ACHIEVING THE U.S. 2025 EMISSIONS MITIGATION TARGET

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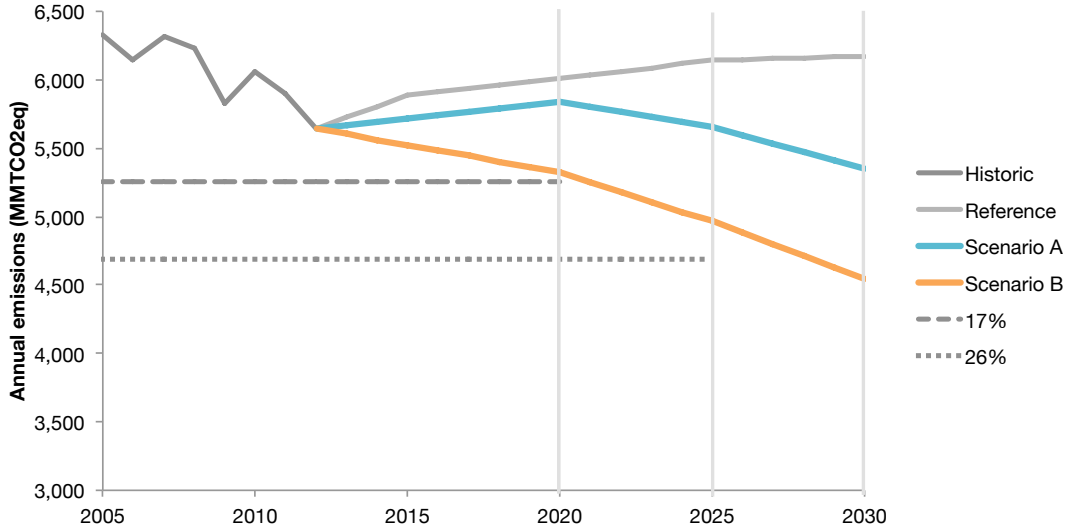
Executive Summary

In November 2014, the United States pledged to lower its greenhouse gas (GHG) emissions by 26%-28% below 2005 levels by 2025. In the months since the release of the target, the question most frequently asked by many following the global climate debate has been: are these reductions achievable? More importantly, can they be attained without new legislative authority—that is, without requiring a divided U.S. Congress to pass new legislation?

In this document, we analyze the suite of existing, proposed and planned policies and examine how close they bring the U.S. to achieving the target range of emissions reductions by 2025. Although the United States has not set a post-2025 target, this analysis is extended through 2030 for consistency with other country pledges.

Our main findings include:

- The suite of recent, proposed and planned regulations pushed forward by the Obama administration could lead to significant reductions in U.S. GHG emissions by 2025—up to 22% below 2005 levels, equivalent to approximately 80% of the needed action. This is within striking distance of achieving the U.S. target with enhanced political will for climate action.
- To achieve the U.S. pledge of reducing emissions 26-28% by 2025, however, the next U.S. President would need to vigorously implement these Obama administration policies as well as propose new emission reduction measures—something that is far from assured given political differences on climate change in the United States currently.
- Weak policy implementation combined with lower-than-expected natural carbon sequestration from U.S. lands, could yield emission reductions in the range of only 11% below 2005 levels by 2025 – far below the U.S. 2025 pledge.
- Other factors are likely to influence the chances of the United States meeting its 2025 emissions reduction goal, including economic growth rates as well as energy prices and demand.



*Note: **Scenario A** represents a "worst case" pathway, resulting from a lower ability of U.S. forests to capture carbon combined with low abatement from domestic action. **Scenario B** represents a "best case" path, with high natural carbon sinks and high emissions reductions from domestic action.*

The U.S. 2025 target: Can it be Achieved and How?

This analysis presents two potential emissions pathways that embody the highest and lowest combinations of two distinct variables (Table 1). The more pessimistic scenario (scenario A) represents a high business-as-usual (BAU) emissions path due to lower ability of U.S. forests to capture carbon (low natural carbon sinks) combined with low abatement from domestic action—potentially as a result of delayed or weak implementation of the Clean Power Plan. The more optimistic scenario (scenario B), on the other hand, includes a low BAU emissions pathway due to high natural carbon sinks as well as high emissions reductions from domestic actions (assuming high emissions reduction from the Clean Power Plan and the production/consumption of HFCs). The methodology for estimating the BAU and potential reductions from domestic actions is described in the following sections.

It is important to note that this analysis is limited only to actions that the Administration has publicly announced. It does not represent the suite of what is possible—but not yet proposed—under existing Executive Branch authority.

Table 1. Scenarios summary

Variables	
Low emissions	BAU with high carbon sinks
High emissions	BAU with low carbon sinks
Low abatement	Low estimates for reductions from Clean Power Plan and HFCs
High abatement	High estimates for reductions from Clean Power Plan and HFCs
Scenarios	
Scenario A – "worst case"	High emissions + low abatement
Scenario B – "best case"	Low emissions + high abatement

Business-as-usual: Projected U.S. emissions through 2030

Total U.S. GHG emissions include the projected release of six Kyoto Protocol gases—carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF_6)—as well as CO_2 removals due to natural carbon sinks. These are further described below.

