton of CO_2e mitigated (its *marginal* mitigation cost). It is the same for each state for a given case. The *average* mitigation cost per unit of CO_2 equivalent in this simulation differs for each state. For CA, for example, it is \$2.21/tonCO_2e. Please note that the average mitigation cost is related to mitigation level of a state, which for this case is 43.50% below the baseline level in 2020 for CA. Multiplying the average mitigation cost by the number of tons of CO_2 mitigated will equal the *total* mitigation cost for each state.

[b] Represents number of permits bought or sold.

TABLE IM1P. POWER SECTOR EMISSION TRADING SIMULATION AMONG FIVE MIDWESTERN STATES IN YEAR 2020

(million dollars or otherwise specified)

State	Before Trading	After Trading[a]			Cost Saving	Permits Traded	Emission Reduction	Emission Reduction
	Mitigation Cost	Mitigation Cost	Trading Cost	Net Cost		(million tCO_2e)	(million tCO_2e)	(percent from baseline)
IA	37	1	25	26	11	3.29	8.10	19.85
IL	30	95	-85	11	19	-11.18	37.45	45.67
MI	14	54	-51	3	11	-6.68	24.70	34.50
MN	137	6	74	79	57	9.74	13.74	20.69
WI	60	10	37	46	14	4.83	13.10	21.95
Total	278	166	0	166	112	17.86[b]	97.09	30.29

[a] Permit Price = \$7.58/tonCO_2e. This is the price of the last permit sold, which is also equal to the price of the last ton of CO_2e mitigated (its *marginal* mitigation cost). It is the same for each state for a given case. The *average* mitigation cost per unit of CO_2 equivalent in this simulation differs for each state. For MN, for example, it is \$0.41/tonCO_2e. Please note that the average mitigation cost is related to mitigation level of a state, which for this case is 20.69% below the baseline level in 2020 for MN. Multiplying the average mitigation cost by the number of tons of CO_2 mitigated will equal the *total* mitigation cost for each state.

[b] Represents number of permits bought or sold.

TABLE IM2P. POWER SECTOR EMISSION TRADING SIMULATION AMONG SEVEN MIDWESTERN STATES IN YEAR 2020

(million dollars or otherwise specified)

State	Before Trading	After Trading[a]			Cost Saving	Permits Traded	Emission Reduction	Emission Reduction
	Mitigation Cost	Mitigation Cost	Trading Cost	Net Cost		(million tCO_2e)	(million tCO_2e)	(percent from baseline)
IA	37	2	25	27	10	3.19	8.20	20.10
IL	30	100	-92	8	22	-11.77	38.04	46.39
MI	14	57	-55	2	12	-7.08	25.10	35.05
MN	137	7	74	81	55	9.56	13.91	20.95
ND	13	-1	9	8	5	1.09	2.31	18.96
SD	6	3	3	6	0	0.35	2.14	25.42
WI	60	11	36	47	13	4.65	13.28	22.24
Total	297	180	0	180	118	18.85[b]	102.98	30.19

[a] Permit Price = \$7.78/tonCO_2e. This is the price of the last permit sold, which is also equal to the price of the last ton of CO_2e mitigated (its *marginal* mitigation cost). It is the same for each state for a given case. The *average* mitigation cost per unit of CO_2 equivalent in this simulation differs for each state. For MN, for example, it is \$0.50/tonCO_2e. Please note that the average mitigation cost is related to mitigation level of a state, which for this case is 20.95% below the baseline level in 2020 for MN. Multiplying the average mitigation cost by the number of tons of CO_2 mitigated will equal the *total* mitigation cost for each state.

[b] Represents number of permits bought or sold.

