



August 31, 2015

To the Members of the Study Committee:

As the study committee prepares its final recommendation regarding the Energy Efficiency and Renewable Standards (EERS) for Ohio, it is important to take note of a growing and significant shift within the health care sector.

Over the past two years, there has been tremendous interest from Ohio hospitals in energy efficiency as both a cost savings mechanism and as a means of improving the health of the communities they serve. This is evidenced by the 108 Ohio hospitals participating in the Healthier Hospitals challenges, and the 104 hospitals participating in the Ohio Energy Cup.

At the Ohio Hospital Association Annual Meeting in June 2015, C-Suite leaders from Ohio hospitals and health systems presented on their respective energy reduction progress. Some highlights from that presentation include:

- The Cleveland Clinic has implemented pilot projects that, in addition to other energy efficiency projects, have already saved \$250,000 annually toward its \$12 million energy demand reduction target;
- Highland District Hospital, a 25-bed hospital in Southwest Ohio, implemented a combination of energy efficiency improvements that places it in the top one-third of U.S. hospitals, reduced its energy use by almost 20%, and was made possible in part because of rebates from its local electric utility;
- ProMedica Wildwood Orthopedic and Spine Hospital installed an advanced combined heat and power system that has achieved its energy and greenhouse gas reduction goals within the first two years of operation; and,
- More than 450 University Hospitals employees pledged 2,071 energy saving actions at work in the UH Employee Energy Challenge, accomplished in addition to other hospital system-wide energy efficiency activities and projects.

Health care organizations know first-hand the benefits other than energy cost savings to be gained through energy efficiency measures. The health care costs and impact on quality of life from air pollution are costs all Ohio residents are asked to bear, but they fall particularly heavily upon our children.

Thirty-one Ohio hospitals reduced energy consumption by 40 GWh through utility rebate programs in 2014. Using the Practice Greenhealth Energy Impact calculator, this resulted in 139 work days gained

and 769 respiratory symptoms avoided, and was equivalent to two-million new mature trees or powering 4,600 homes on an annual basis. Consider what those figures could look like if all 200 Ohio hospitals reduced their energy, or if all organizations reduced their energy consumption by a similar amount.

Recently, the [Health Care Climate Council](#) – of which both Cleveland Clinic and University Hospitals are founding members – released a [statement of support](#) on the U.S. EPA Clean Power Plan:

“Cleaner energy will not only reduce carbon emissions, but will additionally reduce soot and other emissions that also have significant health ramifications. Emphasizing the authority of the public health voice will be crucial, especially as the Clean Power Plan will require states to develop plans for meeting carbon emissions reduction targets. We urge the EPA to continue to work with health partners across the country to support the strongest limits on carbon pollution in order to protect our children, our health, and our future.”

While the Clean Power Plan presents a challenge to all Ohio businesses to increase their energy efficiency measures and reduce harmful emissions, one [analysis predicts that Ohio](#) would be able to surpass the requirements of the Clean Power Plan if the EERS benchmarks are restored in 2017.

We urge you to review the attached documents to better understand the importance of the above matters from the perspective of health care organizations and providers in Ohio.

Respectfully submitted,

Gary Cohen
President and Cofounder, Health Care Without Harm

Rick Sites, Esq.
Regulatory Counsel/Energy & Sustainability Team Leader
Ohio Hospital Association

Attachments:

1. Infographic, summary of Ohio Healthier Hospitals: A Collection of Energy Case Studies
2. [Ohio Healthier Hospitals: A Collection of Energy Case Studies](#), a report featuring Ohio hospitals energy reduction case studies
3. [Ohio Hospitals’ Energy Conservation Efforts Ensure Patient Health, Cut Costs](#), joint press release from OHA and HHI
4. [Statement of Support on the Clean Power Plan](#), Health Care Climate Council (*includes Cleveland Clinic and University Hospitals*)
5. [“Climate change is toughest on children”](#), OpEd by Drs. Bole and Ross from University Hospitals

Committing to energy efficiency with

Ohio Healthier Hospitals:

Turning clean air and energy efficiency into a public health opportunity

The Problem: Pollution in Ohio

As of 2014, there were nearly **200,000 children & 680,000 adults** with asthma at high risk from air pollution in Ohio.



In Ohio, Cleveland, Akron, Canton, Cincinnati, and Dayton are ranked among the worst **10 cities in the country** for year-round particle pollution.



Poor air quality



Poor respiratory health

National average of children's asthma rates:



The incidence rate of childhood asthma in Ohio is double the national average.

Ohio children's asthma rates:



The Opportunity: Energy Efficiency in Health Care



For every \$1 a nonprofit health care organization saves on energy, the equivalent of \$20 in new revenues is generated for hospitals.

Energy efficiency allows hospitals to improve the air quality for the patient population they serve by reducing harmful emissions.



Bottom Line

Engaged leadership is key to successful energy efficiency programs.

Ohio Hospitals: Leading by Example

Hospitals in Ohio participating in utility programs achieved 40 GWh in energy reductions in 2014 alone. Through the support of each facility's leadership, Highland District Hospital, University Hospitals, Cleveland Clinic, and ProMedica achieved significant energy reductions, while cutting costs and improving public health.

Get inspired by their success stories

<p>Highland District</p> 	<p>University Hospitals</p> 		
<p>Strategy</p>  <p>Highland District Hospital worked to implement various projects & operational improvements.</p>	<p>Outcomes</p>  <p>Significant cost savings, including \$20,000 in rebates from electric utility, and increased ENERGYSTAR score.</p>	<p>Strategy</p>  <p>University Hospitals increased employee engagement through the UH Employee Energy Challenge.</p>	<p>Outcomes</p>  <p>Over 450 employees from a wide variety of departments pledged a total of 2,071 energy saving actions at work.</p>
<p>Cleveland Clinic</p> 	<p>ProMedica</p> 		
<p>Strategy</p>  <p>Cleveland Clinic reduced OR air exchange rates during nonsurgical periods.</p>	<p>Outcomes</p>  <p>Achieved energy efficiency, savings \$10,000/OR/year, with annual savings totaling \$250,000.</p>	<p>Strategy</p>  <p>ProMedica committed to leaner energy by installing an advanced combined heat & power system.</p>	<p>Outcomes</p>  <p>Increased energy efficiency and achievement of energy and greenhouse gas reduction goals.</p>

AND THIS IS ONLY THE BEGINNING!

