

The Abell Report

What we think about, and what we'd like you to think about

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ABELL SALUTES: MAGNA's Baltimore Technical training Center, for providing an opportunity to learn the tool and die trade, and for inspiring a passion for a life within it.

One day in June 2002, a man named Frank Stronach took a walk down Park Heights Avenue, in the blocks just below Belvedere Avenue. Mr. Stronach was not out for a stroll; he went looking for troubling streets, and in the Pimlico section of Park Heights he thought he found them. That is why there is now a building as large as a public school (which it once was), identified in foot high letters, "Magna Baltimore Technical Training Center" (MBTTC). Inside, and on the grounds surrounding the building, a quiet transformation in human rehabilitation is taking place, in job training, education, recreation and social services — and Frank Stronach, founder and president of MAGNA, and Paul Myles, director of MBTTC, are making it happen. (MAGNA International, Inc., which includes in its corporate family Magna Entertainment Corporation, owns Pimlico Race Course and Laurel Park).

On two floors, in 48,000 square feet of simulated factory working spaces, are the lathes, drill presses, surface grinders, welding equipment, vertical mills, and computers that make up a

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Maryland's Electricity Opportunity: How to Fix the Power Breakdown

By Richard Munson

The author argues: Modern technology could increase electricity reliability, enhance consumer choices and reduce pollution.

Pending rate hikes have focused attention on electricity, yet few policymakers are looking beyond these increases to consider how Maryland could jump start a culture of innovation and efficiency within its electricity sector. The rate hikes, in fact, offer an opportunity to think boldly about the state's energy future. If regulators and lawmakers focus on creating a more innovative electricity system, they can stimulate immense environmental and economic benefits.

Opportunities are vast. An array of modern technologies can enhance reliability, increase consumer choices, and reduce pollution. Yet, entrepreneurs are blocked by outmoded policies designed over the last century to promote and protect monopolies. Compared with its neighbors, Maryland has been slow to adopt market rules that would spur advances. As a result, the state has not attracted energy entrepreneurs and their investments. Rather than simply play the blame game about who or what is responsible for today's higher rates, the state's leaders need to confront market barriers, and to put into place a more efficient and reliable power system to better serve Marylanders.

The Status Quo Can't Survive

As Maryland thinks about the future of its electricity service, it needs

to consider changing the model of centralized generators and regulated monopolies. After Enron's machinations, California's restructuring debacle, and even Maryland's own rate hikes, some are tempted to ask, why shouldn't we revert to the "good old days" of regulated monopolies and status-quo technologies?

The answer is that the status quo is rickety, inefficient, and unreliable. Today's average generating plant was built in 1964, using technology from the 1950s. Utilities have not improved their delivered efficiency in some 50 years. With efficiency calculated at 33 percent, they essentially burn three lumps of fuel to generate one lump of electricity. Put another way, two-thirds of the fuel burned to generate electricity is wasted. The predominant configuration of centralized power plants eliminates the possibility of capturing and utilizing that heat. As a result, additional fuels must be burned to provide the thermal needs of factories and buildings that are located far from power plants.

The consequences of that system's inefficiencies and stresses are staggering, if little noticed. Unreliable supplies, ranging from milli-second fluctuations that destroy electronic equipment to the summer 2003 blackout that left 50 million without power are annually

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costing Americans \$119 billion. To provide perspective, this unreliable power adds a 44 percent surcharge to the cost of U.S. electricity.

Electricity generators, moreover, are the nation's largest polluters, spewing tons of mercury, sulfur dioxide, carbon dioxide, and other contaminants into America's air and waters. Despite significant government attempts to control such pollution, 46 of the nation's top 50 emitters are power plants. In February 2006, the Maryland Nurses Association claimed that emissions from just six state-based generators cause 100 premature deaths annually in Maryland (and 700 total across the U.S.), as well as 4,000 asthma attacks in the state (and 30,000 region-wide).

Protected from competition, utilities have had little motivation to innovate. The power industry, in fact, spends significantly less on research and development than most other industries.

Modern Technologies

The nation's electricity system, largely because of advances in turbines and computers, is at the beginning of a major technological revolution. Advances as a consequence of it, if not blocked by outmoded policy, could vastly expand consumer options, increase productivity, and reduce pollution.

