

THE CLEAN POWER PLAN: Combating Climate Change + Protecting Our Health

Iowa Environmental Council

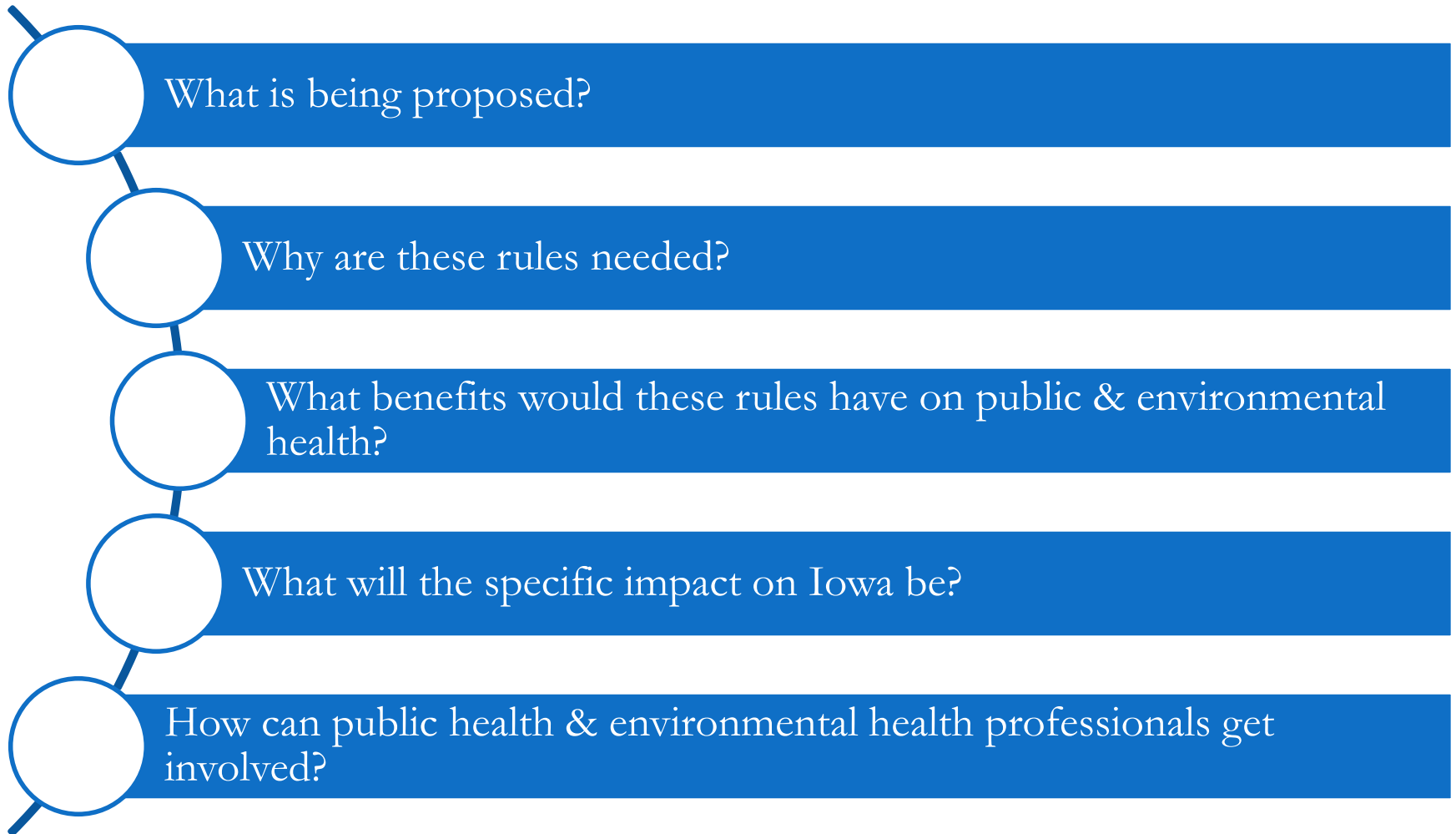
Environmental Law & Policy Center

with Kim Knowlton, Natural Resources Defense Council

November 20, 2014



Presentation Overview



WHAT IS BEING PROPOSED?

