Greenhouse Gas Emission Reductions From Existing Power Plants Under Section 111(d) of the Clean Air Act: Options to Ensure Electric System Reliability

Susan Tierney, Analysis Group
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Questions/Answers

Do you think that there will be electric system reliability problems resulting from the Environmental Protection Agency's ("EPA") regulations to reduce greenhouse gas ("GHG") pollution from existing fossil power plants?

No. The bottom line of my paper is that there is no reasonable basis to anticipate that EPA's regulations, the states' plans and the electric industry's compliance with them will create reliability problems for the power system, as long as EPA and the states plan appropriately and take timely actions to assure electric-system reliability in their plans. The Clean Air Act's Section 111(d), the statutory authority through which EPA will issue its regulations, affords states considerable latitude to mitigate and otherwise resolve reliability concerns.

But many existing power plants have announced that they will retire within the next few years due to the EPA's other air pollution regulations, so won't this make it worse?

In my opinion, no, for several reasons: First, many of the coal-fired power plants that have announced retirements over the next few years have indicated that this is happening because these coal plants are no longer economical in light of competition from existing plants that use low-priced natural gas. Other old, small and inefficient coal plants will retire because it will not be economically worthwhile to spent money to add air-pollution control equipment so that the plant can comply with the EPA's regulations (the Mercury and Air Toxic Standards ("MATS")), because it is cheaper to get power from other sources.

Second, various utilities and grid operators are already focused on making sure that there will be enough generating capacity and other resources (such as demand-response) to ensure that the system can meet customer demands at all times over the next few years, as the system transitions to cleaner supply.

Third, states will need to prepare State Implementation Plans ("SIPs") and submit them to the EPA by two years or so from now. In its SIP, each state will propose to EPA the ways in which existing power plants in the state will reduce GHG emissions. The states will have more years after that to implement the actions in their plans. This means that there is sufficient lead time to take steps to avoid reliability issues associated with the GHG regulations.

Fourth – and perhaps most importantly – the portion of the Clean Air Act (Section 111(d)) under which EPA's GHG regulations and the states' SIPs will take place is very different from the MATS requirements. Section 111(d) allows significant variation and flexibility in how individual states may choose to control emissions in their state. This will allow states to take reliability considerations, among other things, into account explicitly as they develop plans for how the power plants in their state will reduce GHG emissions. Section 111(d)'s 'cooperative federalism' model provides for much more tailored, flexible and creative compliance approaches than was possible for plants under MATS (and other air regulations in the past few decades). This is core to understanding why EPA's regulation of GHG emissions from existing power plants will not jeopardize electric system reliability.

You used the phrase "cooperative federalism" to describe the regulatory approach EPA will rely upon to regulate GHG emissions from fossil plants. What does that mean?

Section 111(d) calls for EPA to use a well-established federal/state framework that has been relied upon for decades to ensure that local air quality meets national requirements. In this 'cooperative federalism' framework, EPA uses its expertise to determine what the national air quality standard should be, and the states are delegated the authority to determine how the standard will be achieved in each state. In essence, EPA identifies the destination (e.g., ambient air quality; or in the case of the upcoming regulation, the new GHG emissions standards for existing fossil power plants), and states determine what route they want to take to get there (i.e., in various components of their SIPs). State air regulators have considerable experience with such SIP processes.

What is EPA's schedule for proposing and finalizing guidance to the states and for the states to prepare their SIPs?

EPA's guidance will be developed through the agency's normal rulemaking process with a notice-and-comment period. The guidance will come first in proposed form (by June 1, 2014), and then in final form (by June 1, 2015). President Obama has requested that EPA to require States to submit their SIPs to EPA by no later than June 30, 2016, after which the EPA would review and approve them and allow some additional period for SIP implementation. (If the EPA does not approve a state's SIP, then EPA has authority to prepare a Federal Implementation Plan.)

You said that the recent EPA MATS rule did not use the cooperative federalism framework that will apply to GHG emission regulations. What does that mean?

