U.S. Energy and Climate Policy 2017 Update:

What a Difference a Year Makes

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Overview

► Context

► What was U.S. climate and energy policy under former President Obama?

► What is U.S. climate and energy policy under President Trump? What might he do?

► What are states, cities, companies, and other countries doing? What might they do?

► What can we do?
Amory Lovins on whether he’s an optimist or a pessimist:

“I am neither - because they are just two different forms of fatalism. The optimist says things have to get better, and the pessimist says things have to get worse.”

“I believe in applied hope. Things can get better, but you have to make them so.”
70% of Americans think global warming is happening
58% of Americans believe climate change is mostly human caused.
Democrats three times more likely than Republicans to say there is solid evidence of global warming and that it is caused mostly by human activity

<table>
<thead>
<tr>
<th>% who say ...</th>
<th>There is no solid evidence of warming, because ...</th>
<th>There is solid evidence of warming, caused by ...</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>DK</td>
<td>Just not happening</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>10</td>
</tr>
<tr>
<td>Republican/Lean Rep</td>
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<td>21</td>
</tr>
<tr>
<td>Democrat/Lean Dem</td>
<td>6</td>
<td>24</td>
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<tr>
<td>Conservative Rep/LR</td>
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<td>26</td>
</tr>
<tr>
<td>Mod/Lib Rep/LR</td>
<td>30</td>
<td>11</td>
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<tr>
<td>Center/Mod Dem/LD</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Liberal Dem/LD</td>
<td>22</td>
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</tbody>
</table>

Note: Figures may not add to 100% because of rounding. QA77/QA77a/QA77b.
Source: Survey conducted June 8-18, 2017.

PEW RESEARCH CENTER
Context: Greenhouse gas (GHG) emissions and energy use. The big change November 2016- November 2017 is in federal policy.
U.S. emissions of carbon dioxide — the main greenhouse gas — are down 16% since 2005, the lowest in about 25 yrs.
Power sector carbon dioxide emissions fall below transportation sector emissions

Energy-related carbon dioxide emissions (Jan 1988 - Sep 2016)

Source: U.S. Energy Information Administration, Monthly Energy Review
Drivers of Change in the Power Sector: Natural Gas, Wind, Solar

- Over the last decade the shift away from coal has accelerated dramatically as natural gas prices have declined to record-low levels.
- The 2016 total utility-scale capacity additions came from natural gas (9 GW), wind (8.7 GW) and solar (7.7 GW).
- Interplay of technology innovation, public policy and market forces
The 4-legged stool driving transportation fuel use and emissions

- U.S. transportation sector is over 90% dependent on oil
- Low oil prices are a challenge
- Most historical progress has been on vehicle efficiency; vehicle standards are critical
- Other legs more difficult
- What’s new is IT (connected and autonomous vehicles [CAVs] and electrification)
- Electrification helps if it’s combined with electricity decarbonization
  - IT could go either way with VMT
  - IT should help with system efficiency
Context: Energy Policy Has Multiple Goals
(from Quadrennial Energy Review [QER] 2016)
Approach to environmental responsibility is the big change 2016-2017
What was U.S. climate and energy policy under former President Obama?
President Obama’s energy policy

- Energy innovation
  - DOE non-defense science and innovation budget (big increase in 2009 and 2010 under ARRA; up 20% 2008-2016 - half of increase in science; ¼ in energy efficiency and renewable energy office; 1/4 ARPA-E)
  - Mission Innovation (2015; 22 countries plus EU agreed to double clean energy R&D over the next 5 years))
  - Advanced Research Projects Agency-Energy (ARPA-E; created in 2007; started getting funding in 2009)

- Clean energy deployment
  - Tax credits (wind PTC; solar ITC; EV; etc.)
  - American Recovery and Reinvestment Act (ARRA, 2009; $90 billion in clean energy funding)