Table 2. Projected greenhouse gas emissions through 2030

	2005	2012	2020	2025	2030
CO_2	6112	5383	5640	5692	5692
CH_4	697	675	713	737	745
N_2O	400	394	334	345	350
HFC	120	151	207	269	302
PFC	6	5	5	6	7
SF_6	15	8	9	10	10
Sinks - low	-1031	-979	-614	-573	-565
Sinks - high			-898	-917	-937
Net GHG - low	6319	5638	6010	6142	6170
Net GHGs - high			6294	6486	6542

Note: All figures are in MMTCO$_2$-eq.

Carbon Dioxide: Future U.S. carbon dioxide emissions are estimated based on the U.S. Energy Information Administrations 2014 Annual Energy Outlook (EIA 2014 AEO) reference case projections, which account for all federal and state regulations implemented as of the end of October 2013.[1] The total CO_2 emissions figures are adjusted upward from the energy CO_2 emissions outlined in the 2014 AEO. We use a 1.03 adjustment factor, which roughly represents the historic ratio between total and energy-related CO_2 emissions in the United States.

CH_4, N_2O, HFCs, PFCs, and SF_6: Projected U.S. emissions of the remaining five Kyoto gases are taken from the 2014 U.S. Climate Action Report (2014 CAR), submitted to the UNFCCC.[2] These estimates have been developed by the U.S. Environmental Protection Agency. [Projections of CH4 and N2O emissions have been updated to reflect the revised global warming potential (GWP) of these gases as outlined in the IPCC Fifth Assessment. The GWP of methane was updated from 21 to 25; the GWP of N2O was updated from 310 to 298.]

Land sinks: The volume of CO_2 removals by U.S. land sinks, particularly forests, is the largest source of uncertainty in future GHG emissions. Historically, this figure has been significant—for example, land sinks offset approximately 15% of total emissions in each of the past five years. Although it is possible that U.S. forests will continue this high rate of carbon sequestration through 2025 and beyond, some studies now indicate that the CO_2 absorption rate may begin to decline due to increased forest disturbances (e.g., drought, wildfires and the spread of diseases), slower forest growth, and other factors.[3] To account for this variability, the 2014 CAR provides both a low and high carbon sequestration figure. Both are including in our calculation.

Abatement potential: Emissions reductions from Executive Branch actions

The following sections detail the series of environmental regulations that are likely to help the United States meet its 2025 emissions mitigation target. This set of programs and regulations represents policies that have been either proposed or adopted after November 2013, the first month not covered by EIA's BAU emissions projections. Potential reductions are obtained from analyses that accompany the publication of each proposal or final regulation, most often the Executive Branch's formal regulatory impact analysis but also sometimes respected independent analysis.

[1] U.S. Energy Information Administration, 2014. Annual Energy Outlook.
[2] U.S. Department of State, 2014. U.S. (Sixth) Climate Action Report.
[3] Tang, J., et al. (2014). Steeper declines in forest photosynthesis than respiration explain age-driven decreases in forest growth. *Proceedings of the National Academy of Sciences*, 201320761.

Table 3. New and proposed policies and their potential GHG impact[(a)(c)]

	Status	2020	2025	2030
Electricity production				
Clean Power Plan				
Low: EPA estimate	Proposed	-335	-470	-526
High: NRDC estimate		-526	-688	-783
Ozone regulations (GHG co-benefits)	Proposed	+51	-108	-329
Transport				
CAFE standards for medium/heavy-duty trucks post-MY2018	Planned	-11	-32	-48
Tier 3 vehicle emissions and fuel standards (GHG co-benefits)	Finalized	-0.8	-1.7	-2.7
Buildings and appliances				
Strengthened commercial building codes	Finalized	-10	-19	-27
New standards for external power supplies	Finalized	-1	-2	-3
New standards for commercial refrigeration equipment	Finalized	-2	-5	-7
New standards for electric motors	Finalized	-4	-8	-12
New standards for walk-in coolers and freezers	Finalized	-2	-5	-9
New standards for residential furnace fans	Finalized	-1	-3	-6
New standards for commercial clothes washers	Finalized	-0.05	-0.12	-0.2
New standards for service florescent and incandescent lamps	Finalized	-4	-9	-13
New standards for automatic commercial ice makers	Finalized	-0.2	-0.4	-0.6
New standards for commercial air conditioners	Proposed	-1	-4	-7
New standards for residential dishwashers	Proposed	-0.4	-1	-3
New standards for health products	Proposed	0	-1	-3
New standards for water pumps	Proposed	-0.04	-0.3	-0.5
Methane emissions[(b)]				
Oil and gas sector		-90	-110	-110
Methane emissions regulations at new oil and gas production facilities	Planned			
Standards to reduce venting and flaring from oil and gas production on public lands	Planned			
Updated standards for landfills	Proposed	0	-2	-2
HFCs				
Low: Potential reductions from EPA's SNAP program	Proposed	-38	-70	-106
High: Potential reduction from amendment to the Montreal Protocol	Discussed	-83	-179	-261
Total - low		-450	-851	-1,214
Total - high		-685	-1,178	-1,625