TABLE IM1W1P. POWER SECTOR EMISSION TRADING SIMULATION AMONG FIVE MIDWESTERN STATES AND WESTERN STATES IN YEAR 2020

(million dollars or otherwise specified)

State	Before Trading	After Trading[a]			Cost Saving	Permits Traded	Emission Reduction	Emission Reduction
	Mitigation Cost	Mitigation Cost	Trading Cost	Net Cost		(million tCO_2e)	(million tCO_2e)	(percent from baseline)
AZ	-35	-415	107	-308	273	14.94	25.23	34.46
CA	13	142	-196	-54	67	-27.41	59.30	45.23
NM	90	-6	38	33	57	5.36	4.88	17.12
OR	56	2	31	33	23	4.33	6.44	20.32
WA	11	13	-2	11	0	-0.30	7.10	31.01
IA	37	-1	25	25	13	3.50	7.88	19.33
IL	30	86	-71	15	15	-9.90	36.18	44.12
MI	14	48	-42	6	8	-5.84	23.86	33.33
MN	137	3	72	75	61	10.11	13.36	20.12
WI	60	7	37	44	16	5.20	12.73	21.32
Total	413	-121	0	-121	534	43.45[b]	196.97	32.40

[a] Permit Price = \$7.16/tonCO_2e. This is the price of the last permit sold, which is also equal to the price of the last ton of CO_2e mitigated (its *marginal* mitigation cost). It is the same for each state for a given case. The *average* mitigation cost per unit of CO_2 equivalent in this simulation differs for each state. For MN, for example, it is \$0.21/tonCO_2e. Please note that the average mitigation cost is related to mitigation level of a state, which for this case is 20.12% below the baseline level in 2020 for MN. Multiplying the average mitigation cost by the number of tons of CO_2 mitigated will equal the *total* mitigation cost for each state.

[b] Represents number of permits bought or sold.

TABLE IM2W1P. POWER SECTOR EMISSION TRADING SIMULATION AMONG SEVEN MIDWESTERN STATES AND WESTERN STATES IN YEAR 2020

(million dollars or otherwise specified)

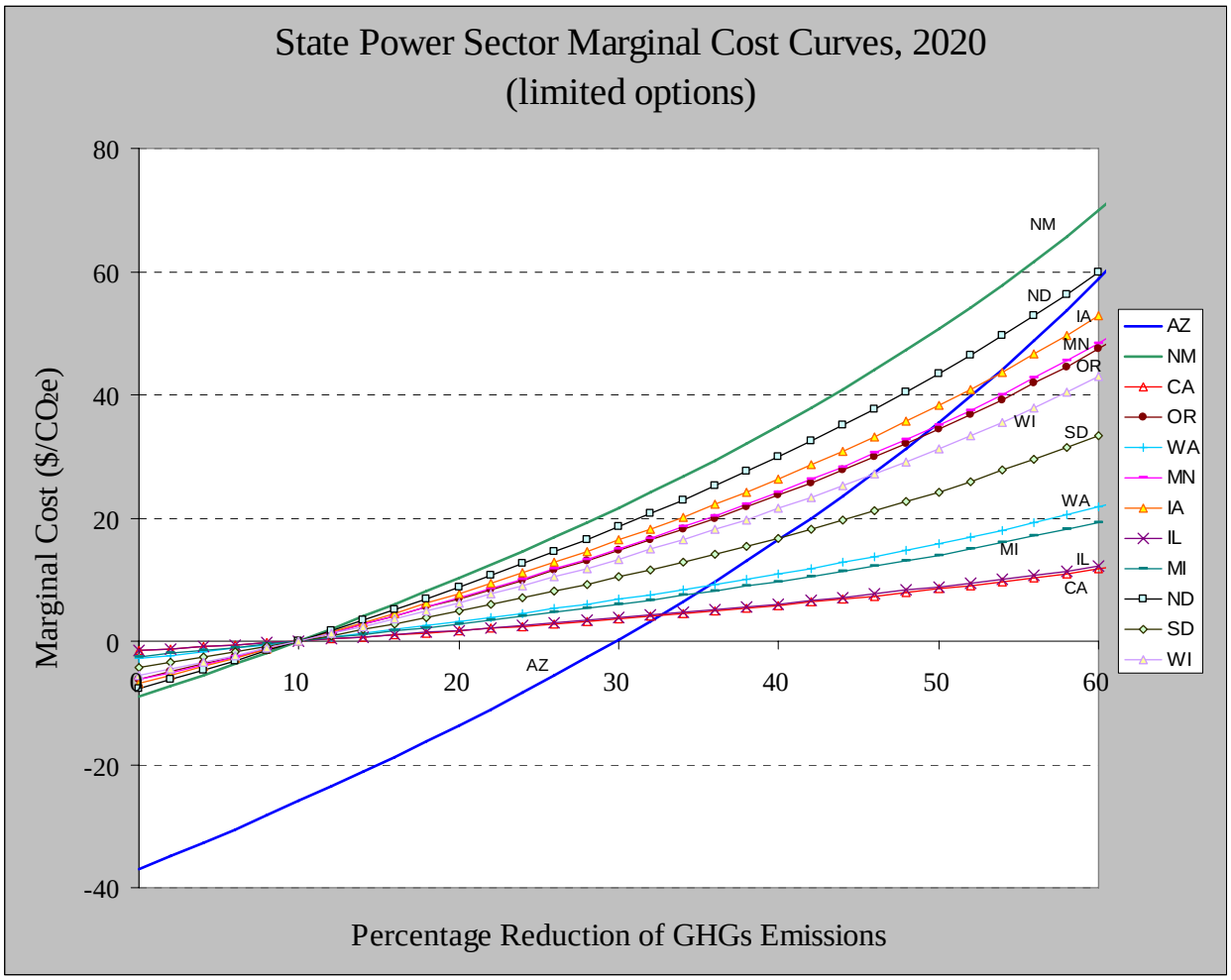
State	Before Trading	After Trading[a]			Cost Saving	Permits Traded	Emission Reduction	Emission Reduction
	Mitigation Cost	Mitigation Cost	Trading Cost	Net Cost		(million tCO_2e)	(million tCO_2e)	(percent from baseline)
AZ	-35	-415	108	-307	272	14.89	25.28	34.53
CA	13	146	-203	-57	70	-27.97	59.87	45.66
NM	90	-5	39	33	56	5.33	4.91	17.23
OR	56	2	31	33	22	4.28	6.49	20.48
WA	11	14	-3	11	0	-0.37	7.17	31.31
IA	37	0	25	25	12	3.44	7.94	19.47
IL	30	88	-75	14	16	-10.25	36.52	44.54
MI	14	50	-44	5	9	-6.07	24.09	33.65
MN	137	4	73	76	60	10.01	13.46	20.27
ND	13	-1	8	7	5	1.16	2.24	18.39
SD	6	2	3	6	1	0.43	2.06	24.49
WI	60	8	37	45	15	5.10	12.83	21.49
Total	432	-108	0	-108	539	40.38[b]	202.86	32.28

