



THE U.S. GREENHOUSE GAS REDUCTION TARGETS

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The United States has proposed greenhouse gas (GHG) reduction targets “in the range” of 17 percent by 2020¹ and 26-28 percent by 2025,² relative to 2005 emission levels. The targets suggest an average annual GHG reduction of 1.2 percent from 2005-2020 and 2.3-2.8 percent from 2020-2025.

Importantly, the targets apply to total domestic net GHG emissions. This means that the targets will not be achieved with the use of international offset credits, as was implied in the U.S. pledge made in 2009 in Copenhagen,³ and consequently will require greater reduction efforts throughout the U.S. economy.

In June 2013, President Obama launched his *Climate Action Plan*,⁴ which includes a series of policies and measures to reduce GHG emissions that the United States intends to implement to meet its targets. Although much progress has been made in the implementation of that plan, achievement of the targets will depend on the robust and timely design, adoption, and implementation of additional policy instruments consistent with those reflected in the Plan.

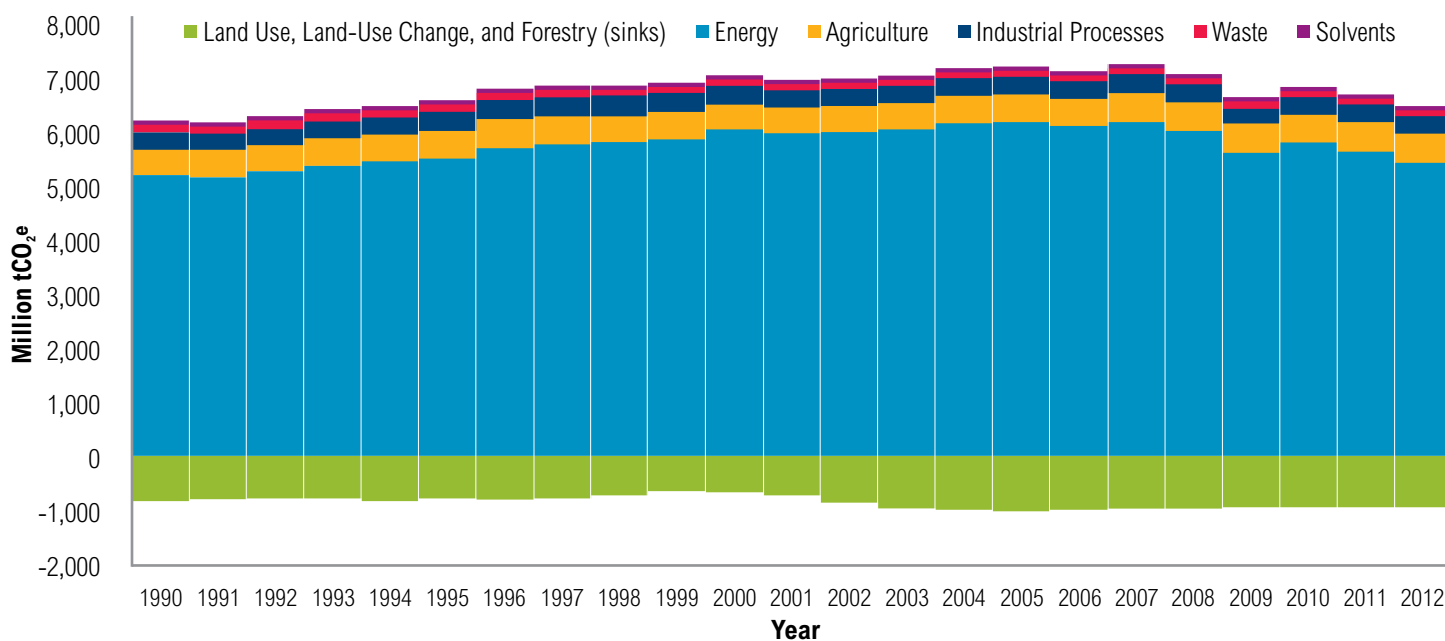
GHG projection scenarios developed by the World Resources Institute (WRI)⁵ suggest that the 2020 and 2025 targets are achievable with aggressive implementation of proposed policies at the federal and state levels. These policies include standards for existing power plants⁶ and other elements of President Obama’s *Climate Action Plan* relating to energy efficiency, hydrofluorocarbons (HFCs), and methane. WRI analysis indicates that, once in place, these policies would continue to drive emission reductions at a similar rate through 2030 and beyond.

This fact sheet provides context for the U.S. targets and a synthesis of WRI and other scenarios that present possible GHG emissions trajectories for the United States, given various assumptions (Tables 1 and 2). Its primary aim is to inform stakeholders engaged in the United Nations Framework Convention on Climate Change (UNFCCC) process.

