CLEAR ECONOMICS:

STATE-LEVEL IMPACTS OF THE CARBON LIMITS AND ENERGY FOR AMERICA'S RENEWAL ACT ON FAMILY INCOMES AND JOBS

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EXECUTIVE SUMMARY

This study examines the economic impacts of the Carbon Limits and Energy for America's Renewal (CLEAR) Act, focusing on household incomes and job creation across the states.

The CLEAR Act would put a cap on the use of fossil fuels so as to reduce emissions of carbon dioxide, the most important greenhouse gas. Any policy that limits the use of fossil fuels will raise their price, impacting real family incomes. But the net impact on family incomes depends on who gets the money that is paid by consumers as a result of higher fuel prices.

The CLEAR Act recycles 75% of this money to the public in the form of equal monthly dividends, and devotes the remaining 25% to clean energy investments. Dividends will insulate household incomes from the impact of higher fossil fuel prices. Expenditures from the Clean Energy Reinvestment Trust (CERT) Fund will create jobs in energy efficiency and renewable energy.

Dividends are the same for all, so the net impact on family incomes (dividends minus the impact of carbon prices) will vary among households depending on the amount of fossil fuels they consume directly and indirectly. Families who consume more will have lower net benefits; families who consume less will have higher net benefits. But regardless of their consumption level, all will have an incentive to limit their use of fossil fuels in response to the market price signals resulting from the cap.

Because high-income households generally consume more fossil fuels than low-income and middle-income households, they will tend to pay more as a result of higher fuel prices than they receive as dividends. These income-related differences in net impacts also apply at the level of interstate comparisons: all else equal, states with lower per capita incomes will receive higher net benefits from the CLEAR Act dividends than states with higher per capita incomes.

But states also differ in other ways that will affect net impacts, such as the carbon intensity of their electricity supplies. At any given income, families in states that get most of their electricity from coal-fired plants will face bigger price increases than families in states that get most of their electricity from less carbon-intensive sources. This effect is offset to some extent, however, insofar as more coal-intensive states tend to have lower average incomes.

We find that interstate differences in impacts on household incomes are small: much smaller than differences across the income spectrum, and vastly smaller than the differences in other federal programs, such as defense spending. As a result, the CLEAR Act delivers positive net benefits to the median household — and to the majority of households — in each and every state.

Nevertheless, interstate differences may be of concern to policy makers. If so, there are two ways to address these concerns: (i) by adjusting dividends in the initial years of the policy, by providing state-specific dividends that equalize net impacts on the median household in each state; or (ii) by allocating investments under the CERT Fund so as to offset these interstate differences.

Interstate differences could be eliminated altogether by modifying the Act so as to provide state-specific dividends, calibrated to equalize net impacts on median households across the states. To avoid creating perverse long-term incentives for states to rely on dirty energy, these dividends could converge towards the national average over time. Under this approach, initially 66% of total carbon revenue would go to a base dividend received by residents in every state, and 9% to dividend supplements that vary based on the impact of higher fossil fuel prices on median households.

Interstate differences alternatively could be addressed in the allocation of the CERT Fund, by directing more investment to states with higher unemployment and/or greater potential economic dislocations from the shift away from fossil fuels. We estimate that the CERT Fund will create roughly 360,000 jobs nationwide. This estimate only counts jobs created by public expenditure; it does not count net job creation from shifting private expenditure away from fossil fuels and towards more labor-intensive spending on energy efficiency and renewable energy. An advantage of this approach is that it focuses attention on the production side of the economy, where interstate differences are likely to be more significant, rather than on the consumption side, where interstate differences are relatively small.

INTRODUCTION

This study analyzes the economic impacts of the Carbon Limits and Energy for America's Renewal (CLEAR) Act, a bill introduced by Senators Maria Cantwell (D-WA) and Susan Collins (R-ME) in December 2009. Specifically, we estimate impacts on household incomes and job creation across the 50 states.

The CLEAR Act aims to safeguard both the Earth's climate and the economic security of American families. The Act seeks to protect the climate by capping the use of fossil fuels, so as to gradually reduce U.S. carbon emissions by 80% by the year 2050. At the same time, the Act seeks to protect family incomes by recycling three-quarters of the revenues from the sale of carbon permits directly to the public, and devoting the remaining one-quarter to job-creating investments in the clean energy transition.

First, we sketch the basic features of the CLEAR Act. We then estimate its impacts on household incomes, state-by-state and across income brackets, taking into account the net impacts of higher fuel prices and the revenue recycled to households. Finally, we estimate the job creation that would result from an interstate allocation of investment funds based on differences in carbon emissions from electricity consumption, unemployment, and population.

CLEAR BASICS

The CLEAR Act is a "100-75-25-0" climate policy:

- *100%* of the permits to bring fossil carbon into the U.S. economy will be auctioned — there are no permit giveaways. The bill strictly limits the buying and selling of permits to prevent carbon market speculation and profiteering.
- *75%* of the auction revenue is returned directly to the public in the form of equal dividends per person. These "energy security dividends" are paid monthly to every man, woman, and child lawfully residing in the United States.
- *25%* of the auction revenue is deposited into a Clean Energy Reinvestment Trust (CERT) Fund to be used for investments in energy efficiency, clean energy, adaptation to climate change, and assistance to sectors that face economic dislocation during the transition from the fossil-fueled economy.
- Zero "offsets" are allowed. Polluters cannot avoid buying permits or curbing their use of fossil fuels by paying someone else here or abroad to clean up after them.

Equal treatment across firms and households

The Act provides equal treatment for producers in the fossil fuel industry, regardless of whether they are in coal, oil, or natural gas. These firms will be required to buy permits, called "carbon shares," for each ton of fossil carbon that they bring into the nation's economy. The total number of permits is set by the cap, which gradually decreases over time. Because all permits are auctioned — with no free giveaways to favored industries — the result is a level playing field: every molecule of fossil carbon is treated equally.

The Act provides equal treatment for consumers, too. All U.S. residents receive the same monthly dividend, regardless of their income and regardless of where they live. These dividends insulate family purchasing power, or real incomes, from the impact of higher energy prices that result from the cap. Households that consume below-average amounts of fossil fuels (and fewer things produced and distributed using them) will come out ahead in pocketbook terms: their dividends will exceed what they pay in higher prices. Households that consume large quantities of fossil fuels will pay more than they get back. All households have an incentive to economize on the use of fossil fuels, in response to the price signal resulting from the cap. For any given household, the net impact of the policy on real income depends on its consumption decisions.

Region-specific allocations of investment

While equal treatment across firms and households is a central feature of the bill, the CLEAR Act recognizes that weaning the economy from fossil fuels poses special challenges for carbon-intensive regions and states. For this reason, the bill specifies that the CERT Fund will provide targeted, region-specific assistance to workers, communities, industries, and small businesses that experience hardship during the nation's transition to a clean energy economy.