The recent MATS rule – issued by EPA at the end of 2011 – set uniform national standards to reduce mercury and other emissions from different categories of existing coal- and oil-fired power plants. The standards will apply to plants everywhere in the U.S. While there are technology choices that plant owners can/will make, there is virtually no discretion in the sense that each plant must ultimately meet the national standard. Each plant covered by the regulation has to come into compliance, or discontinue operations. No trading or averaging is allowed across different generating stations. There is no possibility of purchasing credits resulting from over-compliance at other sources, or to credit emissions reductions resulting from end-use efficiency or zero-carbon energy sources. This inherent inflexibility is fundamentally different from the approach EPA will take for GHG emissions reductions. EPA may set different requirements for plants in different states; the states may come up with completely different packages of actions that may be used by owners of power plants to comply with the EPA regulations. States even have the flexibility to allow different timing and levels of reductions at different plants, as long as they can demonstrate that the resulting emission reductions are at least equivalent to those in EPA's standard for that state.

What do you mean by "electric system reliability?

I use that phrase to mean that the electric system has both (a) enough electric resources available to meet demand during peak conditions consistent with reserve requirements, and (b) the type of generating resources and other tools needed to make sure that the system operates reliability at all times. As the U.S. Energy Information Administration explains, electric system reliability is the "degree to which the performance of the elements of the electrical system results in power being delivered to consumers within accepted standards and in the amount desired. Reliability encompasses two concepts, [resource] adequacy and [system] security. Adequacy implies that there are sufficient generation and transmission resources installed and available to meet projected electrical demand plus reserves for contingencies. Security implies that the system will remain intact operationally (i.e., will have sufficient available operating capacity) even after outages or other equipment failure. The degree of reliability may be measured by the frequency, duration, and magnitude of adverse effects on consumer service."

How much of the U.S. GHG emissions come from existing fossil-fueled power plants?

One third of the nation's GHG emissions come from existing fossil power plants. In general, coal-fired power plants have roughly double the emissions per megawatt-hour ("MWh") as gas-fired and oil-fired power plants. Power supplied by wind, solar and hydro facilities and existing nuclear power plants emit essentially no GHG emissions. In 2012, the sources of U.S. electricity generation were: coal-fired plants (37% of generation); natural gas (30%); nuclear (19%); all renewables (12%); and oil (1%). Thus, approximately one-third of all U.S. electricity generation had zero emissions, with more than a third coming for coal-fired power plants.

In your paper, you say that the reliability 'red flag' has historically been raised because of concerns that compliance with a new environmental rule would require a large portion of generating capacity to be simultaneously out of service to add control equipment, to retire permanently or otherwise to become unavailable to produce power. Has the industry ever had blackouts or other power disruptions as a result of complying with environmental regulations?

No. To date, implementation of new environmental rules has not produced reliability problems, in large part because the industry has proven itself capable of responding effectively. A very mission-oriented industry, composed of electric utilities, other grid operators, non-utility energy companies, federal and state regulators, and others, has taken a wide variety of steps to ensure reliability.

You say in your paper that if a state has concerns about the reliability implications of complying with EPA guidance, the state can take those concerns into account as it prepares its SIP. You say, for example, that a state may come up with different schedules/timetables for individual units' compliance, so long as the overall emission reduction is at least as effective as the EPA's regulation. What do you mean?

For example, a state could propose plan elements that enable early action/compliance at some power plants in exchange for allowing more time for others, or that allow for deeper reductions at one plant in exchange for lighter reductions elsewhere. Also, states may consider diverse options as they plan for cost-effective emissions reductions while also ensuring electric system reliability. Some of the options may take place "inside the fence" of generating units covered by Section 111(d), while others might focus more on interactions of those plants' power production (output) and related emissions, in light of changes in power demand, transmission and generation.

What are examples of compliance actions that can take place "inside the fence"?

Examples include: heat-rate improvements at individual plants; fuel switching (from a dirty to a cleaner fuel); averaging of emissions from various generating units within a single power station; and changes to the operating permit of existing power plants to limit output (and emissions) over some averaging period. There are many examples where power plants have used such approaches to improve their emissions profile.

What are examples of compliance actions that can take place "outside the fence"?

Examples include: emission reductions achieved through changes in the overall dispatch of existing generating resources and/or level of demand on the system: emission-averaging among multiple power plants and multiple generating units at different generating stations; state carbon budgets with an overall emissions cap and with the ability of generators to trade 'allowances' to pollute; multi-state electric-system dispatch practices of grid operators; demand-side reductions; adoption of clean energy standards that require power plants as a whole to meet some average level of emissions, taking into account zero-emitting generating units and fossil generating units; energy efficiency and demand-response programs that affect emissions by reducing the total amount of electricity production and use; and/or transmission upgrades to open up access to underutilized, low-carbon facilities.