About the Clean Power Plan

Overview of the Clean Power Plan

WHO? U.S. Environmental Protection Agency

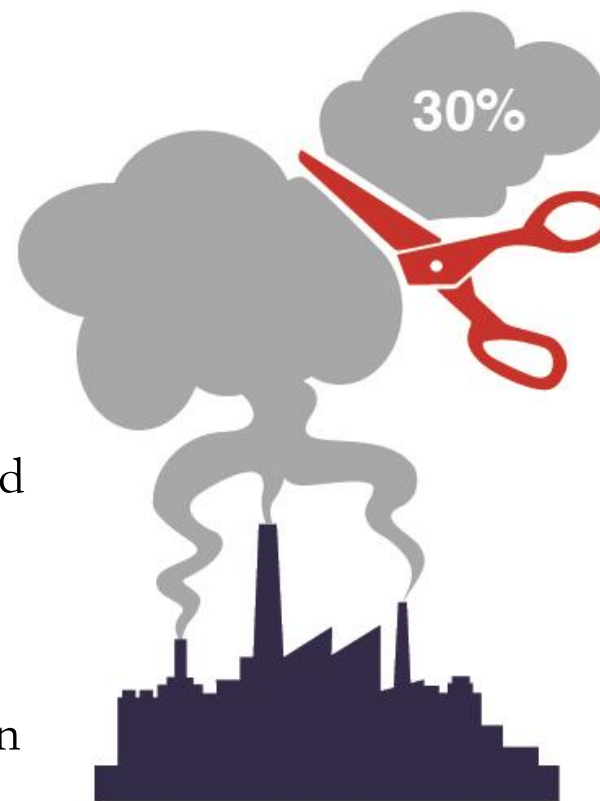
WHAT? Proposed federal rules under the Clean Air Act requiring states to reduce carbon emissions from their existing, fossil fuel (coal) fired power plants

WHEN? By 2030

WHY? The EPA found that carbon pollution endangers public health:

- Carbon pollution is a leading cause of climate change – change that is costly to human & environmental health
- Fossil fuel fired power plants are the largest concentrated source of carbon pollution in the U.S.

HOW? The EPA set state-specific carbon emission reduction goals. Each state must meet these goals by 2030, but states have flexibility in choosing how they reduce carbon pollution




Establishing State-Specific Emission Goals

To cut total U.S. carbon pollution by 30% by 2030, the EPA set specific emission reduction goals for each state



To set state goals, the EPA looked at costs, technology, etc. to develop the best system of emission reduction



This system uses four technologically and economically proven “building block” strategies to develop state-specific carbon emission goals:

Establishing State-Specific Emission Goals

Building Block 1:

Increase Efficiency of Existing,
Fossil –Fuel Fired Power Plants
(6% Heat Rate Improvement)

Building Block 2:

Increase Use of Existing Lower-
Emitting Sources
(NGCC - 70% Capacity Factor)

Iowa's 2012 Emissions Rate: 1,552 lbs/MWh
Iowa's 2030 Emissions Goal: 1,301 lbs/MWh

Building Block 3:

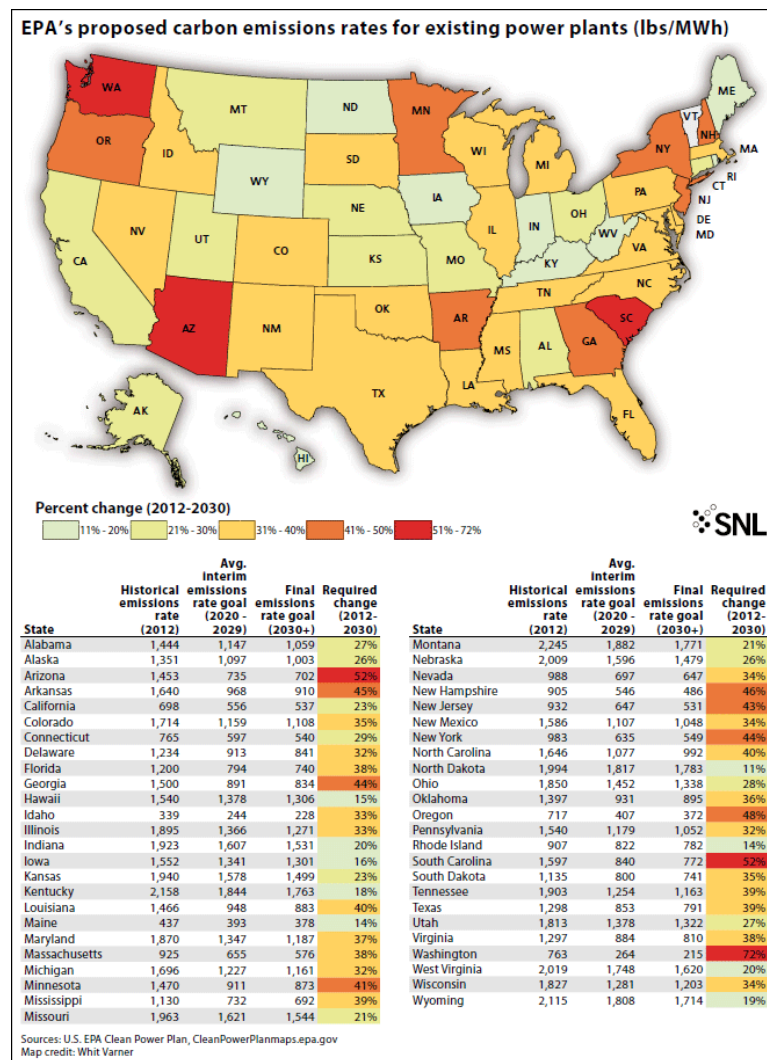
Increase Use of Low/Zero
Emitting Sources
(Regional RE Target of 15%)

Building Block 4:

Increase Demand-Side Energy
Efficiency Programs
(1.5% Annual Incremental Savings)

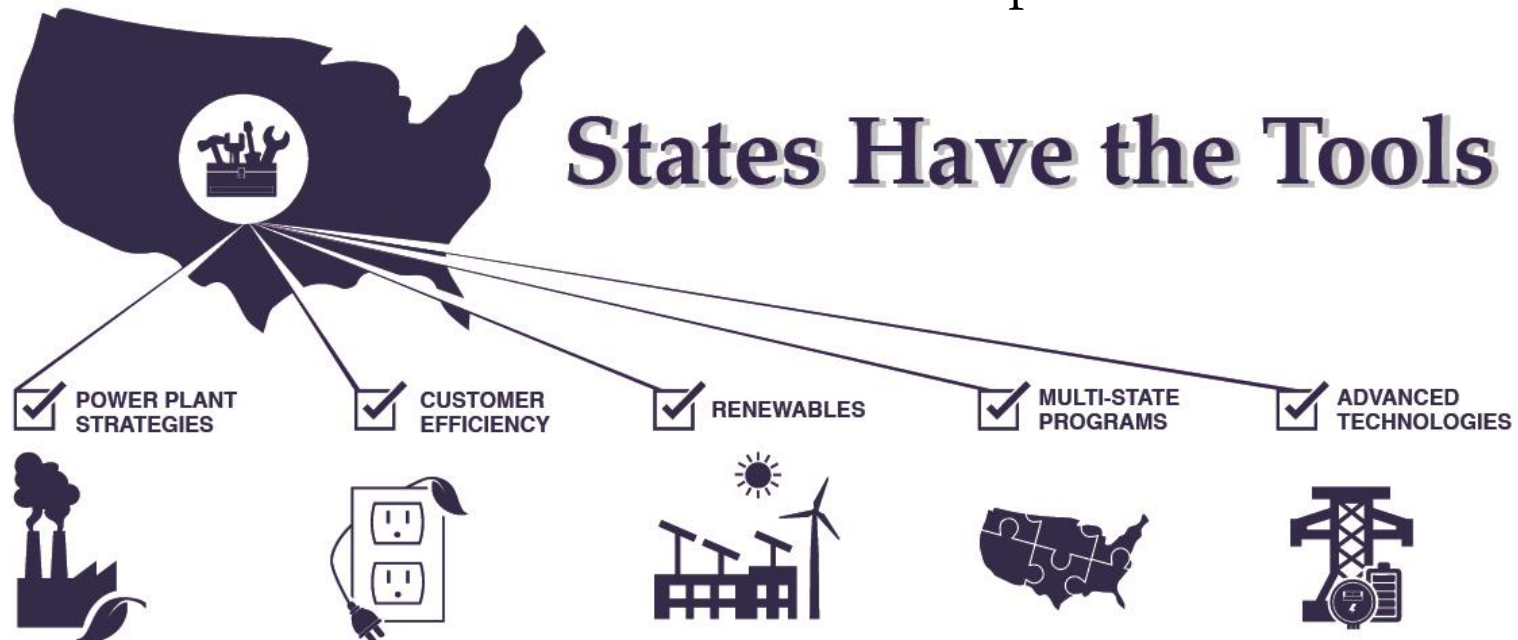
Establishing State-Specific Emission Goals

