

# Closer than You Think: Latest U.S. CO<sub>2</sub> Pollution Data and Forecasts Show Target Within Reach

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**H**ow about a little good news for a change?

Despite Congress' failure to enact comprehensive energy and climate legislation, surprising, and underappreciated, progress has been made in reducing U.S. carbon dioxide emissions during the last few years. In 2011 U.S. emissions of energy-related carbon dioxide were 8.7 percent below 2005 levels despite a 5.5 percent increase in the size of our economy. This remarkable result is due primarily to reduced reliance on coal-fired power plants and increased passenger vehicle efficiency, driven by a combination of policy and market forces. The forecast for 2020, assuming extensions to existing policies that can be reasonably anticipated, is for a further reduction to 10.5 percent below 2005 levels. This contrasts sharply with the forecast made by the Energy Information Agency 7 years ago that emissions would increase by 25 percent between then and 2020, and it puts the 17 percent reduction target embraced by President Obama squarely within reach.

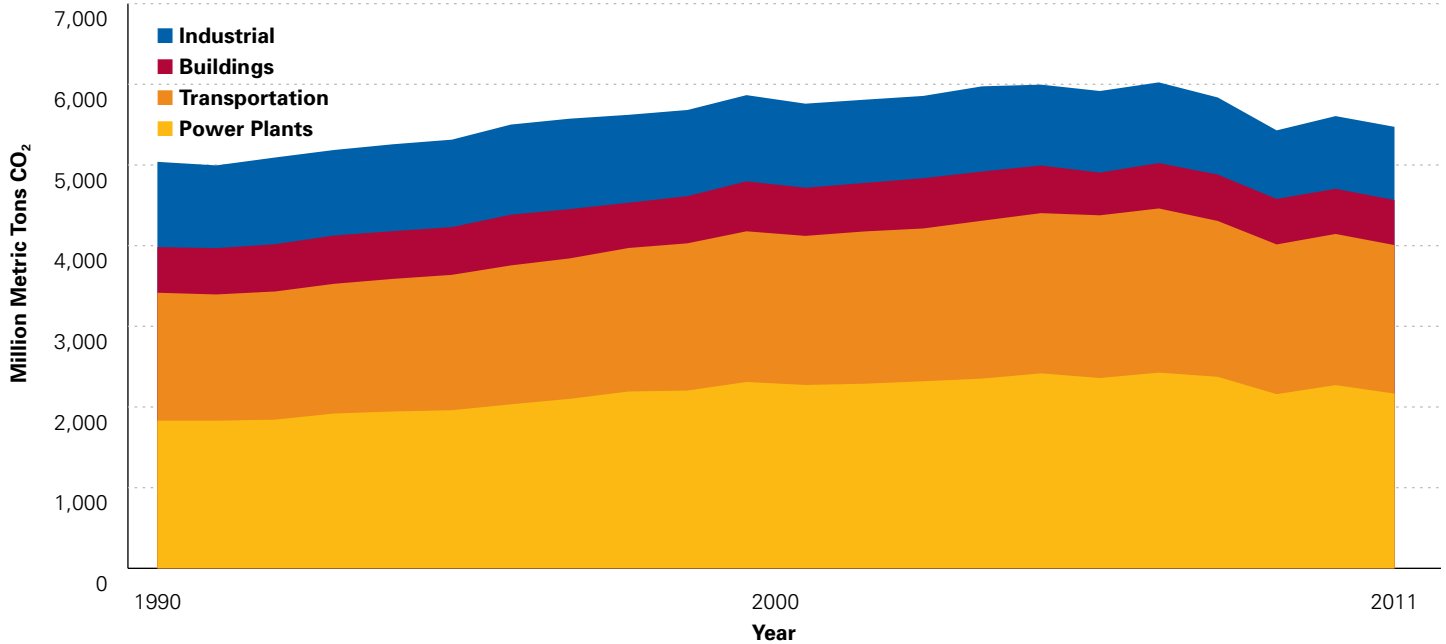
## RECENT TRENDS

U.S. energy-related CO<sub>2</sub> emissions were 5473 million metric tons in 2011, 2.4 percent below 2010 levels and 8.7 percent below 2005 levels (see Figure 1).<sup>1</sup> While our economy remains sluggish, these pollution reductions can't be attributed primarily to the recession. The U.S. economy (measured by GDP) grew by 1.7 percent last year and was 5.5 percent larger in 2011 than it was in 2005.<sup>2</sup>