To learn more about Ohio Healthier Hospitals, and to read the full case studies, please visit

<http://bit.ly/1GhRHRE>





Ohio Healthier Hospitals

A COLLECTION OF ENERGY CASE STUDIES

2015

PREPARED BY





The Healthier Hospitals Initiative (HHI) was launched in 2012 as a three-year national campaign designed to implement a new approach to improving environmental health and sustainability in the health care sector. HHI was led by three nonprofits—Health Care Without Harm, Practice Greenhealth, and Center for Health Design—with the help of 12 sponsoring health systems. In 2015, HHI will continue to help hospitals and health care systems reduce their impact and improve health as a free program of Practice Greenhealth.

More information is available at www.healthierhospitals.org.



Practice Greenhealth is the nation's leading health care membership community that empowers its members to increase their efficiencies and environmental stewardship while improving patient safety and care through tools, best practices and knowledge.

To learn more about Practice Greenhealth www.practicegreenhealth.org.



Health Care Without Harm seeks to transform the health sector worldwide, without compromising patient safety or care, so that it becomes ecologically sustainable and a leading advocate for environmental health and justice.

Visit www.noharm.org for more information.



The Ohio Hospital Association (OHA) Energy and Sustainability Program is an unbiased source of expertise to assist hospitals' best use of energy and resources. Its goal is to improve the economic sustainability and resilience of OHA member facilities.

Learn more at www.ohioshospitals.org/energy.

Foreword

Dear Friends,

As Ohio hospitals strive to achieve the Triple Aim – better patient care, improved population health, and lower costs – energy efficiency, resiliency, and clean energy investments become strategic considerations for health care leaders.

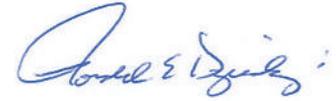
Through a series of case studies, this report offers a roadmap for Ohio hospitals to implement energy reduction strategies that will lead to increased cost savings and improved public health.

We invite you to join the conversation to improve the health of our Ohio communities through energy reductions and clean energy investments.

Best,



Jim Baer, CEO
Highland District Hospital



Ron Dziedzicki, COO
UH Case Medical Center



Bill Peacock, COO
Cleveland Clinic

Please send comments and questions to:

- Lauren Kleinman, Healthier Hospitals, at lkleinman@healthierhospitals.org
- Rick Sites, Ohio Hospital Association, at rick.sites@ohiohospitals.org



Powering Down with Ohio Hospitals



In 2014, 31 OHA hospitals achieved
40 GWh in energy reductions.



That's enough energy to power
4,000 Ohio households
for an entire year.

This has led to:



139 work
days gained



\$5 million in
societal value



769 respiratory
symptoms reduced

and this is just the beginning!

Calculations from [Practice Greenhealth's
Energy Impact Calculator](#).

For more information about household
energy use, visit tinyurl.com/c402gwc.

HOW ENERGY EFFICIENCY INCREASES COST SAVINGS AND IMPROVES PUBLIC HEALTH

Introduction

Given the energy intensive nature of a hospital environment, health care has started examining energy efficiency as a mechanism for significant cost savings. Energy Star for Healthcare reports that for every \$1 a nonprofit healthcare organization saves on energy is equivalent to \$20 in new revenues for hospitals¹.

Beyond cost savings, hospitals have the opportunity to improve the air quality of the patient population they serve by reducing energy emissions. The 2015 State of the Air produced by the American Lung Association² reported that while the air in Ohio has improved over the last 15 years, there is work to be done. Cleveland, Akron, Canton, Cincinnati, and Dayton areas still ranked in the worst 10 cities for year-round particle pollution. As of 2014, there were nearly 200,000 children and 680,000 adults with asthma at high risk from air pollution in Ohio.

Further, the Burden of Asthma in Ohio Report from the Ohio Department of Health³ indicates that children's asthma rates are at 15% compared to the national CDC reported average of 8.3%⁴.

In terms of both a public health and cost savings potential, there are great opportunities for Ohio hospitals to start on an energy reduction journey.

HEALTHIER HOSPITALS IN OHIO

Healthier Hospitals is a free program of Practice Greenhealth for hospitals beginning their sustainability and energy journey. Currently, there are 106 hospitals participating in Ohio, 80 of which are enrolled in the Leaner Energy Challenge⁵.

OHA ENERGY AND SUSTAINABILITY PROGRAM

Ohio Hospital Association (OHA) Energy and Sustainability Program has more than 100 member hospitals benchmarked in ENERGY STAR Portfolio Manager, with over 40 GWh saved in 2014⁶. This is the equivalent to the yearly consumption of nearly 4,000 homes and according to the Practice Greenhealth Energy Impact Calculator⁷, results in an estimated reduction of 769 respiratory symptoms and 139 work days gained.

OHIO HOSPITAL BEST PRACTICES AND GETTING STARTED

Featuring four Ohio hospital case studies, this report offers energy reduction solutions that facilities ranging in size from critical access hospitals to large health systems can implement.

¹http://www.energystar.gov/ia/business/healthcare/factsheet_0804.pdf?da37-0cd7

²http://www.stateoftheair.org/2015/assets/ALA_State_of_the_Air_2015.pdf

³<http://www.odh.ohio.gov/-/media/ODH/ASSETS/Files/eh/asthma/Burden%20of%20Asthma%20in%20Ohio%202012.ashx>

⁴http://www.cdc.gov/asthma/most_recent_data.htm

⁵The Healthier Hospitals Leaner Energy How-To Guide provides a roadmap for getting started. For more information, visit <http://healthierhospitals.org/hhi-challenges/leaner-energy>

⁶<http://ohiohospitals.org/energy>

⁷<https://practicegreenhealth.org/tools-resources/energy-impact-calculator>

LEADERSHIP: ENERGY AS A KEY PRIORITY

An important note is the critical role that leadership plays in the ability of an energy program to be implemented. These Ohio hospital case studies all have that common thread – support from the top.

- **Highland District Hospital**
Leadership made the decision in 2012 that 50% of the capital improvement budget would go towards upgrading boilers and chillers.
- **Cleveland Clinic**
In addition to the Department of Energy's 2020 Building Challenge, a separate energy budget was allocated for projects to help meet energy reduction targets.
- **University Hospitals**
A green revolving fund is set up for one of the medical centers, and there are efforts underway to expand that for the health system.
- **ProMedica**
Setting a system-wide energy reduction target of 7% from a 2011 benchmark allowed energy projects to rise in priority for budget allocation.