(a) Annual figures reflect potential reductions of GHG emissions below BAU in MMtCO$_2$-eq.
(b) For methane released from the oil and gas sector, the 2020 estimate is based on the White House strategy to reduce methane emissions while the 2025 estimate is based on the U.S. goal to reduce emissions by 45% below 2012 levels by 2025. More accurate potential reductions from policy will be included once specific regulations are proposed and finalized.
(c) These calculations are simplified and do not account for interdependencies among sectors.

Electricity generation

Clean Power Plan: Announced in June 2014, the Clean Power Plan imposes the first binding limits on carbon pollution from existing power plants, the single largest source of greenhouse gas emissions in the U.S. economy—32% in 2012. Overall, it aims to cut emissions from the sector by approximately 26% from 2005 levels by 2020, and 30% from 2005 levels by 2030. Although the plan is not yet in effect and is likely to face a host of legal challenges, its provisions are the cornerstone of the Obama administration's agenda to lower GHG emissions. Of all policies considered in this analysis, the CPP represents by far the largest climate pollutants reduction potential and its successful implementation is key to not only achieving the U.S.'s 2025 emissions mitigation target, but even the 2020 Copenhagen pledge.

Although there is a consensus that the plan's overall potential impact is significant, its specific emissions mitigation figures have been disputed. In its regulatory impact analysis, the EPA noted that the plan would reduce CO_2 emissions by 383 million tons ($MMTCO_2$)[4] below business-as-usual (BAU) in 2020, 506 $MMTCO_2$ in 2025 and 555 $MMTCO_2$ in 2030.[5]

Since EPA's publication of the draft Clean Power Plan rule, a number of groups have made statements that the EPA estimates significantly downplay the plan's true emissions reduction potential. Major critiques include that the agency did not fully account for the displacement of coal- and gas-power generation with the entry of additional renewable energy and greater improvements in energy efficiency. In a separate analysis, the environmental group Natural Resources Defense Council (NRDC) projected that, under the CPP, emissions from the power sector would in fact be lower than the levels estimated by EPA.[6] Because NRDC used different BAU projections for CO_2 than the EPA, the emissions reductions listed for 2020, 2025, and 2030 in its document are not directly comparable to those of the EPA. To facilitate our calculations, we used EIA's CO_2 power plant emissions projections as the BAU and subtracted each group's "with CPP" emissions scenario from this baseline. The results are provided in Table 3.

Ozone regulations (GHG co-benefits): In November of this year, EPA released a proposal to revise the National Ambient Air Quality Standards for ground-level ozone from 75 parts per billion (bbp) to within a range of 65 to 70 ppb. Although, as in the case of the Tier 3 standards described immediately above, the rule does not principally aim to reduce GHG emissions, it has important climate co-benefits. Specifically, lowering the concentration of ground-level ozone is expected to increase the carbon sequestration potential of U.S. forests, essentially by making forests healthier.

The potential benefits are substantial: reducing allowable ozone concentrations to 65 ppb can increase carbon sequestration by as much as 329 million tons in 2030. These, however, are not expected to accrue until after the middle of the next decade because of the time it takes for forests to gain biomass. The rule's impact on carbon sinks is therefore negligible in 2020. We calculate the regulation's additional sequestration potential in 2025 by plotting the data provided in its Regulatory Impact Analysis for added carbon storage in 2020, 2030, and 2040 and extrapolating the in-between figures based on the overall trend.

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[4] The number listed in Table 3 differ slightly because they were obtained by subtracting EPA's "with Clean Power Plan" CO2 emissions projections from EIA's power sector emissions projections in order to match the components that were used to build the BAU.

[5] EPA, 2014. Regulatory Impact Analysis for the Proposed Carbon Pollution Guidelines for Existing Power Plants and Emission Standards for Modified and Reconstructed Power Plants.

[6] NRDC, 2014. Comment on EPA's Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units. Available at: http://docs.nrdc.org/air/files/air_14120101b.pdf.

Transportation

CAFE standards for medium- and heavy-duty trucks post-MY2018: In the 2013 Climate Action Plan, President Obama instructed the EPA and the National Highway Traffic Safety Administration (NHTSA) to begin developing new corporate average fuel economy (CAFE) standards for medium- and heavy-duty vehicle model years 2018 and beyond. The rule, which the Obama administration expects to finalize by March 31, 2016, will build on the first iteration of the CAFE requirements for trucks MY2014-2018, issued in 2011.

