The Effects on Households of Allocation to Electricity Local Distribution Companies

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Introduction

The introduction of an emissions cap and trade program for carbon dioxide (CO_2) emissions could have important effects on households. Changes in the electricity sector are especially important because nearly 40 percent of emissions come from this sector and a majority of emissions reductions are expected to come from this sector in the early decades of a program. The changes in the electricity sector may affect households in different regions and income groups in different ways.[1] To reduce the effect on electricity prices, various proposals call for free allocation of emissions allowances to local electricity distribution companies. These companies are regulated throughout the nation and could be expected to act as trustees on behalf of consumers, using allowance value to offset the lion's share of the increase in electricity prices that would otherwise occur under a cap and trade program.

Free allocation to electricity consumers will mitigate the change in electricity bills, however the ultimate effect on households is uncertain. The lower electricity prices that result lead to increased electricity consumption and associated emissions in the electricity sector. To achieve the same level of emissions reduction from the overall economy would require greater emission reductions in other sectors such as personal transportation, industry, etc. In turn, this raises the costs of goods and services from these sectors. Second, the allocation of free allowances to electricity consumption erodes the allowance value that otherwise might be returned to households or firms or directed to other purposes.

This technical note reports the effects on households of two scenarios. In both, government's share of allowances associated with direct energy use at the local, state and federal levels are withheld, and a portion of the allowance value is used to purchase international offsets. In the first scenario, the remaining emissions allowances are auctioned. The market clearing price is $20.91 per metric ton, calibrated to match the

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[1] See technical memo: Paul, Burtraw and Palmer, 5/19/09, from Resources for the Future, for a discussion of regional effects on electricity prices.

price identified by EIA's analysis of the Lieberman-Warner bill (April 2008).[2] Allowance value collected in the auction is returned to households as a taxable per capita dividend.

In the second scenario, 30 percent of the allowance value is returned to local electricity distribution companies sufficient to offset their allowance burden. The remaining allowance value is distributed to households as a taxable per capita dividend. A lower electricity price results, so that the original allowance price of $20.91 would result in 24 percent fewer emissions reductions from the electricity sector. The requirement for increased emissions reductions from the electricity and other sectors under the national cap raises the allowance price to $26.90.

The attached table compares these two scenarios for the nation divided into eleven regions and income deciles. On a national average basis, the auction with per capita dividends imposes a cost of $139 per household. The allocation to local distribution companies raises the cost of climate policy to households to $175. However, two groups benefit from this policy. One is the Ohio Valley region, where benefits accrue across nine income deciles. The other group is households in the highest income decile for the nation.

Background on the model supporting this analysis can be found in:
Burtraw, Sweeney and Walls 2009. The Incidence of U.S. Climate Policy: Alternative Uses of Revenues from a Cap-and-Trade Auction. RFF Discussion Paper 09-17.

[2] U.S. Energy Information Administration. 2008. Energy Market and Economic Impacts of S.2191, The Lieberman–Warner Climate Security Act of 2007. SR/OIAF/2008-01, April.

Net Welfare Loss After Remedy					
Region	Decile	Avg Income	Initial Consumer Surplus Loss	Cap and Dividend (Taxable)	Free Allocation to LDCs*
Southeast	1	7,174	347	(282)	(233)
Southeast	2	15,359	465	(178)	(136)
Southeast	3	23,096	550	(107)	(73)
Southeast	4	31,039	638	(35)	(8)
Southeast	5	39,548	703	(42)	(2)
Southeast	6	49,370	812	73	110
Southeast	7	61,363	904	165	195
Southeast	8	77,159	1,002	296	313
Southeast	9	100,969	1,222	473	490
Southeast	10	182,750	1,482	768	761
Southeast	Avg	56,528	796	99	128
California	1	7,537	307	(389)	(264)
California	2	15,457	403	(289)	(169)
California	3	23,019	490	(257)	(126)
California	4	30,800	608	(172)	(36)
California	5	39,786	644	(175)	(33)
California	6	49,656	765	(79)	66
California	7	61,313	891	108	237
California	8	77,381	1,018	256	375
California	9	100,041	1,232	400	525
California	10	178,631	1,627	880	971
California	Avg	69,317	887	112	236
Texas	1	7,558	381	(434)	(336)
Texas	2	15,344	464	(278)	(204)
Texas	3	23,135	581	(217)	(147)
Texas	4	31,015	702	(112)	(47)
Texas	5	39,824	820	33	82
Texas	6	49,621	882	135	165
Texas	7	61,314	1,008	180	218
Texas	8	76,424	1,075	280	302
Texas	9	99,838	1,373	573	569
Texas	10	171,804	1,664	996	930
Texas	Avg	58,586	905	127	163
Florida	1	7,801	369	(226)	(188)
Florida	2	15,500	436	(93)	(81)
Florida	3	23,112	529	(115)	(93)
Florida	4	31,095	634	(14)	1
Florida	5	39,241	678	(24)	8
Florida	6	49,143	773	34	55
Florida	7	61,766	855	104	123
Florida	8	76,941	1,004	286	285
Florida	9	100,195	1,182	478	448
Florida	10	173,488	1,482	826	755
Florida	Avg	54,325	774	104	112
Ohio Valley	1	7,413	410	(182)	(167)
Ohio Valley	2	15,518	503	(59)	(70)
Ohio Valley	3	23,115	601	18	(1)
Ohio Valley	4	31,161	717	91	73
Ohio Valley	5	39,673	806	120	108
Ohio Valley	6	49,639	902	191	169
Ohio Valley	7	61,878	1,036	279	263
Ohio Valley	8	76,991	1,153	383	350
Ohio Valley	9	99,602	1,348	586	541
Ohio Valley	10	177,756	1,756	1,024	924
Ohio Valley	Avg	60,237	944	262	234
Mid-Atlantic	1	7,692	405	(209)	(153)
Mid-Atlantic	2	15,463	446	(84)	(56)
Mid-Atlantic	3	22,794	542	(13)	9
Mid-Atlantic	4	31,051	653	67	88
Mid-Atlantic	5	39,436	717	78	101
Mid-Atlantic	6	49,579	825	153	176
Mid-Atlantic	7	61,863	922	159	185
Mid-Atlantic	8	77,081	1,048	347	349
Mid-Atlantic	9	101,109	1,163	400	410
Mid-Atlantic	10	182,398	1,637	943	890
Mid-Atlantic	Avg	66,037	890	231	243