Other uses of the CERT Fund include investments in the reduction of emissions of greenhouse gases other than carbon dioxide; biological carbon sequestration, at home and abroad; and energy efficiency and clean energy research and development (for a complete

list, see the appendix to this study). Subject to the Act's guidelines on eligible uses, decisions on how to allocate CERT Funds among alternative investments are left to the Congressional appropriations process.

Carbon revenue: Follow the money

The amount of money that will be raised annually by carbon permit auctions, and redistributed via dividends to the public and CERT Fund investments, is likely to be quite substantial. In 2020, the reference year for which we present estimates in this study, the cap will limit carbon dioxide emissions to 5.4 billion tons. If we assume a permit price of $25/ton — which is within the "collar" of minimum and maximum prices mandated in the bill[1] — this translates into total permit revenue of $135 billion.

These billions do not materialize out of thin air. The counterpart to the total value of the permits is the higher cost to consumers, as firms pass through the cost of carbon permits to end-users of fossil fuels.[2] Although higher fuel prices are a cost to consumers, they are not a cost to the U.S. economy as a whole. Instead they are a *transfer*. Unlike the situation when fuel prices rise for other reasons—such as OPEC supply caps or rising world demand — the extra dollars paid as a result of a cap-and-permit policy are recycled within the national economy. The economic pie remains intact. What changes is how the pie is sliced —and this depends on who gets the money.

THE CLEAR DIVIDEND: IMPACT ON HOUSEHOLD INCOMES

The CLEAR Act specifies that carbon permits will be auctioned to fossil fuel firms, rather than distributed free of charge. The firms will pass through the costs of the permits to consumers via higher prices. In other words, the money that the firms receive from consumers by virtue of higher prices equals what they pay for the permits.[3] The CLEAR Act specifies that 75% of the carbon permit revenue will be recycled directly to the public in monthly dividends (see box, above, for a description of how the dividends would be paid out).

The net impact of this transfer on household incomes is the difference between what the household receives as dividends and what it pays as a result of

How will dividends be paid?

The most efficient way to pay the monthly climate policy dividends to the American public is via electronic funds transfer (EFT).

ETF is now the most widely used method by which federal and state agencies distribute recurrent payments to individuals. The United States Treasury's Financial Management Service currently disburses almost one billion payments annually on behalf of the Social Security Administration, the Department of Veterans Affairs and other federal agencies, and more than 80% of these are disbursed electronically.

The two main EFT methods are direct deposit into bank accounts and Electronic Benefit Transfer cards. The first requires that the recipient has a bank account. The second transfers funds through an industry-standard magnetic-stripe debit card that is protected by a personal identification number (PIN).

Paper checks are sent to the minority of recipients who prefer non-electronic transfers. Because this method of disbursement is considerably more costly than EFT, the Treasury Department has launched its "Go Direct" campaign which has persuaded millions of recipients to switch from paper checks to EFT.

The costs of electronic transfers amount to pennies each — a tiny fraction of the payments themselves.

1 The minimum and maximum permit prices set by the bill for the year 2012 are $7 and $21, respectively. The bill specifies that the real (inflation-adjusted) minimum price will rise by 6.5%/year and the real maximum price by 5.5%/year. Therefore in 2020 the price collar (in 2012 dollars) will be $11.58-$32.23.

2 Household consumption — both direct expenditures on fossil fuels and indirect expenditures on goods and services produced and distributed using them — accounts for roughly 66% of U.S. carbon emissions. The remainder comes from local, state, and federal government expenditure, non-profit institutions, and exports (Boyce and Riddle 2008, Table 1).

3 Most economic analysts assume that firms will pass 100% of the permit cost onto consumers. For an analysis of how alternative assumptions on the percentage pass-through would affect estimated impacts on households, see Boyce and Riddle (2007).

higher fossil fuel prices. When its dividends exceed what it pays, the household experiences a net financial benefit as a result of the policy. When what it pays exceeds its dividends, the household experiences a net financial cost. In this section we describe how net benefits vary across states and income brackets.

Net impacts across the states

Table 1 shows state-by-state net impacts on median households — households whose per capita income puts them exactly in the middle of the state's income distribution. The dividend per person, shown in the first column, is the same in every state: in 2020, at a permit price of $25/ton, it comes to $297/person. What the household pays as a result of higher fossil fuel prices differs, however, because consumption patterns vary across states, due, among other reasons, to differences in median incomes, home heating and cooling needs, and the carbon intensity of the state's electricity supply.[4] As a result, net impacts vary across the states, too.

The CLEAR Act specifies that 75% of the carbon permit revenue will be recycled directly to the public in monthly dividends.

Interstate differences in the impact of higher fossil fuel prices ("carbon price impacts") are shown in the second column of Table 1. Nationwide, the annual cost to the median household is $232 per person.

TABLE 1: NET IMPACT OF CLEAR DIVIDENDS ON MEDIAN HOUSEHOLD ($ PER CAPITA, 2020)

State	Dividend	Carbon price impact	Net benefit
Alabama	297	232	65
Alaska	297	242	55
Arizona	297	212	85
Arkansas	297	223	74
California	297	207	91
Colorado	297	267	30
Connecticut	297	248	50
Delaware	297	278	19
D.C	297	277	21
Florida	297	220	77
Georgia	297	258	39
Hawaii	297	248	50
Idaho	297	201	96
Illinois	297	251	47
Indiana	297	287	11
Iowa	297	266	32
Kansas	297	266	31
Kentucky	297	258	40
Louisiana	297	231	67
Maine	297	213	85
Maryland	297	267	30
Massachusetts	297	252	46
Michigan	297	259	38
Minnesota	297	273	24
Mississippi	297	212	85
Missouri	297	265	32
Montana	297	222	76
Nebraska	297	251	46
Nevada	297	237	60
New Hampshire	297	236	61
New Jersey	297	249	48
New Mexico	297	224	74
New York	297	206	91
North Carolina	297	245	53
North Dakota	297	266	31
Ohio	297	269	28
Oklahoma	297	233	64
Oregon	297	196	101
Pennsylvania	297	231	66
Rhode Island	297	225	72
South Carolina	297	215	83
South Dakota	297	224	73
Tennessee	297	239	58
Texas	297	245	53
Utah	297	256	41
Vermont	297	200	98
Virginia	297	270	27
Washington	297	201	96
West Virginia	297	242	56
Wisconsin	297	276	21
Wyoming	297	265	32
US Average	**297**	**232**	**65**

4 For details on the methods of calculating net benefits, see Riddle and Boyce (2007). For a more detailed discussion of the reasons for interstate differences, see Boyce and Riddle (2009).

Differences across the states are fairly small: in the lowest-cost state (Oregon), the annual carbon price impact is $36 less; in the highest-cost state (Indiana), it is $55 more. The range is narrow because total carbon use per capita is fairly similar across the country; so when all fossil carbon is treated equally, as in the CLEAR Act, carbon price impacts are similar, too. Many of the factors that contribute to differences in carbon use across states have offsetting effects. For example, states that use more energy for home heating costs generally use less for air conditioning. Similarly, states that have more coal-intensive electricity tend to have lower median incomes, and hence lower consumption, which leads to lower carbon price impacts.