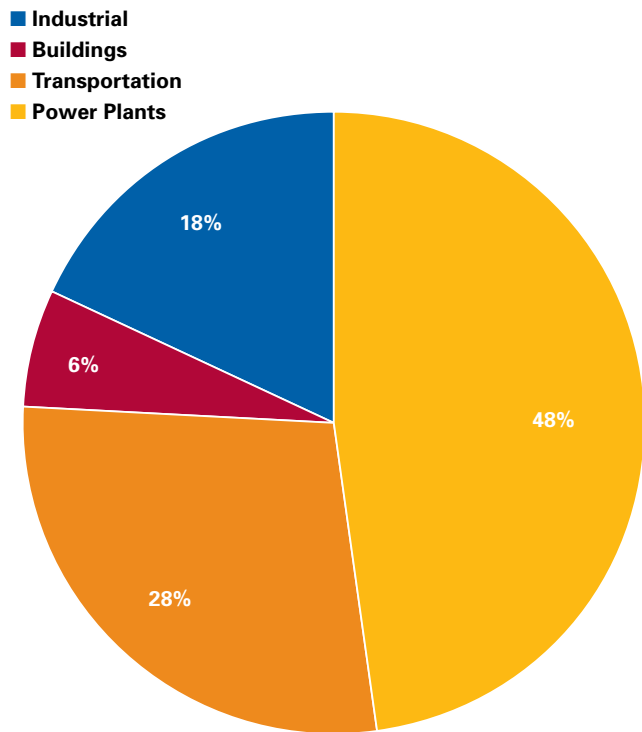
Many factors affect U.S. carbon pollution, and a complete analysis of recent trends is beyond the scope of this issue brief, but Figure 2 reveals that almost half of the emission reductions from 2005 to 2011 came from power plants, followed by the transportation sector at a little more than one-quarter, and the industrial sector (a little less than one-fifth). Residential and commercial buildings contributed the smallest reduction, accounting for 6 percent of the

total. (All figures cited here are measured in terms of direct emissions; had power plant emissions been attributed to the end-use sector where the electricity was consumed the share of reductions attributable to the buildings and industrial sectors would have been much higher). Total electricity consumption during this period increased by 1.2 percent, implying that the 10.4 percent reduction in emissions from the electric sector is attributable to increased reliance on lower-emitting generation sources. At the same time, had electricity consumption increased by 2 percent per year, as had been forecast, instead of less than 2 percent total, these emission reductions would not have materialized. Similarly, the total number of miles driven in 2011 was approximately 2 percent lower than it was in 2005, indicating that improved vehicle efficiency was the primary factor contributing to the 7.3 percent reduction in emissions from the transportation sector during this period.<sup>3</sup>

