



A&WMA

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Sustainability for a Green City on a Blue Lake

by Sanda Kaufman, Wendy Kellogg and Nick Zingale



Sanda Kaufman

The word “sustainability” has become so familiar that by now its users seldom define it. And after having heard it in various venues, most of us feel we know what it means. Upon closer inspection, however, we might find that each of us invests this term with personal hopes and beliefs. If asked to agree on an explicit definition we might find the task rather complicated. We might not agree on what is to be sustained or on the geographic or administrative boundaries of the area affected, on whose role it is to promote or impose measures that contribute to it, on what are good ways to do it, or how to measure success.

The differences matter: if one focuses only on economic or only on environmental outcomes, besides the ensuing lack of needed consensus for action, we can expect proposals for very different actions and very different groups arrayed in support or against the proposals. We begin here by outlining how we understand sustainability in the Cleveland context, and then we discuss some implications for the City’s future.

Sustainability refers to the capacity of a system – whether ecological, social, or economic – to weather changes in time while retaining certain qualities that we deem desirable. We have come to recognize that social and economic sustainability are fundamentally dependent on practices that do not destroy the capacity of the earth’s ecosystems to support human communities now and into the future. Therefore, for regions, cities, organizations, and economic practices, promoting sustainability amounts to fostering conditions that allow structures and activities to thrive over time without reducing or compromising their resource base.

Sustainability does not mean “stays the same.” Rather, it subsumes the ability to sustain, adapt or change our practices, our institutions and rules to enhance our collective ability to respond to future challenges and opportunities. It also means selecting courses of action that erect the fewest possible barriers to future choices in the long run. Thus a city or region is sustainable if it manages in the long run to provide the quality of life its residents seek, despite changes and fluctuations in the larger context in which it is embedded, and without undermining the ability of future generations to do the same.

The vision for Cleveland as a “Green City on a Blue Lake” encompasses this whole-systems understanding of sustainability. From this perspective, which we adopt here, economic, social and ecological needs are interdependent key components of a healthy, prosperous and resilient community. But what does that mean?

“Healthy” refers to the city’s residents as well as to their natural and built environments. For example, Cleveland is currently a car-based city. The metropolitan area is relatively vast, so almost every activity requires a car or bus trip. This is not promoting, and even detracting from the residents’ health compared to a mostly walkable urban environment. While reconfiguring existing metropolitan space is a tall and expensive order, recognizing this aspect would allow for beneficial changes to be implemented at every opportunity. Conversely, failing to make health a goal may well lead to missing opportunities and continuing on the current path. The components of the area’s natural environment also face health challenges, such as habitat fragmentation, or water and air pollution that harm both residents and wildlife.

“Prosperous” refers to several contributors to the quality of life of Clevelanders. It encompasses both individual and collective aspects. Individuals may wish to have access to housing, education, secure employment, health care, and the lifestyle of their choice. Collectively, we seek resources that enable us to maintain and improve our natural and built environments (including infrastructure), as well as our stock of physical and cultural amenities – parks, museums, universities, etc.

“Resilient” is perhaps the least transparent of the three attributes of community, and a concept of more recent vintage. At its simplest, it refers to a community’s reaction to external setbacks such as the economic crisis of 2008, a natural or man-



Wendy Kellogg



Nick Zingale

Energy Efficiency Innovation at Cleveland State University

Most of us are familiar with Kent State University and its dominance in Liquid Crystal technology, and with the University of Akron and its comparable status with Polymers. These innovations have had significant influence on job creation locally and throughout the nation. Less glitzy, so far, are the technology contributions at Fenn College of Engineering at Cleveland State University. Some of you may be familiar with Dr. Majid Rashidi and his water-tower wind turbines on a roof on Chester Avenue, north of Cleveland State. CSU's Dr Rashidi has demonstrated a four-fold increase in wind-to-generated power efficiency compared to a standard wind turbine by mounting a pair of turbines on a cylinder with the turbines rotating into the wind, a novel but very important application of Bernoulli's Principle. This discovery makes roof-top wind turbines a practical alternative to giant wind mills.

