An Early Look at the Clean Power Plan in Six Charts

Flexibility Provides Opportunities to Unleash Innovation, Reduce Pollution, Save Lives, and Grow a Prosperous Low Carbon Economy

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Background

On August 3rd, President Obama announced the Clean Power Plan – a historic set of Clean Air Act standards that will finally put an end to the era of unlimited carbon pollution from the nation's fossil fuel-fired power plants. Fossil fuel-fired power plants are the nation's single largest source of climate-destabilizing pollution, accounting for nearly 40 percent of our emissions of carbon dioxide. And unlike other major air pollutants from the power sector that have been subject to protective standards under the Clean Air Act, carbon pollution from power plants has been subject to no national limits until now.

Reducing carbon pollution from the power sector will yield a safer and more stable climate for ourselves and for our children. In addition, it will result in near-term public health benefits in the form of thousands of avoided deaths, hundreds of thousands of avoided childhood asthma attacks, and fewer strokes and heart attacks. And by creating incentives for energy efficiency, the Clean Power Plan has the potential to reduce energy bills for households by an average of approximately $80 per year when fully implemented – yielding significant economic benefits.

The Clean Power Plan is an important step for our nation, but it should be seen as setting the floor for ambition as states and power companies race to claim a bigger share of the clean, low carbon economy. It is abundantly clear that the power sector is fully capable of achieving – and greatly exceeding — the standards laid out in the Clean Power Plan, and doing so in a highly cost-effective way that maintains a reliable and affordable electric system. Moreover, experience has shown that states that move early and in a rigorous way to reduce emissions will reap the greatest health and economic benefits.

States will have tremendous flexibility under the Clean Power Plan to determine how best to win this race and how to take advantage of their own unique opportunities. Deploying that flexibility to surpass the carbon pollution limits established in the Clean Power Plan will maximize benefits to ratepayers and power companies, while improving health in local communities.

In this whitepaper we provide an early look at the most important features of these vital standards.

The Reductions in Carbon Pollution Required under the Final Rule are Abundantly Achievable

This rule is expected to reduce emissions of carbon dioxide from the power sector to 32 percent below 2005 levels by 2030. Emissions reductions are required beginning in 2022, two years later than would have been required under the proposed rule. To provide even greater time for power companies to reduce their emissions of carbon pollution, EPA has built in a glide path that calls for lower reductions in the first years of the program than are required in the program's later years.

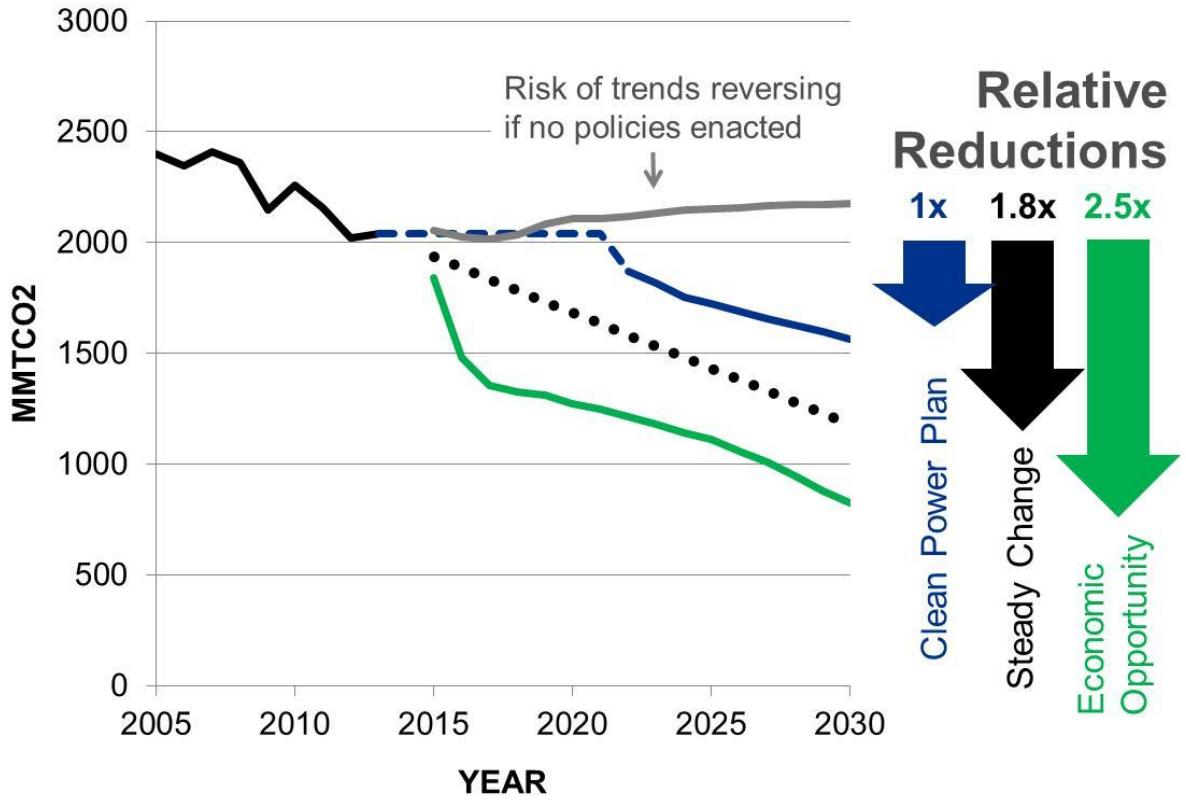
The end result of all these changes is that EPA has made an already eminently reasonable rule even more achievable. To put these reductions into context, the power sector has already reduced emissions of carbon pollution to 15 percent below 2005 levels.[i] Thus, the power sector is nearly halfway towards the final target, even before federal standards have been put in place (See Chart 1).

