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Power & Water

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MILWAUKEE'S ELEMENTAL ECONOMIC STRATEGY

The city of Milwaukee is attempting to redeploy its legacy assets in water and power-based engineering and manufacturing by pairing them with new platforms for applied research. The hope is to help the local economy regain some of its innovation footing and create a more nurturing environment for new water and power company start-ups. The recent launch of twin accelerator projects has given the city a legitimate claim to being a leader in developing a more sustainable water and power infrastructure for an increasingly resource-constrained world.

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Despite the efforts of city boosters everywhere to tout their city as the next hub for "bio" this or "tech" that, generally, the most effective economic development strategy is to realign local strengths to new and emerging global markets. Milwaukee, long known as a center of brewing, craft manufacturing, and the design and production of specialized industrial machinery, is trying to do just that by repositioning its legacy assets around the evolving needs of a rapidly urbanizing world; one faced with unprecedented environmental strains and resource depletion.

By expanding partnership opportunities between industry and academia, and offering whole new platforms for applied research, Milwaukee is hoping to rebuild a culture of innovation and entrepreneurship in the critical spheres of water and power technology. This modern industrial-cum-*cleantech* focus is intended to return the city to a center of engineering and industrial prowess for a resource-constrained age.

Like other cities known for their niche economic specializations, Milwaukee's unique strengths in water and power can be attributed to institutional assets and knowledge that have accrued over many decades. The city's formative 19th century economy centered on harnessing and monetizing the area's two main resources: an abundant and widely navigable fresh water system, and a large and fertile countryside. Successive waves of Northern European immigration, particularly from Germany, populated the area with unusual numbers of highly skilled and entrepreneurial tradesmen, engineers, machinists, and inventors to the point where the city became known by the late 19th century as the "Machine Shop to The World." The city became a large exporter of beer and industrial machinery and became well known for its ambitious public works projects, particularly its expansive and modern water and sewer systems.

By the mid 20th century, the city was home to companies such as AO Smith Corporation, Allis Chalmers, Cutler-Hammer, and Johnson Controls Inc. and had evolved into a center of motorized power control, hydraulic and propulsion systems, and a wide assortment of engines, turbines and generators with various industrial applications. These companies built-up their own R&D departments and became a major driver of patent activity in the region. The city had also added three engineering colleges and a strong technical education system to support the efforts of its predominantly manufacturing-based economy.

Although many of the region's legacy companies relocated production to other regions beginning in the 1970s and 80s, they have retained much of their engineering and product development infrastructure and talent in southeastern Wisconsin. Tapping into this deep reservoir of institutional know-how and steering it in new directions is the impetus behind two parallel initiatives underway in the region to both modernize and reenergize an industrial eco-system that – like beer – had once made Milwaukee famous.

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THE GLOBAL WATER CENTER

An historic outgrowth of Milwaukee's 20th century "beer to gears" economy (and the city's later concern with fixing its recurrent problems with accidental sewage discharges into Lake Michigan) was the growth of numerous smaller companies involved in the purification, filtration, conservation, testing, treatment, pumping, and metering of water. A study performed by the University of Wisconsin – Milwaukee in 2009 identified 161 such companies in the seven-county Milwaukee region as of 2009. Together with the university's existing Great Lakes Research Institute at the Port of Milwaukee, along with newer cultural attractions like Pier Wisconsin (an environmentally-focused Great Lakes learning center jutting out into Lake Michigan), a new water-themed "Fresh Coast" brand identity began to take hold in the region starting in 2008.

The cluster's global economic potential (estimated to be about $500 billion annually) and the research opportunities it presented for area universities provided a strong rallying point that extended across industry, government, and academia. This groundswell resulted in the creation in 2008 of the Milwaukee Water Council, a corporate-led industry trade organization spearheaded by the CEOs of Badger Meter Inc. (a local manufacturer and servicer of municipal water and gas metering systems) and AO Smith (water heaters) and organized and funded under the aegis of the Greater Milwaukee Committee – a long-standing philanthropic and civic advocacy organization representing some of the largest corporations in the region.

The Water Council's mission is to spotlight the industry and facilitate connections among businesses, academia, venture capitalists, serial entrepreneurs, and traditional EDOs. The organization's mission according to its website is to " … *[a]lign the regional freshwater research community and water-related industries to establish the Milwaukee region as the World Water Hub for water research, economic development and education."* The organization currently has 130 members from across industry and academia and helps profile the work of the over 100 water scientists presently working in the region.

According to a recent Forbes article, one fifth of the world's population lacks access to clean water and by 2025, 1.8 billion people will live in water scarce areas of the world. Referring to the Milwaukee project in the article, Harvard University professor Rosabeth Moss Kanter was quoted in the article as saying, "The Milwaukee example was particularly striking because it wasn't high tech. It was in a different arena. It required a lot of imagination. It meant reframing people who are making pipes and valves to being in the water business."

