The Electricity Journal 30 (2017) 10–14

Contents lists available at ScienceDirect

The Electricity Journal

journal homepage: www.elsevier.com/locate/tej

Utilities and health: Energy efficiency as a common link

Anne Evens*, Margaret Garascia, Marjorie Isaacson

Elevate Energy, 322 S. Green, Chicago, IL 60607, United States

ARTICLE INFO

Keywords:
Health
Healthy homes
Energy efficiency
Utilites
Comfort

ABSTRACT

The interconnections between health, housing and energy are increasingly apparent. Fossil fuel combustion has a clear negative effect on public health, with impacts that are disproportionately felt among communities of color, the poor, and other vulnerable populations in the U.S. and globally. Energy efficiency has a well-documented positive impact on household health, including decreases in asthma and cardiovascular disease. The utility industry has an important role to play in improving the health of its customers.

1. Introduction

The utility industry has an opportunity to play a larger role in improving the health of its customers given that the interconnections between health, housing, and energy are increasingly apparent. Electric utilities can broaden their impact by understanding these connections and leveraging them to help make customers' homes more efficient and improve their indoor air quality, comfort, and wellbeing.

Just as health and housing characteristics are strongly interconnected, housing is also a key driver of energy use. Utilities already recognize this relationship in the design and implementation of their residential energy efficiency programs. Incorporating considerations of the impact these programs have on health could make a significant difference, at little additional cost. This article will (1) review the connection between fossil fuel generation, climate change, and health; (2) discuss existing literature on energy efficiency and its ability to improve health and energy insecurity; and (3) outline the opportunity for electric utilities to more proactively improve customers' health including incorporating healthy homes measures into energy retrofit programs and guidelines, supporting changes to more effectively value these retrofits, and operating innovative programs to make the health-utilities connection.

1.1. Generation and health

Before energy ever reaches its end user, it has obvious implications on the environment, and thereby on public health. The public health impacts of energy production and climate change are increasingly well understood, as evidenced by the American Public Health Association's decision to focus its annual meeting in 2017 on the topic of climate change and public health. Generation of electricity has long involved the combustion of fossil fuels, which produce air pollution and greenhouse gases. In addition to these airborne issues, generation can also have negative impacts on the soil and environment for local communities that are home to power plants, refineries, and other parts of the fossil fuel industry.

Air pollution caused by the combustion of fossil fuels includes CO_2, particulates, and nitrogen oxides, which contribute to smog, acid rain, and the greenhouse gas effect (Luber et al., 2014). These direct impacts cause health problems including asthma, cardiovascular disease, and others (Clean Air Act Overview, 2017). Combustion of these fuels also accelerates climate change, which in turn causes a host of health-related problems including but not limited to extreme heat and severe weather, changes in infectious disease ecology, and impacts on water supply and quality (Luber et al., 2014). The Center for Disease Control and Prevention has summarized these effects in Fig. 1.

In addition to these global impacts, the production of carbon-intensive energy has hyper-local impacts on the communities where fossil fuels are extracted, refined, transported, and combusted, such as the pollution of local air and waterways and the siting of industrial facilities. In the United States, these impacts have disproportionately affected communities of color and low-income households. Efforts to combat and ameliorate these local environmental impacts and involve communities in decisions about their local environments and public health are known as environmental justice. According to Dr. Robert Bullard, one of the founders of the environmental justice movement, "whether by conscious design or institutional neglect, communities of color in urban ghettos, in rural 'poverty pockets,' or on economically impoverished Native-American reservations face some of the worst environmental devastation in the nation" (Bullard, 1993). Thus, as they design energy efficiency programs and allocate ratepayer funds, utilities must use the lens of environmental justice to weigh the health and environmental impacts of electricity generation.

* Corresponding author.
E-mail addresses: anne.evens@elevateenergy.org (A. Evens), margaret.garascia@elevateenergy.org (M. Garascia), marjorie.isaacson@elevateenergy.org (M. Isaacson).