Determining an energy baseline is where the journey starts. The Ohio Hospital Association offers free benchmarking support for member hospitals to input data into ENERGY STAR Portfolio Manager. Once the baseline is established, there are a number of opportunities to consider.

NO/LOW COST

By committing to benchmarking data through ENERGY STAR Portfolio Manager, healthcare facilities are introduced to a wide range of opportunities in terms of cost savings and energy reductions. With such close margins, energy projects can lead to large annual savings at very low costs. University Hospitals' Employee Energy Competition is a great example of a no-cost initiative to result in energy savings.

MODERATE INVESTMENT

Energy retrofits and updating equipment entail a moderate upfront investment, and a great option for facilities that are suffering from high energy costs associated with aged equipment or inefficient energy operations. The Highland District Hospital case study is a good example of the savings associated with upgrading equipment.

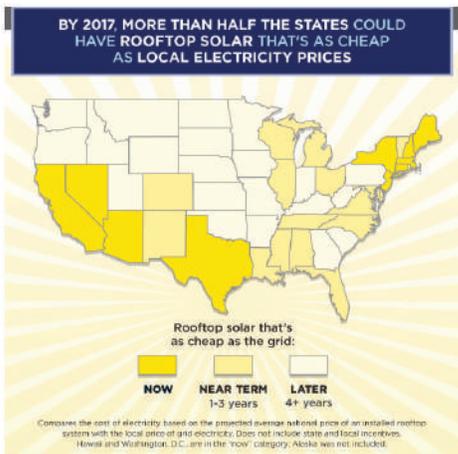
HIGH INVESTMENT

Facilities that have already laid the foundation for a robust energy efficiency program can start to look into new technology that can take a hospital's energy program to the next level. Both Cleveland Clinic's OR setback pilot and ProMedica's installation of the Combined Heat and Power (CHP) system at one of their hospitals are examples of making investments with tangible results.

LOOKING FORWARD: CLEAN ENERGY INVESTMENTS

According to the Practice Greenhealth Benchmark report, 21% of award-winning hospitals reported purchasing or generating renewable energy in their portfolio in 2013. Hospitals are diversifying their energy portfolios which is leading to increased resilience, improved financial performance, improved community health and fulfillment of their organizational mission.

Energy: Using ENERGY STAR reported values, the hospitals reduced their energy use by an aggregate 2.5%, eliminating 73,600 metric tons in greenhouse gas emissions, the equivalent of removing 15,600 vehicles from U.S. roads annually.



SUMMARY

- Highland District Hospital, a critical access hospital, identified energy reduction as a strategy and priority to reduce overall costs.
- Highland District Hospital worked with the Ohio Hospital Association Energy and Sustainability Program to complete an energy audit, which helped identify multiple opportunities for energy reduction and cost savings.
- A combination of projects and operational improvements increased their ENERGY STAR rating to 64, and resulted in significant cost savings including over \$20,000 in rebates from their local electric utility.

OHA PARTNERSHIP FOR ENERGY SAVINGS

Highland District Hospital

THE PROBLEM

With a changing healthcare landscape and a community business closing, it was imperative that Highland District Hospital reduced its costs not only for the hospital's budget but to help minimize costs for the patients in its community.

STRATEGY SELECTED

Senior leadership partnered with the Ohio Hospital Association (OHA) Energy and Sustainability Program to complete the benchmarking process into ENERGY STAR, which included an energy audit of the hospital. This process identified two initial projects: lighting retrofits and replacing boilers/HVAC.

The OHA Energy and Sustainability Program was a natural choice not only because it is free for members, they also bring a demonstrated value and context since they have completed benchmarking for more than 100 hospitals and over 40 hospital energy audits across the state of Ohio. This "no-strings attached" approach delivers transparent and objective recommendations, as well as experience to draw upon other common stories and subsequent remedies from other Ohio hospitals.

IMPLEMENTATION PROCESS

As Highland District is a critical access hospital with limited staff, an important part of this project team was the OHA Energy team member. After benchmarking and quantifying the facility's energy baseline, engineers did a day-long energy walk-through based on the ASHRAE Level 1 audit process. During this initial visit, the OHA Energy team members were able to meet with the CFO, share their findings, and start building the relationship. This led to the development of a multitude of projects, starting with re-lamping the old side of the hospital building to switch out from T-12 to T-8 bulbs. The Ohio Hospital Association helped to identify and facilitate multiple rebates through the local utility resulting in \$20,000 back to Highland District for the lighting project.

The team looked next to some necessary upgrades to the infrastructure, which included upgrading to two boilers at 80 hp, a 480 volts chiller, and a multistack to recapture heat to meet hot water demand. As this hospital is a pillar in its small community and focused on staying independent, this enabled the senior leadership team to make financial decisions for the long term. Although the boilers and chillers were 50% of their capital budget for 2012, the leadership team made the commitment as they understood that the financial long-term gain was worth the investment.

Finally, there were some operational changes such as occupancy sensors for equipment rooms, streamlined from three to one computer system control for the HVAC, and some variable frequency drives (VFDs) were installed.



Highland District Hospital, a 25 bed critical access hospital, located in Hillsboro, Ohio



DEMOGRAPHICS

Highland District Hospital is an acute care critical access hospital (25 beds) located in Hillsboro, Ohio.

The hospital employs more than 340 people, 70 community volunteers, and medical staff includes 60 physicians which represents 23 specialties to service an area of over 65,000 residents in Highland County and surrounding areas.

While Highland District is a community-centered hospital, they are also known for technology and sophisticated healthcare services.

BENEFITS

- Reduced general maintenance for staff with new equipment.
- Improved employee satisfaction with internal air quality and comfortable temperatures.

RESULTS

- Energy costs reduced and received \$20,000 in rebates from local utility.
- Improved ENERGY STAR score of 64.

CHALLENGES AND LESSONS LEARNED

One of the challenges that a rural hospital often faces is a disadvantage in the bid process due to travel time. In this particular case, it only extended the length of the bid process, which ultimately added to the overall project time.

Highland District's CEO, Jim Baer, had these three pieces of advice for a CEO of another rural hospital:

1. Look at energy as a significant savings opportunity, especially for the long-term.
2. Look for funding or resources – local providers, the state of Ohio, or other partnerships such as state hospital associations.
3. Start with an energy audit; this gives a roadmap of the short, medium and long term priorities.