The Global Water Center located on the edge of Milwaukee's Third Ward warehouse district.

With the help of local government and industry leaders, the newly formed Water Council successfully lobbied the University of Wisconsin Board of Regents to establish the nation's first and only School of Freshwater Research at the University of Wisconsin – Milwaukee in 2009. A key role of the school is to support the existing water industry cluster and to work toward commercializing water science-based research that can support new business formation in the region. This effort was further supported by the creation of a special water law program at Milwaukee's Marquette University, an Institute for Water Business at nearby UW-Whitewater, and the city's subsequent designation as a UN Global Compact City of freshwater expertise.

Although the Water Council's role primarily has to do with promoting research and helping build water-based businesses, it has also served as something of an unofficial forum for the controversial local debates over diverting Lake Michigan water to communities outside the Great Lakes watershed, and the even more contentious debate about preventing the encroachment of the highly invasive and eco-system altering Asian Carp

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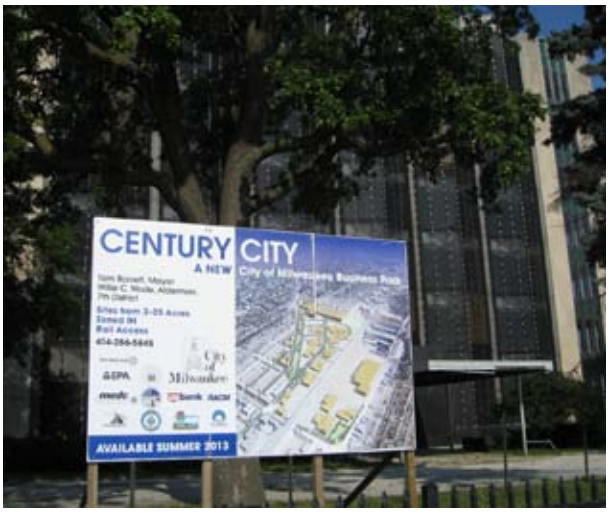
from entering into the Lakes from the Chicago Ship Canal. The Water Council has also hosted several water conferences in the city to help reinforce its position as a leader and "first mover" in the water industry.

Recognizing a further need for a visible industry hub and dedicated business incubator, the Water Council opened the doors to the Global Water Center (GWC) building in September 2013. The GWC, funded through member donations and various state and federal grants including from the National Science Foundation, is the focal-point of a new water industry seed accelerator where fledgling water-related businesses can connect to mentorship opportunities, venture capital, and specialized technical assistance in addition to cultivating critical vendor/supplier relationships with the corporate membership of the Water Council. Geographically, the new GWC building straddles the edge between Milwaukee's trendy Third Ward neighborhood and a former 18-acre industrial brownfield rechristened as a future urban tech park called the Reed Street Yards. The tech park is positioned to host businesses being spun out of – or attracted to – the GWC.

The $22 million GWC building is a renovated 100,000-square-foot, seven-story former box factory and warehouse featuring a lecture hall, exhibition space, and a state-of-the-art water flow lab in addition to more traditional offices and common areas. A full two thirds of the building was already leased upon the building's opening, including a full floor dedicated to UW-Milwaukee's new School of Freshwater Sciences. The Wisconsin Economic Development Corporation, the state's lead economic development agency, contributed $750,000 to the build-out plus grants of $50,000 apiece to each of the 13 water start-ups located at the GWC. A law firm specializing in water issues as well as a small venture capital group are also housed within the accelerator.



The city of Milwaukee's master plan for the northern quadrant of the 30th Street corridor in front of AO Smith's long-abandoned former research building - the last surviving AO Smith building in the corridor.

"Our goal from the outset has been to position ourselves as the Silicon Valley of water technology," says Rich Muessen, CEO of Badger Meter and one of the founding members of the Water Council. "The reason this has worked so well is because of the many water-based companies in the region, whether they're involved in water purification, water delivery, water conservation or water fixtures, very few are competitors as opposed to being complementary to one another. That, and because this has been largely industry and not government driven."

Similar to the Water Council in overall concept but markedly more expansive in ambition, scope, and reach is the Midwest Energy Research Consortium (M-WERC), an organization focused on collaborative research and business start-ups in the areas of energy, power and control (EPC) systems. Its mission is to reconstitute, realign, expand, and leverage existing EPC assets within the region for new and emerging global market opportunities, resulting in new energy and power systems technologies and cleantech businesses.