It is important to note that interstate differences in the impact of higher fossil fuel prices will occur under *any* policy to cap carbon emissions. Interstate differences in *net* impacts will depend on who gets the money. The most striking feature of the results shown in Table 1 is that *the net impact of CLEAR on the median household is positive in every state*.[5]

Nationwide, the average net benefit works out to $65 per person, or $260 for a family of four.

Net impacts across the income spectrum

Table 2 presents a more fine-grained picture: it shows how net benefits vary across the income-distribution spectrum in each state. In the lower-income deciles (a decile is 10% of the population), the net impact is invariably positive, reflecting the fact that low-income households consume less than the average amount of carbon. In the top deciles, the net impact is negative, reflecting their above-average levels of consumption. Two conclusions from Table 2 stand out:

First, *the middle class is "made whole" by the CLEAR dividends:* Approximately 70% of the U.S. population comes out ahead from the policy, including not only lower-income families but also the middle class. "Come out ahead" here means a net benefit in simple pocketbook terms, not counting the policy's main benefits in the form of reduced dependence on fossil fuels and protection from climate change.

TABLE 2: NET IMPACT OF CLEAR ACT BY STATE AND INCOME DECILE ($ PER CAPITA)

	Decile									
State	1	2	3	4	5	6	7	8	9	10
Alabama	186	151	125	102	78	51	21	-18	-75	-202
Alaska	170	136	112	89	67	43	15	-20	-71	-180
Arizona	195	164	140	119	97	73	44	9	-45	-163
Arkansas	187	155	130	108	86	61	33	-2	-54	-168
California	208	175	150	127	103	77	46	7	-53	-190
Colorado	161	122	95	69	44	16	-17	-58	-120	-255
Connecticut	185	147	118	91	64	34	-2	-48	-119	-284
Delaware	151	112	84	58	33	5	-27	-68	-127	-257
District of Columbia	180	136	103	71	38	2	-42	-100	-191	-410
Florida	194	161	136	113	89	63	33	-7	-66	-201
Georgia	169	131	104	78	52	24	-8	-50	-111	-246
Hawaii	170	135	109	86	62	36	6	-32	-88	-212
Idaho	198	168	146	126	106	85	60	28	-18	-118
Illinois	176	138	111	86	60	32	0	-41	-102	-238
Indiana	143	103	75	49	24	-4	-35	-74	-131	-252
Iowa	156	119	92	68	44	19	-11	-47	-100	-213
Kansas	160	122	94	69	44	17	-14	-52	-109	-232
Kentucky	169	131	104	78	53	26	-6	-46	-105	-234

5 This reflects the fact that U.S. household incomes are skewed (in the strict statistical sense of that term) toward upper-income groups: hence the mean (average) is greater than the median (middle). The impact of higher fossil fuel prices is proportional to consumption, so this too is skewed to the top of the distribution. Because the median household is "below average" in terms of its income and consumption, it pays less than the average into the total carbon-revenue pool. An additional boost to household net benefits comes from the fact that, as noted above, household share of total carbon revenue (75%) is somewhat greater than household share of the nation's total carbon consumption (66%).

	Decile									
State	1	2	3	4	5	6	7	8	9	10
Louisiana	186	152	127	103	79	53	23	-16	-73	-199
Maine	192	161	138	117	96	73	46	13	-37	-145
Maryland	161	123	95	70	44	16	-17	-58	-120	-256
Massachusetts	177	140	112	86	60	31	-3	-46	-112	-261
Michigan	166	129	101	76	51	24	-7	-47	-105	-233
Minnesota	156	117	89	63	38	10	-21	-61	-120	-246
Mississippi	196	165	141	119	97	73	44	9	-44	-160
Missouri	162	124	96	71	46	18	-13	-53	-112	-239
Montana	185	153	130	108	87	64	37	4	-45	-151
Nebraska	167	131	105	82	58	33	4	-32	-84	-197
Nevada	178	144	119	96	72	47	17	-20	-76	-198
New Hampshire	177	143	118	95	73	48	20	-16	-69	-184
New Jersey	179	142	114	88	62	33	0	-44	-110	-261
New Mexico	186	154	130	108	85	61	33	-3	-56	-172
New York	208	176	151	128	104	77	45	4	-60	-210
North Carolina	176	140	114	90	65	39	8	-30	-88	-213
North Dakota	155	118	92	68	44	18	-12	-49	-102	-215
Ohio	159	120	92	67	41	14	-18	-58	-116	-243
Oklahoma	183	148	123	100	77	52	23	-14	-68	-184
Oregon	206	176	153	133	112	89	63	29	-21	-133
Pennsylvania	184	150	125	102	79	53	24	-14	-70	-194
Rhode Island	190	156	131	108	85	59	29	-9	-65	-192
South Carolina	194	162	138	116	94	70	42	6	-46	-162
South Dakota	185	152	128	106	85	61	34	0	-49	-154
Tennessee	181	145	119	95	71	44	13	-26	-83	-211
Texas	180	143	116	91	66	38	6	-34	-94	-227
Utah	158	123	98	75	53	29	1	-33	-83	-187
Vermont	200	170	148	128	108	86	61	29	-19	-123
Virginia	162	123	94	68	41	12	-21	-64	-127	-268
Washington	204	173	150	129	108	84	57	21	-31	-148
West Virginia	177	142	116	92	68	42	12	-26	-81	-201
Wisconsin	149	110	83	58	34	8	-23	-60	-115	-231
Wyoming	156	119	93	69	45	19	-11	-48	-102	-219
US Average	186	152	126	102	78	51	20	-19	-78	-211

Note: Each decile equals 10% of the population, ranked by per capita income (decile 1 = lowest; decile 10 – highest).

Second, *interstate differences are very small compared to differences across the income spectrum:* Across the income classes, the average net benefit nationwide ranges from +$186 per person in the bottom decile to -$211 in the top decile. Across the states, by contrast, the net benefit to the median family (see Table 1) is always positive, and lies within a much narrower range: +$11 to +$101.

Some opponents of a cap-and-dividend policy have exaggerated regional differences in impacts by confusing interstate differences with differences across the income spectrum. For example, the chief executive of one of the nation's largest coal-based electric utilities has claimed that the policy would take money from "mom in the Midwest and dividend it to Paris Hilton."[6] This assertion stands reality on its head.

6 Michael Morris, president and CEO of American Electric Power, quoted in Juliet Eilperin & Steven Mufson, "Senators to propose abandoning cap-and-trade," *The Washington Post,* February 27, 2010, p. A1.

If "mom in the Midwest" lives in a median-income household in the 12-state Midwestern region (defined by the U.S. Census Bureau as Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin), her family receives an annual net *benefit* of $37 per person (see Table 1). If "Paris Hilton" is meant to connote someone in the top 10% of the income spectrum in California, she pays an annual net *cost* of $190 (see Table 2); and if she is meant to connote someone at the very top of the income spectrum—say, in the top 0.1%—her net cost, due to her disproportionately high carbon consumption, would be far greater than this.