CONTEXT FOR THE U.S. TARGETS

- The United States accounted for 15 percent of global annual GHG emissions in 2011, making it the world's second largest emitter.⁷ Emissions per person in the United States are also among the highest in the world, at 17 metric tons CO₂-equivalent (tCO₂e)—more than double the world per capita value of approximately 7 tCO₂e.⁸
- According to the latest GHG inventory⁹ submitted to the UNFCCC, in 2012, U.S. net GHG emissions totaled 5.5 billion tCO₂e, more than 10 percent below 2005 levels (Figure 1). However, more recent U.S. Government data¹⁰ suggest that, in 2013 and 2014, emissions from fossil fuels increased compared to 2012 levels.
- Parties to the UNFCCC, including the United States, have agreed to a goal of limiting global warming to 2°C (3.6°F)¹¹—the threshold commonly referenced as necessary to avoid the worst effects of climate change.
- President Obama has already proposed or implemented significant emissions-reduction efforts through executive authorities under existing laws, which do not require new legislative action. These include emissions standards for new and existing power plants,¹² fuel-economy standards for light-duty and heavy-duty vehicles,¹³ and efficiency standards for buildings and appliances.
- Challenges remain. In some key areas, such as the proposed standards for power plants, states will have to develop implementation plans to meet the standards. While the Administration's actions are based on existing legal authorities and do not require congressional approval, they will probably face court challenges that could slow progress. In addition, the recent election means that Congress is likely to pass legislation to slow or stop climate action, but President Obama has promised to veto such legislation to prevent it from becoming law.¹⁴
- In the years to come, the United States will need to overcome these and other challenges to meet or exceed its GHG reduction targets and to achieve an emissions pathway consistent with a 2°C goal.

Figure 1 | U.S. Greenhouse Gas Emissions by Sector: 1990–2012



Source: Based on a figure from U.S. Department of State. 2014. First Biennial Report of the United States of America. Available at: <http://www.state.gov/documents/organization/219039.pdf>. Data are from the 2014 U.S. National Inventory Submission to the UNFCCC. Available at: http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8108.php.

