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## **ROI CASE STUDY**

### **JOHNSON CONTROLS MUNICIPAL WI-FI SOLUTION**

#### **CITY OF CUMBERLAND, MARYLAND**

#### **THE BOTTOM LINE**

**By deploying a Johnson Controls Municipal Wi-Fi Solution, the city of Cumberland, Maryland will improve productivity, reduce fuel costs, reduce its carbon footprint, and create a new revenue stream by reselling network access to Internet service providers. It will also make Internet access more available to its lower income and rural residences.**

**ROI: 35%**

**Payback: 2.88 years**

#### **THE COMPANY**

The city of Cumberland has a population of 22,000 and is located in western Maryland. The city is located 130 miles from both Pittsburgh, Pennsylvania, and Washington, DC, and is adjacent to three large state parks. As a result, it is an ideal location for families, tourists, and businesses seeking a rural location with both commercial and residential appeal. The city has a thriving downtown and an expanding arts and entertainment district. In order to attract new visitors, residents, and businesses, the city is continually seeking ways to improve its ability to cost effectively provide the services and facilities its citizens and businesses need.

#### **THE CHALLENGE**

Since 1996, the city of Cumberland has participated in a system called AllCoNet, a wireless, IP-based high-speed intranet network used by political entities and not-for-profit-agencies in Allegany County, Maryland, to reduce telecommunications costs and improve service levels. The city of Cumberland uses its portions of the network to improve Internet access and reduce telecommunications costs for its municipal facilities, including schools, libraries, and the public safety departments.

In late 2006, the city of Cumberland was finalizing plans to have Johnson Controls install a system that would help the city improve the energy efficiency of its facilities. Johnson Controls also has expertise in building and operating both municipal wireless and wireless fidelity (Wi-Fi) network solutions that are used for productivity improvements such as the automation of meter reading, and proposed a substantial expansion to the city's existing wireless network capabilities. After a careful analysis of the costs and benefits, the city of Cumberland decided to have Johnson Controls deploy a Wi-Fi network as a substantial addition to its participation in AllCoNet.

**RELATED RESEARCH**

- G90 Nucleus Top Ten Predictions for 2007
- G57 Avotus Helps Manage Communication Costs
- F96 5 Steps to a More Mobile Workforce
- E64 Traq Wireless ROI case study - Burlington Northern
- D89 Public Wireless Access - Wait or Jump In

The project has wide support because it is being financed with performance contracting, which stipulates that infrastructure investments will be paid for by productivity and energy savings from the Wi-Fi network, and that Johnson Controls will compensate the city if cost savings fall short of financing needs.

**THE STRATEGY**

In late 2006, the city of Cumberland began working with Johnson Controls and CONXX, a systems integrator, on the construction of its new Wi-Fi network. The deployment will take about a year to complete, and involve the following:

- Transmitter installation. The city's meter reading staff is in the process of installing wireless transmitters on each of the water meters at the city's 9,000 residences and 1,140 businesses.
- Network installation. Staff from CONXX is in the process of deploying both the wireless network — including transmitters and repeaters that will be installed on telephone poles and municipal properties — and equipment for receiving data from the transmitters that will be on the water meters.
- Capacity reselling. Once the wireless network is fully installed, it will have sufficient bandwidth to provide Internet access to all of the city's residences and businesses. Because the city lacks the necessary billing and marketing infrastructure, it will make the network available to local Internet service providers, who will use the city's network to provide Internet access to the residences and businesses and pay a fee to the city for each account.

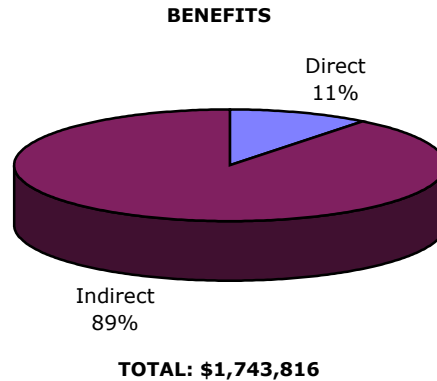
The city expects to have the network fully deployed in mid-2008 and will reach all of the city's 22,000 residents and 1,140 businesses. The city has some rural areas that will receive Internet access because of repeaters and signal amplifiers that Johnson Controls and CONXX will include in the deployment of the network. Breadth of access to the network is important to the city, which wants it to be used by families of all income groups, rural residents, and visitors.

**KEY BENEFIT AREAS**

Deploying the Johnson Controls muni Wi-Fi solution is enabling the city of Cumberland to improve productivity, reduce fuel costs, accelerate receivable collections, and create a valuable new revenue stream. Key benefits of the solution include:

- Improved staff productivity. By automatically collecting meter and sewer data over the new Wi-Fi network, the city will reassign its two meter readers to higher-value tasks.
- Reduced fuel costs. Because meters will no longer be read manually, the city will eliminate the cost of transporting its meter readers around the city.
- Accelerated bill collection. The city currently bills its residences and businesses for water and sewer usage on a quarterly basis. When the wireless meter reading system is in place, the city will bill on a monthly basis, and reduce its receivables carrying cost.
- Capital expenditure avoidance. The city had been planning to spend \$300,000 per year for the next six years moving residents' meter readers from their basements to the outsides of their homes. The city no longer has to undertake this project.