The middle class is "made whole" by the CLEAR dividends.

The accurate way to characterize differences in net impacts would be to say that cap-and-dividend "takes money" from elite consumers with outsized carbon footprints and dividends it to everyone equally.

These results have political implications as well as economic significance. The fact that the policy protects the real incomes of the middle class and yields net benefits for most families can help ensure that the CLEAR Act will receive durable support from the public—support that must be sustained over several decades in order to make the clean energy transition. And the fact that interstate differences are relatively small means that the policy has the potential to attract support across the country from the public in "red" states, "blue" states, and swing states in between.

Sensitivity analysis

The results presented above are based on a permit price of $25/ton CO_2 in the year 2020 (in 2012 dollars). The actual permit price in that year will depend, among other things, on the state of the economy (economic booms put upward pressure on demand for permits, pushing prices higher, while recessions have the opposite effect) and the pace of technological change in the energy and transportation sectors (more rapid progress in energy efficiency and clean energy development will reduce demand for permits, lowering prices). In order to limit price volatility in the face of these uncertainties, the CLEAR Act specifies a "price collar"—minimum and maximum permit prices that rise (after adjusting for inflation) over time.

Table 3 presents a sensitivity analysis to examine how total permit revenue, dividends, and per capita impacts vary depending on the permit price. In addition to the price of $25/ton that we have assumed in our analysis, results are shown for the minimum and maximum prices established in the legislation for the year 2020 ($11.58 and $32.23, respectively).

TABLE 3: SENSITIVITY ANALYSIS: IMPACT OF CLEAR ACT WITH ALTERNATIVE PERMIT PRICES (IN THE YEAR 2020)

Permit price in 2020	$11.58	$25	$32.23
Total revenue	$63 billion	$135 billion	$174 billion
Dividends	$47 billion	$101 billion	$131 billion
Dividend per capita	$137	$297	$383
Carbon price impact per capita (median household)	$107	$232	$299
Net benefit per capita (median household)	$30	$65	$84
CERT Fund	$16 billion	$34 billion	$43 billion

Equalizing net impacts across the states

Interstate differences in the net impact on households of dividends and higher fuel prices are fairly small, as shown in Tables 1 and 2. Nevertheless, these differences may be of concern to policy makers. If so, there are two ways to address these concerns: (i) by adjusting dividends in the initial years of the policy, so as to equalize net impacts on the median household in each state; or (ii) by allocating investments under the CERT Fund so as to offset these interstate differences.

The aim of the first approach would not be to equalize net benefits across all households, which would destroy the incentive for households to economize on their use of fossil fuels. A key feature of the cap-and-dividend policy is that it rewards households who use less carbon: net benefits to any household depend on what and how much it consumes. The aim would be to equalize net benefits across states, and for this it makes sense to think in terms of net benefits to the median household — the household exactly in the middle of the state's income-distribution spectrum. If Congress were to insert such a provision into the final version of the bill, it could task an appropriate federal agency with calculating state-wise net impacts on median households for this purpose.

To illustrate how this would work, Table 4 shows how state-specific dividends would vary so as to equalize net impacts across states (as in our previous tables, the numbers here refer to the year 2020 with a permit price of $25/ton). Annual dividends would range from a low of $261 per person in Oregon to a high of $352 per person in Indiana. In every state, the net benefit to the median household would be equal to the national average, $65 per capita.

The state-specific dividends shown in Table 4 in effect consist of two parts: a base dividend that is received by residents in every state, plus a state supplement that varies with the impact of higher fossil fuel prices on median households. In Table 4, the base dividend is $261 per person (the Oregon dividend), and the largest state supplement (in Indiana) is $91 per person. Nationwide, 75% of total carbon revenue continues be returned to the public as dividends: with 66% going to the base dividend and 9% to the state supplements, the net impact on median households is equalized across the states.

The argument in favor of state-specific dividends is that it would achieve "equal treatment" across the states, when this is defined in terms of net impacts on consumers. This might broaden political support for the bill, although a similar effect might be obtained by addressing interstate differences via CERT Fund allocations, as discussed in the next section.

There are two arguments against different dividends for different states. The first is that these would violate the principle behind the dividends: that the American people own our country's share of the Earth's scarce carbon absorptive capacity in equal and common measure. In this view, the dividend provisions of the CLEAR Act are not only about protecting families from the impact of higher fossil

TABLE 4: STATE-SPECIFIC DIVIDENDS TO EQUALIZE NET IMPACT ON MEDIAN HOUSEHOLD ($ PER CAPITA, 2020)

State	Dividend	Carbon price impact	Net benefit
Alabama	297	232	65
Alaska	307	242	65
Arizona	277	212	65
Arkansas	288	223	65
California	272	207	65
Colorado	332	267	65
Connecticut	313	248	65
Delaware	343	278	65
D.C	342	277	65
Florida	285	220	65
Georgia	323	258	65
Hawaii	313	248	65
Idaho	266	201	65
Illinois	316	251	65
Indiana	352	287	65
Iowa	331	266	65
Kansas	331	266	65
Kentucky	323	258	65
Louisiana	296	231	65
Maine	278	213	65
Maryland	332	267	65
Massachusetts	317	252	65
Michigan	324	259	65
Minnesota	338	273	65
Mississippi	277	212	65
Missouri	330	265	65
Montana	287	222	65
Nebraska	316	251	65
Nevada	302	237	65
New Hampshire	301	236	65
New Jersey	314	249	65
New Mexico	289	224	65
New York	271	206	65
North Carolina	310	245	65
North Dakota	331	266	65
Ohio	334	269	65
Oklahoma	298	233	65
Oregon	261	196	65
Pennsylvania	296	231	65
Rhode Island	290	225	65
South Carolina	280	215	65
South Dakota	289	224	65
Tennessee	304	239	65
Texas	310	245	65
Utah	321	256	65
Vermont	265	200	65
Virginia	335	270	65
Washington	266	201	65
West Virginia	307	242	65
Wisconsin	341	276	65
Wyoming	330	265	65
US Average	**297**	**232**	**65**

fuel prices, but also about a democratic distribution of the property rights that are created by capping carbon emissions.

The second argument against state-specific dividends is analogous to the argument against basing dividends to households on their carbon consumption: it rewards those who use more fossil fuels, and thus dampens incentives to invest in energy efficiency and renewable energy. To be sure, as long as all households within a given state receive the same dividend, they retain incentives to reduce their use of fossil fuels. But interstate differences in carbon price impacts reflect state policies, as well as the decisions of individual consumers. In California, for example, the median household electricity bill is lowest in the nation — despite electricity prices that are roughly 50% higher than those in the Midwestern states — thanks to the state's ambitious energy efficiency policies.[7] Of course, it can be argued that differences in state policies are not the fault of the average state resident. One way to strike a balance between considerations of individual responsibility and state responsibility would be to provide state-specific dividends for the first five or ten years of the policy, converging over time to equal dividends nationwide.