Despite its initial success, this is only the beginning for Highland District Hospital. The critical access hospital is anticipating several upcoming projects in order to become an ENERGY STAR certified hospital. These include implementing an automatic computer shutdown program to further reduce energy, a water conservation program by changing toilets to low flow (1.6 gpf), light sensors for offices and bathrooms, and a parking light retrofit. Additionally, Highland District Hospital has partnered with the local utility service provider to participate in a Continuous Energy Improvement (CEI) hospital and university group.

SUMMARY

- University Hospitals recognized the opportunity to change individual energy awareness and energy saving habits in the workplace as it pursued its own institutional energy efforts, including a 3% reduction in energy use intensity at medical centers enrolled in Healthier Hospitals.
- An incentivized UH Employee Energy Challenge was created to inspire employees to adopt energy saving actions at home and at work and to be energy aware.
- The results were impressive: 456 employees, engaged from a wide variety of disciplines/departments and position levels and pledged 2,071 energy saving actions at work; 97 participants completed both phases and took 1,181 energy actions at work that they would continue beyond the Challenge.

“ The inspiration to participate in the UH Energy Challenge was to save money for the birth of our youngest child. My energy awareness has changed during the Challenge with the replacement of our furnace and the decision to get a high-efficiency model and reduced gas usage this winter. We also increased our use of CFL light bulbs in our house and made an effort to turn off lights when they were not needed. ”

Jeff Luhn,
IT&S

INDIVIDUAL BEHAVIOR CHANGE FOR ENERGY SAVINGS

University Hospitals

THE PROBLEM

Even though energy conservation is often referred to as a low-hanging fruit, individual behavior change continues to present a challenge. Individual choices ultimately influence the energy costs and environmental impact of the health system.

STRATEGY SELECTED

The UH Employee Energy Challenge idea came from CleanMed, a national sustainability health care conference, with the goal to incentivize individual energy saving actions at work and at home, illustrate their impact back to the group taking action, and inspire adoption of new energy saving behavior. Employees pledged their energy aware actions through an incentivized survey mechanism.

Two criteria were used when creating energy awareness actions in the pledge: actions could either be under employees’ personal control, such as taking the stairs, or could require outside influence to accomplish, such as speaking to a supervisor about switching from incandescent to LED lighting. In this way, employees could be empowered by personal choices similar to what they might do at home, while also having the opportunity to influence indirect energy actions at work by engaging on a deeper level with colleagues. Considering the importance of indirect actions in this campaign, leadership support was a key component of this strategy, in addition to energy awareness resources.

IMPLEMENTATION PROCESS

The implementation process was set up into phases:

Pre-Challenge Phase: Communications Were Disseminated to Each Medical Center Via:

- An energy specialist who used a booth at medical centers to promote energy programs.
- Presentations at the system-level Sustainability Council and Facilities meetings.
- Flyers distributed to facility operation directors and Green Teams via email.
- Meetings and site-specific email distributions from facility managers and communication directors at two newer facilities.
- Postings on the internal employee website and in weekly internal “news” emails.

Phase I: Energy Challenge Registration and Pledge

- Employees were required to register and pledge to adopt energy conservation actions (energy aware actions) for three months, including tracking home energy bills.

“ Inspiration was honestly the prize, however I was equally happy about the education and self-awareness of my utility consumption. So concepts or challenges like this I believe are great and may be the best way to involve a larger amount of our population to see larger scale changes. ”

Bret Mason,
General Maintenance



Greening UH poster educating energy efficient behavior

DEMOGRAPHICS

University Hospitals, the second largest employer in Northeast Ohio with 25,000 employees, serves the needs of patients through an integrated network of 15 hospitals, 29 outpatient health centers and primary care physician offices in 15 counties.

At the core of this \$3.5 billion health system is University Hospitals Case Medical Center, ranked among America’s 50 best hospitals by U.S. News & World Report in all 12 methodology-ranked specialties.

Its main campus includes UH Rainbow Babies and Children’s Hospital, ranked among the top children’s hospitals in the nation; UH MacDonald Women’s Hospital, Ohio’s only hospital for women; and UH Seidman Cancer Center, part of the NCI-designated Case Comprehensive Cancer Center at Case Western Reserve University.

- Upon online submission of the registration/pledge, the energy awareness webpage opened for participants with access to energy education resources for home and work.

Phase II: Follow-Up - Three Months Later

- All participants were surveyed and asked to comment on actions they took and will continue to pursue in order to quantify impacts of the Challenge on individual behavior.
- Participants also reported electric and natural gas usage for the three months of the challenge, which was compared to regional averages and reported back to them.
- A prize drawing amongst the participants who completed both phases was accomplished through random selection (grand prize was a nest home thermostat and iPad mini, with two additional prizes of LED bulbs).
- The final communication piece, called “Energy Usage: UH and You”, tied together individuals’ efforts in particular areas (using power strips) and how they are related to UH Energy efforts (HHI Leaner Energy Challenge). This was published on the Greening UH Energy webpage and presented to the System Sustainability Council.

BENEFITS/OUTCOMES

- Participants who reported home electricity usage used on average 45 kWh less/month than the monthly OH average of 892 kWh.
- Survey results indicated intentional long-term behavior change by participants, with top actions being posting energy education and having energy conversations with supervisors.
- Participation of new UH employees: 121 out of 456 Phase I participants were from new facilities acquired by the system.
- 75% of participants found the Greening UH Energy webpage useful and 85% said they would join another energy challenge in the future.
- The program identified engaged employees who can be cultivated as future front-line green team members.

CHALLENGES AND LESSONS LEARNED

- As this was a communications-focused employee engagement program, support from communication teams and facility-level operations directors were key to its success.
- Future energy challenges should include an interactive survey tool or energy usage calculation tools to give immediate feedback to participants.
- The competition became a great welcoming opportunity for employees from new medical centers that recently joined the UH health system.
- Participant survey feedback suggested: opportunities to better prepare managers on UH Energy practices, new initiatives to make employee conversations more productive, offering energy provider and energy saving device discounts through the employee discount program, and awarding HealthMiles (discount off health insurance premium) for participation.