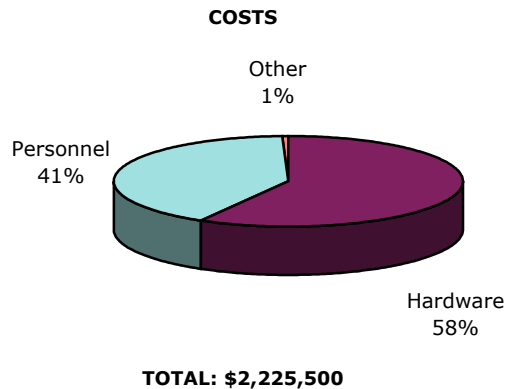
- Increased revenue. The city’s wireless network will be a robust network that extends all the way to its residences, businesses, and visitors — and is capable of competing with commercial Internet service providers. Because the city lacks the billing and marketing infrastructure to sell Internet access to its residences, access to the network will be sold to Internet service providers, who will perform all the marketing and billing, and remit a monthly fee to the city based on the number of subscribing residences and businesses to whom they resell network access.



**KEY COST AREAS**

Key cost areas for the deployment included personnel and hardware. Hardware purchases included:

- Wireless transmitters for the meters at each of its 9,000 residences and 1,440 businesses.
- Building and telephone-pole-mounted devices for collecting sewer and water usage data from the transmitters on the water meters.
- Hardware for aggregating the data for download to the city’s billing systems.
- Networking equipment to transmit wireless Internet access to the homes and businesses, including repeaters that strengthen the signal so it can be received in rural homes.



Meter readers and other Cumberland water department staff are expected to spend a year installing the wireless transmitters on all of the water meters, while staff from CONXX, a Johnson Controls partner, install repeaters and transmitters on telephone poles and buildings. Other costs consisted of rental fees to Allegany Power for placement of hardware on the utility's telephone poles. After the deployment, the city expects to dedicate a small portion of a technician's time to the investigation of anomalous meter readings and system maintenance tasks.

### **LESSONS LEARNED**

Both budgeting and risk management have been key to the success of the deployment because some city officials did not see the benefit in investing in wireless infrastructure. In order to overcome this resistance, the city administrator teamed up with representatives from Johnson Controls and CONXX, its system integrator. Careful analyses of costs and benefits were performed, and references were obtained from other municipalities with wireless networks. The city administrator used this information to educate elected officials about the benefits of the network and overcome resistance to it.

### **CALCULATING THE ROI**

Nucleus calculated the costs of hardware, personnel, and other costs over a 3-year period to quantify the city of Cumberland's total investment in Johnson Control's muni Wi-Fi solution.

Direct benefits include the acceleration of accounts receivable collection, the elimination of gasoline costs for manual meter reading, and expected revenues from reselling network access to Internet service providers. Indirect benefits consist of the improved productivity of meter readers.

A number of important benefits which the city of Cumberland expects to achieve, but are not quantified, in the ROI calculation include:

- Improved services. Once the city has the system in place, it plans to improve costs and service levels by installing applications for video surveillance, asset tracking, and remote monitoring of assets such as water utilities.
- Economic assistance. The city is considering using the new Wi-Fi network to provide low-cost Internet access to — among others — the poor and elderly.
- Increased billing accuracy. Because the town will be able to receive near real-time data about how much water is flowing to each of the city's residences and businesses, it will be able to more rapidly detect leaks in pipes. Because pipe leaks typically result in billing disputes and account write offs, this will increase both billing accuracy and revenues.
- Increased property values. Having a wireless network as part of its public infrastructure will make the city of Cumberland a more attractive locale in which to own a home or operate a business and improve both property values and tax receipts.

*Nucleus Research is a global provider of investigative technology research and advisory services. Building on its unique ROI case study approach, for nearly a decade Nucleus Research has delivered insight and analysis on the true value of technology and strategies for maximizing current investments and exploiting new technology opportunities. For more information or a list of services, visit [NucleusResearch.com](http://NucleusResearch.com), call +1-781-416-2900, or e-mail [info@NucleusResearch.com](mailto:info@NucleusResearch.com).*

# DETAILED FINANCIAL ANALYSIS

## CITY OF CUMBERLAND, MARYLAND

### SUMMARY

Project:	<b>Johnson Controls Municipal Wi-Fi Solution</b>
Annual return on investment (ROI)	<b>35%</b>
Payback period (years)	<b>2.88</b>
Net present value (NPV)	<b>(355,072)</b>
Average yearly cost of ownership	<b>741,833</b>

<b>ANNUAL BENEFITS</b>	<b>Pre-start</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
Direct	0	361,830	361,830	361,830
Indirect	0	601,342	601,342	601,342
<b>Total Benefits Per Period</b>	0	963,172	963,172	963,172

<b>DEPRECIATED ASSETS</b>	<b>Pre-start</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
Software	0	0	0	0
Hardware	1,300,000	0	0	0
<b>Total Per Period</b>	1,300,000	0	0	0

<b>DEPRECIATION SCHEDULE</b>	<b>Pre-start</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
Software	0	0	0	0
Hardware	0	260,000	260,000	260,000
<b>Total Per Period</b>	0	260,000	260,000	260,000

<b>EXPENSED COSTS</b>	<b>Pre-start</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
Software	0	0	0	0
Hardware	0	0	0	0
Consulting	0	0	0	0
Personnel	831,000	27,500	27,500	27,500
Training	0	0	0	0
Other	0	4,000	4,000	4,000
<b>Total Per Period</b>	831,000	31,500	31,500	31,500

<b>FINANCIAL ANALYSIS</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
Net cash flow before taxes	931,672	931,672	931,672
Net cash flow after taxes	595,836	595,836	595,836
<b>Annual ROI - direct and indirect benefits</b>			<b>35%</b>
Annual ROI - direct benefits only			17%
<b>Net present value (NPV)</b>			<b>-355,072</b>
<b>Payback (years)</b>			<b>2.88</b>
Average annual cost of ownership			741,833
3-year IRR			2%

### FINANCIAL ASSUMPTIONS

All government taxes	50%
Discount rate	15%