A number of states have achieved even deeper cuts in recent years, demonstrating that the sector is capable of rapid change. From 2005 to 2012 alone, 16 states reduced carbon dioxide emissions from the power sector by at least 25 percent, and nine states actually reduced emissions by more than 40 percent.[ii] By comparison, the Clean Power Plan requires nationwide reductions of roughly 20 percent below 2014 levels by 2030 (32 percent below 2005 levels), 15 years after the plan's finalization.[iii]

To be clear, a strong regulatory "signal" that rewards and incentivizes investments in carbon pollution reduction across the nation is absolutely critical to provide the certainty needed for long term investment, and to ensure that the power sector continues to decarbonize, and does not slow or reverse course. Such standards are particularly important when you consider that power companies are expected to invest up to $2 trillion in new generation, transmission, and distribution infrastructure between 2010 and 2030 in order to modernize aging generating facilities and grid systems.[iv] Much of this infrastructure will have a lifetime measured in decades. Rigorous carbon pollution standards will ensure that consistent and clear investment signals are provided, will align these investments with the imperative to cut carbon and will reduce the risk that these investments will become stranded in the future.

CHART 1

Reductions in carbon pollution required under the Clean Power Plan compared to historical rate of change and cost-effective reductions



Notes: For illustrative purposes, the above figure compares the Clean Power Plan as finalized against a linear interpolation of historical trends and against EIA's carbon pricing scenario. Historical CO_2 emissions from the power sector come from EPA's Greenhouse Gas Emissions Inventory.[v] The interpolation depicted is based on that data (2005-2013 emission). Final emissions under the Clean Power Plan are based on the mass budgets for existing units plus the new source complements.[vi] Since EPA has not set emissions budgets for Alaska or Hawaii, we added 2012 historical emissions for each of those states to the mass budgets under the Clean Power Plan.[vii] The reference case from EIA's AEO2015 was used to depict the "risk of trends reversing if no policies enacted."[viii] The economic opportunity line depicts the carbon pricing scenario from EIA's AEO2014 as this scenario. output is not available for the AEO2015.[ix] These calculations do not attempt to account for any emissions reductions that might occur as a result of the Clean Energy Incentive Program.

Standards of Performance Based on Proven, Cost-Effective Measures that are Already Being Widely Deployed

The technologies that can help us achieve rigorous carbon pollution standards already exist and are highly cost-competitive. Renewable energy resources and natural gas have dominated new construction of power plants since the 1990's as a result of the rapidly evolving economics of generation coupled with smart state policies (See Chart 2). More than one-half the states have energy efficiency programs in place, which are driving considerable savings on electricity bills. And there are numerous common-sense practices and equipment upgrades that existing steam power plants can and have implemented to improve their efficiency. [x]

Under the Clean Air Act, EPA emission standards are required to reflect the "best system of emission reduction" that has been adequately demonstrated, taking into account costs, energy needs, and other factors. Consistent with these requirements, the final Clean Power Plan sets minimum carbon pollution standards for fossil fuel-fired power plants that reflect proven measures for emission reduction and that take into account technical feasibility, electric reliability, cost-effectiveness, and the regional and technological diversity of the power sector. These standards are based on the following three "building blocks":

- Building Block 1 involves improving the efficiency of existing coal-fired steam power plants, so that they emit less carbon pollution per unit of electricity produced.

- Building Block 2 involves gradually shifting generation from high-emitting coal and oil-fired steam power plants to lower-emitting power plants fueled by natural gas, over the time period from 2022-2030.

- Building Block 3 involves gradually shifting generation from all fossil fuel-fired power plants, including coal and gas-fired units, to zero-emitting, utility-scale renewable resources including wind, solar, and geothermal power.

