

Examples of Co-Benefits Associated with Climate Policies in the US, prepared 27 March 2019

A. Vehicle performance standards, including pollution fees in fuel prices

1. San Joaquin Valley, CA: Enhanced Fleet Modernization Program Plus-up (EFMP Plus-up) \$4.8 million pilot program in California designed to provide up to \$9,500 to low-income residents living in disadvantaged communities so that they can replace their old vehicle with a new or used hybrid, plug-in hybrid or electric vehicles. 13,000 cars have been repaired to state smog standards by Valley Clean Air Now's Tune In & Tune Up program since 2011.¹
 - a. **Co-benefits:**
 1. Families achieve approximately \$500 in average annual fuel-cost savings
 2. Recipients report that increasing the reliability and safety of their vehicles created multiple co-benefits including promotions at work, savings toward the purchase of a home, and enough additional time and money to be able to enroll in community college classes.
 3. Recipients also report spending half of what they previously did on gas and using the savings to pay off remaining loans on the new vehicle.
 - b. **Equity consideration:** 97.8% of 30,000 customers of the program are residents of disadvantaged communities.
2. A 2005 study modeled the potential results of increased corporate average fuel economy standards by 30% in 2010 and 50% in 2015²
 - a. **Co-benefits:**
 1. The value of the reduced gas consumption is greater than the increased vehicle cost (\$75-100 billion saved in 2030 versus \$55 billion increase in vehicle prices in 2030).
 2. Reduce greenhouse gas emissions by 100 mega tons
 3. Create 300,000 jobs

B. Clean energy supply policies

1. In California a model to install rooftop solar³
 - a. **Co-Benefits:** reduced electricity costs by 75 to 90% for over 5,500 families, saving them an estimated \$150 million in lifetime electricity costs.
 - b. **Equity considerations:** Families lived in a designated 'disadvantage community' and had incomes within 80% of the area median income.
2. Currently more than 100 million people in the United States live in communities where air pollution exceeds health-based air quality standards.⁴

¹ <http://greenlining.org/issues/2015/climate-investments-case-studies-report/>

² http://misi-net.com/publications/vehicle_fuel_efficiency_standards.pdf

³ <http://greenlining.org/issues/2015/climate-investments-case-studies-report/>

⁴ <https://nca2018.globalchange.gov/chapter/13/>

3. A 2017 paper published in Nature Energy quantified the effects of scaling up clean energy sources (wind, solar, and hydro power, etc) between 2007-2015⁵
 - a. **Co-benefits:**
 1. Reduced CO2 emissions by 747 mega tons
 2. Avoided 7,000 premature deaths
 3. Saved the US economy \$87.8 billion, 64% from health savings and 36% from avoided climate impacts
4. A 2016 study found that implementing a clean energy standard in 17 NE states (ME, VT, NH, MA, CT, RI, NY, PA, NJ, DE, MD, WV, OH, IN, MI, IL, WI) reduced CO2 emissions by 85 mega tons by 2030⁶
 - a. **Co-Benefits:** average health savings of clean energy standard: \$148/ton of CO2 (cost \$126/tCO2) ... *1.17 benefit to cost ratio*

C. Energy efficiency programs

1. In 2015 Oak Ridge National Labs evaluated the costs and benefits for the DOE's Low Income Home Weatherization Assistance Program for program year 2010 (this was a ramped-up year during President Obama's stimulus). Here's highlights of what they found⁷:
 - a. **Co-benefits:**
 1. Spending (DOE plus partners) was \$2.7 Billion for an average of \$6,812 per home. 340,158 units were weatherized
 2. Present value of energy savings (2013 dollars) \$1.2 billion in total; \$3,700 per unit. 78% of savings accrued to the homeowners
 3. The present value of a limited set of health and household related non-energy benefits is \$4.8 billion or \$14,448 per unit.
 4. 28,000 direct and indirect jobs; increased national economic output by \$4 billion.
 5. First year energy savings of 7,610,000 Million British Thermal Units
 6. Carbon emissions were reduced by 7,382,000 metric tons
 7. A sub-study of one program that added asthma reductions measures as well as weatherization found that it reduced the annualized costs associated treating children with asthma by \$421
2. U.S. hospitals could save roughly \$15 billion over 10 years by adopting basic energy efficiency and waste-reduction measures (cumulative; no discount rate reported).⁸