U.S. GHG EMISSIONS SCENARIOS

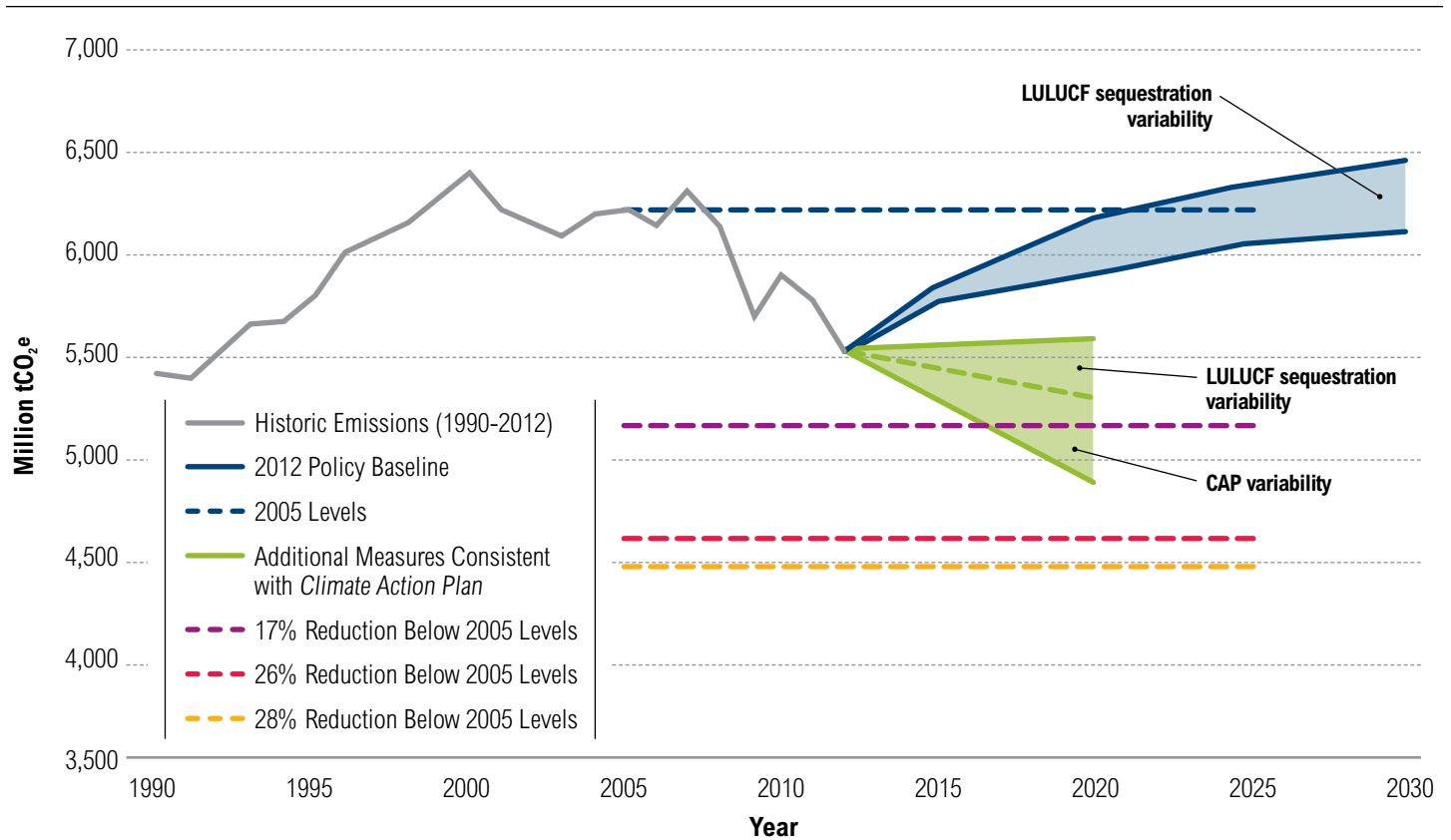
U.S. Government Scenarios

The most recent GHG emissions scenarios published by the U.S. Government are taken from the *2014 United States Climate Action Report*¹⁵ and cover all major greenhouse gases¹⁶ and economic sectors.

■ In the 2012 Policy Baseline scenario, GHG emissions levels are projected to be between -4.5 percent and 0.1 percent in 2020 and between -2.4 percent and 3.2 percent in 2025, relative to 2005 levels—significantly above the levels implied by the U.S targets.¹⁷

■ The 2012 Policy Baseline, however, does not include policies adopted after September, 2012. Therefore, this scenario excludes important recent policy announcements, including the proposed standards for new and existing power plants and other elements of the President’s *Climate Action Plan*. According to U.S. Government scenarios, the 17 percent target for 2020 is achievable, albeit with uncertainty,¹⁸ assuming the full implementation of policies consistent with the *Climate Action Plan* (Figure 2).

Figure 2 | **U.S. Emissions Projections—2012 Policy Baseline Compared with Potential Reductions from Additional Measures Consistent with the *Climate Action Plan***



Source: Based on data and a figure from U.S. Department of State. 2014. First Biennial Report of the United States of America. Available at: <http://www.state.gov/documents/organization/219039.pdf>.

Notes: Figure 2 “shows the range of projected emissions for both (1) the 2012 Policy Baseline scenario (in blue), which assumes that no additional measures are implemented after 2012; and (2) a scenario (in green) that incorporates post-2012 implementation of Additional Measures Consistent with the Climate Action Plan. The range (in blue) for the 2012 Policy Baseline scenario reflects variability in projected net sequestration rates from land use, land-use change, and forestry (LULUCF), much of which will be determined by factors that cannot be directly influenced by policies and measures. The range (in green) for the Additional Measures Consistent with the Climate Action Plan scenario reflects both LULUCF sequestration variability, as well as uncertainty regarding projected emission reductions from measures that will be implemented consistent with the Climate Action Plan. The dotted line delineates the share of projected variability that is attributable to LULUCF and the Climate Action Plan, respectively. Specifically, the portion labeled “CAP variability” illustrates the range of emission outcomes that can be directly influenced by implementation of the Climate Action Plan, assuming best-case LULUCF sequestration outcomes. The LULUCF sequestration variability ranges are identical in both scenarios.” (U.S. Department of State. 2014. <http://www.state.gov/documents/organization/219039.pdf>.) For all scenarios, WRI has linearly interpolated between available data points.

