

Technology:

The Disruptive Tsunami Washing Over Cities.

TECHNOLOGY FOR TOWNS.

Small cities and towns are evolving beyond the fear of change to accept the benefits of new technologies ranging from social media to autonomous vehicles to robotics to drones to new business models for e-commerce. The blockchain, “smart poles” with sensors and Wi-Fi, microgrids, smart solid waste systems, drones and smart zoning are only a few of the innovations that will enhance city security, services, communication and administration. And, whatever we know today will surely be out-of-date soon.

THE ARRAY OF NEW TECHNOLOGIES, THERE IS NO FINISH LINE:

Writing about the state of technology is treacherous given the pace of change. However, understanding and anticipating the impacts of technological changes are imperative for securing the sustained prosperity of cities, neighborhoods and main streets. Technology is quickly changing the way by which cities provide public services, adopt new financial models and regulate development.

CONSIDER THE POSSIBILITIES:

The answer to this new environment of continuous change is to create a way of life in city hall that expects constant change; to create skills necessary to find, evaluate and exploit the new technologies that are useful and reject the junk. Downtown is a good place for experimentation.

- The smart city developments from the big tech firms like IBM, Cisco, Google, Amazon and the rest are expanding and infiltrating city hall. Understand their interest in contracting with cities to install and manage their hardware and software. Also understand the city’s obligation to ferret out the benefits, the costs and the escape path once the system has fulfilled its mission or proves to be of no use. Appreciate the experiences of other communities.
- Autonomous vehicles are coming fast. Find experts to help evaluate the impact of AVs on land use, street design, parking requirements and mass transit systems. The impact of autonomous buses, delivery trucks, ride-share services, freight trucks and private vehicles is hard to fathom.
- Electric vehicles are gaining ground; combinations with AVs will change travel habits. Free charging stations may be a downtown amenity or “perk”.
- Economic development will depend on full access to high-speed broadband internet service.
- Last mile warehouses are infiltrating developed areas. The last mile is close to homes and offices, so the warehouses must be close to homes and offices. Anticipatory zoning may be useful.
- Coordination and collaboration with neighborhood, business and academic organizations will become more important. The point of technology is connectivity so management systems that connect users will continue to be useful.

- High speed broadband internet service is growing in its areal coverage. The digital divide lurks to exclude this service from low-income neighborhoods. Equity distribution becomes an issue for cities.
- Solar and wind power are becoming more prevalent. The two-way movement of power is becoming controversial. Smart micro-grids are emerging in areas with special circumstances.
- Internet Service Master Plans are being prepared by progressive cities.
- Many major cities worldwide including Paris, Copenhagen and Barcelona are launching smart city initiatives. Kansas City has demonstrated how real-time data gathered by sensors provides tangible benefits to citizens.
- Small cities and towns can use their downtowns to roll-out high-tech services to provide businesses with access to the global marketplace and to test reliability and usefulness.

SMART POLES.

In a simple sense, streetlight poles are being connected to the internet enabling the attachment of all kinds of sensors [see following graphics]. Sensors connected to the internet make data, “Big Data” available to everyone to collect and analyze and employ to provide services, respond to emergencies and plan for the future. Communications become instantaneous, recordable and available to everyone in the network.

Short List of Dashboard Data Sets.

- | | |
|---|--|
| a) Air pollution, air quality | p) Ridership, Bus |
| b) Air pollution, GHG emissions | q) Ridership, Para Transit |
| c) Crime by type and location | r) Ridership, Ride Sharing Trips |
| d) Economic Development, Jobs Private | s) Ridership, Transit |
| e) Economic development, Jobs Public | t) Smart electric meters |
| f) Emergency responses by type and location | u) Smart gas meters |
| g) Energy use, alternatives | v) Smart parking meters, |
| h) Energy Use, electric | w) Smart pole sensor operations |
| i) Energy use, natural gas | x) Smart street lights |
| j) Fire responses by type and location | y) Traffic accidents, emergency response times, routes, street/lane closures |
| k) Infrastructure mishaps, power | z) Traffic congestion |
| l) Infrastructure mishaps, roads | aa)Waste collection, sanitary sewer |
| m) Infrastructure mishaps, stormwater, flooding | bb) Waste collection, solid waste |
| n) Infrastructure mishaps, water/sewer | cc) Weather severe warnings, |
| o) Noise pollution | dd) Wildfires and environmental disasters |

Elevation documentary: how drones will change cities.