REDUCING OR AIR EXCHANGE RATES FOR ENERGY SAVINGS

Cleveland Clinic

SUMMARY

- To meet the Cleveland Clinic's \$12M energy demand reduction target¹, one of the reduction strategies included an analysis of the operating rooms (ORs).
- OR air exchange rates, measured in air exchanges per hour (ACH), were investigated as an energy conservation measure. It was known that OR ACH rates remained high even when surgical cases were not being performed. This included nights and weekends.
- Annual air balance reports indicated that even the surgical conditions ACH rates exceeded universally accepted guidelines by 5-15 ACH.
- Estimated annual savings of \$250,000 per year with approval and implementation of OR ACH setbacks down to the levels specified by the engineering guidelines (20 ACH).
- Reducing ACH during the non-surgical periods reduces energy consumption by up to 484,500 kBtu per OR/year (which equates to approximately \$10,000 in utility costs). By adjusting the air changes per hour (ACH) to meet the state and federal codes of 20 ACH, this resulted in an estimated annual savings of \$250,000 per year.

THE PROBLEM

Heating, ventilation and air conditioning (HVAC) is the single most energy-intensive component in the health system's energy profile (51%). There are 215 operating rooms (ORs) across the health system running multiple cases per day. Because of the ORs' requirements for air changes per hour, strict temperature and humidity parameters, pressure relationships, and energy-intensive surgical lighting systems, OR HVAC systems came into sharp focus as a strategic priority for energy demand reduction.

STRATEGY SELECTED

The first step was to illustrate the scale of the opportunity that OR setbacks presented. A third-party engineering firm assessed OR occupancy, existing conditions and costs to implement, control and maintain an OR HVAC setback strategy.

Facilities Institute Guidelines (FGI) and the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) guidelines govern the minimum total and outdoor air change rates for ORs to maintain temperature, ensure particulate removal, and overcome equipment loads. ANSI/ASHRAE/ASHE Standard 170-2013: Ventilation of Health Care Facilities requires a minimum of 20 ACH total and four ACH of outdoor air when the room is in use. Cleveland Clinic's design specification exceeded the guideline by 5 ACH, with no measurable benefits. ASHRAE 170 and many state codes also allow the number of air changes to be reduced when the space is unoccupied¹. OR HVAC setback, also referred to as "unoccupied setback", is an energy saving strategy that reduces the amount of air supplied to an OR when the room is not in use while still maintaining temperature and humidity ranges. HVAC systems run all night—even when the OR is unoccupied. Facilities recognized the enormous potential that unoccupied settings presented - on the order of \$2,000,000 per year². Yet, clinicians had concerns about needing to condition the space at a moment's notice and require assurances that the implementation will not negatively impact patient safety or infection rates.

IMPLEMENTATION PROCESS

In collaboration with the Infection Prevention Department, Surgical Operations Executive Committee, and the Design and Planning Department, the Facilities Department adjusted all main campus ORs to 20 ACH and OR design standards were adjusted down to the 20 ACH per ASHRAE 170's guidance.

The team included representatives from facilities, design and planning team, surgical operations, infection prevention, surgical staff, and other key stakeholders. Their task was to evaluate and provide a recommendation for unoccupied settings:

- Identify peer facilities that implemented setbacks with no safety risks.
- Identify what the users of the space needed versus wanted.

¹ 71-Subsection 1.c: when the space is unoccupied providing that the required pressure relationship to adjoining spaces is maintained while the space is unoccupied and that the minimum number of air changes, temperature and pressure relationships indicated is reestablished anytime the space becomes occupied

² Based on findings from third party study funded at request of the Greening the OR Committee



Cleveland Clinic OR, an energy-intensive space

DEMOGRAPHICS

Cleveland Clinic is a nonprofit multispecialty academic medical center that integrates clinical and hospital care with research and education.

More than 3,000 full-time salaried physicians and researchers and 11,000 nurses represent 120 medical specialties and subspecialties.

The Cleveland Clinic health system includes a main campus, eight community hospitals, more than 75 Northern Ohio outpatient locations, Cleveland Clinic Florida, the Lou Ruvo Center for Brain Health in Las Vegas, Cleveland Clinic Canada, and Cleveland Clinic Abu Dhabi (scheduled to begin seeing patients in 2015).

In 2013, there were 5.5 million outpatient visits throughout the Cleveland Clinic health system and 157,000 hospital admissions.

- Articulate what permissions were necessary to override settings.
- Map out HVAC usage per OR suite.
- Research available technologies.
- Pilot solutions/prove out setbacks.
- Conduct cost benefits analysis when retrofitting an existing facility.
- Implement across the health system.

The end goal of this concept is to reduce the ACH when conditions permit, on a space-by-space basis. This concept was pilot-tested in E Building's OR Renovation Project, an integrated set of OR design criteria and performance standards.

BENEFITS OF PILOT RESULTS

- Based on measured reduction in fan power and cubic feet of air per minute (CFM) of cooling, an estimated \$10,000/year/OR can be achieved.
- 20,000,000 kWh of electricity will be saved.
- The system will provide better oversight of room conditions to assure that it is always within the required guidelines for temperature, humidity, pressurization and ACH and make those parameters visible to the surgical team within the room.

CHALLENGES AND LESSONS LEARNED

1. Costs

The OR setback strategy can be adopted with little or no additional upfront cost in new construction, while a retrofit of an existing facility requires upfront costs to be weighed against the expected energy savings. Since most OR setback solutions require periodic maintenance, the cost of maintenance should be part of the equation. Pitching for a total cost setback strategy is not an easy sell to a management team focused on cost reductions.

2. Adaptive Comfort

To respond to user differences, ORs may be kept in "ready" mode, i.e. in occupied mode, even though there is no code requirement to do so. Clinical and facility staff are working together to decide which control solution meets the surgical team's needs while still saving energy.

3. OR Controls

It's complicated. The facilities/buildings have different and varied HVAC system controls. Designing the right control interface was very important to the success of this project for our various user groups.

4. Surgical Staff

One strategy to ease surgical staff concerns was to automate OR setbacks with the surgical schedule. This is achieved by linking setbacks to the OR scheduling system which programmed the ORs to be set back once the schedule is completed and designed to return to occupied mode 30 minutes prior to the initiation of the daily schedule. A safety feature embedded into the surgical light ensures that setbacks aren't activated if the surgical light is on. The monitoring system controlling OR setbacks also gives better visibility and control of prescribed temperature ranges for the surgical staff.

Enterprise implementation is slated for 2015.

USING COMBINED HEAT AND POWER SYSTEM FOR ENERGY SAVINGS

ProMedica

THE OPPORTUNITY

As a mission-driven, community-based healthcare system, one of the ways ProMedica positively impacts the community is by reducing their energy consumption. The savings associated with energy conservation not only lowers operating cost, but also is re-invested into patient care and the communities that ProMedica supports.