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Like the Water Council, M-WERC's membership represents a broad array of companies and higher education institutions throughout the upper Midwest looking to leverage their combined resources to build the region's capacity for innovation and entrepreneurship around industries where it already has a competitive edge. The organization's six targeted technology areas include: distributed energy research and systems, building energy

and efficiency, energy storage, the energy-water nexus (i.e. hydro-power), and renewables and bio-fuels. Its core mission areas include: technological innovation, market and industry expansion, public policy support, workforce development and organization development, and strategic collaboration.

The organization is part trade group, research consortium, business accelerator, and community developer and has bold plans to rebuild a large swath of its immediate neighborhood as it rebuilds and retools an entire industry. It differentiates itself from the numerous other energy-focused business accelerator programs throughout the country by its emphasis on collaborative industry-driven research focusing on advanced-stage research with clear, near-term market potential (versus university-led initiatives that tend to be skewed more toward the long-term advancement of disruptive, paradigm-changing technologies such as fuel cells).

M-WERC's founder and CEO, Alan Perlstein, a one-time industry executive for the Milwaukee-based power and controls division of defense contractor DRS Technologies, has a vision of reestablishing the "industrial commons" (i.e. the interlinked network of companies and research-engineers) that had at one time established Milwaukee as an industry leader in power and control systems in the US. The commons can be traced back to the inter-company ferment created through the various mutations, collaborations, and spin-offs from Milwaukee's seminal EP Allis Co. during the early 20th century. The company, later known as Allis-Chalmers, was a major manufacturer of heavy industrial equipment and helped spawn myriad other companies that made-up an extended outsource-network of suppliers and component manufacturers.

Quoted in a recent article in the Milwaukee Business Journal, Perlstein said that given the presence of many of the aforementioned large power companies extant in the region, that "The Midwest and Milwaukee in particular, arguably has the nation's strongest energy, power and controls cluster already. We're an unknown giant," he said. He also cites a recent report entitled the *Wisconsin Economic Future Study* which has identified the parent economic cluster of electrical equipment manufacturing as one of the fastest and most important driver industries in the state of Wisconsin. In the same article, Milwaukee Mayor Tom Barrett added further credence by saying, "The Water Council's prominence did not happen overnight. We have to talk about Milwaukee's prominence as an energy hub and, fortunately, it's not something that we have to make up."

Like the Water Council, M-WERC plans to operate an industry-specific business accelerator and research labs. However unlike the Global Water Center 's trendy digs adjacent to downtown Milwaukee, M-WERC's accelerator will be housed in the recently vacated former headquarters of Eaton Corporation's Milwaukee division in the city's rather desolate and isolated 30th Street Industrial Corridor. The corridor, buoyantly rebranded as "Century City," was at one time a major tentacle of the

The former Eaton Corp. research building re-birthed as Century City Tower in Milwaukee's 30th Street Industrial Corridor. The building houses M-WERC's energy, power and controls accelerator, the Energy Innovation Center (EIC).

city's industrial landscape and a major source of manufacturing jobs for Milwaukee's black working class. It began falling on very hard times in the 1980s with the relocation of several of the city's mainstay corporations such as car frame manufacturer The AO Smith Corporation along with the many smaller, co-located companies making up its extended supply-chain.

Although companies such as Master Lock Corporation and Harley-Davidson still maintain production facilities in the corridor, the neighborhood presents a somewhat post-apocalyptic aspect and has been dubbed "Detroit 53216" by one local writer in reference to its level of desolation and the local zip code.

Perlstein's visionary goal is to incubate and grow new companies in the energy, power and controls sector in the uniquely-equipped, seven-story, 200,000-square-foot former Eaton research building then having those companies spin-out their production and jobs in the surrounding neighborhood. A main focus of the research he is attempting to commercialize among and on behalf of M-WERC's extended network of member companies and university research labs relates to distributed energy and micro-grid technologies. (Distributed energy and micro-grid generally refers to interconnected, autonomous, and multivariate energy sources that can be integrated into a single system to assure energy redundancy and security for large, dependant power users. The networked system can either supplement the main power grid or operate independently from it.)

Perlstein's ultimate goal is to have the adjacent Century City business park hard-wired as a distributed-energy power-park to serve as a working demonstration of micro-grid technology and to attract high power users to the neighborhood. M-WERC is currently working on another micro-grid demonstration project in Madison, WI.

The organization's membership has grown dramatically in recent years to 70 and includes all three of Milwaukee's engineering schools (UW-Milwaukee, Marquette University, and the Milwaukee School of Engineering) along with UW-Madison and five Wisconsin technical colleges. Corporate members are scattered throughout eight Midwestern states extending from Ohio to Minnesota. These members include power system heavy hitters, Rockwell Automation, Briggs & Stratton, Kohler Power Systems, DRS Technologies, Eaton Corporation, and Johnson Controls which is an industry leader in smart building technology and lithium-ion battery research.

