



OHIO PUBLIC FACILITIES MAINTENANCE ASSOCIATION

*** KEYNOTE ***

10/25/10

“A Vision for Ohio Leadership in the New Energy Age”

Thank you for coming this morning to hear my vision of how Ohio can help lead the U.S. and world in the new energy age. I believe few opportunities will be as great in the 21st century ... and I believe Ohio is well-positioned to play a leading role in the development and deployment of advanced energy technologies. The building, transportation, and industrial sectors of our economy are ripe for an energy make-over and the benefits will be a safer, healthier, and more prosperous future for all of us and future generations.

Over the last century, we have seen the industrial age, the flight age, the space age, the information age, and the internet age. The United States has been fortunate to have led every one of those periods of economic expansion. What age are we in now or are we approaching. I believe the next great age will be the energy age based on limited natural resources and a world population that is expected to grow from 6 billion to 9 billion in the next 50 years – with hundreds of millions buying cars, refrigerators, microwaves, air conditioners, TV’s, and cell phones for the first time.

Though we are not experiencing an energy crisis per se at this time, there will another one as soon as the world economy starts expanding again. It was just two years ago – before the great recession started - when oil prices hit \$125 per barrel and gas rose to over \$4 per gallon. Everyone was buying hybrid cars and the Presidential candidates of both parties were promoting energy independence and the need to diversify our energy portfolio. Since then oil prices have fallen due to lower demand, and our society has largely gone back to old wasteful habits as if nothing happened or will happen again.

Fortunately, there have been some positive developments that give me hope:

First is, public policy at the state and local level. Though I would prefer a national energy policy that would make energy a national priority and commit our country to innovation and leadership on the world stage; I am glad that many states such as Ohio are addressing the need and opportunity. For example, In 2008 Ohio passed SB 221 which requires IOU’s to generate 25% of their energy portfolio from advanced and renewable energy systems. This was a landmark bill that has catapulted our State from irrelevance to national prominence in just two years. As a result solar farms, wind farms, biomass plants, and more are being planned and installed at this very moment.

The second is, ingenuity and entrepreneurship in the private sector. Again, though it would help to have a national energy policy that would send clear signals to large companies and investors, many of us in the business world are not going to wait until the government tells us what to do. The opportunities of invention, product development, and process improvement abound in the energy field and hundreds of Ohio companies are determined to seize them. For example, Toledo has become a a hub for solar research and manufacturing. And Cincinnati has more green buildings than most any city in the Midwest.

The third is, the USGBC LEED rating system for buildings. In my 30 years working in the building industry, nothing has been as transformational as the LEED rating system. It has truly revolutionized the way we look at buildings. And because buildings consume almost 70% of all electricity generated in our country, the opportunity for improvement is enormous. The most refreshing aspect of the green building movement is that the leaders are not just tinkering at the margins; they are setting long term goals like net-zero energy buildings that will totally re-make this industry. Once again, Ohio is stepping up as a leader with active chapters in several cities and hundreds of certified buildings in the pipeline.



And the fourth is, the increasing number of individuals who are embracing the concept of sustainability. They recognize that what we are doing as a country, society, and living species is not forever sustainable. Mindless and selfish drilling, mining, burning, wasting, dumping, and polluting cannot continue to go on without eventually affecting the safety, security, health, and prosperity of future generations. And the fact that countless individuals are standing up to this practically American tradition and saying STOP gives me hope. They speak with courage, they speak with their actions, and they speak with their wallets. Some of them are right here in this building attending this convention. They reduce, reuse, and recycle. They implement energy conservation, energy efficiency, and renewable energy solutions in their work places and homes. They are the grass roots leaders who are ultimately going to make Ohio and America great again.

Given these exciting developments, along with awareness of our past and a vision for the future, I believe Ohio should think and act boldly. The energy age is approaching if not already upon us ... and we can either react to it and become a mere consumer of its future products and services, or we can proactively help lead it and become a solution provider for the U.S. and world.

As the owner and operator of a LEED Platinum and near-zero energy building, I can personally attest to the many benefits of demonstrating energy leadership. It is not just the energy savings – although the energy savings can alone justify the incremental investment. It is also about providing a healthy and comfortable indoor environment where people are able to enjoy and thrive on doing their life's work. I have no doubt that our employees are 1%, 2%, 3%, and maybe even 5% more productive than they would be in an average building. Payroll is the single largest cost in our P&L – as it is with most organizations - and so the boost to our bottom line is significant even if somewhat intangible.