One of the hottest items is the cogenerator. This ingenious machine produces both heat and electricity and can mean huge savings for consumers that might otherwise vent most of their energy to the great outdoors. A cogenerator captures the usually wasted heat to warm buildings, power chillers, dry paints and materials, and run an array of industrial processes. Maryland is home to some 827 megawatts of cogeneration,

roughly the equivalent output of a large coal-fired power plant. The sizes and fuels range from a 75-kilowatt, natural-gas-powered installation at the University of Maryland's Chesapeake Laboratory Administration Building; to the 152-megawatt, waste-powered unit at the Bethlehem Steel Corporation at Sparrows Point; to the 180-megawatt, coal-fired facility at the Warrior Run chemical facility in Cumberland. A cogeneration unit managed by Trigen provides 2.1 megawatts of electricity production as well as steam, hot water, and chilled water for 250 commercial, government, institutional, a hospitality customers in downtown Baltimore and Inner Harbor East. A separate facility at the University of Maryland in College Park provides 26 megawatts as well as heating and cooling for campus buildings; the school expects to save \$120 million over the life of the 20-year contract.

Other entrepreneurs are recycling energy. Primary Energy, for instance, operates several turbines that provide almost 1,000 megawatts, as well as process steam, by tapping the gas that once flared from giant blast furnaces at steel smelters along the southern shore of Lake Michigan. Recycled heat could generate a substantial 45,000 megawatts of electricity and reduce carbon dioxide pollution by 320 million tons.

Huge savings can result from the widespread adoption of rather simple technologies that increase energy efficiency. Compared to the basic incandescent bulb, for instance, compact fluorescent lamps consume one-quarter the energy and last seven times longer.

Modern compressors and heat exchanges can reduce dramatically the operating costs of refrigerators, buildings can make better use of natural lighting and ventilation, and electronic devices can cut the standby consumption of computers and other equipment.

Advancing efficiency would mean less need for electricity generation and transmission and their accompanying economic and environmental costs.

Also available are microturbines, combined-cycle gas turbines, and back-pressure steam turbines, which capture the energy when industries or institutions reduce pressures in their steam pipes. Many universities, hospitals, and industrial buildings, including several in Baltimore, employ district heating systems that distribute hot water or steam through pipes to buildings throughout their complexes. Few of these institutions capture the pressure reduction when valves cut the high-pressure steam coming from the generator to the low-pressure steam that can be handled by individual buildings.

Maryland has a mixed, but mostly disappointing, record with the better-known energy alternatives. The state, for instance, has done little to capture the energy within poultry litter, which is overwhelming Eastern Shore farmers and causing substantial pollution of the Chesapeake Bay.

Wind energy also has been slow to develop in Maryland. Compared to the 129 megawatts installed in Pennsylvania and the 66 in West Virginia, Maryland counts no current wind developments. Three projects are proposed in the state, but only one, a 40-megawatt effort in Allegany and Garrett counties, has been permitted.

Maryland could be on the forefront, however, of solar energy with the largest photovoltaic production facility (BP Solar) in Frederick and the largest solar financing company (SunEdison) in Baltimore. Yet other states, including New Jersey, Pennsylvania, and California, are more aggressive in advancing solar systems. Photovoltaics cells, which convert sunlight into electricity,

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have enjoyed fourfold cost reductions in the past 15 years, and further cuts seem likely because of advances in the manufacture of silicon wafers.

Moving Toward Decentralization

Most of today's technological innovations suggest a shift toward dispersed generation, with a more efficient grid linking turbines, cogenerators, energy recyclers, fuel cells, or renewable technologies. No doubt there's a need for transmission infrastructure improvements, and some utility executives want to continue building big coal-fired and nuclear facilities, but the trend is toward smaller units that can be sized more readily and economically to meet a particular need.

Localized power helps avoid or reduce distribution bottlenecks and curtail the need for massive investments in high-voltage (and unpopular) transmission lines. Some 10 percent of electricity is sacrificed during the typical long-distance transmission process as a result of heat and resistance. During peak hours, the number rises to 20 percent, meaning that congestion-related losses require the construction of extra generators and lines.

Today's centralized power system offers numerous backup redundancies, yet harsh weather, terrorist attacks, and simple accidents have highlighted the vulnerability of large power plants and far-flung transmission wires. Smaller, dispersed units, in contrast, could enhance security and resiliency. To state the obvious, a destroyed microgenerator has smaller impacts than damage to a nuclear reactor or high-voltage line.

Distributed generators can provide the highly reliable and high-quality power demanded increasingly by the array of businesses that cannot afford energy disruptions. On-site units also avoid most power outages and surges



Bringing innovation to the power industry requires a paradigm shift in thinking.



that result from problems with the grid, as evidenced by Kodak's continuing to operate during the massive blackout in summer 2003 that left 50 million people without power in the Northeast and Midwest.