⁵https://www.nature.com/articles/nenergy2017134.epdf?author_access_token=uYr0473RE7N8gJCivi6eKNRgN0jAjWel9jnR3ZoTv0O9NQQavv-jglBpgJVQy91sl6ZpWXil0zPIZ8H2tvWaSoZi9rrMjTx9l2FLlqAykV00GsKxOpkwjZM1RpGmND_BuVZCRc2dDL42qJnMAq4DGw%3D%3D

⁶<https://www.tandfonline.com/doi/abs/10.1080/10962247.2016.1192071?journalCode=uawm20>

⁷<https://www.energy.gov/sites/prod/files/2015/09/f26/weatherization-works-II-ARRA-period-eval.pdf>

⁸<https://nca2018.globalchange.gov/chapter/14/>

3. 2018 report analyzed cost and benefit of LEED-certified buildings in the United States, China, India, Brazil, Germany, and Turkey from 2000 to 2016 (only US outcomes listed below)⁹
 - a. **Co-Benefits:**
 1. Saved \$6.7 billion in energy costs
 2. \$2.68 billion saved in health benefits from reduced air pollution, which avoided: 172-405 premature deaths, 171 hospital admissions, 11K asthma exacerbations, 54K respiratory symptoms, 21K lost days of work, 16K missed school days

D. Pricing Carbon

1. A 2016 study found that implementing an economy-wide carbon tax in 17 northeast states (ME, VT, NH, MA, CT, RI, NY, PA, NJ, DE, MD, WV, OH, IN, MI, IL, WI) would reduce CO2 emissions 502 mega tons by 2030¹⁰
 - a. **Co-Benefits** Average health savings of carbon cap & trade: \$80/tCO2 (cost \$15/tCO2) ... *5.3 benefit to cost ratio*
2. Buonocore et al modeled the health benefits of a Massachusetts wide carbon fee and rebate program running from 2017 to 2040.¹¹
 - a. **Co-Benefits:**
 1. 340 premature deaths from air pollution prevented.
 2. Value of climate benefits was \$2 billion
 3. value of health benefits was \$2.9 billion.

E. Smart Urban Design

1. Failing to address aging and deteriorating infrastructure is expected to cost the U.S. GDP as much as \$3.9 trillion (in 2015 dollars) by 2025.¹²
2. A 2005 NYC program, Safe Routes to Schools, built new sidewalks and bike lanes, improved safety at crossings, upgraded signage, and educated pedestrians.¹³
 - a. **Co-benefits:**
 1. 33-44% reduction in school-age injury rates (14% reduction for all ages)
 2. program cost \$10.3 million dollars and saved \$230 million in health costs from improved air pollution, physical activity, and avoided injuries
 - b. **Equity considerations:** [Research shows](#) that the amount and quality of pedestrian and cycle-friendly infrastructure is unequally distributed across race and income demographics

⁹ <https://www.nature.com/articles/s41370-017-0014-9>

¹⁰ <https://www.tandfonline.com/doi/abs/10.1080/10962247.2016.1192071?journalCode=uawm20>

¹¹ <https://iopscience.iop.org/article/10.1088/1748-9326/aae62c>

¹² <https://nca2018.globalchange.gov/chapter/11/>

¹³ <https://ajph.aphapublications.org/doi/10.2105/AJPH.2014.301868>

3. Replacing 50% of short (≤ 4 km one way) car trips with travel by bicycle in the 11 largest midwestern cities would reduce CO₂ emissions by 2.9 billion pounds a year¹⁴
 - a. **Co Benefits:** 1,295 fewer deaths per year and \$8.7 billion/year in savings from improved air quality and increased physical activity

F. Redirect subsidies from fossil fuels to clean energy

1. Opportunity to modernize and update infrastructure: 70% of the grid's transmission lines and power transformers are over 25 years old, and the average age of power plants is over 30 years old¹⁵

¹⁴ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3261937/>

¹⁵ <https://nca2018.globalchange.gov/chapter/4/>