In your paper, you say that one thing that will help states reduce their GHG emissions is the existence of significant 'under-utilized' power plant capacity at relatively clean plants. What does that mean?

Because a significant amount of existing generating capacity is not producing power at full output, one thing that states could allow (and encourage) is the shifting of power generation from plants with high GHG emissions to other cleaner power plants. Output at natural-gas fired combined-cycle power plants averaged approximately 50 percent in 2012; as a general rule, for every MWh generated at a gas-fired power plant, there will be one-half the GHG emissions as generation at a coal-fired power plant (given the relative carbon content of the two fuels). Additionally, there is the potential to reduce overall demand through energy efficiency and demand response, thus reducing the need to dispatch plants with relatively high emission rates. There is potential to add additional low or zero-carbon electricity supply (e.g., wind and solar facilities; efficient combined heat and power facilities; nuclear uprates which increase the MWh generation at existing nuclear facilities). Actions also can be taken to extend the life of or increase the output from, well-performing generating units that produce no emissions at the facility (e.g., hydroelectric resources, nuclear plants).

Does your paper describe the amount of generating capacity in each state that will be directly affected by EPA's GHG regulations?

Yes. The paper has an appendix (Appendix #2) that shows the number of power plants and amount of generating capacity existing in each state as of the beginning of 2013. (This table is also attached to the end of this Q/A fact sheet, and shows coal, gas and oil power plants directly affected by EPA regulations, as well as other generating capacity (such as renewable energy and nuclear plants) that are part of each state's electric system. The table also shows the capacity factor (level of utilization) of different types of plants, and the extent to which less-than-full output (i.e., capacity factor lower than 100%) at existing plants could provide opportunities for shifting output from plants with relatively high emissions to others with lower emissions.)

As of the start of 2013, there are 3,084 Electric Generating Units ("EGUs") and Natural Gas Combined Cycle ("NGCC") units likely to be directly affected by EPA's upcoming regulations. (See Table 2 from the report, reproduced below.) These generating units represent approximately 532 GW of generating capacity, with 292 GW of coal-fired power plants (mainly EGU capacity), 217 GW of natural-gas-fired plants (mainly NGCC units), and 24 GW of plants that burn oil (mainly EGUs). Together, these facilities represent about half of total generating capacity in the U.S. as of the first quarter of 2014 (with the rest being primarily nuclear, hydro and wind), and 70 percent of U.S. fossil generating capacity.

Table 2 from the Report
Existing Power Generation Capacity in the U.S. as of 3-2014:
All Power Plants and Power Plants Likely to be Subject to Clean Air Act 111(d)

	Generating Units Likely to Be Directly Covered by Section 111(d)		Total Grid-Connected Generating Capacity in the U.S. (GW)	111(d) Capacity as a Share of Total Capacity (%)
	(# Units)	(GW of Capacity)		
Coal	1204	292.4	303.7	96%
Natural Gas	1,636	216.6	414.3	52%
Oil	244	23.7	38.2	61%
Nuclear	0	0	98.0	0
Hydro	0	0	99.0	0
Wind and Solar	0	0	68.9	0
Other*	0	0	21.7	0
Total	3,804	532.4	1042.4	51%

Source of data: SNL Financial, March 2014. "GW" reflects net summer capacity of the generating units.
* This includes biomass, geothermal, and generation from other fuels not listed above.

Does your paper explain the types of actions that states can take to address reliability issues as they develop their SIPs?

Yes. The paper provides two different types of information relevant for states' preparation of their SIPs. First, the report explains the many ways that states differ from each other, in terms of things relevant for their plans. These differences show up in the character of the power plants located in each state, the electric industry structure, the GHG emissions from existing power plants, renewable energy potential, reliance on in-state versus out-of-state power resources, the outlook for demand growth, mix of public policies affecting power plants (including renewable policies and energy efficiency programs), and many other differences. This information represents constraints and opportunities affecting states' SIPs.