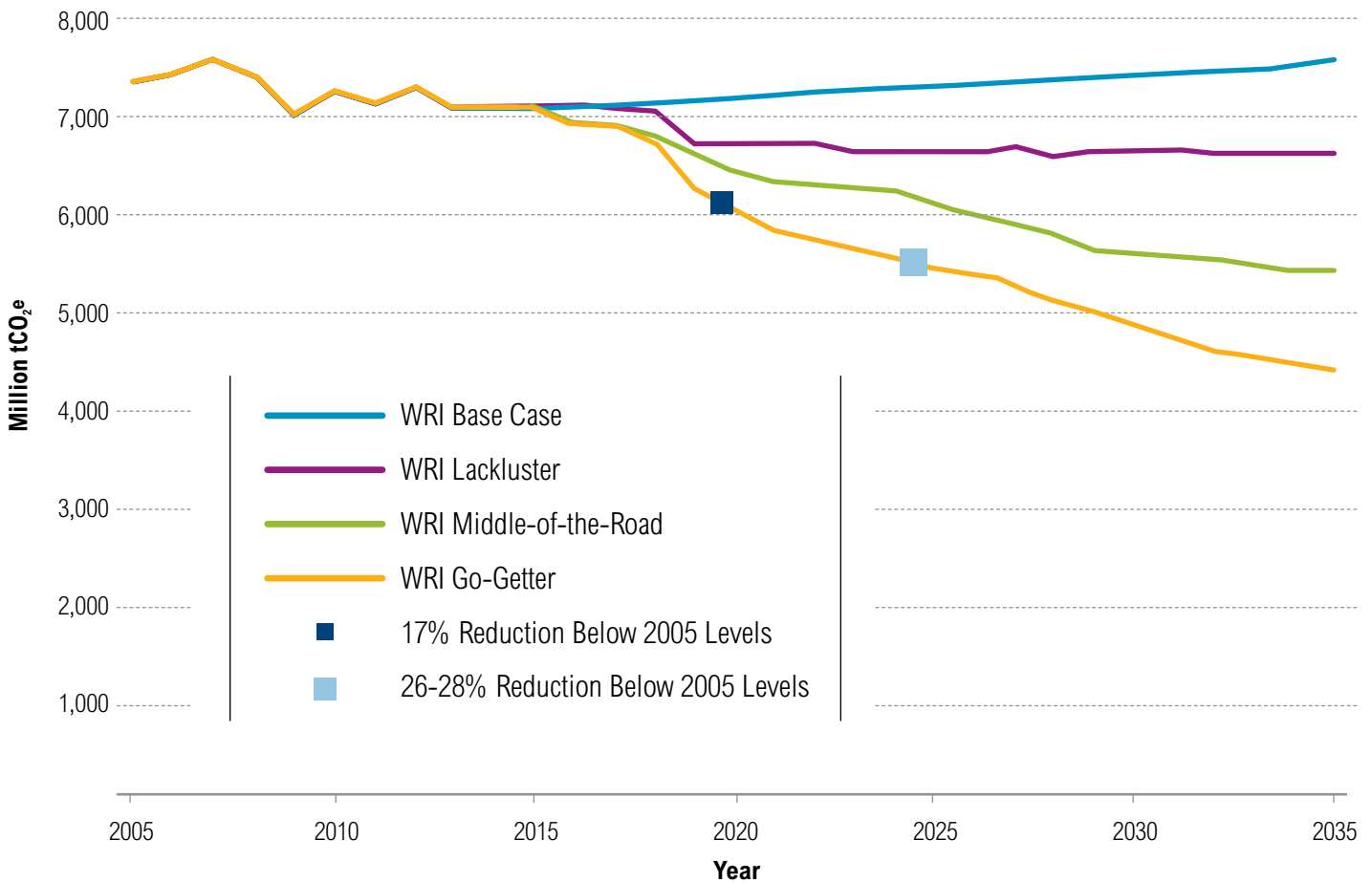
WRI Scenarios

WRI GHG emissions scenarios were published in the report, *Can the U.S. Get There from Here?*¹⁹ The scenarios cover all major greenhouse gases and economic sectors, with the exception of emissions sequestration by the land use, land-use change, and forestry sector. WRI’s analysis therefore considers gross GHG emissions totals, rather than net GHG emissions.

- WRI’s analysis demonstrates that meeting the U.S. targets is achievable using existing executive authorities (that is, without congressional action and new federal legislation) but requires ambitious action across many sectors of the economy.

- WRI’s analysis identifies four areas²⁰ with great potential for emissions reductions—power plants, energy efficiency, hydrofluorocarbons (HFCs), and methane—all of which are included in the President’s *Climate Action Plan*. Implementation processes in some of these areas—for example, new and existing power plant standards—are already underway, but additional federal and state actions will be required to move U.S. GHG emissions from the current “Base Case” trajectory to a more ambitious “Go-Getter” trajectory that achieves the targets (Figure 3).²¹

Figure 3 | **WRI GHG Emissions Scenarios for the United States Absent New Congressional Legislation**



Source: Adapted from WRI. 2013. *Can the U.S. Get There from Here?* Available at: <http://www.wri.org/publication/can-us-get-there-here>.

