

Cleaner Energy and Health: Household, Local and Global Benefits

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Energy is central to the very service systems that sustain human life and well-being such as transportation, buildings, materials, infrastructure, food, hygiene, thermal comfort, communications, and lighting. But how we choose to supply energy can also have negative consequences such as water scarcity, air pollution, and extreme weather related events. When we burn fossil fuels to produce energy, for example, greenhouse gas emissions trap heat in the lower atmosphere and affect the quality of environmental services, the global climate, and our health. This year in the United States alone, more than 10,000 people will die from complications connected to air pollution. And we must not forget that energy goes hand in glove with another life-sustaining resource – water. Water is essential to operating power plants. When power plants produce more energy, they use more water and compete for this finite resource with other industries in drought-prone areas. The result is higher costs of water and energy.

We experience these externalities of our energy choices every day in the quality of the air we breathe and altered weather patterns such as heavy rains, record-setting periods of drought, or hotter than average days. According to the American Lung Association’s 2013 “State of the Air” analysis, more than 44 million Americans live in an area with unhealthy levels of air pollution all year.¹ Wind carries solid and liquid particles from power plant emissions through the air, and when inhaled, the particles can result in heart and lung damage. Climate changes also affect health. Extreme heat not only exacerbates upper respiratory illnesses like asthma and sinusitis but also extends the pollen season, which in turn triggers more, and more intense, cases of asthma. Asthma prevalence has risen 17 percent in the United States between 2001 and 2010 according to federal data.² The Centers for Disease Control and Prevention report that one in 12 people has asthma, which costs the United States about \$56 billion a year in medical costs, lost school and work days, and early deaths. If greenhouse gas

1 American Lung Association, State of the Air 2013 Rankings, available at <http://www.stateoftheair.org/2013/city-rankings/most-polluted-cities.html>.

2 Lara J. Akinbami, M.D.; Jeanne E. Moorman, M.S.; Cathy Bailey, M.S.; Hatice S. Zahran, M.D.; Michael King, Ph.D.; Carol A. Johnson, M.P.H.; and Xiang Liu, Trends in Asthma Prevalence, Health Care Use, and Mortality in the United States, 2001–2010. NCHS Data Brief. Number 94, May 2012. Available at <http://www.cdc.gov/nchs/data/databriefs/db94.htm>.

emissions continue to increase, doctors expect allergic conditions to worsen.³ In addition to the pollution from fossil fuels, thousands of families burn charcoal or wood on small stoves in their homes because they cannot afford to pay utility costs. The pollution from these energy sources also results in compromised upper respiratory health, which also leads to missed school and work days and more admissions to the emergency room.

According to the U.S. Energy Information Administration, fossil fuels supply 76 percent of the energy consumed in the United States to operate the buildings we live and work in every day. The total energy consumed is expected to grow by nearly 10 percent between 2010 and 2030, with about one-third of this growth from the building sector. Homes with little or no insulation or with windows that leak can expose families to the noises from the street, outdoor air pollutants, and extreme weather conditions. These homes also require more energy to heat or cool the living space, which results in higher utility bills and ultimately an increase in harmful emissions and water usage at the power plant. People with lower incomes are more likely to be living in older, deteriorated buildings. It should come as no surprise, then, that they also experience much higher rates of asthma-related hospitalizations.⁴ Specifically, building dampness is associated with a 30 to 50 percent increase in a number of respiratory and asthma-related health problems, including upper respiratory tract ailments, coughing and wheezing, and asthma.⁵ Children who do not feel safe or comfortable in their own homes coupled with routine visits to the emergency room and the financial hardship that ensues can be sources of toxic stress for children, which we are learning can disrupt brain development and threaten their learning, health, and life prospects.⁶

The Opportunity

Addressing the connections between energy service provision, consumption, and externalities can uncover structural barriers. This in turn may lead to innovations to change the enabling environment, develop new financial and business models, change behavior patterns, and transcend limitations of man-made environments, infrastructures, and technologies. Interventions in the energy system can then influence human and community health by positively contributing to critical community resources. For example, if the United States were to successfully reduce greenhouse gas emissions by 17 percent by 2020, more

3 W. Koch, *Climate Change Linked to More Pollen, Allergies, Asthma*. Natural Resources Council of Maine. (May 2013) available at <http://www.nrcm.org/news/environmental-issues-in-the-news/climate-change-linked-to-more-pollen-allergies-asthma/>.