THE CERT FUND: INVESTMENT AND JOB CREATION ACROSS THE STATES

Although interstate differences in CLEAR's impacts on consumers are relatively small, there are reasons to be concerned about the dislocations that any policy to reduce the use of fossil fuels will cause on the production side of the economy, particularly in states where coal mining and industries reliant on coal-fired electricity are important sources of jobs and incomes.

The CLEAR Act addresses this concern by specifying that the CERT Fund shall be used, among other things, to carry out programs, provide incentives, and make loans and grants "to provide targeted and region-specific transition assistance to workers, communities, industries and small businesses" in states that experience "the greatest economic dislocations due to efforts to reduce carbon emissions and address climate change."

The CERT Fund, as noted above, is the vehicle specified in the CLEAR Act for allocating the 25% of total carbon revenue that is not recycled directly to the public as monthly dividends. The act provides guidelines for eligible uses of the CERT Fund, but it does not micro-manage its allocation, leaving this to legislative priorities that may change over time.

Interstate allocation of CERT investment: An illustration

Here we provide an example of how CERT resources could be used to address interstate differences in economic impacts of climate legislation on production sectors. In our calculations, we assume that 85% of CERT funding will flow back to the states in one way or another—either through federal agencies such as the Department of Energy's Weatherization Assistance Program or through block grants to the state governments.[8]

In our calculations, the interstate allocation of the CERT funds is based on three variables:

Carbon emissions from electricity: the state's share of total U.S. carbon emissions associated with the consumption of electricity.

Unemployment: the state's share of total U.S. unemployment.

Population: the state's share of total U.S. population.

Our allocation formula puts 25% of the weight on carbon emissions, 25% on unemployment, and 50% on population (for details and data, see the appendix.)

Table 5 shows the resulting allocation of the CERT Fund by state, again for the year 2020 with a permit price of $25/ton. The total amount of money invested in the states is roughly $28.8 billion, or $84 per person. States with larger populations receive more dollars, but the amount per person varies across the states because we include unemployment and carbon emissions from electricity in our allocation formula. CERT allocations range from $60 to $134

7 See Boyce and Riddle (2009, Table 2). For electricity rates, see U.S. Energy Information Agency, "Average Retail Price of Electricity to Ultimate Customers by End-Use Sector, by State," online at www.eia.doe.gov/cneaf/electricity/epm/table5_6_a.html.

8 We assume that the remaining 15% is devoted to international climate change mitigation and adaptation. Economic benefits from these uses are not included in the analysis that follows.

TABLE 5: CLEAR ACT: INTERSTATE ALLOCATIONS OF CERT INVESTMENTS + DIVIDENDS ($ PER CAPITA, 2020)

State	CERT investment	Dividend	Total state receipts
Alabama	96	297	393
Alaska	73	297	371
Arizona	76	297	373
Arkansas	84	297	381
California	78	297	375
Colorado	81	297	379
Connecticut	72	297	369
Delaware	94	297	391
D.C	109	297	406
Florida	89	297	386
Georgia	88	297	386
Hawaii	75	297	373
Idaho	79	297	376
Illinois	83	297	380
Indiana	108	297	405
Iowa	93	297	391
Kansas	91	297	388
Kentucky	119	297	416
Louisiana	89	297	387
Maine	72	297	369
Maryland	80	297	377
Massachusetts	77	297	374
Michigan	93	297	390
Minnesota	86	297	383
Mississippi	87	297	384
Missouri	95	297	392
Montana	84	297	382
Nebraska	84	297	381
Nevada	93	297	390
New Hampshire	67	297	364
New Jersey	76	297	373
New Mexico	84	297	381
New York	70	297	367
North Carolina	87	297	384
North Dakota	103	297	400
Ohio	97	297	394
Oklahoma	89	297	387
Oregon	73	297	371
Pennsylvania	80	297	377
Rhode Island	83	297	381
South Carolina	88	297	386
South Dakota	74	297	371
Tennessee	91	297	389
Texas	85	297	382
Utah	80	297	377
Vermont	60	297	357
Virginia	81	297	378
Washington	68	297	365
West Virginia	99	297	397
Wisconsin	89	297	386
Wyoming	134	297	431
US Average	**84**	**297**	**381**

per capita, and hence total revenue recycling (dividends plus CERT funds) ranges from $357 in Vermont to $431 in Wyoming.

Unlike defense spending, the CLEAR Act would have strikingly equal economic impacts across the states.

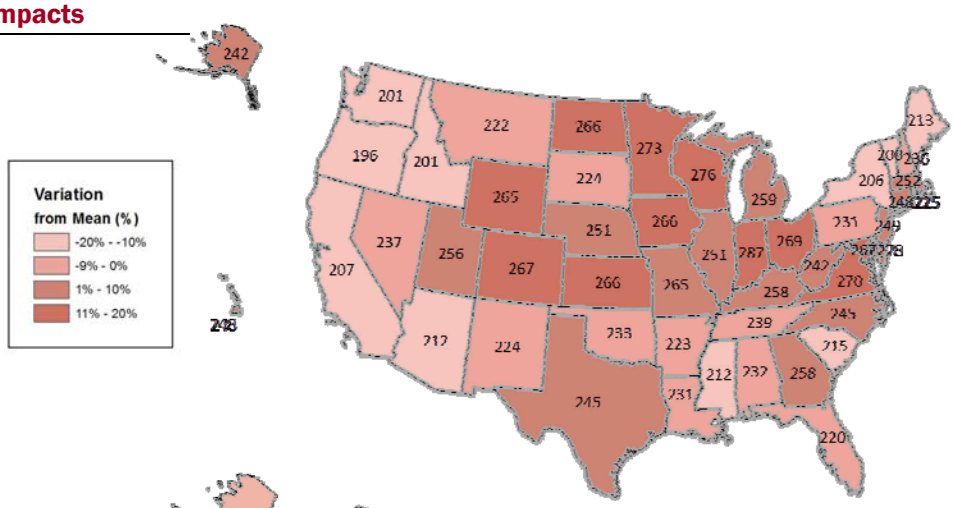
The maps on page 11 summarize interstate differences in the economic impacts of the CLEAR Act:

- Map 1 shows the impact of carbon prices on the median household, at a permit price of $25/ton CO_2 in the year 2020, based on the results reported in Table 1. The nationwide average annual cost is $232 per person. The lowest cost is in Oregon ($196) and the biggest is in Indiana ($287).
- Map 2 shows dividends under the CLEAR Act (for the same year at the same carbon price). The annual dividend of $297 per person is the same in every state.
- Map 3 shows dividends plus CERT investments, when the CERT Fund is allocated as shown in Table 4. The nationwide average is $381 per person ($297 in dividends plus $84 in CERT investments).
- Map 4 shows federal defense expenditures, helping to put interstate differences in the CLEAR Act in perspective. Unlike defense spending (indeed, compared to most government programs), the CLEAR Act would have strikingly equal economic impacts across the states.