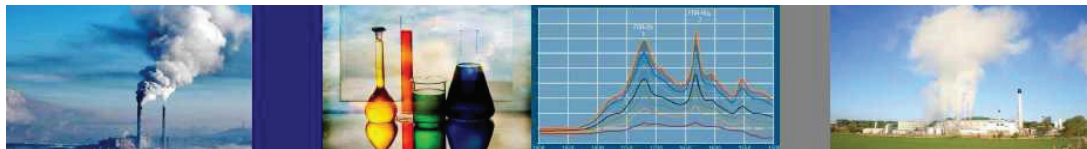
Less known, but perhaps as important, is CSU's world-class research Center for Advanced Control Technology (CACT). The center is, in part, an out-growth of CSU's long-term relationship with NASA Glenn Research Center. A prime example of CACT's activities is the work of its Director, Prof. Zhingiang Gao, and his research in Active Disturbance Rejection (ADR) Control. ADR has the potential to revolutionize control technology. Control technology is well known in all areas where machines are involved. It is important to functional efficiency and power consumption, among other factors, that can make the difference in economic completion between efficient American manufacturing and cheap foreign labor. ADR not only improves controls, but it can make the application quicker and easier. ADR is highly mathematical, which is the reason your eyes might be glassing over just now, but believe me when I say, this is an important development affecting not only economics, but also the environment.

Classic control technology is based on Proportional Integral Derivative (PID) control, which dates back to 1922, and remains as the tool of choice in over 90% of industrial applications. PID is based on reactive control to an observation sensor, just as a shock absorber reacts to a spring observation. PID is passive and linear. An improvement is nonlinear PID, which is designed to dampen out the highly non-linear high frequency noise. Nonlinear PID is effective for control of systems such on truck anti-lock braking systems (ABS), which in relative terms is a simple task. ADR is also nonlinear, but unlike PID, it is an active system, as its name implies. ADR substitutes desirable high frequency oscillations for the destructive noise. Instead of reacting to the noise, ADR during setup determines what is desirable for the system.

The noise might be power surges and machine location error. A thermodynamic application might be a hose extruder with ten heat zones working independently. A case study on an operating hose extruder was conducted by Line Streams Technologies. LST was founded by Dr. Gao, and this private company develops ADR controls for selective applications. While the extruder was running, an ADR Control took fifteen minutes to get the ten individual heat zones of the extruder to work as a system, recognizing and compensating for upstream and downstream heat transfer. One by one, the zones equilibrated, improving product capability by 500% and reducing overall power consumptions by 58%. A PID control had the ten heat zones working independently, continuously over and undershooting the target temperature.

Obviously, more complicated systems require more upfront development of the ADR control, but imagine an ADR control on an Electric Power Plant Combustion Source. Even a conservative 10% combustion efficiency improvement would be immense. CSU is proving that simple concepts such as Bernoulli's Principle or active versus passive control, when creatively applied, can make huge contributions. For more information on CACT and Line Stream Technologies, go to the following websites: <http://linestreamtech.com> and <http://cact.csuohio.edu>.

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Spring Conference Focus on Efficient Waste & Energy Management

The NOC-AWMA spring technical conference "Moving to an Efficient Future" follows the theme of this issue of the newsletter. Regulatory compliance is still important, and the conference will lead off with an Ohio Regulatory Update by Bill Skowronski, the head of the Northeast District office of Ohio EPA. However, as environmental compliance becomes more mature and routine, this chapter needs to shift to the very important area of production efficiency. Environmental management has often been viewed by industrial management as a non-productive cost of doing business. Today's environmental manager needs to learn how to save the company money, not just spend it on compliance issues. NOC-AWMA needs to reinvent itself to be a support vehicle for that effort. This year's spring conference is a step in that direction. Among the presentations are Frito-Lay's "Zero Landfill" Program, FirstEnergy's Renewable Energy Portfolio and developments at the Cuyahoga County Solid Waste District. Presentations for two additional sessions are pending confirmation. The conference will be held the Tri-C eastern campus on Tuesday, May 18 from 9:30 until 3:00. Lunch is included. Registration information is available on the Current Events tab of our web site at www.nocawma.org. Credit card payments are available through the PayPal link on our on-line registration form.

New NOC-AWMA Officers Elected

In a hotly contested election in banana republic style, Pat Nortz of NTH Consultants was elected to succeed Keith Gaydosh of Affinity Consultants as Chairperson of the chapter for the coming year. We all thank Keith for his successful two-year tenure as chairperson. In a classic case of changing chairs, Keith was elected to replace Pat as Vice Chairperson. Chuck Sisia of Labyrinth Management Group and Bob Perry of FirstEnergy shook off token write-in opposition to retain their positions as Secretary and Treasurer, respectively. Natalie Oryshkewych of Ohio EPA, DHWM was reelected to a full three-year term as a Director. Louise Barton of Air Compliance Testing and Joe Green of Masco Retail Cabinet Group are current Directors in the middle of three-year terms and were not up for election. We all wish them success and personal fulfillment in their generous service to the membership of the chapter. Please support them in their efforts.



