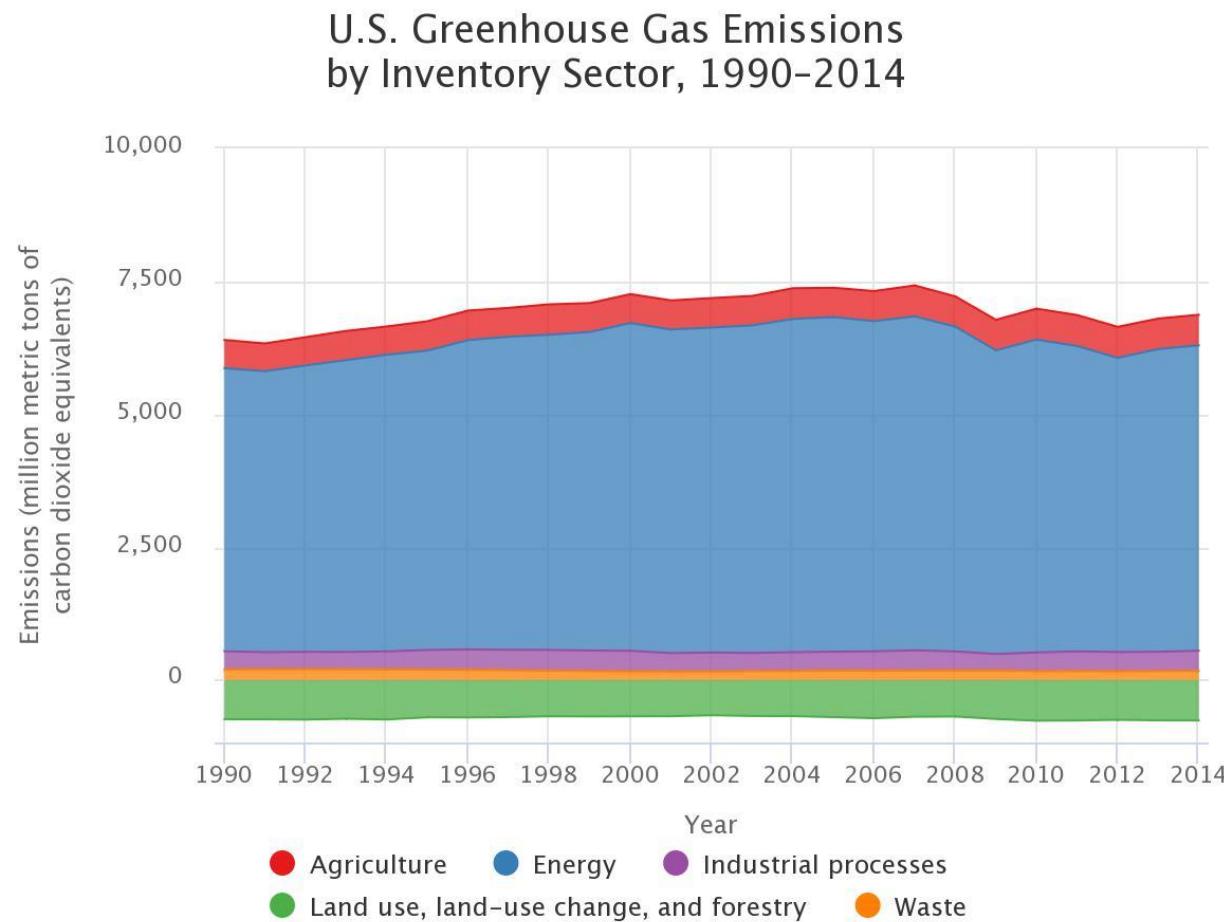


# National Mitigation and Adaptation

# National Greenhouse Gas Emissions



Source: U.S. EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2014.

<http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html>

# What US has done recently

- US 2014 Climate Action Report:
    - Report to the UN on US climate efforts
  - Adopted aggressive vehicle fuel standards: 54.5 mpg average by 2025
  - Doubled renewable generation from wind and solar since 2008
  - Improved energy efficiency through appliance standards, weatherization, etc.
  - Issued federal air standards for oil and natural gas industry
- <https://www.state.gov/documents/organization/219038.pdf>

# Obama's Climate Action Plan

- Limit carbon emissions from both new and existing power plants via EPA's Clean Power Plan
- Continue to increase the stringency of fuel economy standards for automobiles and trucks
- Continue to improve energy efficiency in the buildings sector
- Reduce the emissions of non-CO<sub>2</sub> greenhouse gases through a variety of measures (methane, Hydrofluorocarbons, etc.)
- Increase federal investments in cleaner, more efficient energy sources for both power and transportation
- Identify new approaches to protect and restore our forests and other critical landscapes, in the presence of a changing climate.