Also we are able to attract and retain better talent now largely because we are seen as a company with a purpose and mission beyond just making a profit. Burned-out generation X and progressive-thinking generation Y workers want to find meaning in their work and feel like they can make a difference in the world. Again, although the productivity savings is difficult to calculate, there is no doubt in my mind they are real.

The PR benefit of being an energy leader is also worth taking into account. We built our building 5 years ago and people are still calling us almost every week to request a tour so they can learn how to design and build sustainably. And the media has given us more free exposure than we could ever afford to buy in traditional advertising. The public recognition has been a boost to our credibility and marketability. Even if the top-line benefit is as little as 1%, 2%, or 3%, it adds to the financial justification of everything we are doing. Too many conventional-thinking business people only look at the obvious and directly calculable energy cost savings – but the HR and PR savings have the potential to far-outweigh the energy savings.

In fact, the experience of designing and building our headquarters was so enlightening that soon after moving in we decided this was not the end of a project but the beginning of a journey. Further inspired by renown architect Ed Masria and his 2030 Challenge - which calls for all buildings to be net zero energy by the year 2030 - we committed ourselves to achieving this goal by 2010 – 20 years ahead of schedule. Therefore we have continuously improved our building operations and added renewable energy systems as our budget allows. For example, in the last 5 years we have installed additional solar PV, a solar thermal system for water heating, sunshades over our south-facing windows, and a low-speed wind turbine to complement our solar PV system at night and during winter.

Initially, our building was designed to be 50% more energy-efficient than a conventional building, and the incremental cost was 10% of the total building cost. But as we pursued our NZE goal over the last 5 years that incremental cost has increased to 20% of the total building cost.

Certainly our payback was quicker on most our energy efficiency investments over our renewable energy investments. And it became progressively more difficult to find energy savings over time since all the easy improvements had already been made. But our energy savings on the incremental cost is calculated at



\$75,000 per year and this will yield a simple payback of 6-8 years. This is based on the average office building costing \$2.50 psf/yr for energy and ours costing only \$0.30 psf/yr.

I know what conventional thinking says: That we should not make an investment unless the payback is less than, say, 2-5 years. But we do not want to be conventional – we want to be a leader. And as mentioned before, we have been fortunate to realize intangible benefits of equal or greater value than the calculated energy savings. When added all together, we have done far better than the status quo investor.

But I want to further expand on the subject of how we justify capital projects, because it is so central to our ability to successfully compete in the new energy economy. For America to become a great country again and Ohio to become a strong leader, we have to think beyond the infamous payback paradigm.

- Yes, financial payback is important but only if calculated with all the risks over the life of the equipment. Such risks might include the fact that some analysts predict oil will go to \$200 a barrel in a couple years. Also China's economy is heating up again. Also oil production is showing signs of peaking. Also residents do not want coal-fired or nuclear power plants in their back yard. Also that many states are mandating public utilities to generate some electricity with renewable energy. Also smart-meters are being rolled-out and 'time-of-use' pricing will become a fact of life. These are just some of the risks that when added up tell a story that it might be wise to plan for higher energy costs in the future. Therefore those who embrace a life-cycle cost approach will have a better chance of being around in 5-10 years than those who are mainly focused on meeting next quarter's numbers. That's why the Japanese auto manufacturers are leading the world in hybrid car sales; why Germany is leading the world in renewable energy production; and why the U.S. is more dependent on foreign sources today than ever before. A long term vision and commitment trumps the get rich quick approach to investing and so we in Ohio need to be mindful of this when moving forward.
- In addition to payback, there is the ethical/moral consideration when weighing investments. In 2007 climate scientists around the world issued a consensus opinion that climate change is in fact occurring, and there is a very high probability that this is partly due to human activity (ie. burning fossil fuels and releasing CO2 into the atmosphere and thereby creating a greenhouse effect around the planet). Scientific measurement of increasing CO2 levels and average temperatures tells us this is in fact occurring; empirical evidence of polar ice caps and glaciers melting also tells us this; and in my mind common sense through other life experiences such as the growing prevalence of air and water pollution tells me this. I am not a climatologist – but I am an engineer and if the data says this is a problem then I think we need to listen. The vast majority of the people who say climate change is not occurring - or is only a natural phenomenon - are not scientists who have spent their career studying this. Instead it seems to me they are paid lobbyists, talk-show hosts, and political extremists who have no technical foundation other than some hearsay arguments. At this time the preponderance of evidence points to a big problem if we don't start acting like responsible citizens of the Earth. Fortunately, there are some short term benefits to less carbon pollution such as cleaner air and a healthier population.
- A third consideration above and beyond payback is national security. Do you know that we are importing twice the amount of oil now than we did during the first energy crisis 30 years ago? Given this and the fact we now have a heavy military presence in the Middle East, is it possible we are heading in the wrong direction? It simply does not make sense that we are sending \$500 billion a year of our country's wealth to a dangerous part of the world and at the same time spending hundreds of billions more securing our 'interests' over there. Imagine the difference if we invested that money over here and what that that would do for our economy. Imagine the difference if the external costs of waging war and protecting our interests overseas, and cleaning up our air and water were allocated to the energy industry rather than the DOD or EPA? The cost of gas would be over \$5 per gallon like it is in Europe; and the cost of electricity would be over \$0.20-0.30 per kWh.