Interstate differences in economic impacts

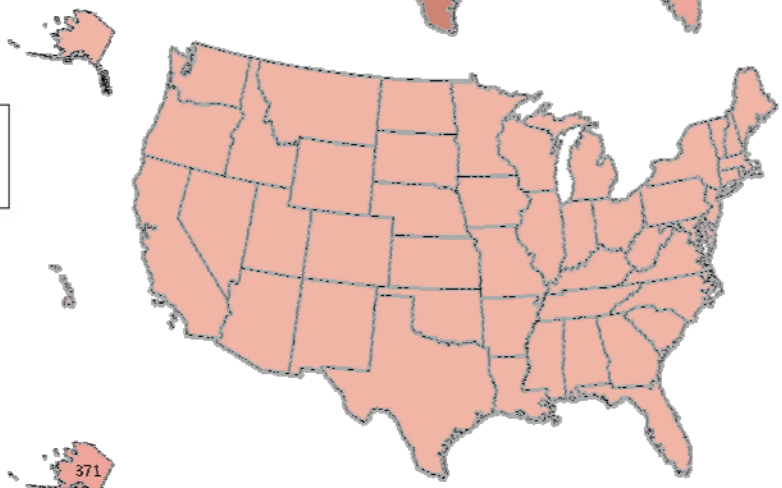
MAP 1. CARBON PRICE IMPACT
($ PER PERSON, MEDIAN HOUSEHOLD)

Impact of fuel price increases in 2020 at a permit price of $25/ton carbon dioxide. Any policy that caps carbon emissions will raise fuel prices to consumers. The question is: *who gets the money?*



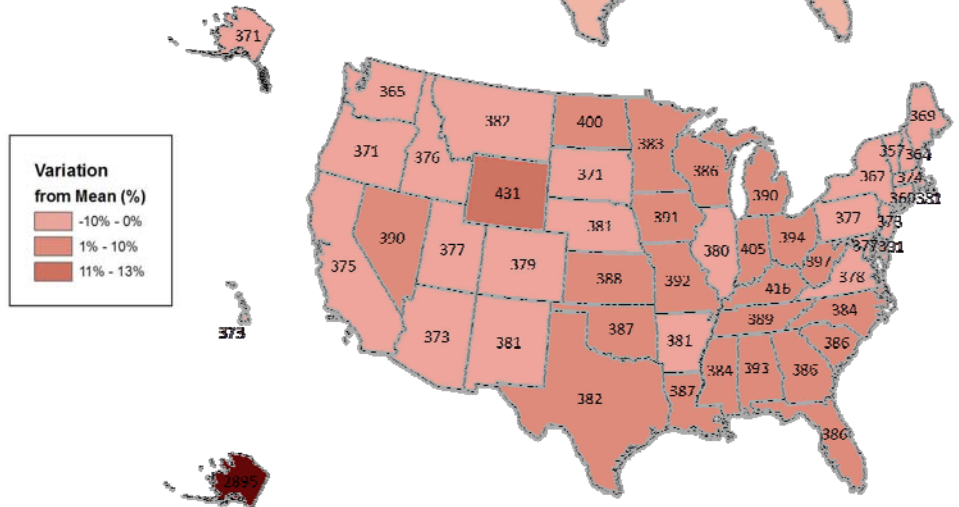
MAP 2. CLEAR DIVIDENDS ($ PER PERSON)

The CLEAR Act would refund 75% of carbon revenues directly to the public as monthly dividends. At a permit price of $25/ton, annual dividends will amount to $297 per person, nationwide.



MAP 3. DIVIDENDS PLUS CERT INVESTMENTS
($ PER PERSON)

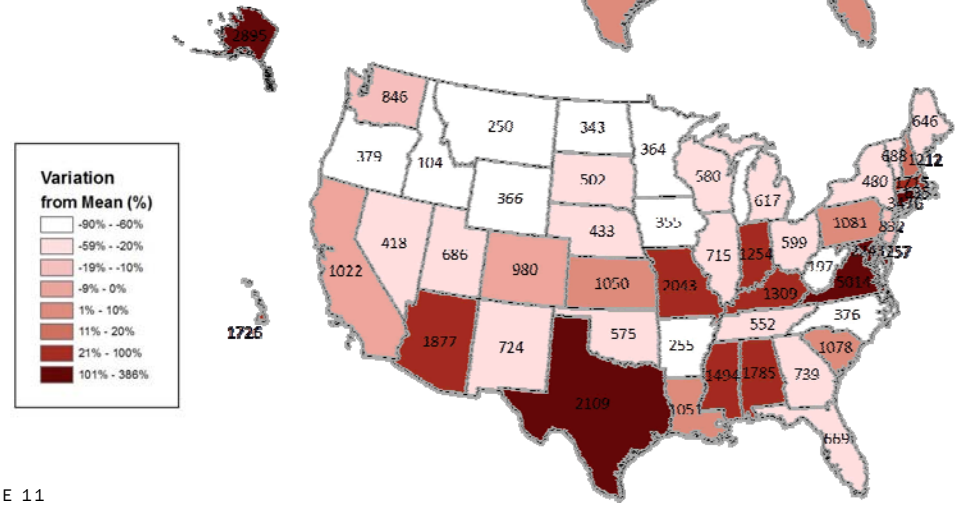
The CLEAR Act would devote 25% of carbon revenues to the Clean Energy Reinvestment Trust (CERT) Fund. Targeting CERT funds to states with more carbon-intensive electricity and higher unemployment would create modest variations across states in total returns (dividends plus CERT investments).



MAP 4. FEDERAL DEFENSE EXPENDITURES
($ PER PERSON)

All federal policies have disparate economic impacts across the states. The interstate differences are typically much larger than those of the CLEAR Act. Defense expenditures, for example, vary from$106 per person in Idaho to $5,014 per person in Virginia.

Source: National Priorities Project



Comparing the distribution of CERT funds under this formula to the net benefits from dividends to consumers, reported in Table 1, we find that states with lower net benefits to consumers generally receive higher allocations from the CERT Fund. Four of the ten locations with the lowest net benefits to consumers (Indiana, Delaware, Ohio, and the District of Columbia) would be among the top ten recipients of CERT funds per capita. At the other end of the spectrum, five of the ten states with the largest net benefits to consumers (Oregon, Vermont, Washington, New York, and Maine) are among the bottom ten recipients of CERT funds per capita. In no case does a state rank in the top ten or bottom ten in both respects. This balancing effect is not coincidental, since the carbon intensity of the state economy affects both net impacts on consumers and the allocation of the CERT Fund.

In other words, in allocating investments from the CERT Fund, Congress can further promote interstate equity under the CLEAR Act in two ways: by addressing the impacts of the carbon cap on the production side of the economy and, at the same time, channeling greater investment to states that receive smaller net benefits on the consumer side.

Job creation impacts

The CLEAR Act will lead to job creation in two ways:

- First, the shift of private expenditure from fossil fuels to greater spending on energy efficiency and renewable energy will boost jobs, since the latter sectors are more labor-intensive.
- Second, public investments from the CERT Fund will create jobs. The distribution of these jobs across the states can be influenced by Congressional decisions on the allocation of CERT expenditures.