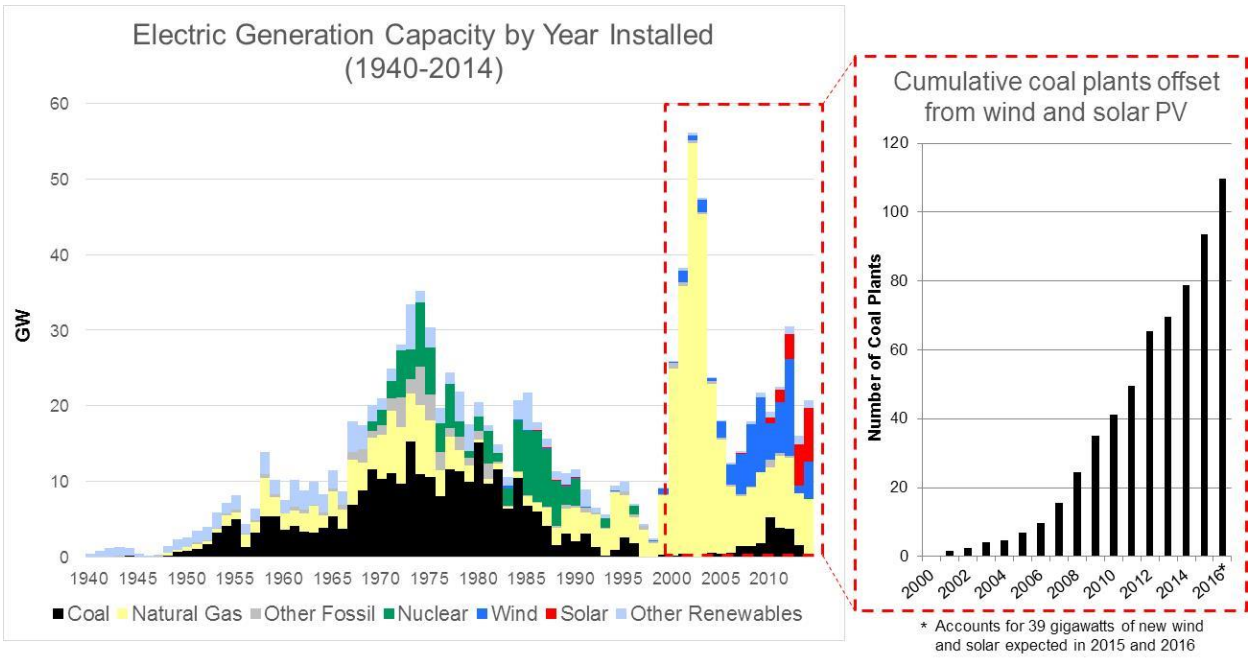
EPA generally assumed that these building blocks would be "phased in" gradually between 2022 and 2030, thus providing power companies with even more time to comply with the reasonable emissions limits in the final rule. Further, EPA evaluated the potential to deploy these building blocks on a regional basis in order to reflect the interconnected and interstate character of the power grid, while taking into account differences in energy portfolios and resource availability in each state across the country. EPA used this analysis to determine feasible emission standards for fossil power plants through 2030 in each of the nation's three major grid regions – and selected the *least stringent* of these regional standards to set national technology-based standards.

Following the traditional approach EPA has taken for other pollutants from the power sector, EPA established distinct national standards for two major types of fossil power plants, expressed in terms of the amount of carbon dioxide per unit of electricity produced. For coal and oil-fired steam generating units, EPA set a final (2030) performance standard of 1,305 pounds of carbon

dioxide per megawatt-hour (lb CO2/MWh). For natural gas-fired stationary combustion turbines, EPA established a final performance standard of 771 lbs CO2/MWh. For each of these technologies, EPA also established interim standards that apply in three phases over the period from 2022 to 2029, and that reflect the gradual phase in of the building blocks.[xi]

Unlike the proposed rule, these limits do not incorporate the most cost effective emission reduction measure available: end-use energy efficiency. This underscores that the Clean Power Plan leaves considerable opportunities on the table for states to establish even deeper reductions across the nation through their individual plans. Recognizing the inherent value of these measures, which typically save consumers two-to-five dollars for every one dollar invested, EPA is allowing states to use them for compliance.[xii] Indeed, EPA enables states to customize solutions that reflect their policy priorities so long as the standards are achieved.

CHART 2



Notes: Capacity data comes from EIA, FERC, and Bloomberg New Energy Finance. [xiii] [xiv] [xv] Calculations of avoided coal plants are based on: historical wind capacity factors as reported by DOE; historical capacity factors for utility scale PV and rooftop PV as reported by NREL.[xvi] [xvii] [xviii] In addition, calculations assume that the typical capacity factor for coal remains about 60 percent, and that the typical coal plant has a nameplate capacity around 500 MW. Bloomberg New Energy Finance was used for wind and solar installation data after 2009 because EIA form 860 only captures generators with nameplate capacity of greater than 1 MW, while a typical distributed generation solar system has a capacity smaller than 1 MW.

The Clean Power Plan Provides States with Tremendous Flexibility

The Clean Power Plan reflects the "cooperative federalism" approach that has successfully reduced air pollution for decades under the Clean Air Act. Under this framework, states have tremendous flexibility to craft individualized plans, with broad public input, that meet or exceed the national standards described above and that consider state-specific needs, priorities and opportunities.

Moreover, the Clean Power Plan can be implemented by states through straightforward, flexible, cost-effective approaches that exclusively regulate fossil fuel-fired power plants and draw upon well-established regulatory tools and existing legal frameworks. EPA provides "model rules" in the final Clean Power Plan that illustrate two such approaches and that also show how states can harness the benefits of interstate trading by adopting basic "common elements" that would enable trading among mutually compatible state plans.

State Emission Limits

To facilitate state flexibility, the Clean Power Plan provides states with the option of adopting one of four different carbon pollution limits – all of them based on the uniform national standards described above:

1. States can directly apply the national emission standards to their fossil fuel-fired power plants.

2. States can take a weighted average of these rates, resulting in a single "blended" rate that is applied to all fossil-fuel-fired units in the state regardless of the technology type.

3. States can adopt an EPA-established "mass-based" budget for existing fossil fuel-fired power plants, expressed in terms of total emissions of CO_2 per year.

4. States can adopt a mass-based budget that applies to both existing and new fossil fuel-fired power plants. Because this reflects potential growth in generation and emissions, it is generally higher than the mass-based budget for existing power plants alone.