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Ohio Regulatory Review: New BAT Guidelines

Bill Skrowronski, head of the Northeast District office of Ohio EPA will provide a regulatory update that the NOC-AWMA Spring 2010 Technical Conference on May 18. See separate article in this newsletter for more information.

Ohio EPA DAPC has published a policy determination for interpreting the New BAT that was required by Senate Bill 265. The guide is applicable during this transition period while Ohio EPA writes BAT rules as required by the statute. The guide is very helpful in understanding Ohio EPA policy toward applying BAT. It is yet unclear whether Ohio EPA continues to apply BAT by policy, rather than by rule. See Editorial in this newsletter. Note that BAT may now apply in some situations when a simple PTIO renewal contains no new or modified sources. See the new BAT rule at OAC 3545-31-05 for exceptions. Note also that the guide was written before the federal court invalidated the 10 tpy BAT exemption and the memo does not cover that issue. Ohio EPA memo can be found at: <http://www.epa.ohio.gov/portals/27/SB265/Post090803BATv7.pdf>.

NOC-AWMA Meeting Change

In an apparent effort to stifle my sarcasm at chapter planning meetings, the officers decided to move the long-standing meeting date from the second Wednesday of each month to the second Thursday of each month. The move purportedly was to better accommodate schedules of members, even though on Thursday afternoons I have a golf league. Members should be apprised that I only play golf in the summer. There is no May planning meeting. All members, affiliates and perspective members are invited to all meetings. In fact, the chapter works best when more members attend these meetings. Please try to attend. If you do not receive announcements of meetings and would like to receive them by email, contact Louise Barton at louise@aircomp.com.

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Another Successful All-Ohio Spring Conference

Once again the Southwest and the Northern Ohio chapters of A&WMA put together a full and rewarding program at the Vern Riffe Center in Columbus for its All-Ohio Fall 2009 Multi-Media Technical Conference. Much of the program was devoted to Climate Change. As in the past, the room was packed and no one left cheated for their time. Richard Sprott, President of the International A&WMA, presented a perspective of the past, present and future of the organization, and a synopsis of the A&WMA on Greenhouse Gas Assessment and Reporting held in Baltimore. Gary Bramble, former chair of the SW chapter addressed the Copenhagen Framework Convention on Climate Change from the perspective as A&WMA delegate. William MacDowell, Section Chief for air enforcement and compliance at U.S. EPA Reg. V spoke of Region V Enforcement Priorities for 2009/2010, a talk that relieved or worried some of the audience depending on whether Bill mentioned their industrial sector. Bill also addressed the new Mandatory GHG Reporting Rule in a separate session. Karen Hale, OEPA, DHWM, covered the Hot Waste Topics and John Remy of the Solid Waste Authority of Central Ohio covered SWACO's Industrial Waste to Energy program. As the featured luncheon speaker, OEPA Director Chris Korleski highlighted OEPA's views on GHG Reporting and Carbon Credits in his usual very personal presentation style. Each of the presentations was met with rapt attention and the program ran long. The final forum presentation on the pending Cap & Trade Legislation led by Dick Brewer of Duke Energy, Aparna Dial of Ohio State University and your editor had to trim our hour and fifteen presentation to a half hour. Amazing to me, most of the audience stayed the extra half hour after the scheduled 3:30 adjournment for a lively give and talk session. By any standards, it was an extremely rewarding conference. Don't miss the next one.

Don't Let Your Fleets be Idle!



Starting October 1, 2009, **it will be illegal to idle a car, truck, bus, or other motor vehicle** for more than 5 minutes in the summer or 10 minutes in the winter, in the City of Cleveland.

Other cities, including **South Euclid, North Olmsted, and Maple Heights**, have also enacted **anti-idling ordinances** that affect all drivers and fleets.

For more information on anti-idling, visit our partners at www.cleanairzone.org
For information on air quality in Northeast Ohio, visit NOACA's Air Quality Programs at www.noaca.org or call Amy Wainright at (216) 241-2414 x252.