- Because different states have different energy portfolios, state goals vary widely
- Iowa's goal: 16% emissions reduction by 2030 (the 5th lowest goal in the country)



State Flexibility under the Clean Power Plan

- Under the Clean Power Plan, states must meet specific emissions goals, *but*
- States can choose any of the EPA's proposed emission reduction strategies – or develop their own



WHY ARE THE RULES NEEDED?

Combating Climate Change & Protecting Public Health

Why are these rules needed?

- **Fossil-fuel fired power plants are** “the largest concentrated source of carbon dioxide emissions in the U.S., making up roughly 1/3 of all domestic greenhouse gas emissions.” (*EPA*)
- Carbon pollution is one of most significant causes of climate change.
- Climate change contributes to a host of human health threats.

Climate Change Costs our Communities

- Nationally, climate-related disasters cost the U.S. \$140 billion in 2012 - \$1,100 per taxpayer. (NRDC)
- Iowans faced \$5.6 billion in economic losses from 2008-2012. (NRDC, citing C.J. Anderson)



Source above: NRDC, May 2014, Handout FS 14-05-H, citing 1) NRDC, *Who Pays for Climate Change?*, May 2013 www.nrdc.org/globalwarming/taxpayer-climate-costs.asp

NRDC's *Economic Opportunities of Cutting Carbon Pollution and Climate Change in Iowa*, pg. 1 <http://www.nrdc.org/globalwarming/files/carbon-pollution-state-jobs-IA-2.pdf>, citing to Anderson, C.J. "Extreme Weather and Climate Change in Iowa: Now and Future Trends," Iowa State University Climate Science Program, December 11, 2013, ppc.uiowa.edu/sites/default/files/anderson.pdf.

Image Source, right: Cedar Rapids, 2008 floods: www.theatlantic.com, Ron Mayland/Reuters

Climate Change Threatens our Health

- According to the U.S. Global Change Research Program's 2014 *National Climate Assessment*, climate change poses significant human health challenges, including:
 - ✓ increased air pollution and ground level ozone;
 - ✓ increased allergens;
 - ✓ increased temperature extremes;
 - ✓ increased precipitation extremes;
 - ✓ increased incidence of vector-borne diseases;
 - ✓ increased incidence of food- and waterborne diseases; and
 - ✓ increased incidence of mental health and stress-related disorders.

Increased Air Pollution & Ground Level Ozone

- Climate change is projected to increase particulate matter air pollution & increase ground level ozone. (*National Climate Assessment*)
- “Ground level ozone (a key component of smog) is associated with diminished lung function, increased hospital admissions & emergency room visits for asthma, and increases in premature deaths.” (*National Climate Assessment*)
- In 2012 alone, asthma sickened 41,694 children and 193,727 adults in Iowa. (*NRDC*)



Sources, above: Luber, G., K. Knowlton, J. Balbus, H. Frumkin, M. Hayden, J. Hess, M. McGeehin, N. Sheats, L. Backer, C. B. Beard, K. L. Ebi, E. Maibach, R. S. Ostfeld, C. Wiedinmyer, E. Zielinski-Gutiérrez, and L. Ziska, 2014: Ch. 9: Human Health. *Climate Change Impacts in the United States: The Third National Climate Assessment*, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 220-256. doi:10.7930/J0PN93H5.