The "blended" interim and final rate-based standards for each state, as well as the mass-based budgets for existing and new units, are shown in Table 1 below. Because EPA's approach to standard-setting in the final Clean Power Plan yields uniform national standards of performance for all fossil generating units, state emission limits become more uniform nationally than they were in the proposed rule. The remaining disparity between state standards is reflective of the relative mix of steam units or natural gas units operating in the state in 2012, and of the procedure EPA used to translate rate-based targets into mass-based targets. Thus, the state standards shown in the tables are ultimately based on national standards that are consistently applied to every existing unit across the country.

CHART 3

Mass Targets for Existing & New Units (million short tons)							Rate Targets (lbs CO2/MWh)				
			Interim Goals				Historical	Interim Goals			
	Historical Emissions		Step 1	Step 2	Step 3	Final Goal	Rate	Step 1	Step 2	Step 3	Final Goal
STATE	2005	2012	(2022-4)	(2025-7)	(2028-9)	2030	2012	(2022-4)	(2025-7)	(2028-9)	2030
AL	87.40	71.86	66.52	62.10	59.34	57.64	1,518	1,244	1,133	1,060	1,018
AR	27.56	37.70	36.20	33.52	31.79	30.69	1,782	1,411	1,276	1,185	1,130
AZ	55.38	55.95	35.87	34.07	33.04	32.38	1,552	1,263	1,149	1,074	1,031
CA	46.20	52.74	54.86	53.47	53.00	52.82	961	961	890	848	828
CO	44.11	42.42	36.38	34.13	32.75	31.82	1,995	1,476	1,332	1,233	1,174
CT	10.75	7.91	7.61	7.30	7.13	7.06	846	899	836	801	786
DE	6.92	4.99	5.38	5.07	4.89	4.78	1,254	1,093	1,003	946	916
FL	137.21	116.42	120.10	113.18	109.03	106.64	1,247	1,097	1,006	949	919
Fort Mojave	N/A	0.58	0.65	0.64	0.64	0.65	858	877	817	784	771
GA	91.45	60.23	54.54	50.79	48.42	46.94	1,683	1,290	1,173	1,094	1,049
IA	38.72	37.37	30.53	28.03	26.37	25.28	2,195	1,638	1,472	1,355	1,283
ID	0.68	0.80	1.66	1.64	1.63	1.64	834	877	817	784	771
IL	100.46	91.92	80.73	74.26	69.99	67.20	2,173	1,582	1,423	1,313	1,245
IN	130.73	105.83	92.40	85.00	80.13	76.94	2,021	1,578	1,419	1,309	1,242
KS	39.99	33.12	26.87	24.66	23.19	22.22	2,319	1,654	1,485	1,366	1,293
KY	99.20	92.86	77.07	70.74	66.55	63.79	2,166	1,643	1,476	1,358	1,286
LA	47.02	47.26	42.23	39.13	37.13	35.85	1,618	1,398	1,265	1,175	1,121
MA	26.50	13.25	13.45	12.82	12.48	12.30	1,003	956	885	844	824
MD	34.75	20.59	17.52	16.08	15.13	14.50	2,031	1,644	1,476	1,359	1,287
ME	4.17	1.90	2.27	2.18	2.13	2.11	873	888	827	793	779
MI	81.73	68.00	57.11	52.76	49.92	48.09	1,928	1,468	1,325	1,228	1,169
MN	38.71	27.73	27.42	25.27	23.85	22.93	2,033	1,535	1,383	1,277	1,213
MO	84.46	79.01	67.59	62.08	58.45	56.05	2,008	1,621	1,457	1,342	1,272
MS	26.99	25.25	29.11	27.36	26.29	25.67	1,185	1,136	1,040	978	945
MT	21.00	16.99	13.98	13.00	12.38	11.96	2,481	1,671	1,500	1,380	1,305
Navajo	N/A	31.42	26.84	24.96	23.77	22.96	2,121	1,671	1,500	1,380	1,305
NC	80.19	61.24	61.26	56.71	53.76	51.88	1,778	1,419	1,283	1,191	1,136
ND	36.13	33.64	25.55	23.44	22.03	21.10	2,368	1,671	1,500	1,380	1,305
NE	23.19	26.55	22.34	20.49	19.27	18.46	2,161	1,658	1,488	1,369	1,296
NH	8.42	4.50	4.49	4.26	4.13	4.06	1,119	1,006	929	881	858
NJ	20.97	16.26	18.37	17.54	17.09	16.88	1,091	937	869	829	812
NM	34.94	31.48	15.04	14.14	13.59	13.23	1,798	1,435	1,297	1,203	1,146
NV	28.72	16.04	15.44	14.99	14.81	14.72	1,102	1,001	924	877	855
NY	60.24	35.33	35.71	33.66	32.42	31.72	1,140	1,095	1,005	948	918
OH	142.24	101.26	88.90	82.02	77.52	74.61	1,911	1,501	1,353	1,252	1,190
OK	53.75	51.42	47.82	44.47	42.34	41.00	1,565	1,319	1,197	1,116	1,068
OR	8.85	7.53	9.31	9.02	8.89	8.82	1,089	1,026	945	896	871
PA	133.08	115.25	106.60	98.95	94.04	90.93	1,682	1,359	1,232	1,146	1,095
RI	2.63	3.66	3.84	3.69	3.61	3.58	918	877	817	784	771
SC	42.80	35.87	31.17	28.81	27.29	26.30	1,791	1,449	1,309	1,213	1,156
SD	3.56	3.47	4.25	3.93	3.72	3.58	2,240	1,465	1,323	1,225	1,167
TN	58.65	39.97	34.27	31.58	29.81	28.66	2,122	1,531	1,380	1,275	1,211
TX	251.81	244.33	223.67	210.38	202.60	198.11	1,566	1,279	1,163	1,086	1,042
UTE	N/A	3.31	2.80	2.60	2.48	2.39	2,145	1,671	1,500	1,380	1,305
UT	38.26	34.00	28.95	27.15	26.04	25.30	1,874	1,483	1,339	1,239	1,179
VA	45.00	27.32	31.47	29.61	28.49	27.83	1,442	1,120	1,026	966	934
WA	15.33	6.76	12.65	12.07	11.76	11.56	1,566	1,192	1,088	1,021	983
WI	52.90	40.29	33.66	31.08	29.40	28.31	1,996	1,479	1,335	1,236	1,176
WV	92.13	72.45	62.80	57.60	54.14	51.86	2,064	1,671	1,500	1,380	1,305
WY	47.14	47.19	39.09	36.38	34.65	33.47	2,331	1,662	1,492	1,373	1,299