Elevation is a short documentary by online magazine **Dezeen** about how drones will transform cities – revolutionizing how people travel, how goods are delivered and how buildings look and are constructed. This vision of the future is set out in the 18-minute film, which features interviews with architects and industry experts including Norman Foster, Paul Priestman, Liam Young and Anab Jain. Read more on Dezeen: www.dezeen.com/elevation **LINK:** <https://www.youtube.com/watch?v=Z0osJnSWxt8>

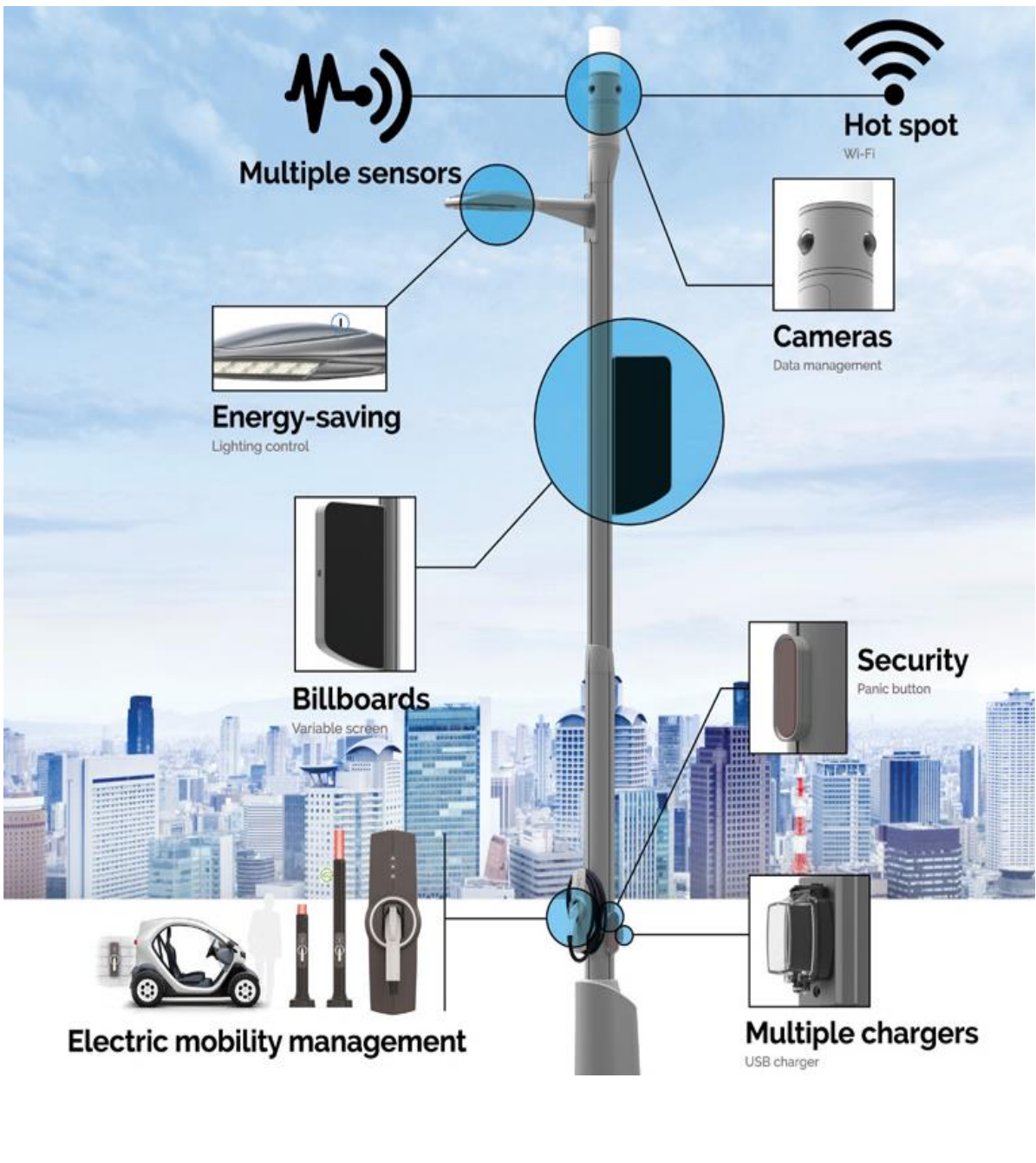
DRONES.