4 F.J. Malveaux and S.A. Fletcher-Vincent. Environmental risk factors of childhood asthma in urban centers. *Environmental Health Perspectives*. 103 (Suppl 6): 59-62 (September 1995).

5 D. Mudarri and W. J. Fisk, "Public Health and Economic Impact of Dampness and Mold. *Indoor Air* (June 2007), 226-35.

6 J. Radner and J. Shonkoff, *Mobilizing Science to Reduce Intergenerational Poverty*. Investing in What Works for America's Communities (San Francisco: Federal Reserve Bank of San Francisco, 2012), 338.

than 24,000 lives could be saved.⁷ We can reach that target through new business development, local investments, and civic engagement and participation, which could simultaneously strengthen the fabric of communities and improve human health and well-being.

To leverage the energy system to enhance human health, we must intervene at the level of energy *supply*, energy *demand*, and energy *efficiency* while also addressing structural barriers and innovation opportunities.

Energy supply interventions involve developing new, clean sources of energy or reducing the social, economic, and environmental costs related to existing practices. Continued public investment in the supply of renewable technologies provides an opportunity to create lasting healthy and stable environments for low-income residents. Last year, supported with Community Development Block Grant (CDBG) funding from Los Angeles County Supervisor Gloria Molina, Enterprise Community Partners, Inc. orchestrated energy retrofits on nearly 90 homes in East Los Angeles has helped homeowners and their families save substantially on utility bills. One resident, Hermila Garcia, noted that when she received her first utility bill after her home was retrofitted with solar photovoltaic panels, attic insulation and a tankless water heater, she couldn't believe how much it had declined. For homeowners like Garcia, the retrofits have drastically reduced their utility bills, estimated to be about 30 percent annually. Savings from the last installation cycle are estimated to eliminate 1,165 tons of greenhouse gas emissions over the 30-year lifetime of the solar panels.

Interventions at the level of energy demand include reducing the consumption of energy at the individual, community, and national scales. Here there is a tremendous opportunity to build on the effectiveness of community health workers interventions to both advance health and energy conservation. Community health workers could help identify tactics and resources for improving energy efficiency, which have the added benefit of improving human health. Models such as "Health Leads" in Boston, and the Washington-Heights "Inwood Network for Asthma" (WIN) initiated by New York Presbyterian Hospital anchor community health workers in the community while maintaining a strong presence in the hospital where they connect with families who need immediate support. The WIN program includes a home environmental assessment but could be augmented with a home energy audit that would combine improvements to lower or eliminate asthma triggers with improvements that could reduce the household utility bills. Much could be done to better streamline and combine federal resources for energy efficiency through weatherization and other programs with resources for public health initiatives.

Intervening at the level of energy efficiency includes increasing the efficiency with which energy is converted, supplied, and used. The U.S. Department of Housing and Urban Development targeted more than \$6 billion of the \$14 billion allocated under the American

7 Seth Godin, "Deaths per TWH by Energy Source," Next Big Future, March 13, 2011, available at <http://nextbigfuture.com/2011/03/deaths-per-twh-by-energy-source.html>.

Reinvestment and Recovery Act (ARRA) for addressing energy, including \$2 billion in Neighborhood Stabilization Program funds to address green improvements in the foreclosed housing stock across the country. In addition, of the \$840 billion funds allocated through ARRA, more than \$60 billion went to states and localities specifically for energy-related tax incentives, contracts, grants, loans, and entitlements. These investments have sparked new ways of thinking about energy as a pathway to job creation and a healthier planet through cleaner energy sources and greater energy efficiency as well as opportunities to reduce the costs associated with operating buildings and homes. Investments in energy efficiency at the household level are resulting in lower utility bills and improvements in occupant health and could result in millions of children and adults experiencing healthier indoor environments through energy retrofits.⁸ But this nexus between health and energy must be intentional.

Conclusion

Converging trends in the electric power market have utilities, state, and federal agencies reassessing how best to provide low-cost electricity while meeting requirements for reducing a range of pollutants, particularly from aging coal plants that harm public health and worsen climate change. We can reduce power plant pollution through a combination of using electricity more efficiently and switching to cleaner sources of power. As we pursue strategies to deliver energy from cleaner sources to improve overall air quality we must also increase the efficiency with which we use energy in our homes where we stand to gain health benefits directly from the improved indoor air quality.

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8 E. Tohn, J. Wilson. Creating Healthy and Efficient Housing. Home Energy Magazine. (September 2012) Available at <http://www.homeenergy.org/show/article/id/1805>.