As described in more detail below, any one of the four alternative standards described above can be implemented by the states using traditional regulatory approaches that apply emissions limits to individual existing power plants and are consistent with existing law, while preserving compliance flexibility to ensure the cost-effectiveness of the program. The states also have the opportunity to "phase in" their compliance obligations under any of these frameworks. States can determine the optimal reduction trajectory over the course of the interim compliance period (2022-2029), as long as they meet the interim standard on average over that timeframe, and have achieved the final goal by 2030.

State Planning Process and Implementation Guidance

Under the final rule, states will be required to submit a complete final plan by September 6, 2016; if they need more time, states may submit an initial plan with an extension request by that date. States that receive an extension of the deadline would have until no later than September 6, 2018 to submit a final plan, and would have to submit a progress report in September 2017. For states that fail to make an initial submission or fail to submit an approvable state plan, EPA will issue a federal plan that establishes a workable framework for achieving the state standard.

There are clear advantages for power companies in states that submit plans swiftly. Expeditious submission of state plans can help provide a clear framework for power companies to take the time necessary to plan their investments for their upcoming compliance obligations, while maximizing compliance flexibility. The timely finalization of state plans also maximizes the opportunities for power companies and other entities to earn early action credits created by the Clean Energy Incentive Program outlined below.

The Clean Power Plan is accompanied by extensive guidance to support the states in developing approvable plans – including proposed "model rule" provisions that constitute a presumptively approvable state plan and that can be adopted "off the shelf" by the states.

In addition, EPA has issued a proposed federal plan to accompany the final Clean Power Plan, and will take public comment on that proposed federal plan over the coming months. The federal plan contains two alternative sets of provisions: one designed to meet a mass-based target, and the other designed to meet the national rate-based standards. In both cases, the federal plan takes the form of a traditional air pollution regulation that exclusively applies to regulated power plants, while incorporating emissions trading provisions and other compliance flexibilities that will help power companies minimize costs and ensure reliable electric service.

As the federal plan and model rule provisions demonstrate, state plans can be designed in a straightforward way that enhances compliance flexibility and minimizes costs – while remaining consistent with traditional forms of air pollution regulation that have been applied under existing law.

Other state policies that mitigate carbon emissions, such as the incentives and portfolio standards for clean energy and energy efficiency that exist in many states around the country, can help power companies achieve compliance more cost-effectively. However, there is no

requirement that states implement such policies. Nor do these policies need to be incorporated into the state plan.

The final Clean Power Plan also enhances compliance flexibility by describing how states can enable interstate trading of compliance credits or allowances through adoption of consistent implementation approaches and mutually compatible compliance frameworks. Adopting such "trading ready" plans would provide access to compliance credits or allowances across state lines, and allow power companies and states to work together to achieve emissions reductions across the interconnected electric grid, without the need to formally adopt and submit a joint compliance plan.

Incentives for Early Reductions

The final Clean Power Plan includes a voluntary "early action" program known as the Clean Energy Incentive Program (CEIP). The CEIP will provide a pool of compliance credits for emission reductions achieved in 2020 and 2021 by qualifying renewable energy and low-income energy efficiency projects that are implemented *after* states submit final plans to EPA. As soon as a final state plan is submitted to EPA, any renewable project that is then built or low income efficiency program that is then deployed is eligible to earn and generate extra credit between 2020-2022, that can then be used for compliance with the standard during the compliance period from 2022-2029. States that put their plan in place quickly will have the opportunity to qualify more potential projects or programs for credit. In effort to ensure that states and power companies thoughtfully design their energy efficiency programs in a way that is accessible for low-income consumers, the CEIP provides low-income energy efficiency projects with double the amount of credit that would otherwise be awarded.