Perhaps decentralization's key benefits are financial. Put simply, smaller modules are less risky economically because they take less time to devise and construct, obtain greater efficiencies, enjoy portability, and face reduced vulnerability to fuel shortages and price volatility. Small generators, which can be built in increments that match a changing electricity demand, allow for more reliable planning. Large units, in contrast, take a dozen years to complete, during which time forecasts can alter dramatically, perhaps eliminating or reducing the need for the investment. Big plants also invariably "overshoot" because they add huge supplies that remain idle until the expected demand "catches up."

Even fervent distributed-generation advocates do not envision the total abandonment of today's centralized generators or long-distance transmission lines. Their goal is a more equal hybrid of central power and distributed energy. Compared to the present system's virtually total reliance on large plants and long lines, a mixed approach would provide substantial economic, environmental, and security benefits.

Barriers to Innovation

The potential benefits from innovation go well beyond increased efficiency and better generators. Consider the changes that resulted from the breakup of the AT&T monopoly that allowed us to transcend the ubiquitous black rotary telephone for a cornucopia of cell phones, cable TV, and video teleconferencing. Largely because of innovations spurred by competition, messages now can travel by airwaves, cable, fiber optics, microwave, as well as traditional copper wires. Compared to the time when a monopoly controlled the market, the cost of sending a unit of data has plummeted more than 90 percent. Many of those innovations were unknown when competition was brought to the telecommunications industry, yet they have expanded consumer options substantially. Likewise, the innovations that could be sparked by true electricity competition are vast.

Bringing innovation to the power industry requires a paradigm shift in thinking. More than four generations of Americans have come to accept the notion that electricity is best produced by monopolies at centralized generators. Most take for granted the traditional system in which distant power plants throw away much of their heat, while more fuel is burned elsewhere to produce the same thermal energy for homes, office buildings, and factories. Utilities, moreover, have been protected from market discipline for some 90 years, but few challenge the wildly inaccurate assumption that the United States' utility industry has achieved maximum efficiency.

Rather than subsidize or mandate the technologies promoted by the politically powerful, innovation-enhancing markets must require the elimination of regulatory and environmental obstacles. Numerous power-market rules were designed over the last century to support and protect today's dominant structure –

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centralized, steam-powered generators controlled by regulated monopolies. Put another way, today's rules are skewed against alternatives and innovation. We need a strategy designed to knock down and break through the barriers.

Recommendations

To obtain the benefits of innovation and efficiency, Maryland needs a new, bolder approach toward electricity. Here are specific recommendations:

1. Plan: As with most enterprises, planning is essential. Baltimore has done an impressive job with its various land-use master plans, yet it could do more on the energy front. Following New York City's example, the mayor should organize an energy policy task force to create a five-year plan that would have the city lead by example. Although task force membership should be limited to 15 to 20 individuals in order for the panel to operate effectively, it must include representatives from diverse stakeholders, including the local utility, business associations, community organizations, environmental-justice advocates, real estate developers, and construction contractors. Within six months of its forming, the task force should issue a document that outlines what the city will do, through building codes, bulk purchases, land-use plans, and other tactics, to enhance electricity reliability and efficiency. In addition to setting a clear set of near and long-term actions, the task force will create alliances among key constituencies that will stimulate future cooperation rather than confrontation. Maryland's governor should launch a similar energy policy task force for the state.

2. Eliminate Barriers: Remove systematically the barriers to entrepreneurs and modern technologies. The state should modernize its rules if it is to

develop a modern electricity system for the 21st century.

- a. Regulators must establish clear and fair interconnection rules, enabling independent generators to connect with the distribution system. Unlike most of its neighboring states, Maryland has been slow to adopt such rules and, thereby, burdened entrepreneurs. No doubt those standards must address safety since uncontrolled electricity endangers power-line workers and the general public. Yet the Institute of Electrical and Electronics Engineers (IEEE) has addressed those concerns with a national consensus technical interconnection standard that establishes criteria and requirements for linking distributed resources with electric power systems. New York issued its own standardized interconnection procedures in 1999, and California followed with its Rule 21 in December 2000.
- b. Regulators must set reasonable backup rates for entrepreneurs wanting to buy and sell power into the grid. A possible model would be the standby rates adopted by the New York Public Service Commission,



