Sierra Club

ACCELERATING THE US COAL PHASE OUT: LEADING BY EXAMPLE IN PARIS AND BEYOND

KEY POINTS

- An unprecedented wave of coal plant retirements has yielded deeper economy-wide carbon reductions for 2015 than those laid out in the Waxman-Markey legislation
- Because of these record coal retirements, US carbon emissions are trending decisively downward and will meet or even exceed the Clean Power Plan's 2030 target as much as five years ahead of schedule, helping the US deliver a strong pledge at this year's Paris climate conference

The climate change crisis and the public health impacts of coal mining and coal combustion in power plants together call for an urgent acceleration of our power grid from a high carbon, heavily polluting energy system to a low carbon, clean energy future.

For the past dozen years Sierra Club and our allies have been working to stop the construction of new coal-fired power plants, phase out and replace the existing coal fleet with clean energy, and ensure a fair and equitable transition for workers and communities affected by the ongoing transformation of the US power sector. From 2002 to 2010, the primary focus of our Beyond Coal campaign was to stop the rush to build more than two hundred proposed coal plants; we successfully stopped 90 percent.

Starting in 2010, after the US Senate failed to pass comprehensive climate legislation, known as the Waxman-Markey bill, we built out a national campaign with the support of Bloomberg Philanthropies and other partners to circumvent a gridlocked Congress and work directly in states and with local community groups to secure the retirement of fully one third of the US coal fleet by 2015. Earlier this year as we neared our 2015 goal, Bloomberg Philanthropies pledged an additional $30 million — on top of $50 million pledged in 2011 — to the Beyond Coal campaign, enabling us to commit to a new target: by 2017 locking in the replacement of half of the US coal fleet with clean energy no later than 2025.

With the support of Bloomberg Philanthropies, the Sierra Club presents this quantitative analysis of our progress and the likely impact on carbon emissions by 2025 of achieving our goal of retiring half the US coal fleet in the coming years. We have undertaken this review as part of the Beyond Coal campaign's commitment to robust data, analytics and transparency. Based on an analysis of EPA and EIA data as well as data provided by the Rhodium Group, where noted, the findings quantify for the first time how over the past five years — despite continued inaction by Congress — an unprecedented wave of coal plant retirements has yielded deeper economy-wide carbon reductions for 2015 than those laid out in the Waxman-Markey legislation. Moreover, thanks in part to our coal replacement work, US carbon emissions are trending decisively downward, positioning the US power sector well to meet and even exceed the US EPA's carbon pollution standard for power plants, known as the Clean Power Plan, as much as five years ahead of schedule. Taken together, these developments put the US in a strong position to lead by example on the global stage and push for ambitious commitments at the international climate change conference to be held in Paris in December 2015.

CARBON EMISSIONS IN 2015 WILL FALL BELOW WAXMAN-MARKEY TARGET:

With no action from Congress, the Beyond Coal campaign — working at the state and local level with over a hundred partners nationwide — has already helped the US economy

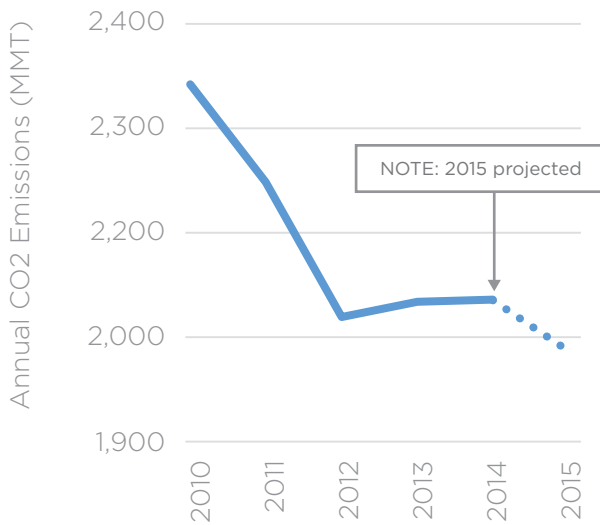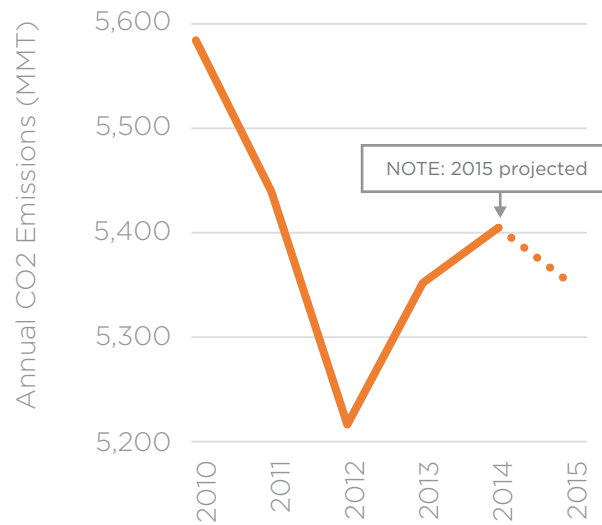## Figure 1A: Electric Power Sector

Figure 1B: All Sectors (Economy-Wide)

cut carbon faster than would have been mandated under the 2009 comprehensive cap-and-trade legislation.