A technology once reserved for the military and other sophisticated and well-funded users is now available to all. The use of photographs and videos taken from above the scene using drones has immensely enhanced information presented at zoning public hearings, crash site analyses and a wide range of municipal operations. Qualified flyers are now on the staffs of cities and their consultants.

Lumca Smartpole



SMART POLE FOR SMART CITIES™



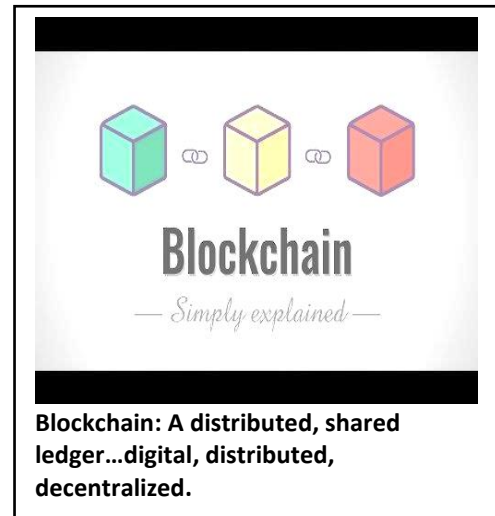
THE SYSTEM OF SMART POLES. Technology needs to be downtown. Systems are being developed that provide security, communication, education, entertainment and energy for recharging, plus much more. The time is now for exploration of technology applications for downtowns, campuses, streets and neighborhoods. The systems exist, pioneering cities are appearing and therefore experiences are available for sharing.



BLOCKCHAINS.

Blockchains are making transactions and the storage of data secure and useful to cities in growing ways. Blockchain technology is emerging from beneath the Bitcoin shadow as the new general-purpose technology with tremendous power and broad applicability; some say it's the next internet. Blockchains offer improvements to municipal administration and the provision of city services.

The American Planning Association recently published an article describing the opportunities. See: Blockchain for Planners, PAS QuickNotes 99, By Justin Hollander, FAICP at <https://www.planning.org/publications/document/9248052/>



MICROGRIDS, SMART AND GREEN.

"A microgrid is a local energy grid with control capability, which means it can disconnect from the traditional grid and operate autonomously."

<http://www.energy.gov/articles/how-microgrids-work>

The Idea in Hoboken. The December 2015 edition of *American City and County* published an article entitled: ***The Birth of a Resilient Microgrid: Hoboken's Journey.*** The Sandia National Laboratory in conjunction with US DOE and US DOC did a study for the city.

The purpose of this article is to increase the awareness and applicability of this concept to small cities and towns, hospitals and education campuses and other small areas that want or need control over their supply of energy.

The City decided to pursue the microgrid concept in the aftermath of Superstorm Sandy. The storm-related catastrophe of power outages in hospitals, senior housing projects and other facilities with dependent populations inspired the City to find a way to better protect and respond to power outages regardless of their cause.

Smart microgrids, through technology, can provide discrete control of generation, distribution, hours of operation, pricing and automatic load control and allocation down to individual customers. Smart microsystems can also reduce greenhouse gas emissions and select from a wide range of energy sources.