Notes: Totals exclude emissions sequestration from the land use, land-use change, and forestry sector and calculations of target levels are based on gross (rather than net) emissions totals.

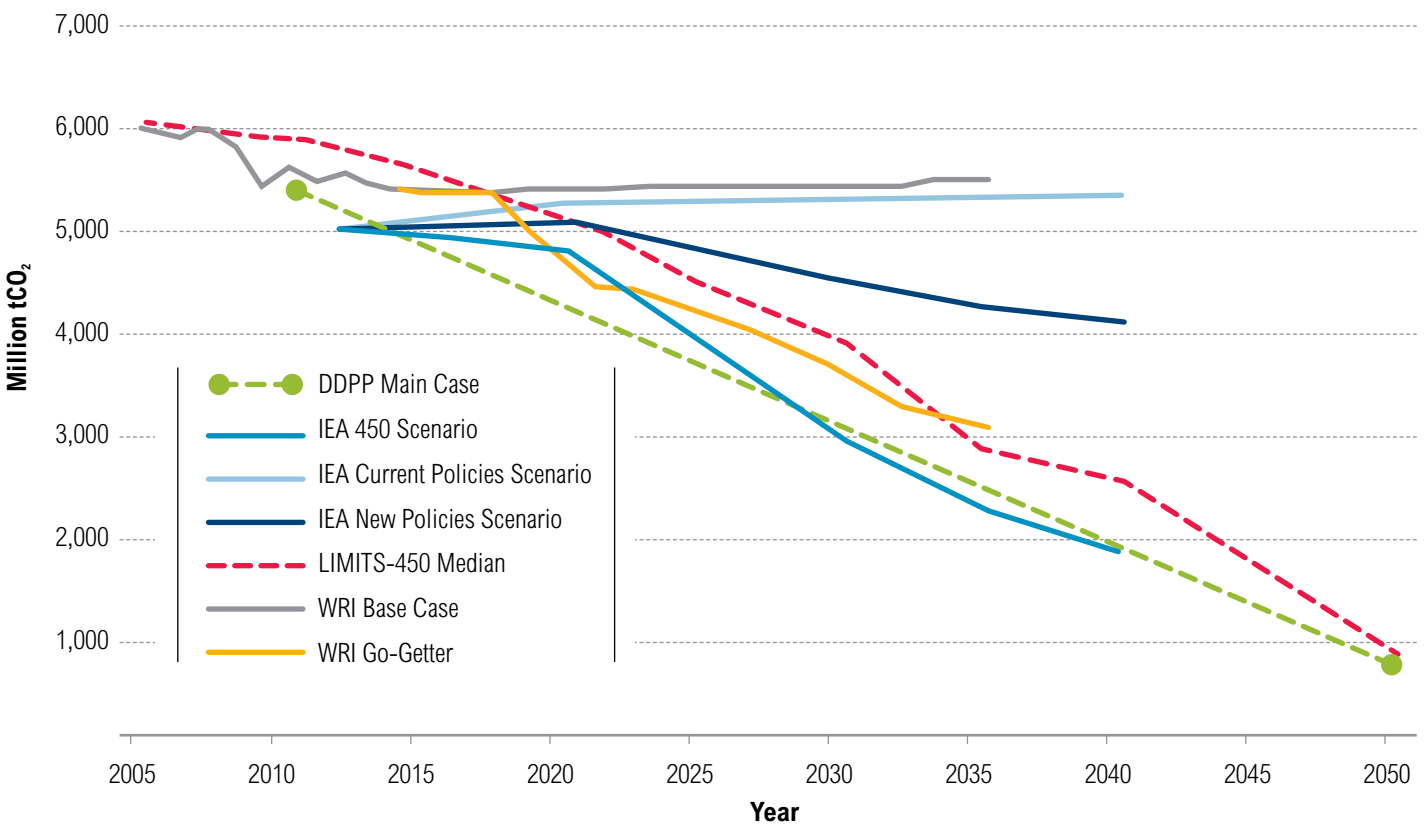
Scenarios Consistent with 2°C

A global temperature increase of 2°C (3.6°F) is the commonly accepted threshold for avoiding the worst effects of climate change. Limiting global warming to 2°C has been agreed to as a global goal by all Parties to the UNFCCC, including the United States. The scenarios considered here that are consistent with the 2°C threshold are based on achieving GHG mitigation at the lowest cost²² and they cover carbon dioxide (CO₂) emissions from the energy sector only.

- Least-cost U.S. emissions scenarios that achieve sufficient GHG reductions to limit global temperature rise to 2°C assume, for example, a price on carbon is implemented in the United States by 2020, causing emissions to decline rapidly over the next several decades (Figure 4).

