The Rest of the Story: A Continuing Legacy of Shared Services in Tompkins County, New York

Studies in Shared Services and Efficiency Conducted by the Cornell Institute for Public Affairs and the Cornell Johnson Graduate School of Management

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Executive Summary

(Prepared by Tompkins County Administration)

As a part of a new "property tax freeze credit" statute enacted by New York State last year, all local governments and school districts must file a "Government Efficiency Plan" by June 1, 2015 that shows how they will save at least 1% of their property tax levy through mergers, consolidations, shared services, and efficiencies.

Local governments within Tompkins County will file a single, consolidated plan that outlines actions taken since 2012—largely in the form of changes made in the cost structure of health benefit plans—that will produce sustained savings of nearly 2% of the $91 million in property taxes levied by all towns and villages, the City, and the County.

Unfortunately, the rigid and narrowly-focused State report tells a small part of the story of cost-saving innovation that has been a part of the governmental culture within Tompkins County for a very long time. In fact, as communities across the State search for ways to intelligently respond to the call for cost-saving joint ventures, many are looking at the examples set by governments within Tompkins County.

Accordingly, as a supplement to its response to the State's call for a fill-in-the-blank report outlining immediate plans for restructuring local government, the **Tompkins County Council of Governments** (TCCOG) has prepared this report to provide important context; to highlight just some of the true innovations that were conceived and implemented in Tompkins County long before the State found that cooperative ventures among governments can positively affect both the quality and cost of local services.

The report that follows was assisted by a team of graduate students from Cornell University's Johnson Graduate School of Management and the Cornell Institute for Public Affairs (CIPA). The Cornell team helped to quantify the impact of some of the large cooperative ventures in Tompkins County. In every case, the team applied the most conservative assumptions possible in order not to inflate claimed savings. *In fact, by omitting duplicative capital costs that would have resulted from individual communities building separate water and sewer treatment projects or public safety dispatch centers, the report significantly understates savings achieved in Tompkins County through inter-municipal capital projects.*

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Established in 2006, The **Tompkins County Council of Governments (TCCOG)** is an association of local municipalities organized to discuss issues and opportunities, and to negotiate agreements for more efficient and fiscally responsible delivery of government services. TCCOG goals include: expanding cooperation among taxing entities and resolving duplication of services; improving communication among local governments in Tompkins County; and improving involvement with School Districts.

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Still, the Cornell report documents $3.8 million in recurring annual savings (2016 projection)—the equivalent of nearly 5% of all property taxes levied by all local governments within Tompkins County—attributable to a handful of local initiatives. The Cornell report shows:

- $1.7 million in recurring annual property tax savings is resulting from local governments coming together in 2011 to form an inter-municipal health benefits consortium. The consortium has already saved $5.5 million.
- $440,000 is saved each year through the County's digital records initiative that has now expanded to include all local governments in the County (Tompkins Shared Services Electronic Records Repository, http://www.tompkinscountyny.gov/tsserr **)**. In addition to annual operating savings and

tremendous improvements in customer service, the initiative allowed the County to avoid the planned construction of a $3.5 million Records Center to house paper files.

- $400,000 in annual property tax savings is being achieved through centralized property assessment. Although the consolidation occurred 45 years ago, it remains a unique accomplishment in New York State, and a reminder of how rational consolidations can save money and improve quality. In today's dollars, taxpayers have saved $18 million over the life of this single initiative.
- $340,000 in annual property tax savings is generated by the unique transit partnership involving the City of Ithaca, Tompkins County, and Cornell University that resulted in the creation of Tompkins Consolidated Area Transit (TCAT).
- At least $250,000 in annual property tax savings resulting from a fully-consolidated 911 dispatch center. Beyond operating cost savings, the consolidation of the dispatch function avoided multiple municipalities each paying the ever-increasing cost of communication technology. The consolidation has allowed even the smallest public safety agency in the County to have access to world-class, life-saving, fully-interoperable communication technology.
- $400,000 per year is saved through efficiencies undertaken by the area's combined water and wastewater treatment facilities. Substantial capital costs were also avoided by communities coming together to build one, rather than several, of these enormously expensive public facilities.