# Obama's Climate Action Plan

- Paris Climate Accord – US Commitment:
  - The United States has committed to reduce its greenhouse gas emissions by 26-28 percent below the 2005 level in 2025, and to make “best efforts” to reduce emissions by 28 percent.
  - Summary from Climate Advisers non-profit: meeting the US commitment will require “the next U.S. President would need to vigorously implement these Obama administration policies as well as propose new emission reduction measures”
- [http://www.climateadvisers.com/wp-content/uploads/2013/12/US-Achieving-2025-Target May-20151.pdf](http://www.climateadvisers.com/wp-content/uploads/2013/12/US-Achieving-2025-Target_May-20151.pdf)

# Other National Level Ideas – Jacobson/Stanford

- “100% clean and renewable wind, water, and sunlight (WWS) all-sector energy roadmaps for the 50 United States.”
  - “This study presents roadmaps for each of the 50 United States to convert their all-purpose energy systems (for electricity, transportation, heating/cooling, and industry) to ones powered entirely by wind, water, and sunlight.”
  - “The roadmaps here provide a consistent set of pathways to eliminate 100% of present-day greenhouse gas and air pollutant emissions from energy by 2050 in all 50 states while growing the number of jobs and stabilizing energy prices.”
  - “The technologies selected for ground transportation, which will be entirely electrified, include battery electric vehicles (BEVs) and hydrogen fuel cell (HFC) vehicles, where the hydrogen is produced by electrolysis.”
  - “Air heating and cooling will be electrified and powered by electric heat pumps (ground-, air-, or water-source) and some electric-resistance heating. Water will be heated by heat pumps with electric resistance elements and/or solar hot water pre-heating. Cook stoves will have either an electric induction or resistance-heating element.”
  - Solutions to the grid integration problem are obtained by prioritizing storage for excess heat (in soil and water) and electricity (in ice, water, phase-change material tied to CSP, pumped hydro, and hydrogen); using hydroelectric only as a last resort; and using demand response to shave periods of excess demand over supply. No batteries (except in electric vehicles), biomass, nuclear power, or natural gas are needed.
  - <http://web.stanford.edu/group/efmh/jacobson/Articles/I/USStatesWWS.pdf>

# Union of Concerned Scientists

[http://www.ucsusa.org/sites/default/files/legacy/assets/documents/global\\_warming/climate-2030-roadmap-exec-summary.pdf](http://www.ucsusa.org/sites/default/files/legacy/assets/documents/global_warming/climate-2030-roadmap-exec-summary.pdf)

BOX ES.2.

## Climate 2030 Blueprint Policies

### Climate Policies

Economywide cap-and-trade program with:

- Auctioning of all carbon allowances
- Recycling of auction revenues to consumers and businesses\*
- Limits on carbon "offsets" to encourage "decarbonization" of the capped sectors
- Flexibility for capped businesses to over-comply with the cap and bank excess carbon allowances for future use

### Industry and Buildings Policies

- An energy efficiency resource standard requiring retail electricity and natural gas providers to meet efficiency targets
- Minimum federal energy efficiency standards for specific appliances and equipment
- Advanced energy codes and technologies for buildings
- Programs that encourage more efficient industrial processes
- Wider reliance on efficient systems that provide both heat and power
- R&D on energy efficiency

### Electricity Policies

- A renewable electricity standard for retail electricity providers
- R&D on renewable energy
- Use of advanced coal technology, with a carbon-capture-and-storage demonstration program

### Transportation Policies

- Standards that limit carbon emissions from vehicles
- Standards that require the use of low-carbon fuels
- Requirements for deployment of advanced vehicle technology
- Smart-growth policies that encourage mixed-use development, with more public transit
- Smart-growth policies that tie federal highway funding to more efficient transportation systems
- Pay-as-you-drive insurance and other per-mile user fees

# Current Situation

- John Holden, Obama Science Adviser (12/22/16):
  - “I think the two biggest drivers of progress on climate change around the world today are that the symptoms of climate change, the damages from climate change, are becoming ever more apparent. And the opportunities to do something are also growing — in substantial part because clean energy is getting cheaper. That’s going to be extremely important moving forward, regardless of what government policies do or don’t materialize in the United States.”
  - “But I don’t think for a minute that if, for one reason or another, the U.S. reduced its level of activity in this space, that China would reduce its [activity]. I expect that the European countries, who are themselves experiencing the impacts of climate change, will stay the course; I think Canada will stay the course; I think many of our friends in Latin America will stay the course; I think India will stay the course.”
- <https://thinkprogress.org/conversation-with-obama-chief-science-adviser-c8ce9c18b16e#.dsyi3gyz6>
- Clean Power Plan:
  - 14 state attorneys, including WA, urging trump to not repeal it
  - Conservative state attorneys urging him to repeal
  - Is currently in the courts
  - Add in where do we go from here – look at 350.org, CCL, Sierra Club, etc.