- Federal lands (higher royalty payments from energy industry; set new limits on where and how companies can develop publicly owned resources; encouraged renewable projects)

- Energy efficiency standards for buildings (finalized 40+ standards)
- Energy efficiency standards for vehicles
- Climate and energy policy closely related
• 22 countries+ EU, (80% of Global Clean Energy R&D,) agreed to seek to double funding over 5 years
• U.S.: Double investment from $6.4B in FY 2016 to $12.8B
• DOE: $1B (21%) increase from $4.8B to $5.9B in FY 2017

Breakthrough Energy Coalition committed to expand investment into earlier stages of innovation through commercialization

Support U.S. economic and environmental objectives; enable U.S. role in expanding global markets; improve global standard of living
The three pillars of former President Obama’s Climate Action Plan (2013)

**Cut Carbon Pollution in America**
- Implement new regulations; reduce federal government’s own GHGs, etc

**Prepare the United States for the Impacts of Climate Change**
- Federal agencies ensure grants, technical assistance, and other programs support smarter, more resilient investments; Partnership for Energy Sector Climate Resilience.

**Lead International Efforts to Combat Global Climate Change and Prepare for its Impacts**
- The 2015 Paris Agreement to reduce global greenhouse gas emissions; provide adaptation assistance; consider climate change as part of national security policy; etc.
Paris agreement

- Agreed in Paris in December 2015
- Entered into force November 4, 2016.
- 195 United Nations Framework Convention on Climate Change (UNFCCC) members have signed the treaty, 144 of which have ratified it.
- Long-term global goal of remaining well below 2°C of warming; with best efforts to achieve 1.5°C
- Bottom-up approach: Country Nationally Determined Contributions (NDC) targets for 2025/2030; then iterate
- U.S. NDC: “achieve an economy-wide target of reducing its greenhouse gas emissions by 26-28% below its 2005 level in 2025 and to make best efforts to reduce its emissions by 28%.”
U.S. Actions

2014 U.S. GHG Emissions by Sector

- Interagency Methane Strategy
- Agricultural policies on N₂O
- HFCs including SNAP
- Oil & Gas Methane
- Efficiency programs
- Other measures

- Clean Power Plan
- Building codes
- Appliance & equipment standards
- Other measures

- Appliance & Equipment standards
- Building codes
- Green Mortgages
- Other measures

- Fuel economy & GHG standards
- Biofuels
- Reduced VMT
- Aviation & Shipping
- Other measures

- Electricity generation
  - 30%

- Transportation
  - 26%

- Industry
  - 21%

- Agriculture
  - 9%

- Commercial & Residential
  - 12%
Legal and scientific basis for Clean Air Act regulation

- In *Massachusetts v. EPA* (2007), the Supreme Court held that greenhouse gases are pollutants under the Clean Air Act.

- **Clean Air Act** requires regulation when EPA finds that emissions of a pollutant endanger public health or welfare.

- On December 7, 2009, the Administrator signed two distinct findings regarding greenhouse gases under the Clean Air Act:
  
  - **Endangerment Finding:** The Administrator finds that the current and projected concentrations of the six key well-mixed greenhouse gases—carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆)—in the atmosphere threaten the public health and welfare of current and future generations.

  - **Cause or Contribute Finding:** The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare.
The Clean Power Plan

- Set flexible and achievable standards; was expected to reduce power sector CO₂ emissions by 32 percent from 2005 levels by 2030 — cutting carbon pollution by 870 million tons
  - First-ever national standards to address carbon pollution from power plants.
  - Regulate existing power plants (separate regs for new plants)

- Implementation of the Clean Power Plan was to occur at the state and tribal level.
- The Supreme Court issued a stay in February 2016
- October 10, 2017, EPA Administrator Scott Pruitt signed an agency proposal to withdraw the Clean Power Plan
EPA’s vehicle greenhouse gas standards