1. The Rhodium Group estimates that 2015 US electric sector carbon emissions will total 1,983 million metric tons (MMT). This is the lowest level of carbon emissions since 1995. See Figure 1A above.

2. The Rhodium Group estimates that 2015 economy-wide emissions will be approximately 5,357 MMT. This is approximately 150MMT below levels for 2015 required by the American Clean Energy and Security Act of 2009 (the Waxman-Markey bill) that Congress failed to adopt. See Figure 1B above.

COAL RETIREMENTS FROM 2010-2015 ARE ACCELERATING US LEADERSHIP, WITH RATE OF 2015 RETIREMENTS OUTSTRIPPING PREVIOUS 20 YEARS:

As a result of our work, buoyed by plummeting clean energy prices, we have secured record coal retirements over the past five years, catapulting the US into a leadership role in transitioning our economy to lower-carbon sources of energy.
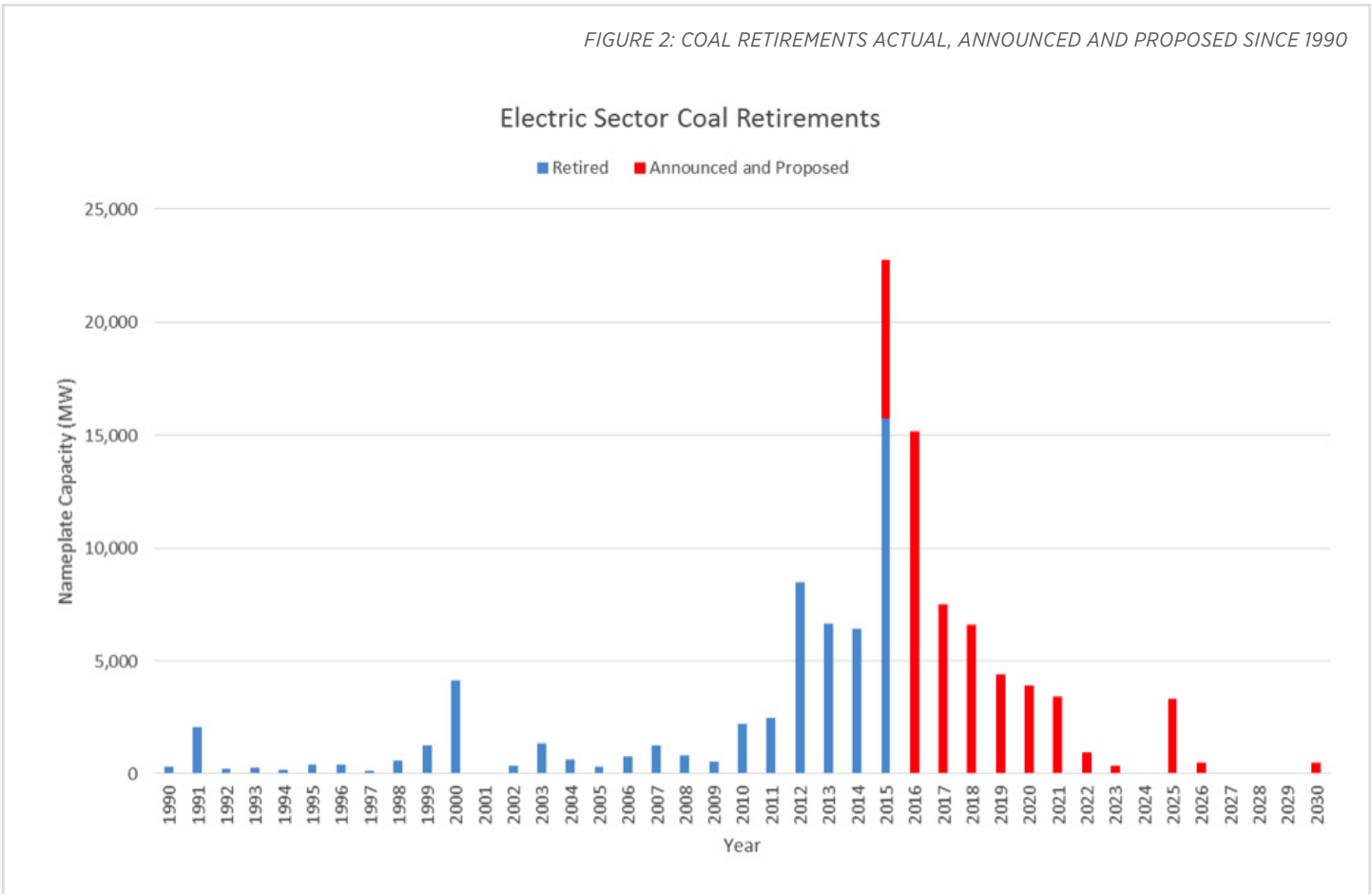
3. In partnership with Bloomberg Philanthropies and our allies, we have helped to retire 41,978 megawatts (MW) of coal-fired electricity generation capacity since 2010, including 15,760 MW thus far in 2015. As illustrated in Figure 2 on the next page, this represents an unprecedented rate of coal retirements in the US power sector. The 2015 coal retirements alone equal as much coal capacity as the US retired in the 20-year period between 1990 and 2009. We project also that another