- It will therefore take significant additional actions over the coming years—for example, actions more ambitious than those quantified in the International Energy Agency’s (IEA) “New Policies” scenario or even WRI’s “Go-Getter” scenario—if the United States is to achieve a long-term trajectory consistent with 2°C.

Figure 4 | Comparison of Policy and 2°C Scenarios for the United States (Energy CO₂ only)



Sources: IEA. 2014. World Energy Outlook 2014. Available at: <http://www.worldenergyoutlook.org/>; IIASA. 2014. LIMITS Scenarios Database. Available at: <https://tntcat.iiasa.ac.at/LIMITSDB/>; SDSN and IDDRI. 2014. Pathways to Deep Decarbonization. Available at: http://unsdsn.org/wp-content/uploads/2014/09/DDPP_Digit_updated.pdf; WRI. 2013. Can the U.S. Get There from Here? Available at: <http://www.wri.org/publication/can-us-get-there-here>.

Notes: In the chart, the “450” label refers to 450 parts per million – generally accepted as the atmospheric concentration level of CO₂ consistent with limiting global warming to 2°C. The DDPP scenario provides values for 2010 and 2050 only – a linear interpolation between these two data points has been added for presentation purposes. The LIMITS-450 Median line represents the median values of 450 parts per million (2°C) scenarios produced by seven different models as part of the LIMITS research effort.

Table 1 | **GHG Scenarios and Selected Assumptions Referenced in This Fact Sheet**

SOURCE	SCENARIO	SELECTED ASSUMPTIONS
U.S. GOVERNMENT SCENARIOS		
UNFCCC	2012 Policy Baseline Scenario	<ul style="list-style-type: none"> ■ Takes into account only those policies adopted before September, 2012 ■ Includes, for example, efficiency and emission standards for cars and trucks, existing appliance efficiency standards and programs, state renewable energy portfolio standards, and federal air standards for the oil and natural gas industry
UNFCCC	<i>Climate Action Plan Scenario</i> ²³	<ul style="list-style-type: none"> ■ Energy CO₂ estimates “are based on a range of potential actions...but do not explicitly measure projected emission reductions from specific rules, standards, and other efforts laid out in the <i>Climate Action Plan</i> but not yet implemented” ■ HFC estimates “are based on analysis conducted by the Environmental Protection Agency (EPA) for a proposal for a global commitment to phase down production and consumption of HFCs under the Montreal Protocol” ■ Methane (CH₄) estimates are based on “applying the CH₄ marginal abatement cost (MAC) curve from the EPA report, <i>Global Mitigation of Non-CO₂ Greenhouse Gases</i>, to the baseline CH₄ emissions projections”
WRI SCENARIOS (DETAILS ON NEXT PAGE)		
WRI	Base Case	<ul style="list-style-type: none"> ■ Incorporated federal policies during 2010-12 include: <ul style="list-style-type: none"> • EPA and National Highway Traffic Safety Administration (NHTSA) standards for fuel economy and GHG emissions standards for passenger cars and light-duty trucks in 2012 and heavy-duty vehicles in 2011 • Department of Energy (DOE) energy efficiency standards for new appliances between 2009-2011 • EPA non-GHG regulations for power plants • EPA regulation in natural gas system emissions in 2012 ■ Projection assumes no new policies after 2010-2012 federal policies
WRI	Lackluster	<ul style="list-style-type: none"> ■ Represents results of actions of lowest cost or least optimistic technical achievement
WRI	Middle-of-the-Road	<ul style="list-style-type: none"> ■ Represents results of actions of moderate cost and moderately optimistic technical achievement
WRI	Go-Getter	<ul style="list-style-type: none"> ■ Highest ambition achievable without new congressional action. Represents results of actions of higher cost or most optimistic technical achievement
IEA AND 2°C /450PPM SCENARIOS (CO₂ ONLY)		
IEA	Current Policies Scenario	<ul style="list-style-type: none"> ■ State-level renewable portfolio standards that include the option of using energy efficiency as a means of compliance ■ Regional Greenhouse Gas Initiative (RGGI) ■ State-wide cap-and-trade scheme in California with binding commitments
IEA	New Policies Scenario	<ul style="list-style-type: none"> ■ Implementation of Clean Power Plan (CO₂ emissions reduction from the power sector of 30 percent by 2030 compared with 2005 levels) ■ Cautious implementation of carbon pollution standards on new power plants ■ Shadow price of carbon assumed from 2015, affecting investment decisions in power generation capacity ■ Extension and strengthening of support for renewables and nuclear, including loan guarantees ■ Corporate Average Fuel Economy (CAFE) standard of 54.5 miles per gallon for Passenger Light-Duty Vehicles (PLDVs) by 2025 ■ Renewable Fuel Standard
IEA	450 Scenario	<ul style="list-style-type: none"> ■ 17 percent reduction in GHG emissions by 2020 compared with 2005 achieved ■ CO₂ pricing implemented from 2020
LIMITS (7 Models)	LIMITS-450 ²⁴	<ul style="list-style-type: none"> ■ A harmonized global carbon tax is assumed from 2012 ■ No resource sharing or effort sharing are assumed
DDPP	“Main Case”	<ul style="list-style-type: none"> ■ Highly efficient end use of energy in buildings, transportation, and industry ■ Decarbonization of electricity, pipeline gas and liquid fuels ■ Fuel switching of end uses from high-carbon to low-carbon supplies