Using 2011 as a benchmark, the health system set out with the goal to reduce energy consumption by 7% at hospitals and largest medical office buildings (MOBs). To this end, ProMedica enlisted energy consultants for benchmarking and to perform ASHRAE Level 2 energy audits. In addition to the energy consultation, ProMedica worked with a utility bill pay service to consolidate all utility bill payments. This consolidation ensured that late payments were avoided, and provided a consistent process for utility data collection. That data was then exported for analysis and input into ENERGY STAR Portfolio Manager for all sites.

STRATEGY SELECTED

An extensive team including leadership, facility managers, service vendors, automation control teams and an assortment of suppliers came together to create and implement the ongoing energy management plan. A number of solutions were selected for the overall energy management plan: LED lights are now installed consistently across the facility, variable frequency drives are being used, and electric motors have been replaced. Additionally, the system-wide Sustainability Council is working to promote individual behavior change (such as unplugging cell phone chargers).

BENEFITS OF A COMBINED HEAT AND POWER SYSTEM

One critical aspect of the energy management plan was the decision to incorporate a combined heat and power system at ProMedica Wildwood Orthopaedic and Spine Hospital. The onsite power system uses natural gas to provide electricity and heat to the hospital. Benefits to the facility include a reduction in annual energy costs, greenhouse gas emissions and source energy use intensity. The compact size and low sound level of the Capstone micro-turbine system was a key consideration because it was housed in the upper floor mechanical room above patient care areas.

The hospital has around-the-clock access to the operation and performance of the system with a distributed generation control system. This web-based dashboard – accessible on mobile devices or computers – provides facility managers with real-time data so that daily energy consumption can be monitored and balanced with the hospital's needs and the system's energy production. This increases savings by providing a baseload of electricity and heat generated by the combined heat and power system.

SUMMARY

- With a continuous need for electricity and heat, hospitals benefit from the energy efficiency and reliability that combined heat and power systems provide.
- ProMedica Wildwood Orthopaedic and Spine Hospital installed an advanced combined heat and power system using two Capstone C65 micro-turbines®.
- With the system in its second year of continuous operation, ProMedica has achieved the energy and GHG reduction goals established during the feasibility and design process.



Capstone C65 microturbines



Installing the Capstone C65 microturbines

DEMOGRAPHICS

ProMedica Wildwood Orthopaedic and Spine Hospital (WOSH), a division of ProMedica Toledo Hospital, was built with patients in mind. The 70,000-square-foot facility is the region's only free-standing hospital devoted exclusively to caring for orthopaedic and spine patients. The entire hospital was designed to provide a state-of-the-art environment that is customized to treat and rehabilitate adults with bone, joint and spine disorders and injuries.

As ProMedica's first all-electronic hospital, WOSH features 36 private rooms with added amenities, including convenient room service; six integrated operating rooms; 24/7 in-house hospitalist care; pre-operative education sessions; a bloodless care program; pain management blocks and anesthesia rounding to aid post-op recovery; and inpatient physical therapy. The high quality of care provided at WOSH has been recognized by the 2014 Healthgrades Patient Safety Excellence Award™ and the Press Ganey Beacon of Excellence for Physician Engagement Award.

MEASURING SUCCESS

Key performance indicators are prepared monthly and communicated to the ProMedica leadership team on energy intensity, cost avoidance and progress of energy conservation measures for all target facilities. This information is then used to make informative future decisions – such as putting combined heat and power systems in other facilities.

RESULTS

- Source energy use index has decreased over 18%.
- GHG reduction of 700 tons or the equivalent of 115 automobiles saved annually.
- Energy supply cost risk mitigated due to multi-fuel purchase options.

COMMUNITY BENEFITS

- Reduced energy consumption equals increased investments into patient care.
- Decreased environmental impact improves the wellness of facilities and the community.

CHALLENGES AND LESSONS LEARNED

Initially, there was reluctance by the maintenance staff about the use of the new technology, and, while leadership was very supportive of the concept of a combined heat and power system, capital improvements like these still compete with other needed capital items for patient care such as MRIs and other clinical equipment.

However, once peers from other ProMedica facilities toured the installation and the staff saw the enthusiasm by their colleagues, they realized what a great system they had. In fact, due to the successful energy reduction, cost avoidance, and the ability to meet electricity and hot water demands, ProMedica is now considering combined heat and power systems for retrofits at other existing hospitals as an alternative to replacing boilers.

Similar systems have been installed at over 200 hospitals nationally with some having emergency power capabilities to improve resiliency and provide redundancy during power outages.

Learn More



Healthier Hospitals
www.healthierhospitals.org



Practice Greenhealth
www.practicegreenhealth.org



Health Care Without Harm
www.noharm.org



Ohio Hospital Association Energy
and Sustainability Program
www.ohiohospitals.org/energy

Healthier Hospitals Leaner Energy Challenge

From powering life-saving equipment to ensuring the comfort of patients and staff, twenty-four hours a day, seven days a week, energy is paramount to quality health care. However, with hospitals and health systems—the second most energy-intensive building sector in the United States—emitting 8% of the nation’s greenhouse gas emissions, it is imperative that hospitals cut emissions through improved operations and equipment maintenance efficiency. There is a need to track both efficiency, as measured by energy used per unit of service or size of hospital, and aggregate use.

Healthier Hospital’s Leaner Energy Challenge helps hospitals set off on that energy reduction journey. More than 80 Ohio hospitals have committed to the Leaner Energy Challenge.

LEVEL 1

Reduce greenhouse gases by decreasing weather-adjusted energy intensity from metered energy use by 3% from baseline.

HOSPITAL NAME	
The Bellevue Hospital	St. Elizabeth Boardman
Doctors Hospital Nelsonville	UH Ahuja Medical Center
Marion General Hospital	

LEVEL 2

Reduce greenhouse gases by decreasing weather-adjusted energy intensity from metered energy use by 5% from baseline.

Cleveland Clinic health system	Mercy Tiffin Hospital
Cleveland Clinic main campus	Ohio Health Grant Medical Center
Euclid Hospital, a Cleveland Clinic hospital	Southern Ohio Medical Center
Fairfield Medical Center	Summa Wadsworth Hospital
H.B. Magruder Memorial hospital	UH Conneaut Medical Center
Lakewood Hospital, a Cleveland Clinic hospital	UH Richmond Medical Center
Lutheran Hospital, a Cleveland Clinic hospital	

LEVEL 3

Reduce greenhouse gases by decreasing weather-adjusted energy intensity from metered energy use by 10% from baseline; OR, if facility is already an ENERGY STAR rated facility (> 75), maintain ES status.