Second, the paper also provides numerous examples to illustrate how states can plan their strategies to assure both electric system reliability and compliance with upcoming EPA guidance, taking into account the different electric systems and policies that exist in a state. The examples suggest ways that states can shape their SIPs to suit their own conditions. The report has examples to illustrate options for states with traditionally regulated electric industries, and other options for states whose electric companies participate in an organized interstate wholesale electric market managed by a regional transmission organization ("RTO"). GHG control options include:

- inter-facility emissions trading for plants owned by a common owner in a single state or in multiple states with traditional electric industry structure – with potential implications for states entering into interstate agreements to accommodate such trading;
- inter-state trading among plants owned by multiple owners in traditionally regulated states;
- reliance on an emissions budget combined with other mechanisms to allow emissions averaging across plants located in a single-state or multi-state RTO; and
- use of collateral programs to support cost-effective emissions reductions (such as clean energy standards, renewable portfolio standards, energy efficiency programs, transmission enhancements, and others).

All of these "tools" provide extensive opportunities for innovative SIP elements that can accommodate cost-effective environmental compliance, alignment with economic principles underpinning electric industry structure and market design, while maintenance of electric system reliability.

APPENDIX 2 from the Report –

Generating Capacity Subject to 111(d) by State as of the beginning of 2013 (Page 1)

	Steam Turbine - Coal			Steam Turbine - Oil			Steam Turbine - Natural Gas			Combined Cycle - Natural Gas			Combined Cycle - Oil		
State	MW Capacity	Number of Units	Capacity Factor (2012)	MW Capacity	Number of Units	Capacity Factor (2012)	MW Capacity	Number of Units	Capacity Factor (2012)	MW Capacity	Number of Units	Capacity Factor (2012)	MW Capacity	Number of Units	Capacity Factor (2012)
ALABAMA	10,790	35	49%	453	15	49%	64	9	77%	6,255	42	63%	0	0	0%
ALASKA	118	16	67%	-	-	0%	-	-	0%	279	4	70%	47	1	77%
ARIZONA	6,230	18	75%	-	-	0%	974	9	7%	6,452	43	32%	0	0	0%
ARKANSAS	5,144	7	63%	300	11	71%	1,203	8	8%	3,060	23	38%	0	0	0%
CALIFORNIA	250	8	61%	-	-	0%	12,848	48	8%	12,830	129	51%	0	0	0%
COLORADO	5,377	26	73%	-	-	0%	120	4	1%	1,663	28	39%	0	0	0%
CONNECTICUT	388	1	3%	1,861	7	2%	44	5	23%	2,303	15	23%	0	0	0%