Although details of the to-be-issued proposal are not yet available, we estimate the potential emissions savings from the post-2018 standard by applying the same emissions reduction rate achieved under the 2011 CAFE requirement, namely a 10% cut in emissions over a 16-year period (2014-2030) projected under the MY2014-2018 rule.[7] Assuming a 10% emissions reduction from the start of the new rule and for the following 16 years (2018-2035), applied *on top of* the emissions savings achieved under the first phase of the rule beginning in 2018, we obtain a 32 and 48 $MMTCO_2$-eq reduction in emissions in 2025 and 2030, respectively.

Tier 3 vehicle emissions and fuel standards (GHG co-benefits): In April 2014, EPA finalized updated standards for tailpipe and evaporative emissions from passenger cars and trucks. This rule will be implemented beginning with vehicles MY2017, and its principle purpose is to set more stringent emissions standards for local pollutants (NOx, particulate matter and other air toxins) and reduce the sulfur content of gasoline. However, it is expected to have some GHG co-benefits. In particular, studies of stricter emissions and sulfur content requirements have demonstrated associated reductions in methane and nitrous oxide emissions.[8] Although these reductions are expected to be somewhat counterbalanced by an increase in CO_2 emissions – as reducing gasoline's sulfur content will require additional refining – the program is still expected to results in a net decrease in CO_2-eq emissions.

We obtained the overall GHG emissions impact in 2020, 2025 and 2030 from the rules' Regulatory Impact Analysis, which includes potential reductions of 0.4 and 2.7 $MMTCO_2$-eq in 2018 and 2030, respectively. Figures for 2020 and 2025 are extrapolated based on an assumed linear trend between the start and end year of the EPA estimate.

Buildings and appliances

Strengthened commercial building codes: This past September, the Department of Energy (DOE) affirmed that the new industry commercial building code provides greater energy efficiency savings than previous standards. The updated code will reduce energy use and cut carbon dioxide emissions by 230 $MMTCO_2$ through 2030.[9] To estimate the annual impact of the policy, we assumed a linear incremental increase in year-to-year emissions reductions for a total of 230 million tons over the next 15 years.

New standards for external power supplies: In February 2014, DOE issued final energy conservation standards for external power supplies sold in 2015 and later. The new standards are expected to result

[7] EPA & NHTSA, 2011. Final Rulemaking to Establish Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles. Regulatory Impact Analysis. Available at: http://www.epa.gov/otaq/climate/documents/420r11901.pdf.
[8] EPA, 2014. Control of Air Pollution from Motor Vehicles: Tier 3 Motor Vehicle Emission and Fuel Standards Final Rule. Regulatory Impact Analysis. Available at: http://www.epa.gov/otaq/documents/tier3/420r14005.pdf.
[9] White House, 2014. Press Release. White House Announces Executive Actions and Commitments from Across the Country to Advance Solar Deployment and Energy Efficiency. Available at: http://www.whitehouse.gov/the-press-office/2014/09/18/fact-sheet-white-house-announces-executive-actions-and-commitments-acros.

in cumulative emissions reductions of 23.6 Mt of CO_2 by 2030. As above, to estimate the annual GHG impact of the policy, we assumed a linear incremental increase in year-to-year emissions reductions for a total of 23.6 million tons over the next 15 years.

New standards for commercial refrigeration equipment: In March 2014, DOE issued final energy conservation standards for commercial refrigeration equipment sold in 2017 and later. The new standards are expected to result in cumulative emissions reductions of 48 Mt of CO_2 and lower N_2O and CH_4 emissions by 6 $MMTCO_2$-eq by 2030.[10] The annual GHG impact of the policy is estimated using a linear incremental increase in year-to-year emissions reductions discussed above. Because the DOE proposal does not provide estimates of N_2O and CH_4 emissions reductions through 2030—the proposal projects the emissions savings for these gases only over the appliances' lifetime—we estimated the annual cuts in these gases by multiplying the annual CO_2 figure by the ratio of the lifetime N_2O and CH_4 to CO_2 emissions reductions.

New standards for electric motors: In June 2014, DOE issued final energy conservation standards for walk-in coolers and freezers sold in 2016 and later. The new standards are expected to result in cumulative emissions reductions of 96 Mt of CO_2 by 2030. The annual GHG impact of the policy is estimated using a linear incremental increase in year-to-year emissions reductions discussed above. We estimated the annual emissions reductions of CH_4 and N_2O through 2030 using the process described above.

New standards for walk-in coolers and freezers: In May 2014, DOE issued final energy conservation standards for electric motors sold in 2017 and later. The new standards are expected to reduce CO_2 emissions by 61.6 Mt and lower CH_4 and N_2O emissions by nearly half a million tons through 2030. The annual GHG impact of the policy is estimated using a linear incremental increase in year-to-year emissions reductions discussed above.

New standards for residential furnace fans: In July 2014, DOE issued final energy conservation standards for electric motors sold in 2019 and later. The new standards are expected to reduce CO_2 emissions by 34 Mt through 2030. The annual GHG impact of the policy is estimated using a linear incremental increase in year-to-year emissions reductions discussed above.