http://dx.doi.org/10.1016/j.tej.2017.04.009

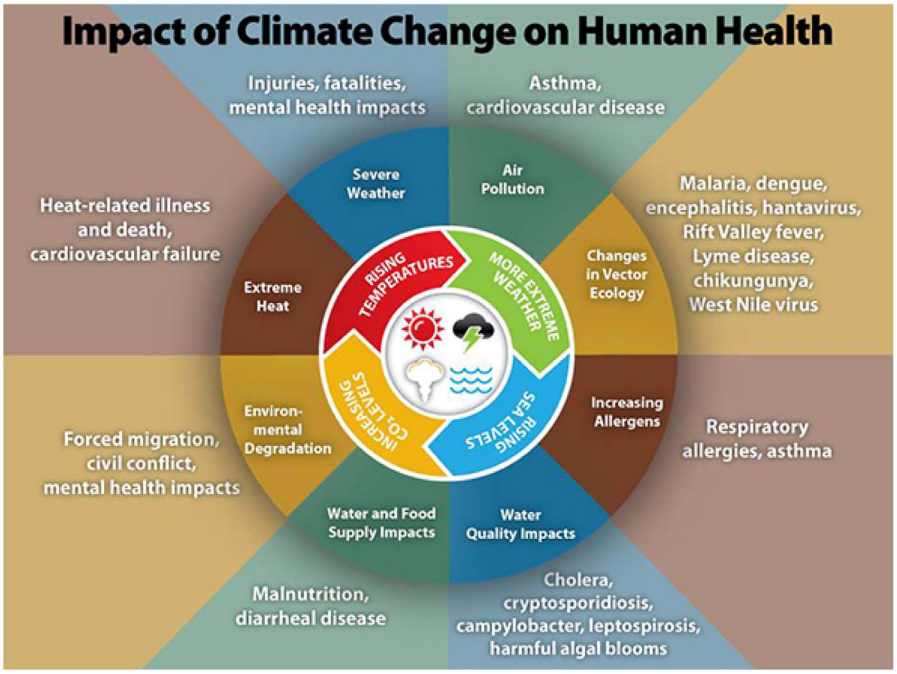

Fig. 1. Reference: Centers for Disease Control and Prevention.

1.2. *Energy efficiency and health*

Healthy home practitioners have identified the elements of a healthy home as one that is dry, clean, safe, well-ventilated, pest-free, contaminant-free, and well-maintained. An eighth element, "energy efficient," has been recommended as another component, because many of the measures that are standard in home energy performance have a corresponding impact on residents' health. Fig. 2 summarizes some of the ways that traditional energy efficiency measures can reduce health risks (Tohn Environmental Strategies, 2016).

Direct install programs, which include upgrades that can be completed in a home visit, such as lightbulb replacements and installation of water-saving devices such as faucet aerators and low-flow showerheads, are limited in the effects of their interventions because they do not address more systemic efficiency issues like heating, ventilation, and air conditioning (HVAC) systems or the building envelope. In contrast, programs like Home Performance with ENERGY STAR that attempt to maximize savings by addressing the whole home also provide many non-energy benefits, including health-related ones. These programs also include requirements to ensure that those interventions avoid unanticipated, potentially hazardous consequences. A recent meta-analysis of residential energy efficiency and weatherization programs found that they delivered myriad health benefits including fewer asthma symptoms; reduction in respiratory-related hospital visits; improved physical and mental health; and overall the strongest improvements were among vulnerable populations like the elderly and children (Tohn Environmental Strategies, 2016).

For example, air sealing and insulation are standard measures in these upgrades. Increasing energy efficiency, via air sealing and insulation, improves the thermal properties of homes by making the environment warmer in the winter and cooler in the summer. A drafty, uncomfortable home places stress on occupants, whereas energy upgrades can improve self-reported wellbeing (Hernandez, 2016). Proper ventilation is also a focus of attention in energy upgrades.

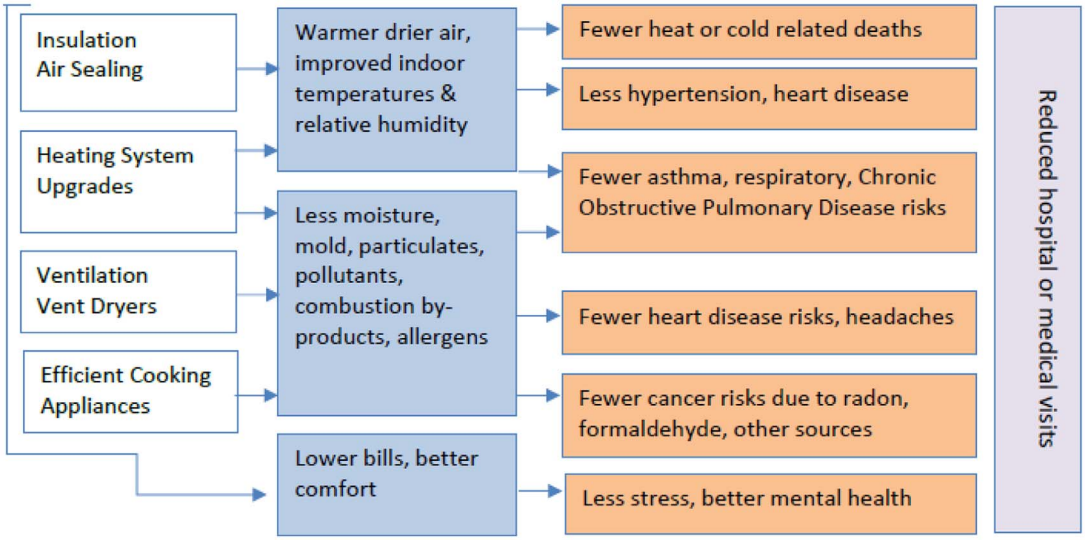

Fig. 2. Refs. Tohn Environmental Strategies, 2016: "Occupant Health Benefits of Residential Energy Efficiency".