DELAWARE	430	3	31%	-	-	0%	846	6	15%	756	6	53%	0	0	0%
FLORIDA	10,493	29	49%	5,499	23	17%	1,038	14	22%	16,785	104	60%	0	0	0%
GEORGIA	12,583	43	38%	655	20	52%	129	2	9%	4,877	26	55%	0	0	0%
HAWAII	180	1	95%	1,119	21	46%	-	-	0%	-	-	0%	375	12	55%
IDAHO	17	6	61%	74	4	65%	-	-	0%	374	4	39%	0	0	0%
ILLINOIS	15,943	71	56%	-	-	0%	40	7	3%	2,005	14	33%	0	0	0%
INDIANA	18,283	78	58%	158	4	0%	-	-	0%	1,549	12	64%	0	0	0%
IOWA	6,784	49	60%	-	-	0%	65	2	14%	813	7	12%	0	0	0%
KANSAS	5,096	14	63%	-	-	0%	1,714	29	11%	-	-	0%	0	0	0%
KENTUCKY	15,329	54	63%	-	-	0%	-	-	0%	-	-	0%	0	0	0%
LOUISIANA	4,430	14	64%	266	7	62%	8,049	64	22%	5,916	41	54%	0	0	0%
MAINE	-	-	0%	1,222	19	20%	93	2	65%	880	5	33%	0	0	0%
MARYLAND	4,771	16	40%	1,730	4	18%	321	8	6%	157	2	31%	0	0	0%
MASSACHUSETTS	1,439	8	18%	2,138	6	1%	645	16	6%	4,315	26	34%	282	4	4%
MICHIGAN	11,778	83	53%	51	2	86%	2,182	9	4%	3,378	33	45%	0	0	0%
MINNESOTA	4,755	41	55%	15	1	50%	174	17	18%	1,502	11	29%	0	0	0%
MISSISSIPPI	2,566	7	33%	235	8	59%	2,773	23	20%	4,685	29	49%	0	0	0%
MISSOURI	12,435	51	67%	-	-	0%	116	6	1%	1,425	11	19%	0	0	0%
MONTANA	1,763	8	62%	-	-	0%	-	-	0%	41	1	0%	0	0	0%
NEBRASKA	4,160	20	69%	-	-	0%	268	9	2%	296	5	11%	0	0	0%
NEVADA	1,303	7	36%	-	-	0%	470	5	7%	3,377	34	54%	0	0	0%
NEW HAMPSHIR	554	4	26%	407	4	2%	-	-	0%	882	4	57%	0	0	0%
NEW JERSEY	2,001	7	15%	163	3	2%	629	8	3%	4,132	42	49%	0	0	0%
NEW MEXICO	3,430	7	72%	-	-	0%	779	11	32%	925	8	48%	0	0	0%
NEW YORK	1,736	15	25%	2,795	9	10%	6,927	22	17%	6,425	63	49%	0	0	0%
NORTH CAROLIN	11,084	34	50%	163	7	66%	-	-	0%	2,809	21	46%	0	0	0%
NORTH DAKOTA	4,153	14	78%	-	-	0%	-	-	0%	-	-	0%	0	0	0%
OHIO	19,394	84	49%	45	3	82%	35	2	1%	2,292	20	67%	0	0	0%
OKLAHOMA	5,323	15	63%	58	1	85%	5,085	32	19%	4,394	31	49%	0	0	0%
OREGON	585	1	52%	59	2	41%	32	2	26%	2,100	18	44%	0	0	0%
PENNSYLVANIA	14,901	59	58%	842	5	7%	1,635	4	11%	5,614	42	64%	0	0	0%
RHODE ISLAND	-	-	0%	4	2	19%	9	4	22%	1,293	11	47%	0	0	0%
SOUTH CAROLIN	6,082	22	50%	244	7	44%	107	3	47%	1,682	10	48%	0	0	0%
SOUTH DAKOTA	475	1	68%	-	-	0%	-	-	0%	170	1	1%	0	0	0%
TENNESSEE	7,734	49	52%	186	6	46%	-	-	0%	960	5	48%	0	0	0%
TEXAS	21,335	40	69%	161	6	77%	18,553	88	13%	27,324	207	50%	0	0	0%
UTAH	4,887	15	72%	-	-	0%	240	4	6%	713	5	55%	0	0	0%
VERMONT	-	-	0%	2	3	26%	-	-	0%	-	-	0%	0	0	0%
VIRGINIA	5,890	41	26%	1,899	14	11%	334	4	7%	2,779	20	78%	0	0	0%
WASHINGTON	1,340	2	32%	150	9	55%	5	1	15%	2,225	21	23%	0	0	0%
WEST VIRGINIA	14,378	33	56%	-	-	0%	-	-	0%	-	-	0%	0	0	0%
WISCONSIN	8,618	58	44%	135	8	55%	7	1	16%	1,724	12	44%	0	0	0%
WYOMING	6,431	24	77%	0	1	51%	3	3	65%	-	-	0%	0	0	0%
50 STATES	292,375	1,204		22,636	227		68,489	482		148,160	1,154		705	17	
source: SNL Financial															