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- c. Regulators should allow the stringing of independent wires across any public street, enabling independent generators to negotiate with utility monopolies in order to send power to their customers. As they can with telephone lines, steam tunnels, and Internet connections, developers must be free to run their own wires and not rely on the utility competitor.
- d. Maryland also should spur the adoption of advanced meters, enabling consumers to obtain real-time prices for their power and to use electricity more efficiently and when it is less costly. The state now requires consumers using more than 600 kilowatts (mostly industrial and large commercial customers) to install “smart meters,” and that requirement will be lowered to 500 kilowatts in June 2008. If more aggressive targets were set, utilities would be prompted to develop the billing system and other back-room infrastructure that would make it relatively easy to bring such meters to the mass market. While the costs are not insubstantial, the additional information from advanced meters would help utilities prevent power theft and better control their distribution systems.

3. Protect the Environment: While northeastern states and California over the past several years have stepped in to ensure that the price of power better reflects the costs to mitigate pollution, Maryland and most other mid-Atlantic states have sat on the sidelines. That stance is beginning to change. In April 2006, Governor Ehrlich signed the Healthy Air Act, which requires power companies to spend approximately \$355 million on pollution-filtration systems by

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2010 in order to cut their mercury emissions by 80 percent, nitrogen oxide emissions by 69 percent, and sulfur dioxide emissions by some 78 percent. The law also requires Maryland to join seven other northeastern states in an effort to have power plants reduce carbon-dioxide emissions by 10 percent by 2018. The law represents a long-delayed move to rein in Maryland polluters and to have the price of electricity include more of the costs associated with power production. Such a move will both improve public health and encourage entrepreneurs to embrace less-polluting technologies.

Maryland also needs to follow the lead of other states and adopt output-based environmental regulations that calculate emissions on the amount of electricity generated, thereby rewarding those innovative generators that supply more electricity and less pollutants. Current environment regulations favor power plants that burn a lot of fuel, regardless of their efficiency. Maryland has adopted limited allowances for energy efficiency and renewable energy in its cap-and-trade program to reduce nitrogen-oxides emissions, yet other states have been more aggressive. For instance, in 2001, Texas issued a standard permit with output-based emission limits for all small electric generators.

4. Provide Consumer Information: The 1999 deregulation law eliminated most utility programs that encouraged energy efficiency and offered consumer information and energy audits. As Maryland residents now seek alternatives to the utilities' higher-priced power, such programs would be valuable. The Public Service Commission (or some other state agency), therefore, should provide a repository of independent analysis and calculations for judging energy alternatives. Maryland should join the numerous other states that offer

unbiased information on how homeowners can weatherize and insulate their homes. Also useful would be consumer-protection monitoring as well as a clearinghouse of objective information on contractors able to provide energy services to Maryland consumers.

5. Lead by Example: Maryland's state and municipal governments own hundreds of buildings that annually consume millions of dollars of electricity. Although some University of Maryland campuses employ combined-heat-and-power units, few government structures have embraced modern technologies. Maryland's public sector, as a result, has missed numerous opportunities to save money as well as advance an industry that could bring jobs, creativity, and economic development to the state. The energy plans to be developed by Maryland's governor and Baltimore's mayor, therefore, should include specific recommendations for how government buildings can lead the demand for electricity innovation and efficiency.

6. Attract Innovators: To become a leader in energy innovation, Maryland must go out of its way to attract entrepreneurs. It already is home to one of the largest photovoltaic manufacturers, and the University of Maryland hosts a combined-heat-and-power research center. Still, the state could learn from Pennsylvania, which recently convinced Gamsea Corp, a Spanish firm that is the world's second largest wind turbine maker, to place its U.S. headquarters in the Commonwealth, providing 1,000 high-paying manufacturing jobs. Although states typically use subsidies to lure businesses, Maryland could achieve substantial gains with simple outreach and the public declaration that the state wants to break down market barriers and attract electricity entrepreneurs. Such efforts would be enhanced if Maryland also expanded its university research efforts on innovative energy technologies.

7. Aggregate: Maryland communities should encourage, or participate in, power-buying cooperatives. Shortly after the 1999 law, several trade associations created the Mid-Atlantic Aggregation Group Independent Consortium in order to purchase power in bulk for some 7,000 Maryland businesses, including clothing stores, nursing homes, and pharmacies. That group claims to have obtained savings of 3 to 8 percent for its members. Because of opposition from traditional utilities, however, Maryland forbids city and county governments from creating buying coops on behalf of their residents. Ohio, in contrast, adopted "opt-out municipal aggregation," allowing cities to buy power at substantial bulk discounts for their interested residents. Aggregation is particularly important for residential customers. Unlike industrialists, they do not buy large quantities of power and, therefore, can't bargain for lower prices. If allowed to pool their demand, coalitions of homeowners and renters could shop for better deals.