New standards for commercial washers: In December 2014, DOE issued final energy conservation standards for commercial clothes washers sold in 2018 and later. The new standard will result in relatively modest CO_2 emissions reductions, equivalent to approximately 1.2 million tons through 2030.[11] To estimate annual emissions reductions, we again assumed a linear incremental increase in year-to-year cuts for a total of 1.2 million tons over the next 12 years. As for the commercial air conditioner policy discussed above, additional GHG benefits in terms of N_2O and CH_4 emissions reductions were only provided as a cumulative figure over the life of the appliances. We estimated the annual emissions reductions of these gases through 2030 using the process described above.

New standards for service florescent and incandescent lamps: Also in December 2014, DOE issued final energy conservation standards for service florescent and incandescent reflector lamps sold in 2017 and later. The rule is projected to reduce CO_2 emissions by 90 Mt through 2030 and result in additional

[10] DOE, 2014. Energy Conservation Standards for Commercial Refrigeration Equipment. Available at: http://www.regulations.gov/#!documentDetail;D=EERE-2010-BT-STD-0003-0104.
[11] DOE, 2014. Energy Conservation Standards for Commercial Clothes Washers. Available at: http://energy.gov/sites/prod/files/2014/12/f19/commercial_clothes_washers_final_rule_1.pdf.

reductions of CH_4 and N_2O emissions.[12] The annual GHG impact of the policy is estimated using a linear incremental increase in year-to-year emissions reductions discussed above.

New standards for automatic commercial ice makers: Rounding out the December 2014 finalized energy conservation announcements were standards for automatic commercial ice makers, also issued by the DOE. The policy, which applies to models sold in 2018 and later, is expected to reduce CO_2 emissions by a relatively modest 4 Mt through 2030 and lower CH_4 and N_2O emissions by a nominal amount.[13] As above, annual GHG impact of the policy is estimated using a linear incremental increase in year-to-year emissions reductions.

New standards for commercial air conditioners: In September 2014, DOE issued proposed new energy conservation standards for commercial air conditioners sold in 2019 and later. If adopted, the new standards could result in 41 $MMTCO_2$ emissions reductions, as well as some smaller cuts in N_2O and CH_4, by 2030.[14] The annual GHG impact of the policy is estimated using a linear incremental increase in year-to-year emissions reductions discussed above. As above, additional GHG benefits in terms of N_2O and CH_4 emissions reductions were only provided as a cumulative figure over the life of the appliances. We estimated the annual emissions reductions of these gases through 2030 using the process described above.

New standards for residential dishwashers: In December 2014, the DOE also issued proposed new energy conservation standards for residential dishwashers sold in 2019 and later. If adopted, the new standards could reduce CO_2 emissions by 14.6 million tons, and results in smaller cuts to N_2O and CH_4 emissions, by 2030.[15] Again, to estimate annual emissions reductions, we assumed a linear incremental increase in year-to-year cuts for a total of 14.6 million tons over the next 12 years. We estimate the additions N_2O and CH_4 emissions reductions using the gas ratio to CO_2 process described above.

New energy conservation standards for hearth products: In February 2015, the DOE proposed new energy conservation standards for hearth products sold in 2021 and later. If adopted as proposed, the new rules could reduce CO_2 and CH_4 emissions by over 11 and 3 million tons, respectively, by 2030.[16] Annual emissions reductions were estimated using the methodology detailed above.

New energy conservation standards for water pumps: The DOE continued the rollout of new appliance efficiency standards in April when it issued proposed standards for pump energy efficiency. The final rule, which will impact commercial and industrial pumps manufactured in 2019 and later, could reduce CO_2 emissions by 2.5 MMT through 2030 and contribute to relatively minor reductions of CH_4 and N_2O.[17]

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[12] DOE, 2014. Energy Conservation Program: Energy Conservation Standards for General Service Fluorescent Lamps and Incandescent Reflector Lamps. Available at: http://energy.gov/sites/prod/files/2014/12/f19/gsfl_final_rule.pdf.
[13] DOE, 2014. Energy Conservation Program: Energy Conservation Standards for Automatic Commercial Ice Makers. Available at: http://energy.gov/sites/prod/files/2014/12/f19/acim_final_rule.pdf.
[14] DOE, 2014. Energy Conservation Standards for Small, Large, and Very Large Air-Cooled Commercial Package Air Conditioning and Heating Equipment. Available at: http://energy.gov/sites/prod/files/2014/09/f18/2014-09-18%20Issuance%20cauc_noticeofproposedrulemaking.pdf.
[15] DOE, 2014. Energy Conservation Standards for Residential Dishwashers. Available at: http://energy.gov/sites/prod/files/2014/12/f19/dishwashers_nopr.pdf.
[16] DOE, 2015. Energy Conservation Program for Consumer Products: Energy Conservation Standards for Hearth Products. Available at: https://www.federalregister.gov/articles/2015/02/09/2015-02179/energy-conservation-program-for-consumer-products-energy-conservation-standards-for-hearth-products.
[17] DOE, 2015. Energy Conservation Program: Energy Conservation Standards for Pumps. Available at: https://www.federalregister.gov/articles/2015/04/02/2015-06947/energy-conservation-program-energy-conservation-standards-for-pumps.