The Clean Power Plan is Poised to Deliver Significant Climate and Public Health Benefits

Power plants are the single largest source of carbon pollution in the United States, and one of the single largest sources in the world. Getting these emissions under control is essential if we are going to avoid catastrophic climate change. The Clean Power Plan builds on the progress we have seen in recent years and will help ensure that the nation accelerates a transition to a low-carbon economy.

In total, the Clean Power Plan is expected to provide climate benefits of $20 billion and health benefits of $14-$34 billion per year by 2030. Each of the climate and health protections, taken alone, provide benefits that far exceed the costs. The health benefits are expected to outweigh costs by a factor of 4 to 1, as they provide healthier and longer lives for Americans (see Chart 4). When the program is fully implemented, the standards are expected to prevent:

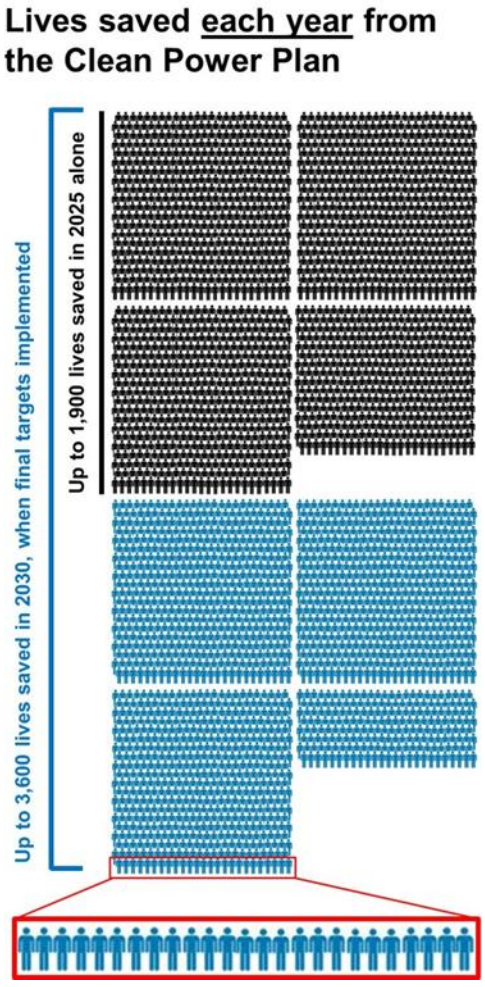
- Up to 3,600 premature deaths
- 90,000 asthma attacks in children

- Up to 1,700 heart attacks
- 1,700 hospital admissions
- 300,000 missed school and work days

That's because power plants are major sources of emissions for a range of pollutants that contribute to ground-level ozone, better known as smog, and dangerous particulate pollution, better known as soot. Power plants are also a major source of emissions for pollutants that have neurotoxic or carcinogenic (cancer-causing) effects. Steps taken to reduce carbon pollution under the Clean Power Plan will have the additional benefit of reducing emissions of these and other harmful air pollutants.

In effort to better ensure that the public health benefits accrue to all communities, the final rule includes a requirement that states engage local communities as they craft their state plans. To facilitate this process, EPA has committed to provide additional data and analytical tools to help communities and states evaluate the impacts of power plant emissions on nearby residents.

CHART 4



The Clean Power Plan is Consistent with an Affordable and Reliable Electric Grid

As we explained in a recent white paper, the proposed Clean Power Plan contained multiple, overlapping features to protect grid reliability – including an extended lead time prior to the compliance period; a long averaging period for the interim standard; flexible compliance provisions allowing states and power companies to decide how to most cost-effectively reduce carbon pollution, including through market-based programs and clean energy policies that have been successfully used around the country.[xix] Under the proposed rule, grid operators and energy regulators could also deploy long-standing tools and processes that have successfully preserved reliability during periods of significant change.

Nevertheless, the final rule added even further measures in response to comments on reliability:

1. As noted above, EPA deferred the start of the compliance period by two years and provided a more extended phase-in of the interim standards.

2. EPA also released, together with the Clean Power Plan, a memorandum of understanding with the Department of Energy and the Federal Energy Regulatory Commission under which all three agencies will carefully monitor the implementation of the Clean Power Plan and coordinate in responding to reliability issues.

3. And as a final backstop, the Clean Power Plan includes special reliability provisions that allow a regulated power plant to operate under a less stringent carbon pollution standard for a 90-day period needed to maintain reliability during unforeseen emergencies.

In short, the Clean Power Plan contains multiple, overlapping provisions that ensure carbon pollution reductions are achieved in a manner that protects and promotes system reliability.

The combination of this flexibility, modest emissions standards, and shifts in power sector economics has resulted in a program that can reduce energy bills for consumers while driving reductions in carbon pollution. Part of the reason for this is that while energy efficiency was eliminated as a building block, it has been preserved as an emission reduction opportunity. This is important as the cheapest way to reduce emissions of carbon pollution is to use less electricity. States have been finding for years that efficiency investments typically save consumers two-to-five dollars for every one dollar invested.[xx] Thus, even when assuming only a modest expansion of state efficiency programs, EPA finds the Clean Power Plan could actually reduce energy bills for households by an average of approximately $80 per year in the year 2030.