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The Old Bat is Back

This editorial is not about Little League baseball returning to wooden bats.

In past issues I picked on Congress and their attempt to destroy the world economy in a misguided attempt to halt nature's climate cycles. I will return to that subject in future issues. But I need to come home to vent a long-standing criticism of agency disregard for the Ohio Administrative Code, particularly by the Ohio EPA. This is not a criticism of the entire Agency, nor am I singling out Ohio EPA, since all agencies have a tendency to believe that the Administrative Code only gets in the way of real business. It's a criticism of a culture that grew over many administrations. I am writing now because I believe the culture may still be alive and destructive.

The specific issue is an old nemesis of mine and of much of the regulated community especially small businesses, i.e., Best Available Technology (that BAT). Historically, Ohio EPA took this broad requirement with a very vague definition and blossom it into a rule that swamped all other rules for minor sources. How many permits have you seen with rule requirements which stated in effect that "Rule XXX" (substitute any federal or state rule of your choice) is considered "less strict than BAT"?

Over the years it came to mean that if you found a way to operate with less pollution than your competitors, you had to live with it, even though it might hinder expansion. For example, your current worse coating had a VOC content of a mere 0.5 lbs (VOC) per gallon. It became your limit. Later an opportunity came along to manufacture a widget that required a better coating with slightly higher VOCs. Your permit would not allow it, but your competitor could use it. Consultants, environmental managers and Ohio EPA field engineers found creative ways to write permits to get around Central Office's insistence that "Best" in BAT meant most restrictive.

The worst offense was the short-term limit, especially the hour limit. The concept appears nowhere in any rule, and was not used in the early years of BAT, but Ohio EPA insisted that it had to be in every permit. The hour limit was extremely restrictive, but rarely was it any better environmentally than a daily limit, or even a monthly limit. This grew into such religiosity, that rarely could you get a permit without it. The creative solution was to hide a monthly average for the hourly limit in the compliance test section of the permit.

The underlying issue is that Ohio EPA forgot that by law it was subject to Ohio's Administrative Code, which said that any "requirement of general or particular applicability and future effect" was a rule and had to be promulgated as a rule. In other words, if you treated it as a rule, it had to be a rule. Dissatisfaction with Ohio EPA abuse of BAT eventually lead to Senate Bill 265 and to a more proscribed approach to BAT, including requiring Ohio EPA to actually write rules for BAT.

One feature of the new BAT was a 10 tpy exemption for BAT. Unfortunately, the US District Court ruled that the exemption was invalid because it wasn't in the SIP. The SIP is essentially Ohio EPA rules that US EPA has approved as federally enforceable. Title V of the CAA required US EPA to determine what state rules were federally enforceable, i.e. which were in the SIP. They couldn't do it in many states and had to hire an outside consultant. You see, there is no actual document

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Sustainability for a Green City on a Blue Lake

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made catastrophe such as the arrival of zebra mussels in Lake Erie, the 2003 electrical power blackout, or predicted consequences of global climate change. Although typically only resilience is mentioned as a desirable reaction to such sea changes, in fact it is only one of three ways in which social and ecological systems respond to shocks; the other two ways are adaptation, and transformation. Resilience entails a system's or community's ability to return to its previous state after a shock. For instance, after an economic downturn a resilient community might be able to return to its former glory. It is clear that such resumption of old ways is not always desirable or possible. For example, in the face of Cleveland's gradual but serious population loss, we might attempt to retain all systems at their current scale, but that is obviously not economically feasible. Adaptation entails retaining the basics, but developing new responses to the changed conditions. Thus Cleveland's response to the population loss might require some painful tradeoffs – reduction in the levels of some systems in order to adapt to the new conditions while still preserving the community's character. Similarly, along with efforts to reduce carbon footprints, adaptation may be part of the response we may need to devise in response to global climate change. Finally, at times not even adaptation is sufficient to respond to effects of a dramatic shock, and then the community needs to transform – change its ways to an extent that renders it very different from its previous form. The foreclosure crisis, for example, may force transformation in some of Cleveland's systems.

The complexity of a system such as the Cleveland metropolitan area is such that no simple response is likely to measure up to current and future challenges and to our goals of a healthy, prosperous and resilient community. Rather, it is more likely that we will need some components to be resilient, while others may need to adapt or even transform. We may need to be steadfast about our goals but flexible about the ways in which we seek to attain them, especially since Cleveland is not an island: it is part of larger regional, state and national systems with which we share resources, laws and rules.