**Figure 1: Energy-Related CO<sub>2</sub>, 1990-2011** (direct emissions)



**Figure 2: Share of 2005-2011 Emission Reductions**  
(Total 524 Million Metric Tons CO<sub>2</sub>)

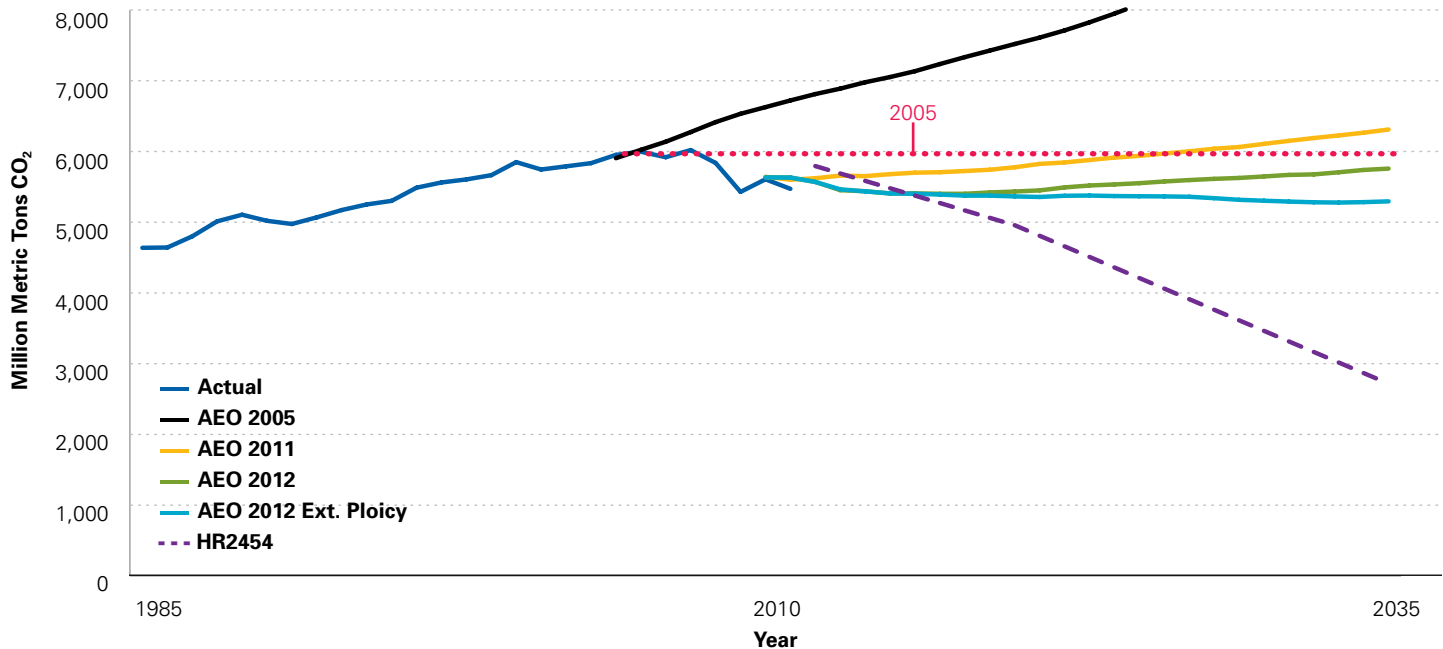


### IMPROVING FORECASTS

Looking forward, the official forecast for 2020—assuming no new policies—is now for carbon emissions to be 9.4 percent lower than they were in 2005.<sup>4</sup> This is a huge contrast to the forecast made by EIA just seven years ago: the AEO 2005 projected that emissions would increase by 25 percent between then and 2020.

The Annual Energy Outlook also includes an “Extended Policies” case, which could be considered a better representation of the current “business-as-usual” baseline. This case assumes implementation of the 2017-2025 vehicle standards proposed jointly by EPA and the Department of Transportation and extension of tax credits for various renewable fuels and technologies. This case also assumes that the Department of Energy continues to update energy efficiency standards for appliances as required by law and consistent with the Department’s strategic plan. (This case does not assume carbon pollution standards for power plants or other stationary sources). The Extended Policies case results in CO<sub>2</sub> emissions 1.3 percent lower than the Reference case in 2020 and 8 percent lower in 2035. Relative to 2005, U.S. carbon pollution emissions are 10.5 percent lower in 2020 and 11.7 percent lower in 2035 in this scenario.

**Figure 3: Energy-Related CO<sub>2</sub>, Actual and EIA Annual Energy Outlook Projections (1985-2035)**



Effective implementation of the Clean Air Act has the potential to achieve substantial additional emission reductions, allowing the U.S. to meet or exceed the goal of reducing emissions by 17 percent from 2005 levels by 2020 embraced by President Obama. This would require reducing emissions to 7.6 percent below the Extended Policies case trajectory, or a little over 400 million metric tons.

Federal performance standards for existing power plants under the Clean Air Act provide the largest opportunity to reduce emissions relative to the Extended Policies case in the absence of new legislation. The Extended Policies case projects that power plants will emit just over 2 billion metric tons of CO<sub>2</sub> in 2020, meaning that a 20 percent reduction from that level would hit the target. That could be accomplished by a 10 percent reduction in electricity demand or by increasing reliance on renewable sources of electricity by 10 percentage points (i.e., from 14 percent of total generation in the Extended Policies case to 24 percent of total generation), or a combination of these measures, assuming these gains were all used to reduce generation from high-emitting coal-fired power plants.