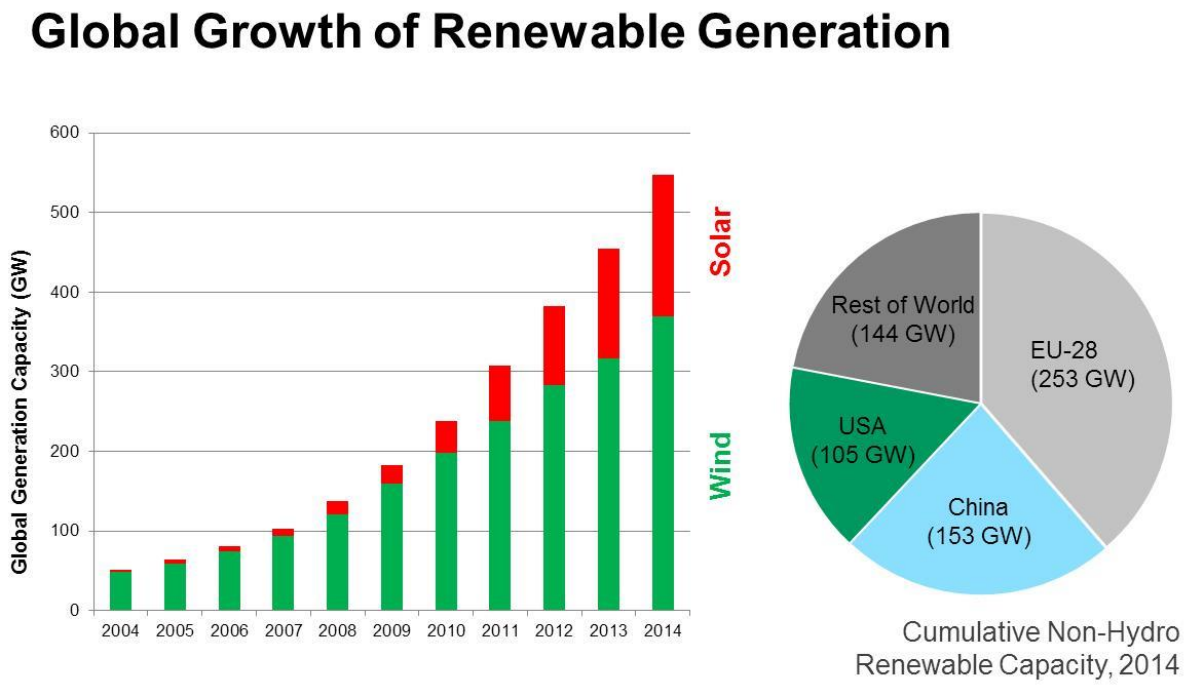
The United States is in a Race to Strengthen Our Economic Competitiveness in the Briskly Expanding Global Low Carbon Economy.

As shown in Chart 5 below, the global leader in installation of renewable generation is now China, which as of 2014 had 50 percent more capacity of non-hydro renewables than the United States (including wind, solar, bio-power, ocean power and geothermal).[xxi] Keep in mind that this is a country whose per capita GDP is roughly 1/4 our own.[xxii]

All told, China is expected to build more than 176 GW of new wind and solar between 2015 and 2020 alone, and one terawatt of non-fossil generation by 2030 (which is comparable to the entire US electric grid).[xxiii] [xxiv] Meanwhile, India has set a target of building 100 gigawatts of new solar by 2022.[xxv] That's in a country where 20 percent of the population still does not have access to electricity.[xxvi]

These goals clearly demonstrate that these nations have already determined that low carbon investments are consistent with robust economic growth.[xxvii] This should give states confidence that there is much they can do to reduce carbon pollution while fueling their own economic engine. Given the scale of change happening around the world, there is strong reason to believe that the greater risk is that we move too slowly and miss out on the opportunities created by the rapidly growing global low-carbon economy.

CHART 5



Notes: Data from REN21's Global Status Report[xxviii]

Conclusion

How to Seize the Low-Carbon Opportunity in the Years Ahead

The transition to a low carbon future has already begun. In total, natural gas and renewables have accounted for 93 percent of all new generation since 2000.[xxix] In recent years, these trends have been tipping more and more in favor of renewables, offsetting more and more carbon pollution. According to Bloomberg New Energy Finance, America will build approximately 19 gigawatts of new wind and 20 gigawatts of new solar in 2015 and 2016 alone.[xxx] This means that in just two years we will build enough new renewable generation capacity to offset more than 30 coal plants.

The price of low and zero-carbon generating resources continues to fall and sustained advances in wind technology have opened up economic opportunities across the United States (see Chart 6).[xxxi] [xxxii] These trends will only strengthen in the years ahead as sustained deployment at home and abroad can be expected to drive sustained advances.

The recent history of wind power technologies provides a great example of this phenomenon. Historically, most wind turbines built in the United States have had "hub heights" about 80 meters tall. However, the next generation of wind technology is now here – with increased hub heights that make it possible to generate dramatically more wind power in a wider variety of places. In Europe, most new turbines are already 110 meters high or more. In the United States, this new generation of wind technologies would increase the land area suitable for wind by 54 percent nationwide (vs. the technical potential available with a hub height of 80 meters).