Methane regulations

White House methane emissions reduction strategy: In March 2014, the White House released its *Strategy to Reduce Methane Emissions*, a roadmap to guide the interagency effort to address the release of the potent GHG at home and abroad. Although the White House paper notes that "elements of the strategy will be further fleshed out in the coming months", it suggests that a comprehensive set of actions could reduce methane emissions by up to 90 $MMTCO_2$-eq in 2020.[18] In January of 2015, the administration released a further plan of action to cut methane emissions. Although the plan did not provide specific information on the tons of CO2-eq that will be cut as a result of these actions, it stated an overarching goal to reduce methane emissions from the oil and gas sector by 40-45% below 2012 levels by 2025.[19]

Overall, the methane strategy focuses on achieving emission reductions in four key sectors: landfills, oil and gas, coal mines, and agriculture.

- *Landfills:* Of the four sectors discussed in the White House strategy, the only rule proposed thus far has been updated performance standards for landfills, an important but fairly modest regulation that is projected to reduce methane emissions by approximately 2.5 $MMTCO_2$-eq in 2023. Assuming reductions in subsequent years will be at least as large as the 2023 figure, we conservatively use the 2023 rate for the 2025 and 2030 calculations.
- *Oil and gas:* The largest methane emissions reductions will come from new regulations of the oil and gas sector, in particular, policies to limit emissions at natural gas production facilities and new standards to reduce venting and flaring from oil and gas production on public lands. In January 2015, the White House announced its plan to regulating emissions from new oil and gas wells. The administration decided against regulating existing facilities, instead preferring to address these through voluntary actions. The proposed regulation will be released by the EPA in the summer of this year. The Bureau of Land Management is also expected to announce a proposal to limit venting and flaring on public lands this year. Assuming that emissions from oil and gas account for approximately 30% of total methane released in the U.S. in 2012, reaching the upper end of the target would result in reduction of around 110 $MMTCO_2$-eq in 2025.
- *Coal mines:* This past May, the Bureau of Land Management (BLM) released pre-proposal notice to gather input on the capture and sale or disposal of waste methane from mines operating on public land. Although the comment period closed in June, BLM has not yet made any indication regarding the release of a proposed rule.
- *Agriculture:* In August of this year, the U.S. Department of Agriculture (USDA), EPA and the DOE released a *Biogas Opportunities Roadmap* that outlines voluntary strategies to reduce GHG emissions from the dairy sector. The Roadmap found that deploying an additional 11,000 biogas systems around the country could reduce methane emissions by 4-54 $MMTCO_2$-eq in 2030.[20] Because this estimate is based exclusively on voluntary action, it is not included as a separate line item in our analysis.

[18] White House, 2014. Climate Action Plan - Strategy to Reduce Methane Emissions. Available at: http://www.whitehouse.gov/sites/default/files/strategy_to_reduce_methane_emissions_2014-03-28_final.pdf.
[19] White House, 2015. Press Release. Administration Takes Steps Forward on Climate Action Plan by Announcing Actions to Cut Methane Emissions. Available at: http://www.whitehouse.gov/the-press-office/2015/01/14/fact-sheet-administration-takes-steps-forward-climate-action-plan-anno-1.
[20] USDA, EPA and DOE, 2014. Biogas Opportunities Roadmap. Available at: http://www.epa.gov/climatechange/Downloads/Biogas-Roadmap.pdf.

Because information on specific regulations is largely not yet available—additional detail on the sectors covered by the strategy is provided below—we use the 90 $MMTCO_2$-eq emissions reduction figure cited in the original White House strategy in our calculations for 2020. For 2025 and 2030, we assume that the methane reduction target for the oil and gas sector is reached.

Hydrofluorocarbons

Montreal Protocol: In May of 2014, the United States, Canada, and Mexico submitted an amendment to the Montreal Protocol to phase down the production and consumption of hydrofluorocarbons (HFCs). The proposed schedule would set gradually decreasing allowable emissions limits for the U.S. and other non-article 5 countries equivalent to 90% of baseline[21] by 2020, 65% of baseline by 2025 and 30% of baseline by 2030. Although the most recent talks did not result in an international agreement on HFCs, we calculate the associated reductions in HFC emissions if such a phase down schedule were to come into effect as an illustrative ceiling of potential emissions cuts. Reductions are measured by subtracting the allowable cap from projected business-as-usual HFC emissions as reported in the 2014 U.S. Climate Action Report. This results in emissions savings of approximately 83, 179 and 261 $MMTCO_2$-eq in 2020, 2025 and 2030, respectively.

Significant New Alternatives Policy (SNAP) Program: If an amendment to the Montreal Protocol is not adopted successfully, the EPA will still be able to reduce emissions of HFCs through the SNAP program, although these reductions would be relatively modest. The program, which derives its authority from the Clean Air Act, allows the EPA to evaluate and regulate substitutes for harmful ozone-depleting chemicals by limiting the use of the most dangerous pollutants and publishing a list of available alternatives. In July of 2014, the agency released a proposal to restrict the use of certain HFCs in sectors where lower-GHG substitutes are available. According to EPA's estimates, the proposed program updates will result in 38, 70 and 106 $MMTCO_2$-eq reductions in HFC emissions below business-as-usual ("most likely" scenario). The cuts will primarily come from commercial refrigeration, followed by foams, motor vehicle air-conditioning, and consumer aerosols.