Many other emission reduction opportunities are also available, from increasing deployment of Combined Heat and Power systems in industry, to installing solar systems on school roofs, and shifting toward electricity to drive our transportation system. The emission reductions achieved to date and the downward shift in the forecast just begin to scratch the surface of what's possible.

## WHAT CHANGED?

Fully decomposing the dramatic change in recent trends and the carbon pollution forecast is beyond the scope of this Issue Brief, but the major drivers include fuel markets, technology, and policy.

**Fuel markets.** Gasoline prices are up (33 percent from 2005 to 2011) and natural gas prices are down (50 percent for the average cost of natural gas used to generate electricity over the same period).<sup>5</sup> These trends are related because a significant amount of natural gas production is now being driven by the search for more valuable natural gas liquids, which follow oil prices. Somewhat counter-intuitively both of those factors actually decrease emissions.

- More than 70 percent of oil is used in transportation, and higher gasoline prices reduce the number of miles people travel and encourage them to select more efficient vehicles.
- Meanwhile, an increasing share of natural gas is used to generate electricity, where low prices encourage power producers to switch from coal to natural gas, reducing CO<sub>2</sub> emissions (while increasing methane emissions in natural gas production and transmission). Low natural gas prices can also reduce electricity rates and encourage greater electricity consumption and less investment in renewables, which would tend to drive up emissions, but due to strong energy efficiency and renewable energy policies the coal-to-gas switching effect has the biggest impact on EIA's latest forecast.

**Technology.** The cost of building coal plants is up,<sup>6</sup> while the cost of wind<sup>7</sup> and solar<sup>8</sup> are coming down. Moreover, advances in energy efficiency technology, such as L.E.D. lighting<sup>9</sup> and super windows,<sup>10</sup> keep replenishing the low hanging efficiency fruit.

**Policy.** Although Congress failed to pass comprehensive energy and climate legislation, the Obama administration has forged ahead using its existing authority to set strong efficiency standards for automobiles<sup>11</sup> and appliances,<sup>12</sup> and strong clean air standards<sup>13</sup> which will reduce mercury, sulfur, nitrogen and carbon emissions from power plants. Meanwhile the states are continuing to lead, with renewable energy standards in 29 states<sup>14</sup> and increasingly effective energy efficiency programs<sup>15</sup> spreading to all regions of the country. In addition, California has finalized its global warming pollution cap<sup>16</sup> and the Northeast is in the process of tightening up its cap<sup>17</sup> on carbon pollution from power plants.

## OTHER GLOBAL WARMING POLLUTANTS

This issue brief focuses on energy-related carbon dioxide emissions, which are responsible for about 85 percent of U.S. global warming pollution, and for which we have the most up-to-date data and detailed forecasts. Emissions of other global warming pollutants, particularly methane and hydrofluorocarbons (HFCs) should not be ignored.

The official inventory of total U.S. global warming pollution is currently only available through 2010 and shows that total global warming pollution, expressed in carbon dioxide equivalents, fell by 5.5 percent between 2005 and 2010.<sup>18</sup> This is less than the reduction in energy-related CO<sub>2</sub> during this period because emissions of both methane and HFCs had increased.