8. Assist Low-Income Residents: The pending rate increases will have a disproportionate impact on the poor, who often face the unfair choice of food or fuel. Maryland lawmakers can continue to advocate for the Low Income Home Energy Assistance Program (LIHEAP), yet that initiative serves only a small proportion of eligible households. Advocacy is needed, too, for initiatives such as Weatherization, which helps low-income residents make their homes more energy efficient, thus cutting their power demand and costs. In addition to providing the aggregation services mentioned above, Maryland, following the example of California, New York, and other states, should provide low-income residents with information and resources associated with residential energy efficiency.

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Conclusion

Admittedly, restructuring the nation's largest industry is difficult, the obstacles to change are formidable, and many utility monopolies are working aggressively to remain protected from entrepreneurs. Yet the U.S. electricity system must change to meet the needs of the 21st century. Innovation's environmental benefits alone are critical. Businesses and individuals also increasingly need more reliable power than the current arrangement provides.

Maintaining the status quo is no longer an option. We need instead to move forward and create a more reliable and efficient power system.

Maryland can and should become a hub for such electricity innovation. Modern technologies are available, and the region is home to coordinated wholesale-power exchanges. What's needed to take advantage of this opportunity is political leadership that will eliminate the numerous regulatory and legal barriers that protect monopolies and discourage innovative entrepreneurs. If Maryland policymakers can look beyond the current rate hikes to restructure the electricity industry based on the principles of technology modernization, market efficiency, and consumer choice, they will bring about immense benefits for the state's economy and environment.

Richard Munson is executive director of the Northeast-Midwest Institute. He coordinates and works with the Northeast-Midwest Congressional and Senate Coalitions, bi-partisan groups that conduct policy research and draft legislation on agriculture, economic development, energy, environmental, and manufacturing issues. Munson is the author of *From Edison to Enron* (Praeger Publishers, 2005), which recounts the history of electricity and suggests an innovation-based vision for the power industry.

ABELL SALUTES:

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sophisticated teaching faculty that turns unemployed high school graduates into highly skilled workers geared to earn as much as \$30 an hour in America's tool and die trade. For those who have not completed high school, there is a school on premises to guide them to a GED degree, a high school equivalent. There are social services to provide emotional support where needed. Outside, for use by both the school and the neighborhood, is a swimming pool and basketball courts.

How do young people down on their luck find themselves in such fortunate circumstances? Mr. Myles says, "When we first opened in 2002, we hung a banner outside above the door, advertising the facility, and the opportunity to learn the tool and die trade. Within days we had over 400 applicants."

Lynnard Jennifer is a 19 year old student at MAGNA. He comes to Pimlico every day from Bel Air. He says, "What I learned here about the tool and die craft has given me a passion for it." And Norman Holman, from nearby Levindale Road, said "I was attending the church next door, when I saw that banner. I can see this job training giving me a lifetime of decent pay."

Who is Frank Stronach and why has he provided MBTTC with a \$12,000,000 investment in plant and an annual budget to support the operation? Born in Austria, Mr. Stronach

emigrated to Canada in 1954. With a working background in tool and machine engineering, he formed a tool and die company in 1957 in a garage. The formation of this company marked the beginning of a corporate evolution and transformation of the company into global conglomerate known today as Magna International, Inc. Today Magna is one of the world's largest suppliers to the automotive industry in the world, with 82,000 employees in 210 manufacturing plants.

In 1971, according to the company's literature, Mr. Stronach introduced to MAGNA his management philosophy known as Fair Enterprise government, which seeks to balance the demands of private enterprise with a corporate commitment to allocate 2 percent of its pretax profits to support programs in the public interest—in health care, culture, social issues, community development education, sports, and politics.

Mr. Myles says that there are about 20 students in the program now and MAGNA pays 100 percent of the \$7,000 tuition, and that he is looking for many more students than that. He says, "It's time to put up the banner again."

The Abell Foundation salutes the Baltimore Technical Training Center, for providing deserving young men and women the wherewithal to learn the tool and die trade, and the passion to make a life within it.

The full report of "Maryland's Electricity Opportunity: How to Fix the Power Breakdown" is available on The Abell Foundation's website at www.abell.org or: write to The Abell Foundation 111 S. Calvert Street, Baltimore, MD 21202