NRDC, May 2014, Handout FS 14-05-H, citing 1) NRDC, *Who Pays for Climate Change?*, 2) American Lung Association, *Estimated Prevalence and Incidence of Lung Disease*, April 2013

Image source right, above: <http://www.center4asthmaallergy.com/wp-content/uploads/2011/10/asthma1.jpg>

Increased Allergens

- Climate change can lead to:
 - ✓ Increases in pollen concentrations;
 - ✓ Longer pollen seasons
 - ✓ Increased growth of indoor molds
(*National Climate Assessment*).
- Increases in pollens/molds can increase allergies, increase asthma episodes.
(*National Climate Assessment*)
- In Iowa, northward shifts of certain plant species and an extended growing season are expected to increase allergy and asthma risks (*National Wildlife Federation*)



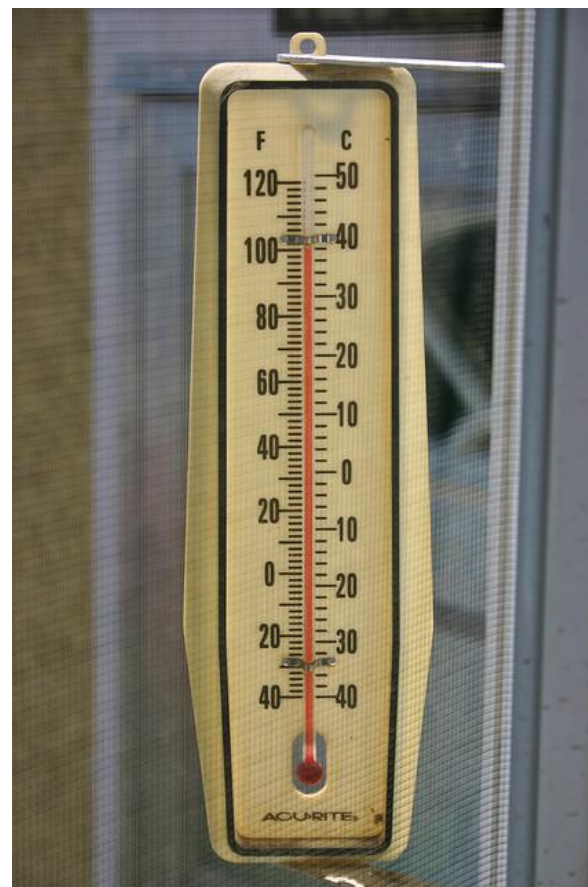
Sources, above: Luber, G., K. Knowlton, J. Balbus, H. Frumkin, M. Hayden, J. Hess, M. McGechin, N. Sheats, L. Backer, C. B. Beard, K. L. Ebi, E. Maibach, R. S. Ostfeld, C. Wiedinmyer, E. Zielinski-Gutiérrez, and L. Ziska, 2014: Ch. 9: Human Health. Climate Change Impacts in the United States: The Third National Climate Assessment, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 220-256. doi:10.7930/J0PN93H5.

Staudt, A., P. Glick, D. Mizejewski, & D. Inkley, 2010: Extreme Allergies and Global Warming, 12 pp. National Wildlife Federation and Asthma and Allergy Foundation of America. [Available online at http://www.nwf.org/~media/PDFs/Global-Warming/Reports/NWF_AllergiesFinal.ashx]

Image source, William Brawley,
http://www.flickr.com/photos/pulmonary_pathology/3734399809/in/photolist-8q84TR-6FZLXB-ekYLQy-6gV9wh-7LzjxS-8Wvnr-49AzPr-9syETP-4SC2ZM-r3rju-mNsRcn-mNv4uA-mNup2y-mNsWVM-mNv9mj-6aexb2-dKbMV-nWGHhH-7Lkquf-8ZKmvj-jNEwz-PNoBz-9AQCeV-6nEgcQ-7HWoy3-jWoMS-8z6VCx-essHg-Cwxgp-a4RLsu-aR4RwP-a4NU78-NpKbk-9VS7C-dVdgsB-bVixws-9SDJVg-a4RLq5-bWRKKo-a4RLoY-dQuu6j-9y3cg8-ehkNbE-dP3eX-o15Y5n-9y68Ts-8R31Ps-adeVN1-8ZGhxn-97dMAf/

Increased Temperature Extremes

- Extreme heat events are increasing in the United States and are projected to become more frequent and intense (*National Climate Assessment*)
- Among weather-related hazards, extreme heat is the number one killer of people in the United States (*CDC*)
- Heat waves result in increased all-cause deaths and increased hospital admissions, but especially for:
 - ✓ Heat stroke
 - ✓ Cardiovascular disorders
 - ✓ Kidney disorders, and
 - ✓ Respiratory disorders. (*Knowlton, Kilbourne, National Climate Assessment*)
- Decreases in deaths and injuries from fewer extreme cold events are not expected to offset the increase in heat related deaths (*National Climate Assessment*)



Sources, above: Luber, G., K. Knowlton, J. Balbus, H. Frumkin, M. Hayden, J. Hess, M. McGeehin, N. Sheats, L. Backer, C. B. Beard, K. L. Ebi, E. Maibach, R. S. Ostfeld, C. Wiedinmyer, E. Zielinski-Gutiérrez, and L. Ziska, 2014: Ch. 9: Human Health. Climate Change Impacts in the United States: The Third National Climate Assessment, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 220-256. doi:10.7930/J0PN93H5.