APPENDIX 2 from the Report –

Generating Capacity Subject to 111(d) by State as of the beginning of 2013 (Page 2)

	All Section 111(d) Units		Nuclear			Wind and Solar			Other		Total Grid-Connected	
State	MW Capacity	Number of Units	MW Capacity	Number of Units	Capacity Factor (2012)	MW Capacity	Number of Units	Capacity Factor (2012)	MW Capacity	Number of Units	MW Capacity	Number of Units
ALABAMA	17,562	101	5,135	5	91%	0	1	0%	10,361	175	33,058	282
ALASKA	444	21	-	-	0%	33	25	7%	1,766	473	2,243	519
ARIZONA	13,656	70	3,937	3	93%	829	65	16%	9,634	133	28,056	271
ARKANSAS	9,707	49	1,865	2	95%	-	-	0%	4,300	112	15,872	163
CALIFORNIA	25,929	185	2,240	2	90%	6,202	498	19%	33,424	1,431	67,795	2,116
COLORADO	7,161	58	-	-	0%	2,411	61	29%	5,685	228	15,256	347
CONNECTICUT	4,596	28	2,117	2	92%	1	6	0%	2,687	144	9,401	180
DELAWARE	2,032	15	-	-	0%	15	4	20%	1,001	31	3,048	50
FLORIDA	33,815	170	3,140	4	65%	74	11	16%	23,441	401	60,470	586
GEORGIA	18,244	91	4,061	4	95%	3	3	5%	17,498	350	39,806	448
HAWAII	1,674	34	-	-	0%	185	27	20%	813	110	2,672	171
IDAHA	465	14	-	-	0%	973	32	22%	3,725	203	5,162	249
ILLINOIS	17,988	92	11,673	11	94%	3,579	36	25%	14,462	577	47,703	716
INDIANA	19,991	94	-	-	0%	1,543	15	24%	6,300	217	27,834	326
IOWA	7,663	58	622	1	80%	5,050	77	32%	3,134	499	16,469	635
KANSAS	6,810	43	1,205	1	78%	2,516	19	22%	3,504	403	14,034	466
KENTUCKY	15,329	54	-	-	0%	-	-	0%	6,768	111	22,098	165
LOUISIANA	18,660	126	2,157	2	83%	-	-	0%	5,551	134	26,368	262
MAINE	2,195	26	-	-	0%	411	10	23%	2,057	292	4,663	328
MARYLAND	6,979	30	1,734	2	89%	148	14	26%	3,819	156	12,680	202
MASSACHUSETTS	8,820	60	685	1	98%	93	32	11%	5,171	231	14,769	324
MICHIGAN	17,389	127	4,131	4	77%	820	16	15%	9,412	644	31,753	791
MINNESOTA	6,445	70	1,697	3	80%	2,867	145	30%	5,333	433	16,342	651
MISSISSIPPI	10,260	67	1,265	1	66%	-	-	0%	4,532	71	16,056	139
MISSOURI	13,977	68	1,240	1	99%	459	6	31%	7,185	377	22,860	452
MONTANA	1,803	9	-	-	0%	638	10	26%	3,150	95	5,591	114
NEBRASKA	4,725	34	1,271	2	52%	415	11	34%	2,032	253	8,443	300
NEVADA	5,150	46	-	-	0%	411	18	12%	5,486	135	11,046	199
NEW HAMPSHIR	1,843	12	1,247	1	75%	171	3	14%	1,311	142	4,571	158
NEW JERSEY	6,924	60	4,273	4	88%	285	128	11%	8,889	233	20,371	425
NEW MEXICO	5,134	26	-	-	0%	921	34	31%	1,833	67	7,887	127
NEW YORK	17,883	109	5,286	6	88%	1,598	27	20%	15,171	843	39,937	985
NORTH CAROLIN	14,056	62	5,206	5	86%	153	64	8%	11,321	344	30,736	475
NORTH DAKOTA	4,153	14	-	-	0%	1,805	28	34%	626	40	6,585	82
OHIO	21,765	109	2,176	2	90%	484	13	24%	9,588	332	34,012	456
OKLAHOMA	14,860	79	-	-	0%	2,973	27	31%	5,494	129	23,326	235
OREGON	2,776	23	-	-	0%	3,154	60	22%	8,144	256	14,074	339
PENNSYLVANIA	22,992	110	9,896	9	87%	1,377	43	18%	9,967	375	44,232	537
RHODE ISLAND	1,306	17	-	-	0%	2	1	0%	712	35	2,019	53
SOUTH CAROLIN	8,115	42	6,659	7	88%	0	1	0%	9,158	254	23,931	304
SOUTH DAKOTA	645	2	-	-	0%	767	11	42%	2,825	75	4,237	88
TENNESSEE	8,879	60	3,512	3	82%	44	5	12%	8,077	190	20,512	258
TEXAS	67,373	341	5,020	4	87%	11,700	116	31%	22,492	504	106,585	965
UTAH	5,840	24	-	-	0%	19	1	24%	1,550	143	7,408	168
VERMONT	2	3	628	1	91%	133	11	9%	545	139	1,308	154
VIRGINIA	10,902	79	3,637	4	90%	-	-	0%	11,750	626	26,288	709
WASHINGTON	3,719	33	1,158	1	92%	2,802	24	27%	24,743	379	32,422	437
WEST VIRGINIA	14,378	33	-	-	0%	583	6	25%	1,542	50	16,503	89
WISCONSIN	10,485	79	1,209	2	92%	614	12	28%	6,252	534	18,559	627
WYOMING	6,434	28	-	-	0%	1,383	30	35%	586	58	8,404	116
50 STATES	532,364	3,084	94,944	95		60,642	1,786		354,445	13,992	1,042,395	18,957

source: SNL Financial