The triple bottom line of financial, environmental, and security improvement needs to be ingrained into our thinking. Take any one of these and the justification for going green is very compelling. Take two or all three and the justification becomes a moral imperative.



Of course the best way for me or anyone to promote sustainability is not to talk the talk but to walk the walk. As such I am determined to not only survive these tough economic times but to thrive in them. My investment in energy efficiency and renewable energy pays dividends and appreciates just like my investment in stocks, bonds, mutual funds, and real estate. In fact the returns are higher since interest rates are so low and real estate has been so depressed. And the increased diversity of my portfolio protects me even more against the many risks that are out there. For those do not know, there are federal tax credits and state grants available for renewable energy installations – and you can take advantage of accelerated depreciation and long-term financing for a net positive cash flow.

As mentioned, old school decision-makers will say that if an investment doesn't pay itself back in 2-5 years it doesn't make sense. Then I notice they are wearing brand name clothes, sporting a fashionable watch, driving a luxury car, and learn they are planning an exotic vacation. And I wonder why they view an investment in their homes and businesses which makes money for them as being inferior to purchases that have no payback and will only depreciate over time. One lesson for me and perhaps all of us is, we need to make going green as socially acceptable and cool as driving a fancy car – because it certainly beats the economic argument for driving one.

I will take the payback of my geothermal heating and cooling system, solar PV array, and hybrid car over that of a Rolex watch, Mercedes convertible, and trip to the Bahamas any day. Plus the long term emotional satisfaction of doing the right thing for the environment and minimizing my dependency on foreign oil far exceeds the satisfaction I get from the typical status symbols. What we need to do is make energy leadership a status symbol in Ohio!

If some of the positive developments in Ohio area are not enough to convince you where this is all going, take a look at some Fortune 100 companies and how they are positioning themselves for future success. GE is betting billions of dollars on solar and wind power; GM is doing the same with plug-in electric vehicles; Wal-Mart is promoting sustainability through its entire supply chain affecting thousands of companies; and even AEP and Duke are investing in solar and wind farms. Energy savings and leadership is becoming as much a part of their thinking as cost, quality, and delivery. This is because of the growing recognition that energy is hidden in many different areas of their P&L statements: from the offices they work in, to the industrial plants where products are made, to the freight cost of incoming materials and outgoing products, to the travel of their employees, to the rest of the supplier and customer chain energy needs.

Also look at what cities like Austin; Boulder; Portland; Chicago; and Pittsburgh are doing. And look at what CA, PA, MI, NJ, and NM are doing at the state level. These progressive cities and states are acting as real change agents and Ohio needs to keep up. Other great role models for us are London, Paris, Brussels, Copenhagen, and Zurich. If you have ever been to any of these cities you cannot help but be inspired by the planning that went into them a 100 or even 200 years ago. You do not need a car; people walk and take trains; homes, places of work, and places of entertainment are co-mingled. People are healthy and the fun and excitement on the streets is very palpable. We need more of this in Ohio and our cities.

The fact is, energy consciousness is an idea whose time has come - again. It used to be a necessary way of life for most of our ancestors. As recently as my parent's generation, one did not have the luxury of wasting things like energy. Growing up during the Great Depression and then serving in WWII, my father was conditioned to conserve and sacrifice the rest of his life. By the 1990's many of us baby boomers had come from the greatest generation in U.S. history only to become the greediest generation.

It is time for our generation to take up the mantle again. This is our opportunity to demonstrate world leadership on a level not seen in many years if not decades. The U.S. should not be waiting for China and India to control their CO2 emissions - as we are the biggest culprit in the world on a per capita basis when it comes to CO2 emissions.