The market price signals created by the cap on carbon emissions will lead to a reorientation of household and business expenditures away from fossil fuels, and boost private spending on energy efficiency and renewable energy. There will be job losses in the fossil fuel sector, and job gains in other sectors such as construction, mass transportation, wind power, solar power, and alternative liquid fuels. Spending on energy efficiency and renewables generates considerably more jobs per dollar than spending on fossil fuels (see Table 6), in part because they are more labor-intensive and in part because they have higher domestic content. So the net effect of this private expenditure shifting will be job creation.

TABLE 6: EMPLOYMENT IMPACTS OF SPENDING ON FOSSIL FUELS, ENERGY EFFICIENCY AND RENEWABLE ENERGY

Sector	Job creation (# of jobs per $ million)
Fossil fuels	
Oil and natural gas	3.7
Coal	4.9
Energy efficiency	
Building retrofits	11.9
Mass transit/freight rail	15.9
Smart grid	8.9
Renewables	
Wind	9.5
Solar	9.8
Biomass	12.4

Job growth resulting from private expenditure shifting may surpass the jobs created by public investment from the CERT Fund. Here we focus on public investments, however, since this is the main avenue by which Congress can shape the interstate distribution of job creation resulting from the CLEAR Act.

To estimate how many jobs CERT Fund investments would create in each state, under the investment allocation formula used above, we translate public expenditures into jobs using the methodology developed by our colleagues at the Political Economy Research Institute (PERI) in the study, *The Economic Benefits of Investing in Clean Energy* (Pollin *et al.* 2009). This study used input-output data at the state level from the U.S. Department of Commerce to estimate the number of jobs per dollar of spending on energy efficiency (building retrofits, smart grid, public transportation, and co-generation) and renewable energy (on-grid renewable electricity, off-grid renewables, and alternative motor fuels). Our estimates include the jobs created in these industries and in other industries that supply intermediate goods (such as steel and building supplies) to them.[9]

9 We assume that CERT Funds are allocated across different types of energy efficiency and renewable energy investments in the same proportions assumed in the earlier PERI study. We do not count induced employment effects from the consumption multiplier (that is, jobs created when workers in these industries spend their earnings to buy goods and services), because CERT Fund investments recycle carbon permit revenues rather than creating additional demand as in an economic stimulus program.

TABLE 7: CERT FUND INVESTMENT AND JOB CREATION BY STATE
(2020, WITH PERMIT PRICE OF $25/TON)

State	CERT investment ($ million)	Jobs created
Alabama	501	7,012
Alaska	57	667
Arizona	559	6,873
Arkansas	270	3,888
California	3,189	33,683
Colorado	454	5,705
Connecticut	280	3,160
Delaware	93	1,067
D.C	73	767
Florida	1,828	23,807
Georgia	967	13,080
Hawaii	108	1,377
Idaho	135	1,828
Illinois	1,193	14,182
Indiana	770	10,177
Iowa	312	4,178
Kansas	285	3,808
Kentucky	571	8,081
Louisiana	447	5,962
Maine	106	1,583
Maryland	508	6,012
Massachusetts	565	6,574
Michigan	1,029	13,012
Minnesota	504	6,462
Mississippi	284	4,143
Missouri	631	8,585
Montana	91	1,294
Nebraska	168	2,246
Nevada	273	2,959
New Hampshire	99	1,312
New Jersey	736	8,354
New Mexico	187	2,647
New York	1,515	17,355
North Carolina	909	11,996
North Dakota	74	1,011
Ohio	1,244	16,715
Oklahoma	367	5,436
Oregon	312	4,151
Pennsylvania	1,120	14,435
Rhode Island	97	1,148
South Carolina	449	6,168
South Dakota	67	979
Tennessee	639	9,167
Texas	2,346	29,479
Utah	248	3,283
Vermont	42	619
Virginia	707	9,414
Washington	505	6,161
West Virginia	201	2,913
Wisconsin	560	7,319
Wyoming	81	1,057
US Average	**28,757**	**363,287**

CERT Fund investments would create roughly 360,000 jobs nationwide.

The results are presented in Table 7. The data again refer to the year 2020, with a permit price of $25/ton CO_2. We estimate that CERT Fund investments would create roughly 360,000 jobs nationwide. The interstate differences in job creation that are shown in the table roughly mirror the interstate allocation of CERT dollars.[10] A different allocation formula would yield a different interstate pattern of job creation. The CLEAR Act itself does not prejudge what is the "best" distribution across states or sectors, leaving allocation decisions up to the annual legislative process.

CONCLUSIONS

The CLEAR Act would put a cap on the use of fossil fuels so as to reduce emissions of carbon dioxide, the most important greenhouse gas. Any policy that limits the use of fossil fuels will raise their price, impacting real family incomes. But the net impact on family incomes depends on who gets the money that is paid by consumers as a result of higher fuel prices. The CLEAR Act recycles 75% of this money to the public in

10 The number of jobs per dollar varies somewhat across the states, however, for two reasons: first, the input-output data from the Commerce Department show some interstate differences in the ratio of jobs per dollar in any given sector; and second, some of the job creation in the supply of intermediate goods spills across state borders (we allocate the out-of-state portion of this indirect job creation across states in proportion to the relative size of the state economies.)

the form of equal monthly dividends, and devotes the remaining 25% to clean energy investments.

Although the dividends are the same for all, the net impact on family incomes (dividends minus the impact of carbon prices) will vary among households, depending on the amount of fossil fuels they consume directly and indirectly. Families who consume more will have lower net benefits; families who consume less will have higher net benefits. And regardless of their consumption level, all will have an incentive to limit their use of fossil fuels in response to the market price signals resulting from the cap.

Because high-income households generally consume more fossil fuels (and more of just about everything) than low-income and middle-income households, they will tend to pay more as a result of higher fuel prices than they receive as dividends. These income-related differences in net impacts also apply at the level of interstate comparisons: all else equal, states with lower per capita incomes will receive higher net benefits from the CLEAR Act dividends than states with higher per capita incomes.

Of course, all else is not equal: states differ not only in average incomes, but also in other ways that affect net impacts, such as the carbon intensity of their electricity supplies. At any given income level, families in states that get most of their electricity from coal-fired plants will face bigger price increases than families in states that get most of their electricity from less carbon-intensive sources. To some extent, this effect is offset by the fact that more coal-intensive states tend to have lower incomes.

Analyzing the economic impacts of the CLEAR Act across the states, we can draw the following conclusions:

- Interstate differences in impacts on household incomes are small: much smaller than differences across the income spectrum, and vastly smaller than the differences in other federal programs, such as defense spending. As a result, the CLEAR Act delivers positive net benefits to the median household—and to the majority of households—in each and every state.
- Interstate differences could be eliminated altogether by modifying the Act so as to provide state-specific dividends, calibrated to equalize the net impact on the median household across the states. To avoid creating perverse long-term incentives for states to rely on dirty energy, these dividends could converge towards the national average over time.
- Interstate differences alternatively could be addressed in the allocation of the CERT Fund, by directing more investment to states with higher unemployment and/or greater potential economic dislocations from the shift away from dependence on fossil fuels.