Congratulations to these Leaner Energy hospitals for achieving Levels 1-3!

Adena Greenfield Medical Center	Mercy Medical Center
Bluffton Hospital	Ohio Health Grady Memorial
Fairview Hospital, a Cleveland Clinic hospital	Summa St. Thomas
Good Samaritan - Premier	Sycamore - Kettering Health Network
Highland District Hospital	Trinity Medical Center East
Hillcrest Hospital, a Cleveland Clinic hospital	UH Geneva Medical Center
Medina Hospital, a Cleveland Clinic hospital	Wright Patterson Air Force Base Medical Center



GENERAL INQUIRIES

www.HealthierHospitals.org

info@HealthierHospitals.org

703.860.9790

MEDIA INQUIRIES

media@HealthierHospitals.org

703.870.7494

MAILING ADDRESS

Healthier Hospitals

Practice Greenhealth

12355 Sunrise Valley Drive

Suite 680

Reston, VA 20191





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Contacts: Benn Grover, Health Care Without Harm
Phone: 888-461-0112
Email: bgrover@hcwh.org

John Palmer, OHA
Phone: 614-221-7614
Email: john.palmer@ohiohospitals.org

Ohio Hospitals' Energy Conservation Efforts Ensure Patient Health, Cut Costs

New Report Showcases Clean Energy Commitments from Four Leading Health Organizations

[Columbus, Ohio] Four Ohio health organizations – Cleveland Clinic, Highland District Hospital, ProMedica, and University Hospitals – successfully implemented energy reduction initiatives that increased air quality, improved patient health, and reduced operating expenses.

Their successes were published in *Ohio Healthier Hospitals: A Collection of Energy Case Studies*, a new report from Health Care Without Harm and Practice Greenhealth released during the [Ohio Hospital Association's 100th Annual Meeting](#).

Representing around 20% of patient beds across the state, these two health systems and two hospitals demonstrated that a variety of energy initiatives ranging from no/low cost to high investment can have measureable impact on the health of their patients, communities, and cost savings.

To help meet its \$12 million energy demand reduction target, Cleveland Clinic reduced operating room air exchange rates in one pilot facility during nonsurgical periods back down to recommended levels, saving \$250,000 annually.

Highland District Hospital, a critical access hospital, implemented a combination of projects and operational improvements that increased its ENERGY STAR rating to 64 and resulted in significant cost savings, including over \$20,000 in rebates from their local electric utility.

ProMedica Wildwood Orthopaedic and Spine Hospital installed an advanced combined heat and power system using two Capstone C65 micro-turbines®. With the system in its second year of continuous operation, ProMedica has achieved the energy and greenhouse gas reduction goals established during the feasibility and design process.

University Hospitals created the UH Employee Energy Challenge to inspire employees to adopt energy saving actions at home and at work. More than 450 employees from a wide variety of departments and position levels pledged 2,071 energy saving actions at work.

The facilities are participants in the [Ohio Hospital Association's Energy and Sustainability program](#). Rick Sites, OHA's regulatory counsel, said the organization's energy program assists hospitals in becoming more energy efficient, improving the overall environmental and public health of their communities while also reducing energy expenses by providing energy audits and benchmarking tools in addition to regulatory support.

Working alongside OHA, the two health systems and two hospitals are also participants in the Healthier Hospitals Initiative, a collaborative of leading health care institutions united to help speed the health care sector toward environmental sustainability and improved population health. The Healthier Hospitals Initiative is a coordinated, sector-wide approach based on the premise that how hospitals are designed, built, and operated can help achieve the Centers for Medicare and Medicaid Services' Triple Aim – better care for individuals, improved health for populations, and reduced per capita costs.

“Senior-level leadership was instrumental in building clean energy programs within each hospital,” said Gary Cohen, founder and president of Health Care Without Harm. “Ohio suffers from some of the worst air pollution in the country and, as we’ve seen with these four leaders, health care is in a unique position to address this major public health threat.”

A [2011 report from the Natural Resources Defense Council](#) found that Ohio had the most toxic air pollution from coal and oil power plants of any state in the country. Ohio's power plants released 44.5 million pounds of harmful chemicals in 2009, accounting for 12 percent of U.S. industrial air pollution. The state also led the country in mercury air pollution.

The American Lung Association's [2015 State of the Air](#) found that while the air in Ohio has improved over the past 15 years, more work needs to be done. Cleveland, Akron, Canton, Cincinnati, and Dayton still rank in the worst 10 cities for year-round particle pollution. As of 2014, there were nearly 200,000 children and 680,000 adults with asthma at high risk from air pollution in Ohio.

Although 89,000 people work in clean energy in Ohio, [recent setbacks on the state's energy policies threaten the sector's growth](#). Passed in 2014, Senate Bill 310 froze Ohio's renewable and energy efficiency standards and as a result, some Ohio clean energy companies are now developing projects outside of the state.

“Investments in clean energy for Ohio's hospitals will also address a range of health issues that plague many Ohio residents,” said Mr. Cohen. “The more we move away from coal and other fossil fuels to power our economy, the healthier our communities, our future, will be.”

[The report can be found here.](#)

In addition to the report's release, senior executives from the hospitals will share the results of their energy initiatives during [a session on June 9 at the Ohio Hospital Association's annual meeting.](#)

About Health Care Without Harm

[Health Care Without Harm](#) works to transform the health sector worldwide, without compromising patient safety or care, so that it becomes ecologically sustainable and a leading advocate for environmental health and justice.

About Practice Greenhealth

[Practice Greenhealth](#) is the nation's leading health care membership community that empowers its members to increase their efficiencies and environmental stewardship while improving patient safety and care through tools, best practices and knowledge.

About the Healthier Hospitals Initiative

The [Healthier Hospitals Initiative](#) (HHI) was launched in 2012 as a three-year national campaign designed to implement a new approach to improving environmental health and sustainability in the health care sector. HHI was led by three nonprofits—Health Care Without Harm, Practice Greenhealth, and Center for Health Design—with the help of 12 sponsoring health systems—including Advocate Health Care, Bon Secours Health System, Catholic Health Initiatives, Dignity Health, Gundersen Health System, Hospital Corporation of America (HCA), Inova Health System, Kaiser Permanente, MedStar Health, Partners HealthCare, Stanford University Medical Center, and Tenet Health Systems (including former Vanguard Health Systems hospitals). In 2015, HHI will continue to help hospitals and health care systems reduce their impact and improve health as a free program of Practice Greenhealth.