These are only a few examples of consolidations, mergers, and shared services that have been undertaken by local governments within Tompkins County. There are other major initiatives that generate significant taxpayer savings and quality of life benefits that were outside the scope of the Cornell study, and have therefore not been quantified in this report. Two obvious examples are:

- **Tompkins Cortland Community College**. TC3 is one of just a few community colleges in New York State sponsored by multiple counties. Compared with the cost of operating two separate colleges and maintaining two stand-alone campuses, the joint venture between Cortland and Tompkins County is a very substantial source of financial savings for both counties. Pooling the resources of two counties has also enabled TC3 to be among the highest quality community colleges in the State.

- **Tompkins County Solid Waste and Recycling**. Responsibility for municipal waste disposal and recycling has been centralized under the auspices of Tompkins County. This functional consolidation is far more efficient than if managed by each municipality, allows a division of labor and development of expertise, and allows the community to pool its recyclable products to secure the highest prices in the commodities market.

In addition to these major projects and initiatives, a survey among TCCOG participants **found 65 separate and specific shared service and cooperative arrangements** involving two or more local governments. These range from small items such as sharing finger-printing technology to large ventures such as the County's contract with a number of towns to plow certain County roads. It is also important to note that unlike towns in other counties, no town in Tompkins County has a police department. Police protection outside the City of Ithaca and the villages is provided centrally by the County Sheriff.

As has always been the case, work to assess whether other structural changes could have a similar impact is on-going. TCCOG is currently exploring whether certain "back office" functions could be centralized—similar to the centralization of the assessment function a generation ago—and whether realignments in the municipal court system could result in improvements in cost or quality.

Background

(Prepared by Tompkins County Administration)

As a part of the 2015 State Budget, the New York State Legislature enacted a new "Property Tax Freeze Credit" that had been strongly advocated by Governor Cuomo. The Freeze promised a State rebate to homeowners for any increase in local government or school taxes levied by "tax freeze compliant" jurisdictions. Compliance meant that in the first year of the two-year initiative, local governments and school districts had to stay within their tax cap. In the second year, local governments and schools also had to show how they saved the equivalent of 1% of their property tax levies through consolidations, mergers, shared services, and efficiencies.

The Freeze is a variation of a property tax levy cap enacted by the State in 2012, and reflects the Governor's perception that high property taxes are "from the waste and duplication over 10,000 local governments."[1] The freeze presumes that fewer governments would mean lower property taxes, and attempts to leverage that outcome by withholding rebate checks to homeowners who live in places that have not found ways to fundamentally restructure their governments in the 12 months since the plan was passed.

Ironically, the freeze punishes communities, such as those in Tompkins County, that have a longstanding and demonstrable history of reducing costs through mergers, consolidations, shared services, and efficiencies. **By not looking at initiatives launched before January 1,**

Table 1. Existing Joint Inter-Governmental Activities in Tompkins County

(Current Joint Activities/Shared Services as Identified by Local Governments In Tompkins County)

Name of Joint Activity	Participants (Survey Respondants)
Ambulance Service	3
Animal Control and Licensing	8
Assessment (Real Property Tax Assessment)	18
Brainteasers	4
Bridge Maintenance	9
Bucket Truck	5
Cayuga Lake Watershed Intermunicipal Organization	5
Civil Service Administration	11
Closest Car Concept (policing)	4
Code Enforcement	2
Community Celebration	3
Congregate Meals	2
Courts (e.g., consolidated town/village court)	6
Court Security	3
Dog Enumeration	3
Fire Service	3
Fire Inspection	3
Economic Development (Consolidated via TCAD)	18
Elections	18
Emergency Planning	3
Emergency Medical Services	3
Gadabout	3
Geographic Information Services	3
Inter-Municipal Health Benefits Consortium	17
Highway Equipment Sharing	7
Highway--Snow and Ice Control	6
Human Services Coalition	2
Hydrofracking Research and Policy Development	5
Inter-municipal Sewer Committee	6
Ithaca-Tompkins County Transportation Council	19
Law Enforcement Technology Shared Services (LETSS)	8
Library Services (TCPL)	3
Live Scan (Fingerprinting) Service	8
Municipal Electric and Gas Association (MEGA)	5
Mutual Aid Agreements (standby agreements)	6
NY Muncipal Insurance Reciprocal (NYMIR)	5
NYS Park Maintenance and Seasonal Operations	3
Police--SWAT Team and other special deployments	3
Prisoner Transport	15
Public Safety Communication and Dispatch	18
Purchasing ("Piggy Back" contracts)	17
Records Management (TSSERR)	12
Recreational Services Support for the City of Ithaca	3
Sewer Interceptors/Pump Stations	3
Shared Conference Facilities	3
Shared Fuel Facility	3
Shared TraC's (Traffic Accident & Citation Software)	2
Sidewalk maintenance	2
Solid Waste Management	17
Southern Cayuga Lake Intermunicipal Water Commission	6
Stormwater Coalition	5
Studies & Project Agreements (e.g., road improvements)	3
Supervisory Training	17
Time Warner Cable Franchise Negotiations	7
Tompkins County Area Transit (TCAT)	3
Tompkins County Council of Governments	17
Tompkins County Drug & Alcohol Testing Consortium	5
Tompkins County Environmental Management Council	6
Tompkins-Cortland Community College	2
Trails--Maintainance	3
Wastewater Treatment	6
Water Quality Monitoring Program	2
Water Systems	5
Youth Development Programs (e.g., Rural Youth Svcs)	7
Youth Services--Recreation Partnership	13
Existing Joint Activities: 65	