- Cover all vehicles
- In coordination with National Highway Safety and Traffic Administration (NHTSA, part of DOT), and California Air Resources Board (CARB)
  - NHTSA sets corporate average fuel economy (CAFE) standards under a separate statute
  - California retains authority to set vehicle air pollution standards; other states may choose between CA and EPA standards
- The final medium and heavy duty standards (set in 2016) are expected to (over the lifetime of the covered vehicles):
  - lower CO₂ emissions by approximately 1.1 billion metric tons,
  - save vehicle owners fuel costs of about $170 billion, and
  - reduce oil consumption by up to two billion barrels
- Light duty vehicles (see next slide)
EPA and NHTSA light-duty vehicle standards

- The standards were established in two phases:
  - Phase 1 - Model years 2012 - 2016; and
  - Phase 2 - Model years 2017 - 2025 (subject to mid-term review).

- Together the final standards are projected to:
  - Result in an average industry fleetwide level of 163 grams/mile of carbon dioxide (CO$_2$) in model year 2025, ~ 54.5 miles per gallon (mpg) (if achieved exclusively through fuel economy improvements);
  - Cut 6 billion metric tons of GHGs over the lifetimes of the vehicles sold in model years 2012-2025;
  - Save more than $1.7 trillion in fuel costs; and
  - Reduce America’s dependence on oil by more than 2 million barrels per day in 2025.

- If they continue to be fully implemented would reduce 140 mtCO$_2$e in 2025.
EPA’s Midterm Evaluation of the standards for model years 2022-2025, in coordination with NHTSA and CARB

- Draft Technical Assessment Report (TAR) issued jointly with the NHTSA and CARB.
- President Trump ordered EPA to reopen the mid-term review.
- Joint EPA/NHTSA request for comment on whether standards remain appropriate.
- The EPA Administrator must make a final determination as to whether the standards remain appropriate or should be changed.
What has President Trump done so far on climate and energy policy? What might he do?
What has President Trump done so far?

- Began exiting the Paris agreement (exit takes effect in November 2020)
- Reopened mid-term review of light-duty vehicle standards
- EPA proposed to withdraw the Clean Power Plan
- Directed EPA to reconsider regulations on methane emissions from oil and gas operations
- Disbanded Interagency Working Group on the Social Cost of Carbon (SCC); Rescinded Administration-wide SCC; directed return to 2003 OMB directive; proposed new, very low SCC estimate
- Rescinded executive order to take climate change into account in national security decisions
- EPA withdrew a request that oil and gas producers report data on their methane emissions
- Rescinded guidance for factoring climate change into National Environmental Policy Act reviews
- Rescinded Obama’s other executive orders on climate (e.g., Climate Action Plan, order urging federal agencies to reduce their CO₂ output and to help communities strengthen their resilience to climate impacts)
- Told all federal agencies to review all rules inhibiting energy production
- Proposed budgets with deep cuts in EPA’s climate programs and DOE’s clean energy RDD&D programs
- DOE and the Federal Energy Regulatory Commission (FERC) proposed subsidies for existing coal and nuclear plants
What has President Trump done so far, cont’d

- Started working to increase fossil fuel production on federal lands by withdrawing regulations, shrinking national monuments; lowered the price companies must pay the government for offshore drilling; acted to accelerate approval for offshore drilling permits; approved exploratory drilling in the Arctic’s Beaufort Sea; and scheduled lease sales on Western land the Obama administration had deemed off limits.

- Proposed to rescind a BLM rule that regulates hydraulic fracturing (fracking) operations on federal and Indian lands; Suspended BLM Methane and Waste Prevention Rule.
What else might President Trump do?