About Ohio Hospital Association

Established in 1915, the [Ohio Hospital Association](#) represents 220 hospitals and 13 health systems throughout Ohio. OHA, marking its centennial year in 2015, is the nation's oldest state hospital association. With a mission to collaborate with member hospitals and health systems to ensure a healthy Ohio, OHA is focused on three strategic initiatives: patient safety and quality, advocacy and economic sustainability.

###

Health Care Climate Council Supports EPA Clean Power Plan

News posted by **Climate and Health Team** on **August 4, 2015**

US & Canada | Tags: [climate and health](#), [EPA](#), [Clean Power Plan](#), [clean energy](#)

The [Health Care Climate Council](#), representing hospitals across the United States that are committed to addressing the health impacts of climate change, supports the [EPA's Clean Power Plan](#). The EPA plan sets the first-ever federal limits on dangerous carbon pollution from existing power plants, cuts the single largest source of the carbon pollution, and safeguards public health from the harmful effects of carbon pollution.

As global temperatures climb and the threat climate change poses to our families and natural environment grows, power plants continue to be one of the largest unregulated polluters of greenhouse gas emissions. The EPA's Clean Power Plan proposes the first-ever national standards to limit climate-changing pollution.

Actions that reduce emissions—like the EPA's Clean Power Plan—can help the world avert serious problems that cost communities nationwide. Carbon pollution from dirty power plants [causes up to 6,600 premature deaths each year](#). The proposed Clean Power Plan will cut hundreds of millions of tons of carbon pollution and hundreds of thousands of tons of harmful particulate pollution, sulfur dioxide and nitrogen oxides. Together these reductions will provide important health protections to communities disproportionately impacted by dirty air and water.

Communities across the United States are already experiencing the health impacts of climate change, with the elderly, children, and people suffering from burdensome illnesses at greater risk. Left unchecked, we will see:

- Continued upward spiral of asthma and respiratory disease;
- Greater likelihood of injury, disease, and death due to more intense heat waves and fires;
- Increased likelihood of under-nutrition resulting from diminished food production in poor regions;
- Risks from lost work capacity and reduced labor productivity in vulnerable populations; and
- Increased risks from food- and water-borne diseases and vector-borne diseases.

"Coal-fired power plants are dangerous to the health of Americans and are also a major driver of climate change. The EPA's proposed rules are critical steps to finally rein in the pollution from these dirty energy sources", stated Gary Cohen, President and co-founder, Health Care Without Harm.

The EPA projects its Clean Power Plan will:

- Cut carbon pollution by 30 percent by 2030 (below 2005 levels), providing up to \$93 billion in climate and public health benefits;
- Prevent up to 6,600 premature deaths, up to 150,000 asthma attacks in children, and up to

490,000 missed work and school days in 2030;

- Prevent 3,300 heart attacks, and up to 2,800 hospital admissions; and
- Help protect low-income communities, as well as children, and seniors who are disproportionately affected by climate change.

(Note: The above projections can be found on the EPA's fact sheet, [Overview of the Clean Power Plan](#))

The Clean Power Plan is the most important step we can take to address climate change and the carbon pollution that fuels it. The Clean Power plan mirrors the commitment the US has already made as part of the Paris climate negotiations scheduled for this December. Cleaning up carbon pollution protects health and every state in the country will see benefits due to reduced emissions.

Cleaner energy will not only reduce carbon emissions, but will additionally reduce soot and other emissions that also have significant health ramifications. Emphasizing the authority of the public health voice will be crucial, especially as the Clean Power Plan will require states to develop plans for meeting carbon emissions reduction targets. We urge the EPA to continue to work with health partners across the country to support the strongest limits on carbon pollution in order to protect our children, our health, and our future.

###

About the Health Care Climate Council

Established by Health Care Without Harm, the [Health Care Climate Council](#) is a leadership network of hospitals committed to strengthening the health sector's response to climate change.

Personal View: Climate change is toughest on children

August 16, 2015 UPDATED 10 DAYS AGO

SHARE

By **DR. APARNA BOLE** and **DR. KRISTIE ROSS**

As pediatricians, we are concerned about the health effects of climate change on children.

The U.S. Environmental Protection Agency's Clean Power Plan, released earlier this month, represents our nation's first substantive effort to limit carbon emissions from fossil-fuel-fired power plants.

The plan will be discussed and debated in terms of its environmental and economic impacts, but it is also essential that the public health benefits of the plan be included in this dialogue. In particular, the World Health Organization estimates that more than 80% of the current health burden from the changing climate is on children younger than 5 years old, due both to their small size and the nature of their growth and development.

We are already seeing the health impacts of climate change right here in Northeast Ohio, including the children we take care of in our practices: extreme precipitation events, extreme heat, longer and more intense allergy seasons, and worsened air quality. In our region, rates of asthma in kids are substantially higher than the national average. In African-American children, asthma rates are greater than 1 in 5 — more than double the national average.

Given that worsened air quality and seasonal allergens are both triggers for asthma exacerbation, children in our community, especially African-American children, are already bearing a significant health burden that is worsened by the effects of climate change. For these children, exercise and play outside can be dangerous instead of healthy, with outdoor summer activities triggering asthma attacks.

Because power plants are the nation's largest carbon pollution source, reducing power plant carbon emissions is an essential component of effective climate action. This measure will also reduce other air pollutants, including particulate matter and surface ozone, which have significant negative health effects, especially for individuals with heart and lung disease, and again with a disproportionate effect on children.

A cleaner energy sector will prevent thousands of premature deaths and hundreds of thousands of child asthma attacks by 2030. This is why we applaud the EPA's Clean Power Plan as a needed public health intervention, and an important step toward ensuring a healthy and safe environment for current and future generations of children here in Northeast Ohio, across the country, and around the world.

Bole is medical director for community integration at University Hospitals Rainbow Babies & Children's Hospital and is a member of the American Academy of Pediatrics Council on Environmental Health. Ross is the clinical director of the division of pediatric pulmonology at University Hospitals Rainbow Babies & Children's Hospital and is a member of the American Thoracic Society Environmental Health Policy Committee.