The Toolkit. “To make the microgrid a reality, Hoboken hired Greener by Design, a private firm, as its energy consultant.” Greener by Design engaged EDF Climate Corps to develop a toolkit to address Hoboken’s situation and to serve as a “model to scale and adapt [the tools] to different types of buildings and different communities.” *The American City and County* article goes on to present the three key features of the toolkit:

- A centralized dashboard,
- A customized timeline, and
- A scorecard.

The Application. Every community has groups of dependent populations vulnerable to power outages. The use of microgrids, especially microgrids supported by alternative energy sources, offers a tremendous opportunity to avoid the misery caused by the lack of power and its many energy-dependent facilities and systems. The link to the study is:

<http://www.hobokennj.org/washingtonstreet/files/hoboken-microgrid-report.pdf>.

SMART MICROGRIDS - CONCLUSIONS.

The strategic deployment of microgrids can build a city’s resilience with grids designed:

- to connect and disconnect from the central grid as appropriate,
- to access alternative energy sources to provide cheap power in normal times and emergency power, when necessary,
- to provide power to critical facilities that need to be free-standing in an emergency,
- to serve as a back-up source of energy during emergencies for dependent populations.

SMART SOLID WASTE.

Kissimmee Uses Innovation to Solve Solid Waste Management With Underground Refuse Systems.

The City of Kissimmee along with Jay Wheeler, President of Underground Refuse Systems, presented an innovative way to overcome the challenge that so many cities and counties throughout the United States have to confront.

The system is operational in Kissimmee FL.

Sensors communicate when the receptacles need to be emptied. The problems with commercial dumpsters, corrals and spillage are solved by the system pictured here. Kissimmee was the first government agency to partner with Underground Refuse Systems, a local business that is part of the UCF Business Incubator located in downtown Kissimmee. Underground Refuse Systems is the first of its kind in the United States that utilizes underground trash containers that eliminate unwanted dumpster use, unsettling odors, and unsightly above ground storage of waste and unnecessary use of space.

Source: Underground Refuse Systems, **LINK:** https://www.youtube.com/watch?v=S_o9Eu2IT64



CONCLUSIONS.

The big take-away is that technological change is big, it is expanding, it is diverse and it is mysterious to most of us. Technology-based systems allow plans to be prepared and then evaluated over time with real-time, transparent, goal-oriented metrics of performance. The response is to create a competent culture that accepts and thrives on change.

1. Infrastructure analyses are being expanded beyond water, sewer and traffic to include amenitized multi-property master stormwater systems, facilities for the reduction, re-use and re-cycling of waste, the provision of broad-band high-speed internet service as a utility and systems to build social and economic assets. Dashboards are essential infrastructure management tools.
2. High-speed broad band internet service master plans are becoming more common.
3. The GIS platform will also enable small area plans to be defined, analyzed and implemented.
4. The essential Planning and Land Development Code documents to be digitized and interactive are:
 - Comprehensive Plans and Zoning Codes are being provided on-line with all supporting data and maps.
 - Development Standards to control site planning and access to infrastructure with master downtown parking and master stormwater systems.
 - Design Guidelines, aesthetically oriented, to produce vision-consistent infill and redeveloped buildings and spaces.
5. Downtown Mobility Plans that include all modes of travel are being provided to professionals and citizens to evaluate options and select alternatives that best meet community goals. On-line plans and information engage citizens in a more meaningful process.
6. Master parking system plans reflect a downtown district-wide park-once approach with user-based funding and an idea for the next generation of growth. Dashboards and real-time systems that direct drivers to available parking spaces are becoming standard.
7. Master utility and stormwater system plans reflect a downtown district-wide approach to stormwater management with a funding program that assesses individual users their fair-share of funding the master system. Technology facilitates system management.
8. Resource management becomes more manageable now that utility companies can draw boundaries around small areas and then monitor water and electric usage. Goals can be established and evaluated with performance metrics, transparently and in real-time.