6,978 MW of coal capacity retires this year, but because of EIA data lags we likely can't confirm this until first quarter 2016. Also important, we have prevented any new coal generating units from breaking ground since 2010.

4. We project that as a result of recent coal retirements, as well as advocacy for related policy measures like efficiency and demand response and market forces including historically low natural gas prices, electric sector coal use in 2015 will be approximately 9 percent lower than in 2014, from 772MMT to 704MMT, pulling coal's share of electric power generation down from 40% to an historic low of 36% this year. In addition, total installed capacity of US coal-fired electric generating units will drop below 300,000MW for the first time in more than two decades.

5. In addition to the 41,978MW retired between 2010 and today, Sierra Club has identified an additional 53,311MW

The 2015 coal retirements alone equal as much coal capacity as the US retired in the 20-year period between 1990 and 2009.

Electric Sector Coal Retirements

■ Retired   ■ Announced and Proposed

THIS CHART SHOWS THE MEGAWATTS OF COAL CAPACITY RETIRED TO DATE PLUS PROJECTED RETIREMENT DATES FOR UNITS ANNOUNCED OR PROPOSED RETIREMENTS INCLUDED IN A UTILITY'S RESOURCE PLANS. SOURCES: SIERRA CLUB, EIA.

of coal generation that has announced to retire or proposed to retire in a utility's resource plan as of November 1, 2015.

6. Our 2017 goal is to lock in for retirement and replace with clean energy at least half the US coal fleet — approximately 166,000MW — by no later than 2025. Once we count those coal megawatts already retired, announced, or proposed to retire, only 70,711 MW remain to hit the Beyond Coal campaign's 166,000MW target.
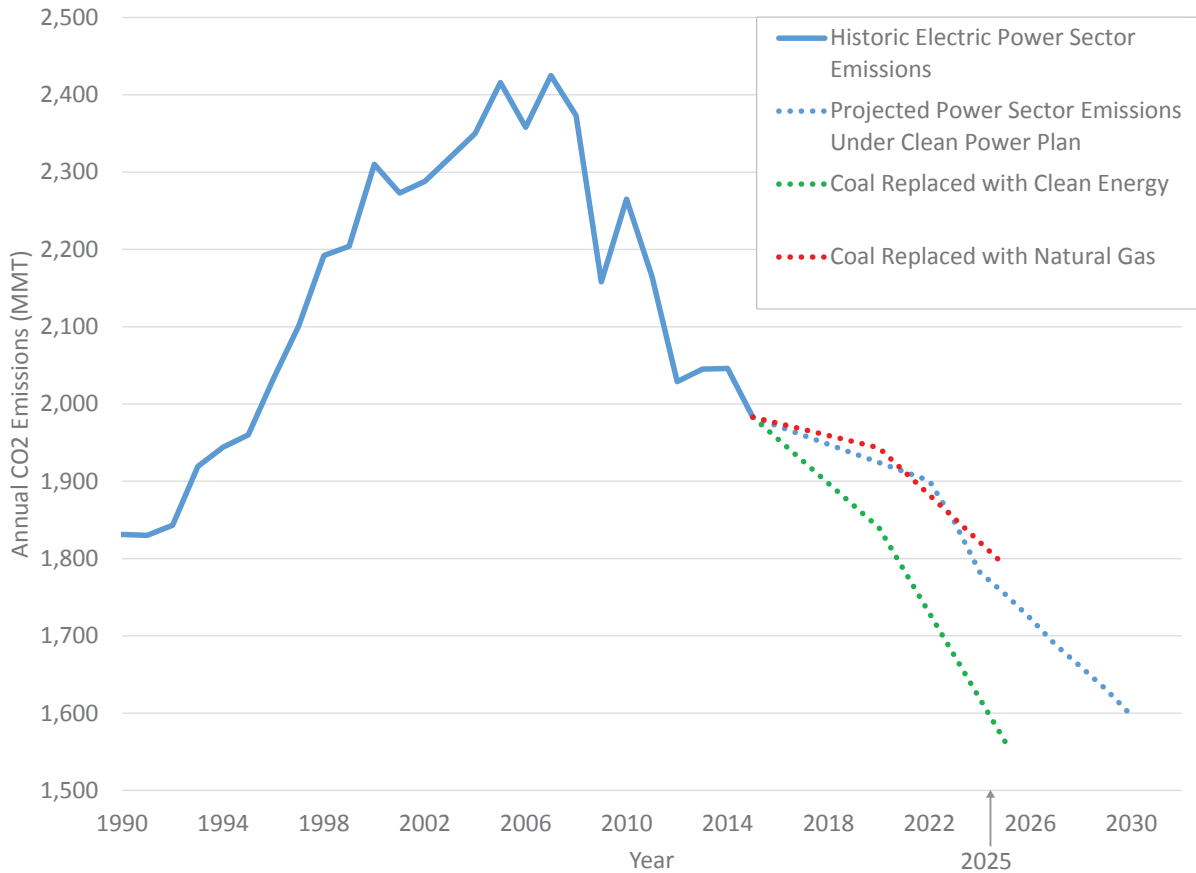
EXPECTED COAL RETIREMENTS WILL ACCELERATE PROGRESS TOWARDS CLEAN POWER PLAN AND PARIS INDC TARGETS:

7. Coal retirements are helping to deliver on the Clean Power Plan, the centerpiece of US climate leadership on the international stage at December's climate change conference in Paris. By locking in coal retirements early and replacing their capacity with cleaner fuels, we are helping to prove that more ambitious climate action is possible.

8. The recently finalized EPA rules establishing carbon emissions standards for existing power plants, known

as the Clean Power Plan, will, when fully implemented, cut electric sector carbon emissions 32 percent below 2005 levels by 2030. Electric sector carbon emissions in 2005 were 2,416MMT. Based on data provided by the Rhodium Group, 2015 electric sector carbon emissions will be 1,983MMT, 433MMT (approximately 18%) below 2005 levels. This is within 5% of the level

> The coal plants retired since 2010 emitted 128MMT of carbon emissions in 2009, approximately 73 percent of the carbon emission reductions achieved in 2015 over 2009 levels.

FIGURE 3: HISTORICAL AND PROJECTED 2020 AND 2025 ELECTRIC SECTOR CARBON EMISSIONS UNDER CPP AND TWO COAL RETIREMENT SCENARIOS WITH GOAL OF RETIRING HALF THE COAL FLEET

the Clean Power Plan* is estimated to achieve by 2022 (1,901MMT) and 12% of EPA's 2025 CPP projection (1,754MMT).Electric sector carbon emissions in 2015 were 175MMT below 2009 levels. The coal plants retired since 2010 emitted 128MMT of carbon emissions in 2009, approximately 73 percent of the carbon emission reductions achieved in 2015 over 2009 levels.

9. Using a combination of EPA, EIA and Rhodium Group data, we analyzed the carbon emission impacts of replacing one half of the US coal fleet by 2025, under two replacement scenarios: 100% zero-carbon clean energy and 100% natural gas. We find that retiring and replacing with cleaner fuels half the US coal fleet targeted would reduce 2025 carbon emissions to between 1,563MMT and 1,791MMT, depending on the replacement mix. In short, we could accelerate EPA's

2030 CPP target by as much as 5 years depending on whether we replace coal plants likely to retire in the coming years with zero-carbon renewable energy or natural gas.

10. The US pledge to be delivered at this December's international climate change conference in Paris, known as our "Intended Nationally Determined Contribution," consists of a commitment to cut economy-wide carbon emissions 26-28% below 2005 levels, requiring the US to cut carbon emissions by approximately 1,750MMT. If we achieve Beyond Coal's stated goal of retiring and replacing half of the US coal fleet with clean energy, 2025 electric sector carbon emissions will fall by as much as an additional 200MMT below levels projected by the CPP, further helping the US meets its INDC commitments.

* For ease of analysis we used EPA final clean power plan mass based limits for existing and new sources. EPA estimates that electric sector carbon emissions will be no more than 1901MMT in 2022, and 1597MMT in 2030. These numbers include EIA projections of "uncovered sources," sources not counted in EPA's CPP calculations, totaling 43MMT in 2022 and 47MMT in 2030. These sources are primarily small boilers operating as peaking units.