Note: Deciles constructed at the national level. All negative welfare losses reflect a net increase in welfare after CO2 revenues are redistributed.
* 30% of total permits are allocated to LDCs for free. The remaining permits are auctioned, and returned to households as a per capita taxable dividend.

Net Welfare Loss After Remedy

Region	Decile	Avg Income	Initial Consumer Surplus Loss	Cap and Dividend (Taxable)	Free Allocation to LDCs*
Northeast	1	6,974	380	(129)	(59)
Northeast	2	15,503	517	(39)	25
Northeast	3	22,909	554	(20)	47
Northeast	4	31,022	648	71	138
Northeast	5	39,823	722	93	167
Northeast	6	49,999	773	134	206
Northeast	7	61,157	940	222	303
Northeast	8	77,414	1,056	330	403
Northeast	9	101,309	1,269	537	598
Northeast	10	181,083	1,704	1,009	1,037
Northeast	Avg	69,702	944	292	356
Northwest	1	6,981	314	(302)	(196)
Northwest	2	15,481	400	(198)	(112)
Northwest	3	23,603	507	(75)	8
Northwest	4	31,225	555	(108)	(13)
Northwest	5	39,551	719	(1)	102
Northwest	6	49,921	758	19	125
Northwest	7	61,763	886	88	204
Northwest	8	77,098	979	185	295
Northwest	9	100,080	1,118	313	421
Northwest	10	176,106	1,539	831	912
Northwest	Avg	61,572	808	96	197
New York	1	6,868	339	(257)	(190)
New York	2	15,735	462	(120)	(68)
New York	3	23,294	469	(188)	(118)
New York	4	31,088	615	(73)	(17)
New York	5	39,497	743	39	85
New York	6	50,041	801	131	176
New York	7	61,583	902	141	194
New York	8	77,592	1,042	280	324
New York	9	101,015	1,198	411	439
New York	10	191,319	1,633	906	890
New York	Avg	66,930	872	173	214
Plains	1	7,223	345	(255)	(183)
Plains	2	15,404	402	(99)	(58)
Plains	3	23,279	530	(29)	10
Plains	4	31,075	584	1	38
Plains	5	39,453	766	165	201
Plains	6	49,864	848	235	252
Plains	7	61,592	1,025	262	301
Plains	8	76,723	1,056	307	340
Plains	9	98,620	1,204	498	522
Plains	10	181,054	2,028	1,322	1,274
Plains	Avg	63,131	930	280	307
Mountains	1	7,115	381	(313)	(257)
Mountains	2	15,155	479	(185)	(152)
Mountains	3	22,801	558	(88)	(54)
Mountains	4	31,050	650	(21)	(1)
Mountains	5	39,393	729	28	45
Mountains	6	49,655	833	81	98
Mountains	7	61,315	995	220	227
Mountains	8	76,844	1,055	291	288
Mountains	9	99,927	1,264	491	480
Mountains	10	170,924	1,627	915	849
Mountains	Avg	58,202	867	151	161
National	1	7,030	314	(296)	(227)
National	2	15,372	438	(169)	(122)
National	3	23,038	540	(97)	(55)
National	4	31,036	644	(25)	14
National	5	39,553	728	11	57
National	6	49,596	825	93	135
National	7	61,558	940	172	214
National	8	77,074	1,051	303	330
National	9	100,267	1,245	473	496
National	10	178,677	1,634	925	906
National	Avg	58,321	836	139	175

Note: Deciles constructed at the national level. All negative welfare losses reflect a net increase in welfare after CO2 revenues are redistributed.

* 30% of total permits are allocated to LDCs for free. The remaining permits are auctioned, and returned to households as a per capita taxable dividend.