To calculate the overall potential reductions in HFC emissions, we use either the Montreal Protocol figure (high abatement estimate) or the SNAP program figure (low abatement estimate), further detailed in the next section. This reflects the fact that if the international community reaches agreement on the phase-down of HFCs globally, the U.S. will use its authority under the SNAP program to begin reducing emissions to the allowable cap. If an agreement is not reached, potential reductions would only reach the levels indicated in the new SNAP proposal.[22]

Summary of Analysis: Meeting the 2020 and 2025 targets

Given the assumptions described above, our analysis shows that emissions range from about 5,324 Mt to 5,844 Mt in 2020 and approximately 4,964 Mt to 5,657 Mt in 2025 (Figure 1). These are associated with a 8-16% reduction in emissions in 2020 and a 11-22% reduction 2025, both from 2005 levels.

In the pessimistic scenario—high emissions and low abatement—the U.S. does not meet either the 2020 or the 2025 goal. In fact, rising emissions due to lower carbon sinks outweigh any domestic action to lower GHG pollution and total emissions trend upward until 2020. In the more optimistic scenario—low emissions and high abatement—the U.S. meets its 2020 emissions reduction target and positions itself

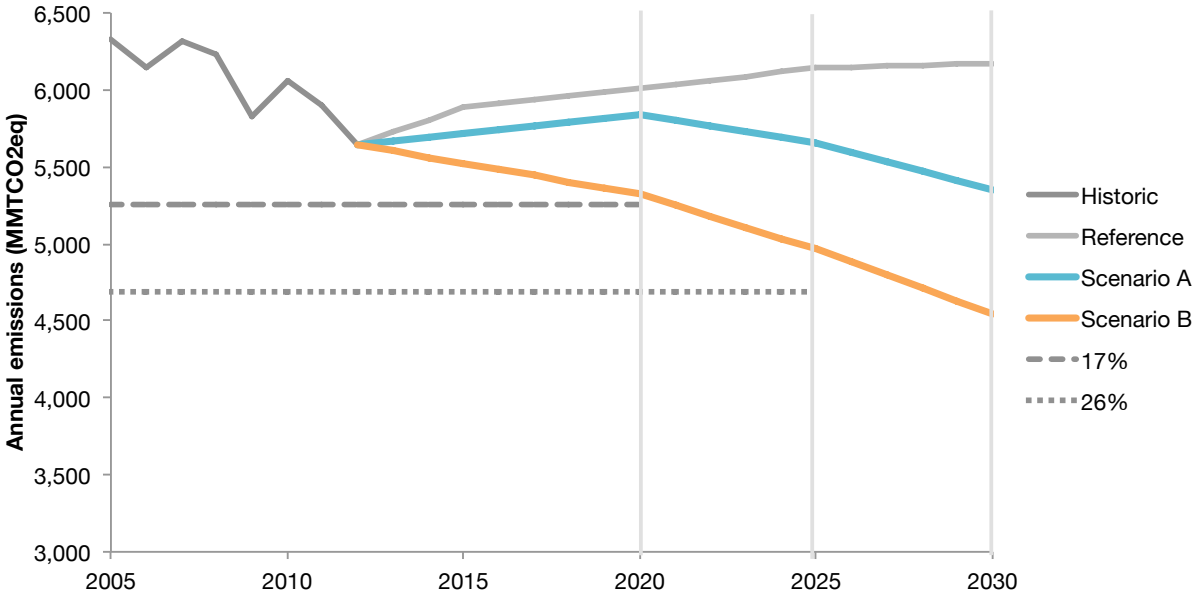
[21] The baseline is defined as the average of HFC consumption and production in 2008-2010.

[22] EPA, 2014. Climate Benefits of the SNAP Program Status Change Rule. Available at: http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2014-0198-0003.

within the range of meeting the 2025 pledge, assuming continued White House leadership and a suite of yet unannounced (and thus not accounted for here) policies after 2016. Figure 2 shows the expected emissions reductions, by source, in 2025 under the "best case" scenario (Scenario B).

Again, these figures reflect only actions that have been publicly announced to date.

Figure 1. Projected emissions relative to targets



Note: The reference line reflects low emissions, i.e., high land sinks.