Table 2 | **WRI GHG Scenario Assumptions in Detail**

SCENARIO	SECTOR ASSUMPTIONS			
	POWER SECTOR	ENERGY EFFICIENCY	HFC CONSUMPTION	METHANE FROM NATURAL GAS SYSTEMS
LACKLUSTER	<ul style="list-style-type: none"> Existing plants: 5 percent improvement in efficiency starting 2018. New plants: 1,000 pounds of CO₂/MWh output through 2020. Beginning in 2020, new unit performance improves to 570 pounds CO₂/MWh by 2030. 	<ul style="list-style-type: none"> 192 TWh savings by 2025 from residential and commercial sectors, plus additional savings from the industrial sector. Annual savings remain constant through 2035. 	<ul style="list-style-type: none"> Consumption ramps down three years later (commencing 2019 instead of 2016) than agreed in the joint North American Proposal. 	<ul style="list-style-type: none"> 26 percent emissions reductions from BAU starting 2019. Assumes implementation of plunger lift systems to reduce emissions from liquids unloading at new and existing wells, and leak monitoring and repair to reduce fugitive emissions from production, processing, and compressor stations.
MIDDLE-OF-THE-ROAD	<ul style="list-style-type: none"> Existing plants: Aggregate emissions reductions across all electric generators equal to 18 percent reduction by 2021 compared to 2012, 33 percent reduction by 2035. New plants: Standards initially consistent with the lackluster scenario. Beginning in 2028, new units achieve emissions rates equivalent to carbon capture and storage (CCS) with a 90 percent capture rate. 	<ul style="list-style-type: none"> 212 TWh savings by 2025, 306 TWh savings by 2035 from the residential and commercial sectors, plus additional savings from the industrial sector. 	<ul style="list-style-type: none"> Consumption ramps down consistent with joint North American Proposal, achieving 85 percent reduction below 2005-2008 level by 2033. 	<ul style="list-style-type: none"> 37 percent emissions reductions from BAU starting 2019. Assumes implementation of measures in lackluster scenario and conversion of existing high-bleed pneumatic controllers to low-bleed or no-bleed controllers to reduce emissions from production, processing and transmission.
GO-GETTER	<ul style="list-style-type: none"> Existing plants: Aggregate emissions reductions across all electric generators equal to 38 percent reduction by 2021 compared to 2012, 74 percent reduction by 2035. New plants: Standards initially consistent with the lackluster scenario. Beginning in 2020, new units achieve emissions rates equivalent to CCS with a 90 percent capture rate. 	<ul style="list-style-type: none"> 364 TWh savings by 2025, 525 TWh by 2035 from the residential and commercial sectors, plus additional savings from the industrial sector. 	<ul style="list-style-type: none"> Consumption ramps down more rapidly than in joint North American Proposal, achieving 85 percent reduction by 2028 (five years earlier). 	<ul style="list-style-type: none"> 67 percent emissions reductions from BAU starting 2019. Assumes implementation of measures of middle-of-the-road scenario, as well as desiccant dehydrators to reduce emission during hydration of wet gas; improved compressor maintenance to reduce emissions during processing; hot taps in maintenance of pipelines during transmission; and vapor recovery units to reduce emissions during storage.

Source: Adapted from WRI. 2013. Can the U.S. Get There from Here? Available at: <http://www.wri.org/publication/can-us-get-there-here>.