- He could just not do very much
- He could exit the UN Framework Convention on Climate Change (signed by George HW Bush)
- He could undo more rules, but to undo rules requires a rulemaking
- He could stop defending rules in court
- He could reduce the stringency of vehicle standards
- He could revisit the endangerment finding
- He could withdraw and replace the Clean Power Plan
- He could cut EPA’s climate programs (up to Congress)
- He could cut DOE’s low-carbon energy RDD&D programs (up to Congress)
- He could impose tariffs on imported solar panels
- EPA may undo landfill methane rule
- Tax legislation may eliminate EV tax credit, shrink wind tax credit
Clean Power Plan (CPP) implications

Figure 1: Current power sector CO₂ projections and EPA’s CPP headline 2030 target

Million metric tons

2,800
2,600
2,400
2,200
2,000
1,800
1,600
1,400
1,200
1,000

2005 2010 2015 2020 2025 2030

32% BELOW 2005 LEVELS
RHG BASELINE W/O CPP

AEO 2014

Source: EPA, EIA and Rhodium Group analysis.
Nuclear powerplant retirements could increase emissions. Nuclear power now provides 60% of our zero-carbon electricity.
What have U.S. states, cities, companies, and other countries done? What might they do?
Cities are most of the climate problem and most of the climate solution

- Larger cities consume $\frac{2}{3}$ of the world's energy and create over 70% of global CO$_2$ emissions.

- By 2050, between 65% and 75% of the world population is projected to live in cities.

- Urban density creates the possibility for a better quality of life and a lower carbon footprint through more efficient infrastructure and planning.

- There is more political support for action in cities.
Cities are vulnerable to climate change and are in the forefront of resilience efforts

- Cities are often exposed and vulnerable to climate risks such as water shortages, floods and heat stress; many are on the coasts

- New York City progress report:
  - 950,000 trees and six million square feet of reflective rooftop added to the urban landscape
  - Building codes upgraded to prepare for floods, wind, and extreme weather
The City Developed and Released New York City’s Roadmap to 80 x 50 Using a First-of-its-kind Methodology to Conduct a More Sophisticated and Deeper Sector-specific Analysis

80 X 50 ROADMAP
In million metric tons of carbon dioxide equivalent (MtCO₂e)

80% below 2005 levels

*Greenhouse gas (GHG) emissions from electricity production (Energy) is included in Buildings and Transportation

↓80% reduction
U.S. states have played, and can continue to play, an important role in climate and clean energy and transportation policy

- California and northeast Regional Greenhouse Gas Initiative have greenhouse gas cap and trade programs
- California has the authority to set its own GHG standards for vehicles; other states are allowed to choose the federal program or California’s program
- CA and 9 other states have zero-emission vehicle (ZEV) mandate
- Illinois and New York in 2016 passed legislation with incentives for zero-emission power (both renewable and nuclear)
- Many states have clean energy standards, renewable fuel standards, energy efficiency standards, electric vehicle incentives, climate adaptation plans, etc.
- Many states are doing power sector transformation initiatives to advance clean electricity, energy efficiency and electric vehicles
Example 1: States are active in clean energy
Example 2: States are active in energy efficiency
“we will continue to support climate action to meet the Paris Agreement...we will remain actively engaged with the international community”

“In the absence of leadership from Washington, [we] will pursue ambitious climate goals, working together to take forceful action and to ensure that the U.S. remains a global leader in reducing emissions.”

Since its initial release on June 5, 2017, more than 2500 leaders from America’s city halls, state houses, boardrooms and college campuses, representing more than 130 million Americans and $6.2 trillion of the U.S. economy have signed the We Are Still In declaration.

https://www.wearestillin.com/we-are-still-declaration
“America’s Pledge”

Led by California Governor Jerry Brown and Michael Bloomberg, America’s Pledge on climate change is a new initiative to compile and quantify the actions of states, cities and businesses in the United States to drive down their greenhouse gas emissions consistent with the goals of the Paris Agreement.

www.americaspledgeonclimate.com
Other countries remain committed

- As Trump Exits Paris Agreement, Other Nations Are Defiant

- “Tonight, I wish to tell the United States: France believes in you, the world believes in you. I know that you are a great nation. I know your history, our common history. To all scientists, engineers, entrepreneurs, responsible citizens who were disappointed by the decision of the president of the United States, I want to say that they will find in France a second home.” French President Macron

- U.S. is now the only country outside the agreement
What can we do?
Some of what I’ve been up to lately...