## Endnotes

- 1 EIA Monthly Energy Review, June 27, 2012.
- 2 Bureau of Economic Analysis. <http://www.bea.gov/iTable/iTable.cfm?ReqID=9&step=1>, accessed July 1, 2012.
- 3 Multi-modal Transportation Indicators, June 2012, [http://www.bts.gov/publications/multimodal\\_transportation\\_indicators/](http://www.bts.gov/publications/multimodal_transportation_indicators/).
- 4 EIA Annual Energy Outlook 2012, June 25, 2012.
- 5 <http://www.eia.gov/totalenergy/data/monthly/>.
- 6 [http://www.eia.gov/forecasts/aeo/er/early\\_elecgen.cfm](http://www.eia.gov/forecasts/aeo/er/early_elecgen.cfm).
- 7 <http://eetd.lbl.gov/ea/ems/reports/lbnl-5119e.pdf>.
- 8 [http://www.pv-tech.org/guest\\_blog/pv\\_module\\_costs\\_and\\_prices\\_what\\_is\\_really\\_happening\\_now\\_5478](http://www.pv-tech.org/guest_blog/pv_module_costs_and_prices_what_is_really_happening_now_5478).
- 9 [http://switchboard.nrdc.org/blogs/nhorowitz/jobs\\_technology\\_revolution\\_in.html](http://switchboard.nrdc.org/blogs/nhorowitz/jobs_technology_revolution_in.html).
- 10 [http://switchboard.nrdc.org/blogs/lburt/doe\\_paves\\_the\\_way\\_for\\_super\\_ef.html](http://switchboard.nrdc.org/blogs/lburt/doe_paves_the_way_for_super_ef.html).
- 11 [http://switchboard.nrdc.org/blogs/rhwang/545\\_mpg\\_and\\_the\\_rebirth\\_of\\_the.html](http://switchboard.nrdc.org/blogs/rhwang/545_mpg_and_the_rebirth_of_the.html).
- 12 [http://switchboard.nrdc.org/blogs/kkennedy/after\\_the\\_earthquake\\_and\\_befor.html](http://switchboard.nrdc.org/blogs/kkennedy/after_the_earthquake_and_befor.html).
- 13 [http://switchboard.nrdc.org/blogs/fbeinecke/obama\\_says\\_he\\_stands\\_by\\_the\\_ep.html](http://switchboard.nrdc.org/blogs/fbeinecke/obama_says_he_stands_by_the_ep.html).
- 14 <http://www.dsireusa.org/rpsdata/index.cfm>.
- 15 <http://aceee.org/sector/state-policy/scorecard>.
- 16 [http://switchboard.nrdc.org/blogs/kgrenfell/10\\_questions\\_about\\_californias.html](http://switchboard.nrdc.org/blogs/kgrenfell/10_questions_about_californias.html).
- 17 [http://switchboard.nrdc.org/blogs/dbryk/refining\\_rggi\\_states\\_are\\_helpi.html](http://switchboard.nrdc.org/blogs/dbryk/refining_rggi_states_are_helpi.html).
- 18 <http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html>.
- 19 <http://www.eeb.cornell.edu/howarth/Howarth%20et%20al.%20-%20National%20Climate%20Assessment.pdf>.
- 20 <http://www.nrdc.org/energy/leaking-profits.asp>.
- 21 [http://switchboard.nrdc.org/blogs/ddoniger/cooling\\_with\\_less\\_warming\\_time.html](http://switchboard.nrdc.org/blogs/ddoniger/cooling_with_less_warming_time.html).

Actual methane emissions are quite uncertain and many people believe that they are both undercounted and underweighted in the official inventory.<sup>19</sup> This is particularly important because some of the CO<sub>2</sub> emission reductions discussed here could come at the expense of increased methane emissions if coal-fired power plants are replaced by natural gas-fired plants (which have lower CO<sub>2</sub> emissions) and methane leaks from the natural gas system are not adequately addressed (methane is the primary constituent of natural gas). Fortunately, there are many cost-effective opportunities which could reduce methane leaks from the oil and gas system by more than 80 percent, as documented in NRDC's *Leaking Profits* report.<sup>20</sup>

Emissions of HFCs only account for 2 percent of total U.S. global warming pollution, but they are increasing because these chemicals are being used to replace ozone-depleting HCFCs. Better alternatives exist and, once again, sound policies could reverse this trend.<sup>21</sup>

## CONCLUSION

It's good news that U.S. emissions of carbon dioxide are, at long last, on a downward trajectory. The new "business as usual" forecast for 2020 calls for about a 10 percent reduction from 2005 levels. That's not enough to be sure, but it puts the 17 percent reduction target embraced by President Obama squarely within reach. With strong standards to reduce carbon pollution from power plants, a robust drive to capture the full range of energy efficiency opportunities, and effective measures to reduce emissions of methane and other heat-trapping gases, we can meet and exceed this goal and get on track to the deep emission reductions we need to protect our health and environment from the worst consequences of climate change.