According to the Department of Energy, even higher turbines are just around the corner. That translates directly into higher capacity factors and even cheaper electricity. As a result, wind is already out-competing fossil generation around the country, leading to direct economic benefits.[xxxiii]

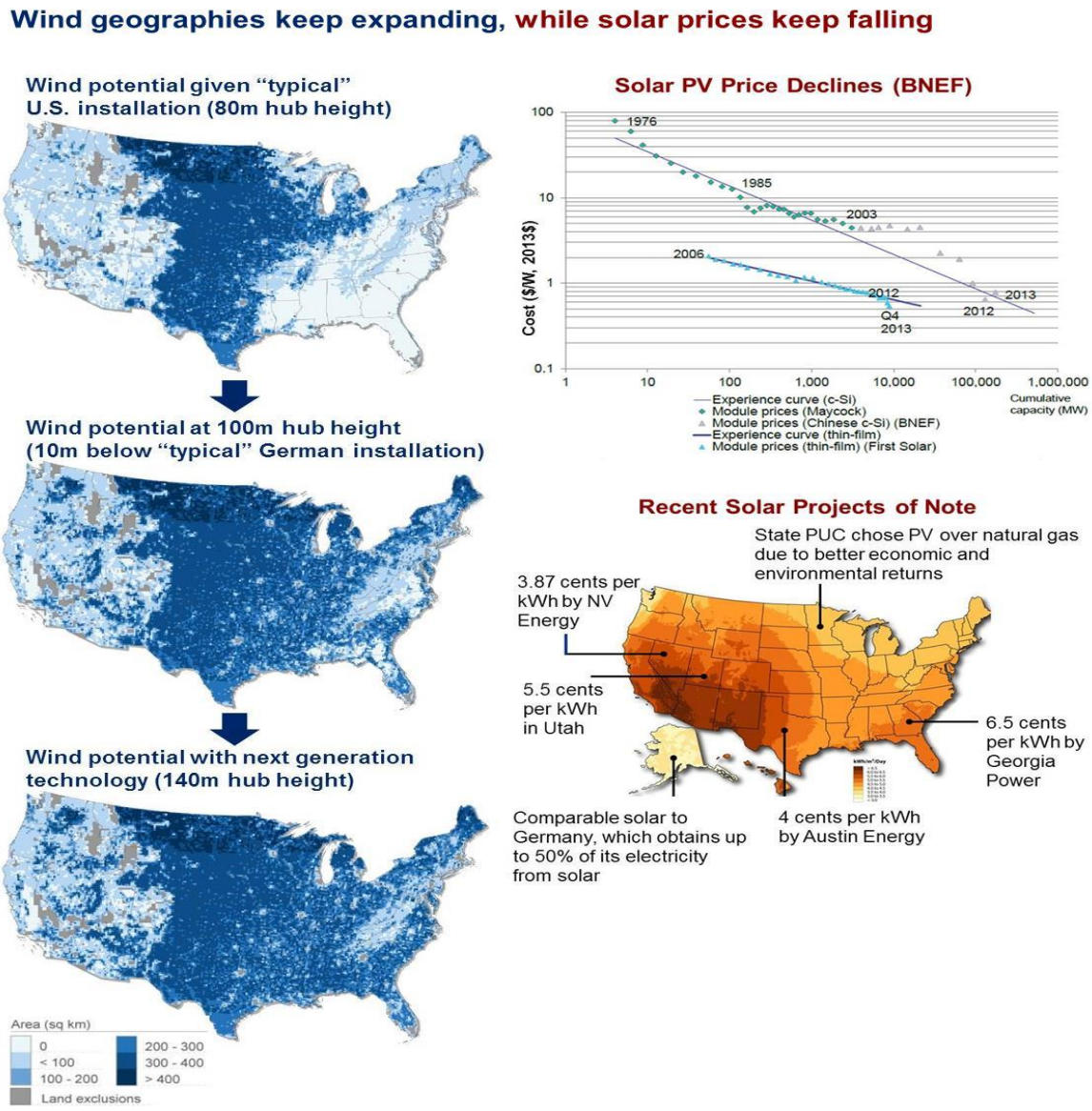
Perhaps the most staggering changes are to be found in the solar industry, where prices have been falling for decades as the industry has matured, in part due to sustained investments here in the United States and abroad.

Since 2007 alone, the price of solar photovoltaic (PV) modules has fallen by more than 80 percent, and many industry analysts are projecting that these declines will continue.[xxxiv] [xxxv] We are seeing this play out on the ground around the country today, with a number of solar PV projects producing power at a cost of just 3.87 to 6.5 cents per kilowatt hour across the country.[xxxvi] [xxxvii] [xxxviii] This is well below the cost of new coal generation, and some projects are comparable to the cost of new gas generation even without the Investment Tax Credit.[xxxix]

So what can you do?

With the release of the final Clean Power Plan, states and power companies will begin the important work of developing state-based solutions. The Clean Air Act requires that this process include extensive public outreach and involvement. It's important that citizens engage in this process and tell state officials, regulators, and power companies that they want to win the race to seize the low carbon economy and that they should therefore act early and boldly to make progress in reducing carbon pollution. By leveraging all of the opportunities and tools that the Clean Power Plan offers, we can secure healthier air, a safer climate, and a more resilient and affordable electricity grid. That's something all Americans can celebrate.

CHART 6



Notes: Wind potential maps from DOE.[xl] Solar cost trends are from Bloomberg New Energy Finance and Business Council for Sustainable Energy. [xli] The solar potential map from NREL, while additional solar project data points are from WRI, Utility Dive, and the Guardian.[xlii] [xliii] [xliv] [xlv]

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