Certainly one of the major challenges in the future will be growing the U.S. and world economies while simultaneously slowing, stopping, and then reversing CO2 emissions. Think for a moment of the millions of new homes, cars, and appliances that must be sold on a continuous basis to keep these economies humming. Do you think we might have to change our behaviors and lifestyles to not only stop but actually reverse CO2 emissions with all this growth still going on? I don't view this as a problem – I view this as an incredible opportunity.

Fortunately smart individuals, families, and communities are already returning to age-old maxims like smaller is better and less is more. This includes the homes we live in, the cars we drive, the food we eat, and the energy and water we use. They have learned not to confuse the quality of life we have with the quantity of stuff we buy.

Of course the ultimate and perfect model for us is Mother Nature and its natural eco-systems. For example, bio-mimicry is a fascinating and growing field of science about making man-made structures more like living plants – as they waste nothing and have the advantage of evolving over millions of years to survive and thrive under the harshest conditions.

Another model to emulate is man-made. It is called the Toyota Production System and it is used by one of the most successful companies in the world. Like natural eco-systems it seeks to eliminate all waste and strives for continuous improvement. Why not adopt principles like these for our buildings, roads, and cities?

Ohio is well on its way to becoming a leader in the new energy age. Therefore I would like to take it to the next step and cast a vision that Ohio should strive to become one of the top 3 states in the country and one of the top 10 in the world when it comes to designing, manufacturing, installing, and maintaining advanced energy systems.

Let's make Ohio a destination for students graduating from the top colleges and universities in the region because of the opportunities in sustainable design. Let's make Ohio's cities communities of mixed-use developments that are holistic and teeming with life - rather than discrete buildings connected by roads with thousands of commuters. Let's give our cities a makeover that includes more tree-lined streets, more outdoor cafes, more parks and ponds and creeks and natural habitats. Let's connect our downtowns to our uptowns to our suburbs with bike trails and mass transportation systems that allows workers, shoppers, and out-of-town visitors to mingle like never before.

Let's make Ohio a role model of best practices put to use. As a practitioner I can tell you that none of this is rocket science. If we embrace just 10 proven concepts we can become that shining city on seven hills. For example:

For new construction, we should try to take advantage of a southern orientation and layout whenever possible for the free benefit of passive solar heating and day-lighting. This alone can make our new buildings 30% more efficient. Sure this might be difficult on north-south running streets but maybe its time we break the boring paradigm that buildings have to be aligned or squared with the streets.

Second, we should super-insulate all our buildings, both new and existing. This is one of the easiest things we can do as a city to reduce our carbon footprint. Installing more attic insulation and wall insulation where there is none, as well as replacing old single-pane windows is about the lowest hanging fruit there is. No moving parts, no equipment change-outs in 5-10 years.

Three, we need to take advantage of natural day-lighting more, and rid ourselves of the idea that we need 100 foot-candles of light glaring down on every square inch of office space. By de-lamping overhead lighting fixtures, and emphasizing the use of small task lamps with CFL's, Cincinnati alone could reduce its accumulative energy load by millions of dollars.



Four, we need to use geothermal heat pumps for heating and cooling our spaces as much as possible. These systems are up to 40% more efficient than conventional furnaces and air conditioning systems. The earth is a great solar collector and so why not tap into that heat source during the winter and use it as a heat dump during the summer? It's proven and the payback can be less than 5 years.

Five, we need to be smarter about the way we heat and use our hot water. We can start by lowering the set-point from 140F to 110F. We can install timers so we are not heating the water at 2am. We can look at using point-of-use heaters, heat pump water heaters, and solar thermal systems to improve efficiency.

If we do these 5 things and do them well, Ohio will become one of the most energy-efficient states in America. But let's not stop there, let's add just 5 more items to the list.

Six, we need to add some sex appeal to our community makeover. Nothing does this like glimmering solar panels on the roof or ground for generating onsite electricity. Not only do they look cool – they fascinate people when you tell them you send power back to the grid on sunny days and on weekends. Though the payback on commercial installations can be as long as 10 years, when combined with the other faster payback items I mentioned, you can justify it based on a diversified portfolio strategy. But the intangible benefit is it serves as a status symbol for your building – which is important as marketing and sales professionals know.

Seven, we need to become more water efficient. Even though we have great natural resources in the Ohio River, Great Miami River, etc, we should still be a model for sustainability. An energy consultant recently told me that 20% of the total electrical consumption in the U.S. is for pumping water. Every time you turn on the faucet or flush a toilet, think of the fact that water came from miles away and since water is relatively heavy it took a fair amount of coal to be burned to move it that far. Waterless urinals, dual-flush toilets, rainwater catchment systems, and the like would make a big impact here.