The Cleveland economy, originally built in large part on resource extraction that is economically advantageous but rather destructive to the natural environment, has been challenged in time by globalization, changing technologies and the demand of residents and businesses alike for an environmentally healthy, amenities-rich place offering economic opportunity for its residents. These economic and ecological challenges, in turn, have tested the region's social fabric. In response, Cleveland's current Administration has set its sight on becoming “a model of sustainability and a leader in the emerging green economy over the next 10 years through the efforts of Sustainable Cleveland 2019.” In the terms we have discussed, this means catalyzing and supporting change – whether resilient, adaptive or transformative - in Northeast Ohio's physical and economic systems to bring them in line with the opportunities and limits of the ecological systems in which the city operates.

Becoming a leader in the emerging green economy is clearly transformative in nature. Although elements conducive to this are embedded in Cleveland's manufacturing base and skills, successfully switching to a different mix of industries cannot happen without deliberate efforts to retool, retrain the workforce, and provide incentives that attract specific kinds of activities to the region. Perhaps one of the most important transformations may have to occur in attitudes with respect to Cleveland's place in the region. Perhaps the remaking of Cleveland's economic base requires a regional approach instead of the intra-regional competitive strategies previously pursued. Pooling regional resources, infrastructure, and talent may be required for this transformation.

Operating within the limits of our natural and built environments entails mostly resilience and adaptation moves that reduce the stress our necessary activities impose on the host ecosystems. For example, while we will continue to engage in waste-producing economic activities, we need to seek ways to minimize this waste through cradle-to-cradle product design. Similarly, while we will continue to produce and use energy, we need to make every effort to switch to renewable energy sources and reduce waste. We should also seek ways to embed in our practices strategies that restore and maintain environmental quality. One necessary adaptive strategy involves educating the public through multiple avenues – schools, community organizations, universities and colleges – to promote a reorientation toward the shared goal of a sustainable Cleveland and to encourage residents to participate in this initiative.

Can efforts such as Sustainable Cleveland 2019 succeed? There is, admittedly, an internal contradiction between the term “sustainability” as we defined it here in reference to the long run, and a specific date that is not very far in the future. However, the long run begins with today. In addition, plans that exceed ten years are less likely to be politically feasible. So in fact working with a ten-year horizon is honest and realistic, and can set the region on a course toward long-term sustainability.

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The Old Bat is Back

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called the SIP. It consists of thousands of scattered cite references in the Federal Register. US EPA argued that BAT was in the SIP and Ohio EPA initially disagreed. Eventually, Ohio EPA gave up, so now Ohio has a rule affecting mostly minor sources unlike any anywhere in the USA. In the Federal court decision, the court ruled that BAT was included in Ohio's first SIP approved on May 31, 1972.

In many ways that's water under the bridge. Except in the only public communication that I am aware of, a February 10, 2010 memo, well hidden on Ohio EPA's web page, is some disturbing language written by Ohio EPA on how it was going to react to the court order.

"Permit writers should develop case-by-case BAT following the methods used prior to the implementation of Senate Bill 265. This may include a *short term limit* and an annual limit." (emphasis added)

The actual definition in the old, and currently SIP effective, BAT rule is:

BAT "means any combination of work practices, raw material specifications, throughput limitations, source design characteristics, an evaluation of the annualized cost per ton of air pollutant removed, and any air pollution control device that have been previously demonstrated to the director of environmental protection to operate satisfactorily in this state or other states with similar air quality on substantially similar air pollution sources."

Did you spot any hourly limit requirement? It speaks of cost-benefit analysis and comparisons to other similar facilities. Hourly limits were not used when the BAT-included SIP was approved in 1972. And the hourly limit did not arise by any changes in the BAT by rulemaking. BAT does not justify simply making an operation more restrictive and locked into its current operation. Apparently, this Ohio EPA memo appears to suggest that Ohio EPA is considering going back to its old easily applied policy that arguably is not in the rule, and therefore, not in the SIP, rather than balancing the environment with costs as the rule implies. The court decision did not invalidate eliminating hourly limits for non-exempt sources subject to BAT. Why should the decision require otherwise for those sources with less than 10 tpy emissions that now are subject to BAT.

Ohio EPA's memo can be found at
<http://www.epa.state.oh.us/portals/27/SB265/Post10TonExemptionCourtDecisionInfo01.pdf>



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