ENDNOTES

1. http://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/unitedstatescphaccord_app.1.pdf
2. <http://www.whitehouse.gov/the-press-office/2014/11/11/fact-sheet-us-china-joint-announcement-climate-change-and-clean-energy-c>
3. The U.S. submission to the Copenhagen Accord (http://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/unitedstatescphaccord_app.1.pdf) presented the 2020 target and identified several post-2020 targets in a footnote, including a 30 percent reduction from 2005 levels by 2025. However, these targets were intended to be achieved “in conformity with anticipated U.S. energy and climate legislation.” That legislation, entitled The American Clean Energy and Security Act (also known as the Waxman-Markey Bill), allowed up to a maximum of 1.5 billion tons of international offsets (http://www.wri.org/sites/default/files/uploads/wri_summary_of_aces_0731.pdf) to be used annually within the proposed cap-and-trade program, implying that the targets could be achieved with significantly fewer domestic GHG reductions. Ultimately, The American Clean Energy and Security Act did not become U.S. law.
4. <http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf>
5. World Resources Institute. 2013. Can the U.S. Get There from Here? Available at: <http://www.wri.org/publication/can-us-get-there-here>.
6. Modeling by the U.S. Environmental Protection Agency indicates that the standards, as currently drafted, would reduce carbon dioxide emissions from power plants by 30 percent from 2005 levels by 2030.
7. <http://cait2.wri.org>
8. Per capita emissions for the United States are for 2012 and calculated from the UNFCCC GHG Data, User Defined Indicators website: <http://unfccc.int/di/Indicators.do>. Per capita emissions for the World are for 2011 and are from <http://cait2.wri.org>.
9. http://unfccc.int/ghg_data/ghg_data_unfccc/ghg_profiles/items/4625.php
10. <http://www.eia.gov/environment/>
11. http://unfccc.int/meetings/cancun_nov_2010/meeting/6266.php
12. <http://www2.epa.gov/carbon-pollution-standards/clean-power-plan-proposed-rule>
13. <http://www.nhtsa.gov/fuel-economy>
14. http://www.nytimes.com/2014/11/11/us/politics/republicans-vow-to-fight-epa-and-approve-keystone-pipeline.html?_r=0
15. <http://www.state.gov/documents/organization/219038.pdf>
16. Carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.
17. http://unfccc.int/files/national_reports/biennial_reports_and_iar/submitted_biennial_reports/application/pdf/first_u.s._biennial_report_rev.pdf
18. In addition to the specifics regarding policy design and implementation, the amount of GHG sequestration from the land use, land-use change, and forestry sector presents another important variable that will affect overall emissions reductions. This point is critical because the U.S. targets have been stated in “net” terms.
19. <http://www.wri.org/publication/can-us-get-there-from-here>
20. <http://insights.wri.org/news/2013/02/new-report-identifies-pathways-us-administration-reduce-emissions>
21. An analysis by the Rhodium Group (<http://rhg.com/notes/is-the-us-on-track-epas-clean-power-plan-and-the-us-2020-climate-goal>) produces similar results and finds that “the current gap between the [2020] target and a scenario without additional policy action is too wide to be closed by the [Clean Power Plan] alone. Additional steps to reduce emissions from energy use, methane, and HFCs will be required.”
22. Other considerations besides achieving a GHG emissions target at the lowest cost, such as historic responsibility and per capita emissions, give different results on rates and shares of reductions. For example, a study by EcoEquity and the Stockholm Environment Institute (<http://gdrights.org/wp-content/uploads/2014/11/National-fair-shares1.pdf>) presents illustrative emissions trajectories guided by a range of equity considerations. This analysis reflects much deeper reductions for the United States than the least-cost scenarios (U.S. emissions drop steeply to below 4 billion metric tons of carbon dioxide equivalent in 2025, and the United States would also finance significant mitigation in developing countries).
23. Text cited comes from the U.S. Biennial Report Methodology Appendix: http://unfccc.int/files/national_reports/biennial_reports_and_iar/submitted_biennial_reports/application/pdf/biennial_report_methodologies_appendix.pdf.
24. A benchmark climate policy scenario with a very likely (>70 percent) chance of reaching the 2°C target in 2100.

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ABOUT WRI

WRI is a global research organization that turns big ideas into action at the nexus of environment, economic opportunity and human well-being.

ABOUT OCN

The Open Climate Network (OCN) brings together independent research institutes and stakeholder groups to monitor countries’ progress on climate change. We seek to accelerate the transition to a low-emission, climate-resilient future by providing consistent, credible information that enhances accountability both among and within countries. <http://www.openclimatenetwork.org>

This fact sheet is part of an OCN initiative to inform the post-2020 GHG mitigation goals in Intended Nationally Determined Contributions under the United Nations Framework Convention on Climate Change. The OCN Secretariat, based at the World Resources Institute, is managing this multi-country effort. For more information regarding OCN and/or this initiative, contact openclimate@wri.org.