[a] Permit Price = \$7.27/tonCO_2e. This is the price of the last permit sold, which is also equal to the price of the last ton of CO_2e mitigated (its *marginal* mitigation cost). It is the same for each state for a given case. The *average* mitigation cost per unit of CO_2 equivalent in this simulation differs for each state. For MN, for example, it is \$0.26/tonCO_2e. Please note that the average mitigation cost is related to mitigation level of a state, which for this case is 20.27% below the baseline level in 2020 for MN. Multiplying the average mitigation cost by the number of tons of CO_2 mitigated will equal the *total* mitigation cost for each state.

[b] Represents number of permits bought or sold.

DATA TABLE
(for Power Sector)

State	Cap: 15% Below 2005 Emissions in 2020 (million tCO_2e)	Baseline 2020 Gross Emissions (Consumption-based) (million tCO_2e)	GHG Mitigation Goal in 2020 (relative to baseline emissions)	Autarkic Marginal Mitigation Cost (dollars per tCO_2e)	Gross State Product in 2020 (million 2000 dollars)
AZ	33.0	73.2	54.88%	46.2	6,219
CA	99.2	131.1	24.33%	2.5	43,086
NM	18.3	28.5	35.94%	29.3	1,568
OR	20.9	31.7	33.97%	18.1	2,564
WA	16.1	22.9	29.70%	6.7	4,030
IA	29.4	40.8	27.91%	14.5	2,968
IL	55.7	82.0	32.04%	4.2	25,856
MI	53.6	71.6	25.17%	4.4	14,234
MN	42.9	66.4	35.35%	19.8	5,267
ND	8.8	12.2	27.91%	16.4	780
SD	5.9	8.4	29.64%	10.2	964
WI	41.8	59.7	30.04%	13.4	5,337
Total	425.6	628.5	32.28%		112,872



Note: Marginal cost curves other than for AZ are developed based on NM curve. 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.