Centers for Disease Control and Prevention (2009). Extreme heat: a prevention guide to promote your health and safety. http://emergency.cdc.gov/disasters/extremeheat/heat_guide-page-3.asp.

Knowlton, Kim, et al. "The 2006 California heat wave: impacts on hospitalizations and emergency department visits." *Environ Health Perspect* 117.1 (2009): 61-67.

Kilbourne, Edwin M. "The spectrum of illness during heat waves." *Am J Prev Med* 16.4 (1999): 359-360.

Image source, Mack Male, Heat Wave: <http://www.flickr.com/photos/christine592/764750418/in/photo-list-2ePP3S-2azxE3-4Uk3we-2JP844-a6Y8Lb-5arTqX-8QvuQe-8hohSX-8GPPoJ/>

Increased Precipitation Events

- The frequency of heavy precipitation events (flooding, heavy rainfalls) is expected to increase throughout the U.S. (*National Climate Assessment*)
- Floods are the 2nd deadliest weather related event in the U.S. and account for nearly 100 deaths per year (*National Climate Assessment*)
- Heavy precipitation events are linked to increases in:
 - ✓ Waterborne diseases
 - ✓ Increases in mold contamination and indoor air quality issues
 - ✓ Increased asthma
 - ✓ Increased toxic waste and raw sewage leaks
 - ✓ Increased lower respiratory track infections (pneumonia, RSV) (*National Climate Assessment, Iowa Climate Change Impacts Committee*)



Image source, U.S. Geological Survey, **Flooded Neighborhood** Flooded neighborhood near Wilson Ave. SW and Hamilton Street SW (photography: Don Becker, USGS); <http://www.flickr.com/photos/usgeologicalsurvey/2594326010/in/photolist-4XfAJN-bs2Dd2-akRBNQ-98gyhE-84gs3N-oHi33g-ep63qj-doTX24-7z68K7-986dPS-fFoNWH-iUUSCW-diQy3g-fW6utx-7t2Nyt-fU3XkK-8kAoHJ-dpgYgL-4XfxWj-dpgTrF-5FDT9o-7Ecm9c-fFESWb-ofemnd-aDEHGh-D7ohN-saMTto-o1HQKn-8RHXiX-bsci9G-oqM1b8-aHKM6F-5R29GA-bM98PH-cNoMcL-9Gnz9R-iYS3Vw-bVGnK-dph1Gb-doHJpF-dpgQ8a-986b17-fTxb5D-ffF7C1-fW6EPo-eT4w1h-9RyKQX-bD9uvG-9RyB4x-9RyEUH#>

Sources, above: Luber, G., K. Knowlton, J. Balbus, H. Frumkin, M. Hayden, J. Hess, M. McGeehin, N. Sheats, L. Backer, C. B. Beard, K. L. Ebi, E. Maibach, R. S. Ostfeld, C. Wiedinmyer, E. Zielinski-Gutiérrez, and L. Ziska, 2014: Ch. 9: Human Health. Climate Change Impacts in the United States: The Third National Climate Assessment, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 220-256. doi:10.7930/J0PN93H5.

Increased Incidence of Vector-borne Diseases

- Climate change is altering the distribution of diseases carried by vectors (i.e., tick, mosquitoes, fleas). Without adequate vector control and other public health measures, this may increase the risk of:
 - ✓ Lyme Disease
 - ✓ West Nile Virus,
 - ✓ Dengue fever
 - ✓ Rocky Mountain spotted fever (*National Climate Assessment*)
- Climate change may specifically alter the transmission cycle of Lyme disease, including:
 - ✓ Lengthened transmission seasons;
 - ✓ Higher tick densities and greater risk (*National Climate Assessment*)



Image source, Eli Christman, Mosquito;