# National Organizations

- Citizens Climate Lobby – <http://citizensclimatelobby.org/>
  - Empowers citizens to lobby their federal representatives on climate change. Seeks passage of a Carbon Fee and Dividend – a revenue neutral carbon tax
- Sierra Club campaigns - <http://sierraclub.org/>
  - Ready for 100: Advocating for 100% clean and renewable energy
  - Beyond Coal: advocate for the retirement of old and outdated coal plants and to prevent new coal plants from being built.
  - Beyond Oil: block the most dangerous oil projects
  - Beyond Natural Gas: advocate for fracking bans and/or safeguards

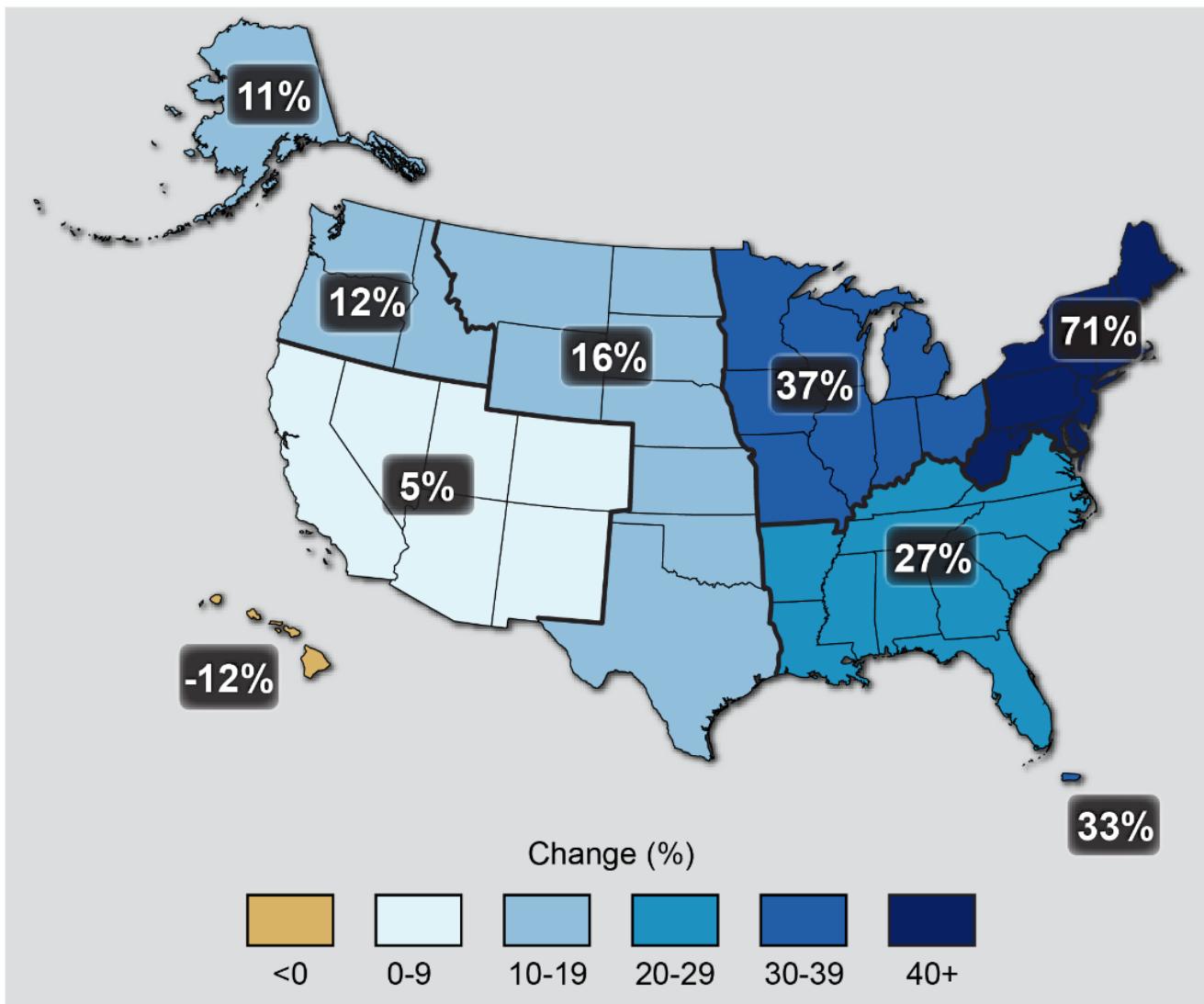
# National Organizations

- 350.org:
  - Divest from fossil fuels campaign: works to encourage organizations and municipalities to divest from fossil fuel companies
  - Supports protests of new pipelines (Dakota Access, Keystone)
  - Currently mobilizing resistance to Trump's fossil fuel agenda and appointments, including a 1/9 Seattle protest
  - Note the Olympic Climate Action in Sequim cooperates with 350.org on specific issues, and is listed as a local affiliate. (<https://olyclimate.org/>)

# National Adaptation - Impacts

- Climate Change Impacts in the US (2014): <http://nca2014.globalchange.gov/>
  - Increasing air temperature: US increased 1.3 – 1.9' since 1895, mostly since 1970
    - Temperatures are projected to rise another 2°F to 4°F in most areas of the United States over the next few decades (3-5°F by 2100 in low emissions scenario, B1).
  - US has seen increased excessively high temperatures, more heavy downpours, and more severe droughts in some regions
  - Children, elderly, poor and sick are the most vulnerable
  - Health impacts include heat stress, respiratory stress from increased pollen, spread of waterborne diseases, impacts from wildfire, flooding, drought
  - Infrastructure (roads, buildings, etc.) is being damaged by sea level rise, flooding, fires, heat
  - Oceans acidifying
  - Sea level rise, combined with coastal storms, has increased the risk of erosion, storm surge damage, and flooding for coastal communities, especially along the Gulf Coast, the Atlantic seaboard, and in Alaska.
    - Seas rose 8" over past century globally, projected to rise between 8" – 6'
    - 5M Americans and 100s of \$Bs of property in US located < 4' above current levels

## Observed Change in Very Heavy Precipitation



# National Adaptation - Impacts

- Climate Change Impacts in the US (2014): <http://nca2014.globalchange.gov/>
  - Some regions may benefit in some ways – longer growing seasons and longer ice-free periods for shipping on the Great Lakes.
  - “Climate change will also alter the stability of food supplies and create new food security challenges for the United States as the world seeks to feed nine billion people by 2050.”