An advantage of the latter approach is that it focuses attention on the production side of the economy, where interstate differences are likely to be more significant, rather than on the consumption side, where they are small. Our estimates indicate that investments from the CERT Fund will create roughly 360,000 jobs nationwide. The economic and political implications of how this employment creation is distributed across the states may turn out to be more important than relatively minor interstate differences in the impacts of the cap-and-dividend policy on consumers.

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APPENDIX

Formula for interstate allocation of CERT Fund

The CLEAR Act does not specify how the revenues from carbon permit auctions that are deposited into the Clean Energy Reinvestment Trust (CERT) Fund will be allocated across uses and across states. The Act simply specifies a list of eligible uses (see sidebar). Decisions on allocations will be up to Congress.

In our analysis, we assume that 85% of CERT funds will flow to the states, either through federal expenditures or block grants to the states. We assume that the remaining 15% will be devoted to international expenditures for climate change mitigation and adaptation.

To allocate expenditures across the states, we use a formula based on three variables:

C = state's share of the nation's carbon emissions from electricity consumption

U = state's share of the nation's unemployment

P = state's share of the nation's population

We assign weights of 0.25 to each of the first two variables, and a weight of 0.5 to population. The state's share of CERT investments, I, is thus:

$$I = 0.25C + 0.25U + 0.5P$$

The data used to obtain the three component variables are reported in Table A.1. The dollar allocations for each state shown in Table 4 are simply the product of I multiplied by the total amount of the CERT Fund distributed to the states in 2020, which is $28.75 billion (with a permit price of $25/ton CO_2, 100% of permits auctioned, 25% of total auction revenues devoted to the CERT Fund, and 85% of CERT funds flowing to the states).

Eligible uses of CERT Fund

Section 6(c) of the CLEAR Act provides that Clean Energy Reinvestment Trust (CERT) Fund will be used to "provide incentives, and make loans and grants" for the following purposes:

a) targeted and region-specific transition assistance to workers, communities, industries, and small businesses experiencing the greatest economic dislocations due to efforts to reduce carbon emissions and address climate change and ocean acidification;

b) targeted and region-specific compensation for early retirement of carbon-intensive facilities, machinery, or related assets;

c) targeted and region-specific transition assistance to residents, communities, industries, and small businesses that experience the greatest negative impacts from climate change;

d) targeted relief to energy-intensive industries that export goods and services to countries that do not have similar restrictions on fossil carbon;

e) training and development programs to prepare workers for careers in energy efficiency, renewable energy, and other emerging clean energy technologies;

f) to curtail emissions of other greenhouse gases and substances that contribute to climate change;

g) international projects that verifiably reduce net greenhouse gas emissions through modification of agriculture, forestry and land use;

h) investment in research, development and deployment of clean energy and fuels;

i) initiatives that increase energy efficiency or energy productivity;

j) financial support to low-income families that experience difficulty paying high seasonal utility bills;

k) projects or initiatives that support residential fuel switching;

l) matching grants to low-income energy efficiency consumer loan recipients;

m) weatherization and improved energy efficiency of public and low-income buildings;

n) climate change mitigation and adaptation;

o) programs that protect or advocate for energy consumers; and

p) to ensure that the program does not contribute to the budget deficit of the federal government.

TABLE A1: DATA USED IN INTERSTATE ALLOCATION OF CERT FUNDS

State	Population (2009)	Unemployment rate (% of labor force, November 2009)	Unemployed persons (seasonally adjusted, November 2009)	Total CO_2 emissions from electricity consumption (million tons CO_2)
Alabama	4,708,708	10.5	216,300	66.0
Alaska	698,473	8.4	30,100	3.6
Arizona	6,595,778	8.9	279,800	42.8
Arkansas	2,889,450	7.4	101,900	32.2
California	36,961,664	12.4	2,272,700	132.8
Colorado	5,024,748	6.9	183,500	48.8
Connecticut	3,518,288	8.2	155,600	15.1
Delaware	885,122	8.6	36,500	12.6
D.C	599,657	11.8	39,000	9.6
Florida	18,537,969	11.5	1,063,600	166.8
Georgia	9,829,211	10.1	476,800	103.5
Hawaii	1,295,178	6.8	43,700	10.0
Idaho	1,545,801	9.1	68,900	11.1
Illinois	12,910,409	10.9	722,600	89.2
Indiana	6,423,113	9.6	297,600	122.4
Iowa	3,007,856	6.7	111,900	44.1
Kansas	2,818,747	6.4	97,100	39.8
Kentucky	4,314,113	10.6	218,500	99.0
Louisiana	4,492,076	6.7	138,400	63.7
Maine	1,318,301	8.0	56,300	6.3
Maryland	5,699,478	7.3	215,800	51.4
Massachusetts	6,593,587	8.7	302,100	41.2
Michigan	9,969,727	14.7	712,400	81.3
Minnesota	5,266,214	7.4	218,900	57.0
Mississippi	2,951,996	9.8	125,200	32.0
Missouri	5,987,580	9.4	282,100	80.5
Montana	974,989	6.4	32,100	11.4
Nebraska	1,796,619	4.6	44,800	23.3
Nevada	2,643,085	12.3	169,200	25.2
New Hampshire	1,324,575	6.7	49,600	4.8
New Jersey	8,707,739	9.7	441,100	42.8
New Mexico	2,009,671	7.8	75,100	21.3
New York	19,541,453	8.6	832,200	73.4
North Carolina	9,380,884	10.7	486,900	87.7
North Dakota	646,844	4.1	14,900	13.7
Ohio	11,542,645	10.6	624,000	150.8
Oklahoma	3,687,050	7.1	126,300	50.0
Oregon	3,825,657	10.7	208,000	11.9
Pennsylvania	12,604,767	8.5	540,900	100.4
Rhode Island	1,053,209	12.7	72,400	4.9
South Carolina	4,561,242	12.3	266,800	39.7
South Dakota	812,383	4.9	22,000	6.8
Tennessee	6,296,254	10.2	304,400	73.9

TABLE A1, CONTINUED

State	Population (2009)	Unemployment rate (% of labor force, November 2009)	Unemployed persons (seasonally adjusted, November 2009)	Total CO_2 emissions from electricity consumption (million tons CO_2)
Texas	24,782,302	8.0	970,300	269.0
Utah	2,784,572	6.3	86,300	28.4
Vermont	621,760	6.4	23,100	0.5
Virginia	7,882,590	6.6	271,300	77.6
Washington	6,664,195	9.0	316,200	14.9
West Virginia	1,819,777	8.4	66,100	31.5
Wisconsin	5,654,774	8.2	250,600	65.3
Wyoming	544,270	7.2	20,900	17.1
US Total/Average	307,006,550	9.0	14,782,800	2,709.0