<http://www.flickr.com/photos/gammaman/7490427254/in/photolist-4YRM2y-5mCj7k-8cEF3o-dL2Wn-34mrZ-ccG8o1-cpUp4u-cpUpej-cpUoNL-cpUoSS-cpUoQL-2kPh9j-ktnKj-8baP3c-hAEz5-hAEyB-6Rbeob-bVjSEF-bVjSAX-fDVaww-aafvbV-aaijWG-aaijVm-aafwdn-bVjSbi-bWcPEd-k2bCQ-5eWeQX-gGcnJH-5b4Ch8-6L7LMe-8nBpyL-eMGUYi-3SukNL-eMGVDv-eMGW6t-6VRbxR-52Qc1t-ccG8rq-6EyBN2-5ebtRi-bVjSDB-6FKDXn-2UQefA-3jH2iK-8sjMYm-4LcK1-ibqtD-9vhSRP-8uXBjn#>

Sources, above: Luber, G., K. Knowlton, J. Balbus, H. Frumkin, M. Hayden, J. Hess, M. McGeehin, N. Sheats, L. Backer, C. B. Beard, K. L. Ebi, E. Maibach, R. S. Ostfeld, C. Wiedinmyer, E. Zielinski-Gutiérrez, and L. Ziska, 2014: Ch. 9: Human Health. Climate Change Impacts in the United States: The Third National Climate Assessment, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 220-256. doi:10.7930/JOPN93H5.

Increased Incidence of Food- & Waterborne Diseases

- Salmonellosis and Campylobacteriosis are more common when temperatures are higher. (*National Climate Assessment*)



Sources, above: Luber, G., K. Knowlton, J. Balbus, H. Frumkin, M. Hayden, J. Hess, M. McGeehin, N. Sheats, L. Backer, C. B. Beard, K. L. Ebi, E. Maibach, R. S. Ostfeld, C. Wiedinmyer, E. Zielinski-Gutiérrez, and L. Ziska, 2014: Ch. 9: Human Health. Climate Change Impacts in the United States: The Third National Climate Assessment, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 220-256. doi:10.7930/J0PN93H5.

Image source, NIAID, Salmonella Bacteria

<http://www.flickr.com/photos/niaid/5613656967/in/photolist-9y4sD6-663GS3-oUqw4E-aUpZtv-dntBks-dkYoFh-4ZXvEZ-o51L4j-76JBn-8tKfgH-8tNhkL-4YnkB1-8YbMM3-61DzQU-3KuSy-5cKC4a-4YXcRC-4UGmk7-5TVUyU-8u1KXR-dQu5BG-fqJvak-AFN91-9VQDQb-4YgqFy-5kV8ot-9VQDMq-HQJlUW-f4X8hj-dWPJZt-7ESk7b-56SBkB-97CcJU-aoWdob-xHczv-9VQDTf-4URYiB-aoTsPK-a3bJE2-5TYVL9-7F31tz-7wsmgv-6pu9Ck-4TsbqH-7F6Sb3-7F6Vvj-7F6LuW-7F6FGy-7F6THd/#>

Increased Incidence of Mental Health & Stress-Related Disorders

- Mental health issues increase following weather disasters
 - ✓ PTSD
 - ✓ Anxiety (*National Climate Assessment*)
- Suicide rates increase with warm weather (*National Climate Assessment*)
- During heat waves, dementia patients are more likely to be hospitalized and/or die (*National Climate Assessment*)



Image source, Sander van der Wel, Depressed;

<http://www.flickr.com/photos/jar0d/4649749639/in/photolist-csMKZA-csMUbj-csMHZG-55AMbS-QVkeE4-e2fQKB-aajmg4-9jctx9-7f3f95-4s4Ju7-mq6ETn-4zN2vk-keEpmZ-7b9Gwh-7JNPKU-caepoC-62LgQK-kQmmSr-6pw5mf-8toFTB-7mAAKB-JPMjV-esNFPy-oQ7wMf-6tMfFe-85Tbze-ca7FBm-angSEe-7Hf8Em-762KYT-5vZUca-sZDh8-anhvyX-5PkrCC-anhBa4-ncvi3w-nexKMB-nexYrn-ncvhWf-ncvhau-9nPRb-76jNWH-anhAH3-cD8JmU-anj2c1-HwBe-f6dDf-7bkkXY-cD8LkA-4XDmSu#>

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WHAT ARE THE HEALTH BENEFITS?