Eight, we need to become a city that recycles everything and wastes nothing. We should set a goal that every home and business in our community recycle at least 50% of what it throws out. There should never be a trash can that does not have a recycling bin next to it. And the number of trash cans should be limited to two per family per week with the ultimate goal of getting down to just one.

Nine, we need to become a state that walks and bikes more by providing the necessary paths and bike racks and shower facilities. And when we drive we need to drive cars that are more efficient than the national average. Just like the City has been creative with property tax abatements for LEED certified buildings and homes, perhaps it could be just as creative with incentives for Hybrid cars that make 50 miles per gallon.

And ten, we need a light rail system that connects our cities. The great cities in America already have mass transit systems, from New York, to Washington DC, to Atlanta, to Dallas, to San Francisco – and while a rail system downtown might be a good start for reviving that area, we need to be proactive to the future and not just reactive to the past. Connecting Cincinnati to Dayton to Columbus and Cleveland would provide strategic benefits to our state.

If we act on these basic but strategic opportunities, we can control our destiny. Most people think that the utilities control their energy costs. No, you do! You are not some hapless victim that should just pay your utility bills every month like there is nothing else you can do. You can reduce your energy usage 50% or even 100% if you make a conscious and strategic commitment to doing so. And if you do this, you will feel like you are in the driver's seat, not the utility.

In conclusion, I want to say I got here by accident ... it was never my intent or expectation that designing a super energy-efficient building would change me and our company the way it has. But Ohio can get there on purpose with the right vision, policies, and leadership from the government, education, and business sectors to you and me doing the little things that we do every day GREAT..

A former U.S. President has said the new energy economy will dwarf by several orders of magnitude the internet economy. He added that it will have the biggest impact on our economy since America geared up for



WWII. In my opinion, we should embrace the energy leadership opportunity in the same way we embraced previous national challenges. If we don't, we risk losing our competitive advantage to countries like China, Germany, and Japan who are investing in this area like we use to invest in opportunities a century ago.

With the midterm elections being next week, let's be mindful of where the candidates stand on energy leadership. Some want to embrace the growing solar and wind industries which are some of the fastest growing industries in the world. But some in my opinion are in the back pockets of the fossil fuel industry and they want to continue our reliance on and addiction to oil and coal. Advanced energy technologies will create engineering, manufacturing, construction, and maintenance jobs of the future. They will also ensure more diversity and competition in our energy industry; whereas conventional providers want to maintain their monopoly-like power and control over the rest of us.

For those of you who have not been to the USGBC's Greenbuild Conference, I cannot encourage you enough to go. This year it will be in Chicago on Nov 16-18 and I guarantee that if you attend the main sessions you will come back a changed person. You will be more excited and hopeful about your work in facility maintenance that you will no longer call it a job. At the least you will consider it a more noble profession and some like me have even elevated it to a calling or vocation.

When you come back – you cannot carry on as usual. You cannot get into your SUV and talk to your clients about designing a LEED building. You cannot turn on those incandescent lights in the kitchen and talk to your kids about the importance of recycling. Professional leadership melds into personal leadership. You will embrace the idea that it all starts with us as individuals - and only then can we tell others about the opportunities, cost savings, and emotional satisfaction of going green.

Logical and rational business people will question you; some may even doubt you. But if you show the courage of your convictions and the emotional intelligence of real leadership, they will eventually come around. The greatest accomplishments in human history were never about payback. If they were, Michael Angelo would never have painted the Sistine Chapel; Thomas Jefferson would never have written the Declaration of Independence; Abraham Lincoln would never have saved the union; and Neil Armstrong would never have set foot on the moon.

The buildings that inspire me most are the cathedrals of centuries ago – when they were built using criteria other than lowest first cost and a 12 week construction schedule ... when they were built before the days of running water and electricity. We need to leapfrog the Europeans so they will visit America - and ideally Ohio - to learn and be inspired by our vision and leadership in sustainability.

Developing my personal brand as an energy leader has been THE most rewarding experience of my professional career. I wake up every day more excited about the future than the day before. The opportunity to help lead one of the biggest movements to ever sweep the face of the planet – and make money at the same time – is exhilarating! But my dominant thought is this: My kids. What will they say if I ignore all the problems and warning signs that are out there and did not do my part to become part of the solution?

Let's make Ohio a top 3 energy leader in the U.S. and a top 10 leader among the nations of the world ... and a destination for others to learn how to do it right!

Thank you.