Its broad-based membership has been used to leverage funding from the Department of Energy and the Wisconsin Economic Development Corporation along with corporate donations. Since its founding in 2009, M-WERC has funded over 19 research projects totaling over $2 million in grants with plans to fund an additional $500,000 in grants in 2014. M-WERC will also serve as the Wisconsin "franchisee" of the Minneapolis-based Cleantech Open – a provider of virtual incubator services for clean-tech start-ups. The affiliation with Cleantech Open will provide M-WERC with access to a proven business boot camp training module, as well as invaluable connections to a nationwide network of business mentor and angel/venture capital groups.

Disavowing a bunker mentality however, M-WERC's mission is not only to incubate new companies, but also to improve conditions in the neighborhood by providing jobs and job training to neighborhood residents and helping to facilitate neighborhood redevelopment. Partnering with them, and located under the same roof, is the Northwest Side Community Development Corporation (NWSCDC), one of the city's most enduring and agile CDCs.

As evidence of the organization's growing regional influence and leadership, M-WERC recently led Milwaukee's successful initiative to be selected for the federal government's new and highly coveted *Investing in Manufacturing Communities Partnership* program. Essentially, the program grants designated communities "most favored nation status" in the receipt and coordination of resources across various federal agencies. Milwaukee was chosen as one of only seven communities nationwide for this important designation based, in part, on the strength and size of its EPC cluster and supporting capacities as highlighted by M-WERC.

Although M-WERC's accelerator building is physically untethered to an anchor institution (such as a university or corporate lab that could provide a built-in feeder to it), Perlstein is hoping to attract tenants by marketing the Eaton building's loaded-for-bear power capacity, robust telecommunications systems, and handsome interior appointments that include a full gym, cafeteria, state-of-the-art teleconference facilities, and a small but impressive collection of modern art. That, and the commitments of area universities to have a visible presence at the facility. Still, crime in the neighborhood is a concern (if not a reality) and has been cited by Eaton and others as a reason they decided along with several predecessors to decamp to the suburbs. The blocks immediately surrounding the accelerator contain several boarded-up apartment buildings, vacant lots, and abandoned factories.

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To assure that doesn't happen, the NWSCDC is working with the city of Milwaukee to leverage its allocation of federal neighborhood stabilization funds for the concentrated rehabilitation of several neighborhood blocks directly adjacent to the industrial corridor. The city is also working on a green infrastructure initiative in the area and has recently completed demolition of the nearby former AO Smith factory – a behemoth-sized complex of aging industrial buildings that were abandoned in the late 1990s. NWSCDC is also being positioned as the de facto master developer for M-WERC by working to assemble and control land, package tax credits and other incentives, and recruit developers.

AN "INFRA-TECH" FUTURE?

It is far too early to know if Milwaukee's twin projects will drive economic growth in a major way. Only time will tell. There does however seem to be more excitement and energy building around these two economic opportunities than any of the uninspired ideas of the recent past. The difference-maker this time around is the existence of a relatively new regional economic entity known as the Milwaukee 7 – a public-private regional economic

development organization created in 2006 and nominally representing the seven counties that make up metro Milwaukee. "M-7" has been instrumental in helping rally corporate and government leaders around unique, asset-based opportunities that the region is uniquely positioned for.

Perhaps more importantly, the opportunities are being presented and led more or less organically by top industry executives in their respective fields working in partnership with a capable and ambitious group of universities looking to aggressively increase their research profile rather than from the top-down by government.

The city's new, more measured focus on *what it already knows* versus the largely policy and incentive-based strategies that have characterized earlier economic development efforts has done a great deal to establish a new local zeitgeist based on ingrained local knowledge and tradition.

Each organization also has well-connected and active board membership giving them both credibility and financial clout vis-à-vis state agencies and venture capitalists. Finally, the *tech-tinged* water and power opportunities are areas that seem both realistic and attainable for a city like Milwaukee that, unlike its urban neighbors of Chicago and Madison, WI, has never been a very strong player in science-based academic research.

The city's new, more measured focus on *what it already knows* versus the largely policy and incentive-based strategies that have characterized earlier economic development efforts has done a great deal to establish a new local zeitgeist based on ingrained local knowledge and tradition. This focus dovetails with the region's recent rediscoveries of its artisanal customs around local food, skilled-crafts, and industrial design, and gives the city and region ideas that they can legitimately "own" versus the prevailing "me too" strategies of recent history. By refocusing around water and power, the city and region have returned, in a sense, to some of their original driver industries. Smartly, these happen to remain the same basic elements that will continue to drive economic development across the globe.