- The Bipartisan Policy Center’s Appalachian Task Force with Senators Mark Warner (D-VA), Thom Tillis (R-NC), Joe Manchin (D-WV), and David Perdue (R-GA)
- Rep Mike Conaway (R-TX); Heidi Heitkamp (D-ND); Shelley Moore Capito (R-WV); Sheldon Whitehouse (D-RI); John Barasso (R-WY) plus 22 other Senators and 48 other representatives on tax incentives for capturing carbon dioxide
- The State CO₂-EOR Deployment Work Group (14 states convened by the Great Plains Institute)
- Rhode Island’s Power Sector Transformation Initiative
- The Hewlett Foundation strategy refresh
State CO-EQR Deployment Work Group: Participating States
If you’re interested in climate and energy policy professionally...

**National**
- Run for elective office or campaign for someone who’s running;
- Nonprofit - foundation, NGO advocate, NGO think tank, academia
- Federal gov’t

**Private sector**
- Work for a company on climate and energy solutions/innovation and/or policy advocacy
- Consulting

**State level**
- Elective office, non-profit, company, state employee on climate and energy policy

**City level**
- Elective office, non-profit, company, state employee on climate and energy solutions
If you’re interested in climate and energy as an avocation

As a Citizen

Elections matter: Vote, volunteer
Make your voice heard: write, call, march

As a Consumer

Pay attention to your carbon footprint
Make good choices on transportation and home energy

Employee

Friend/family

Be a role model
Make it easier for others to act
As of now...

- You have political power
- You have economic power
- You have brain power

Use it well
Extra slides
Comparing NDC Emission Targets to Paris Agreement Temperature Targets

A Emissions pathways

B Temperature probabilities

Fawcett et al 2015
GHG Emissions could go either way with Connected and Automated Vehicles: From 60% reduction to tripling of LDV energy use by 2050

Source: Joint study by NREL, ANL, and ORNL; http://www.nrel.gov/docs/fy17osti/67216.pdf

Figure ES-2. Estimated bounds on total U.S. LDV fuel use per year under the base (Conventional) and three CAV scenarios, based on the study's synthesis approach from CAV feature impact ranges reported in existing literature.
U.S. Department of Energy Notice of Proposed Rulemaking (NOPR) on Grid Reliability and Resilience Pricing, FERC Docket No. RM18-1-000

- **September 28, 2017**: DOE sent NOPR to FERC
- **October 4, 2017**: FERC staff issued questions to potential commenters
- **October 10-11, 2017**: NOPR published in Federal Register; denied motion for extension of comment period
- **October 23, 2017**: Comments due
- **October 10-11, 2017**: FERC must act on NOPR
- **November 7, 2017**: Reply comments due
- **January 25, 2018**: ISO/RTO filing demonstrating compliance with the rule
CEA 2016 report on ARRA’s approximately $90 billion funding for clean energy:

- Smaller amounts to green job training, R&D, carbon capture and storage, clean energy manufacturing, etc.
- About half of the $90 billion was incentives or matching grants.
- $46 billion in incentives leveraged additional $150 billion in private and nonfederal spending.
- So a combined amount of $240 billion in both public and private spending on clean energy innovation, development, and deployment (e.g., solar panels and smart electricity meters).
Context: Then and Now

- In 2008, 48 percent of America’s electricity came from coal; now it’s about 30 percent.
- There are now more than three solar power jobs in the U.S. for every job mining coal.
- In 2008, the U.S. imported about two-thirds of its oil; now, America imports less than half its oil.
- U.S. emissions of carbon dioxide — the main greenhouse gas — are down 16% since 2005, the lowest in about 25 yrs.