  - Impacts to ecosystems, fish and wildlife due to temperatures, water availability, flooding, ocean acidification, etc.

# National Adaptation - Responses

- “Both “bottom up” community planning and “top down” national strategies may help regions deal with impacts such as increases in electrical brownouts, heat stress, floods, and wildfires.”
- “Because of the growing influence of human activities, the climate of the past is not a good basis for future planning. For example, building codes and landscaping ordinances could be updated to improve energy efficiency, conserve water supplies, protect against insects that spread disease (such as dengue fever), reduce susceptibility to heat stress, and improve protection against extreme events.”
- “Substantial adaptation planning is occurring in the public and private sectors and at all levels of government; however, few measures have been implemented and those that have appear to be incremental changes.”
- Climate change adaptation actions often fulfill other societal goals, such as sustainable development, disaster risk reduction, or improvements in quality of life, and can therefore be incorporated into existing decision-making processes.

# National Adaptation - Responses

- A November 2013 Executive Order entitled “Preparing the United States for the Impacts of Climate Change” calls for, among other things, modernizing federal programs to support climate resilient investments, managing lands and waters for climate preparedness and resilience, creating a Council on Climate Preparedness and Resilience, and the creation of a State, Local, and Tribal Leaders Task Force on Climate Preparedness and Resilience.
- FEMA: while the FEMA flood maps don’t explicitly include climate change projections, they do require building codes for areas subject to flooding that have some level of flood-proofing.
  - Ex. in PT, “Residential Construction. 1. New construction and substantial improvement of any residential structure shall have the lowest floor, including basement, elevated one foot or more above base flood elevation.”
  - Communities can also make these more stringent to account for climate change (Olympia has done that recently.)

# National Adaptation - Responses

## Non-governmental Adaptation Efforts and Resources

- Adaptation planning assistance/tools: [ICLEI-Local Governments for Sustainability](#), [Natural Resources Defense Council](#), [The Nature Conservancy](#)
- Best practice examples: [Climate Adaptation Knowledge Exchange](#), [Institute for Sustainable Communities](#)
- Policy, legal support: [Center for Climate and Energy Solutions](#) (formerly Pew Center on Global Climate Change), [Georgetown Climate Center](#)