Projected Impact of the Proposed Clean Power Plan

Impact of the Rules – by 2030

- Benefit:

- 30% reduction in carbon pollution levels (from 2005)
- Between \$55 and \$93 billion in national climate and public health savings per year (*EPA*)

- Cost:

- \$7.3 - \$8.8 billion
- But the EPA projects an \$8 average monthly savings on residential bills



Additional Health Co-Benefits

- Co-Benefits:
 - Reducing pollution is expected to result in a more than 25% reduction in fine particulate matter, nitrogen oxides, mercury and sulfur dioxides from power plants
 - Nationally, the EPA estimates reductions in these pollutants will help to prevent 6,600 premature deaths; 150,000 asthma attacks in children; 3,300 heart attacks; 2,800 hospital admissions; and 490,000 missed work/school days each year
- In Iowa, reductions in these co-pollutants are expected to specifically prevent 47 premature deaths; avoid 15 hospitalizations; and avoid 3 non-fatal heart attacks annually. (*Health Co-Benefits of Carbon Standards for Existing Power Plants*)

Source above: *Health Co-Benefits of Carbon Standards for Existing Power Plants*, Joel Schwartz, Harvard School of Public Health, Harvard University; Jonathan Buonocore, Harvard School of Public Health, Harvard University; Jonathan Levy, School of Public Health, Boston University; Charles Driscoll, Syracuse University; Kathy Fallon Lambert, Harvard Forest, Harvard University; Stephen Reid, Sonoma Technology Inc. Available at: <http://www.chgeharvard.org/resource/health-co-benefits-carbon-standards-existing-power-plants#sthash.xBWMgsN6.dpuf>

WHAT IS THE IMPACT ON IOWA?

Projected Impact of the Proposed Clean Power Plan

Impact on Iowa?

- Iowa is required to only make a 16% reduction in its carbon emissions – the 5th lowest percent reduction goal in the U.S.
- As a national leader in renewable wind generation, the state is well-positioned to meet its 2030 goal.



More Work to Do:

- Iowa is still heavily dependent on coal.
- Despite its advancements in clean energy generation, the U.S. Energy Information Administration still lists Iowa as one of the top ten states in the nation in use of coal per capita.
- Over 62% of Iowa's electric generation was sourced from coal in 2012. (*Iowa Utilities Board*)
- Emissions and disposal of coal waste contribute to:
 - ✓ cardio-respiratory disease,
 - ✓ diabetes,
 - ✓ cancers, and
 - ✓ cognitive behavior disorders. (*LA Physicians for Social Responsibility*)

Source: Iowa Utilities Board, Iowa Electric Profile, Available online at: http://www.state.ia.us/government/com/util/energy/electric_profile.html

Iowa Coal and Health: A Preliminary Mapping Study. Iowa Chapter of Physicians for Social Responsibility. Maureen McCue, MD PhD, Paul Deaton, MA, Eric Nost, BA, John Rachow, PhD MD. Available online at: <http://www.psr.org/assets/pdfs/iowa-coal-and-health.pdf>

Clean Power Plan is an Opportunity

- For Iowa to boost our state's economy by increasing renewable energy generation and moving away from out-of-state coal dependence.
- For Iowa to improve our public & environmental health by reducing carbon pollution, and co-pollutants from coal combustion.

- For Iowa to explore cleaner, healthier energy sources:

In addition to wind, Iowa has significant opportunities to expand solar energy.

As the Iowa Environmental Council noted in an earlier report, Iowa's rooftop solar PV potential alone could meet close to 20% of Iowa's annual electric needs.

How can you get involved?

It is important for the EPA and Governor Branstad to hear from Iowa public health and environmental health professionals about the importance of the Clean Power Plan:

- **For Organizations:**

- ✓ Sign onto a letter of support to Gov. Branstad and the EPA

- ✓ For more information, contact:

Cindy Lane

Iowa Environmental Council

Lane@iaenvironment.org

- **For individuals:**

- ✓ Send an online letter of support to Gov. Branstad:

<http://iaenvironment.org/actnow.php#/10>

- The EPA is accepting public comments on the plan through: **December 1st, 2014.**

- Details on how to submit comments to the EPA are available online at:

<http://www2.epa.gov/carbon-pollution-standards>

- For additional information, contact:

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