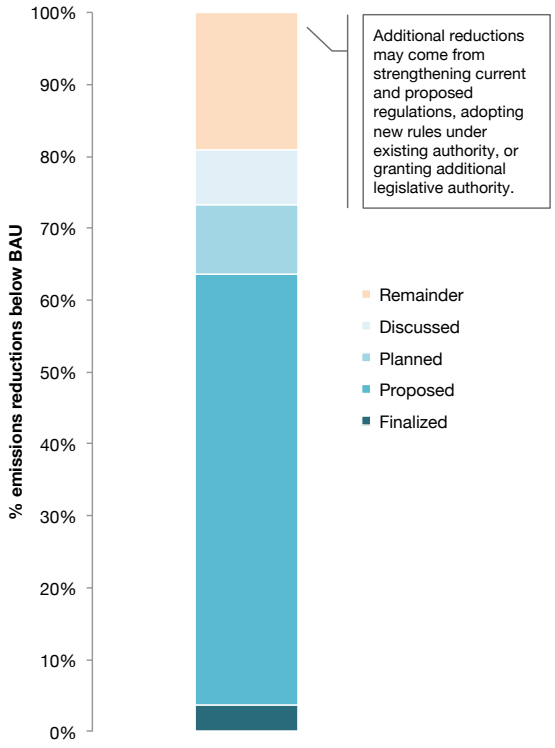
Therefore, there is a gap between what the existing suite of proposed or finalized policies would achieve, and what President Obama has pledged for 2025. To close the gap, the next U.S. President could pursue a range of additional measures (which are not modeled in this study) using existing Executive Branch legal authorities. These include existing environmental laws for increasing the adoption and performance of renewable energy technologies, reducing vehicle fuel demand by improving public transit and encouraging carpooling and telecommuting, developing building retrofit and weatherization programs, and further strengthening building and appliance codes, among others. A recent analysis performed by the Rhodium Group, an independent economic consultancy, estimates that these supplemental actions could achieve at least 105 $MMTCO_2$-eq of additional GHG abatement in 2020.[23]

Another important caveat is that these conclusions are highly dependent on the accuracy of the business-as-usual emissions projections. The EIA reference case estimate is based on the market conditions prevalent as of October 2014. Unpredictable and rapid changes in factors such as prices, production, and energy demand are likely to have a substantial impact on future emissions, as could changes in economic growth compared to projected GDP increases. This variability is not accounted for in this analysis.

[23] Larsen J., Larsen K., and Ketchum W. "Is the US on Track? EPA's Clean Power Plan and the US 2020 Climate Goal." Rhodium Group. Available at: http://rhg.com/notes/is-the-us-on-track-epas-clean-power-plan-and-the-us-2020-climate-goal.

On the road to 2025: Where are we now?

Figure 2. Expected emissions reductions by policy stage in 2025 (high abatement)



The above graphic represents expected emissions reductions in 2025 broken down by the stage of the regulation expected to achieve them.

- **Finalized:** Finalized policies include those already adopted – on-the-book – regulations. These primarily comprise a suite of new and updated energy efficiency standards for buildings and appliances, as well as the Tier 3 vehicle emissions and fuel standards, which are not aimed at GHG emissions but produce climate co-benefits. Totaling ~53 million MT of CO2eq, finalized policies represent approximately 4% of needed reductions.
- **Proposed:** Proposed policies include announced regulations with drafts already available for comment. The most well known of these is the Clean Power Plan to tackle emissions from existing power plants. Proposed policies may eventually be adopted in a somewhat different form, which will have an impact on the expected emissions reductions. Amounting to ~870 million MT of CO2eq, proposed policies account of 60% of total needed action
- **Planned:** Planned policies are those that have been announced, but whose drafts have not yet been made available. The most significant of these are the new regulation to limit methane emissions from new oil and gas facilities. If proposed and implemented as expected, planned policies can reduce GHG emissions by ~125 million MT of CO2eq or 10% of all needed reductions.
- **Discussed:** Discussed policies include those that are considered necessary, but that are not yet close to becoming law. This category by and large includes the phasedown of HFCs under the Montreal Protocol. With potential reduction of ~110 million MT of CO2eq, discussed policies represent 7% of all needed reductions.

Conclusion

This report demonstrates that the suite of recent and proposed regulations pushed forward by the Obama administration, particularly the Clean Power Plan, could lead to significant reductions in U.S. GHG emissions by 2025. These initiatives could amount to up to 22% below 2005 levels and could potentially fall within striking distance of achieving the U.S. target with enhanced political will for climate action. It is important to note that these figures reflect only actions that have been publicly announced to date.

However, to achieve the U.S. pledge of reducing emissions 26-28% by 2025, the next U.S. President would need to vigorously implement these Obama administration policies as well as propose new emission reduction measures – something that is far from assured given political differences on climate change in the United States. This analysis is limited only to actions that the Administration has publicly announced, and does not represent the suite of what is possible – but not yet proposed – under existing Executive Branch authority.

Several factors are likely to influence the chances of the United States meeting its 2025 emissions reduction pledge, including variability in economic growth rates as well as energy prices and demand. In addition, weak policy implementation combined with lower than expected natural carbon sequestration from U.S. forests and lands could yield emission reductions in the range of only 11% below 2005 levels by 2025 – far below the U.S. 2025 pledge. The volume of CO2 removals by U.S. land sinks, particularly forests, is the largest source of uncertainty in future GHG emissions.