[1] *Cuomo, Citing Local Government Waste, Says It's 'Time We Fix' High Property Taxes,* New York Times, October 27, 2014. The article also notes that only 3,200 local governments (cities, towns, villages, and counties) exist in New York State.

2012, the State risks rewarding the complacent and, at best, ignoring communities that were innovators long before 2012.

Later in this document, a report by a team of Cornell University graduate students details $3.4 million in annual and recurring savings from a handful of pre-2012 initiatives within Tompkins County. None of those savings are recognized in the Government Efficiency Plan's tally of savings from consolidations, mergers, shared services, and efficiencies.

Table 2: Joint Activity Opportunities Suggested by NYS Comptroller and In Place or Under Review in Tompkins County

Joint Activities in Place
Procurement
Records Management
Research
Training
Utility Services (billing and collecting)
Health Insurance Cooperative
HR/Personnel
Equipment Sharing
Fuel Facilities
Physical Plant Sharing
Solid Waste
Utility (Water and Sewer) Infrastructure
Emergency Mgmt
Fire Services
Jail Facilities
Police Services
Aging Services
Property Assessment
Snow Plow Contracts
Public Transit
Solid Waste
Youth Programs
Airports
Libraries
Economic Development
Tourism
Transportation System
Joint Activities Under Review
Investment
Tax Collection
IT Admin
IT Asset Management

The Tompkins County Council of Governments (TCCOG) does not agree with the State's premise that local property taxes are the result of duplication and waste by and among local governments. In fact, high property taxes are largely the product of a State that has imposed tremendous and costly burdens on local governments and that has mastered the art of shifting its own costs to local governments, thereby masking the true cost of State government.

However, TCCOG accepted the State's challenge to consider ways to reduce costs through cooperative ventures and more efficient ways of conducting the business of government.

In June 2014, TCCOG formed a Shared Services Task Force, chaired by Cayuga Heights Mayor Kate Supron, to explore shared service opportunities. The group has since met monthly, and is continuing to look at prospective opportunities ranging from the centralization of back-office services to a realignment of the municipal court system. Cost savings, however, are expected to be on the margin, and would not approach the $800,000/year that is required to be a "tax freeze compliant" area.

Early in the review process, it became apparent that the successes already achieved in Tompkins County were producing substantial benefits for local taxpayers, but also limited the range of opportunities for future shared service initiatives. In fact, entities providing guidance to local governments about ideas to consider when responding to the State's call for consolidations and shared services often pointed to examples pioneered in Tompkins County.

As illustrated on Table 1 (page 4) and Table 2, the task force found that in addition to the major joint ventures profiled in the Cornell report, local governments within Tompkins County are engaged in approximately 65 joint activities that range from fire service, to animal control, to sharing a bucket truck (Table 1). Moreover, nearly all of the examples of shared service provided by State authorities are already in place and operational in Tompkins County (Table 2).

Not only have local governments in Tompkins County conceived and implemented several landmark consolidations, but the ongoing interaction among governments that produces everyday savings and efficiencies is vibrant, broad, and deep. Putting a dollar sign on these activities is beyond the capacity of the TCCOG task force, but it is not hard to image the additional cost and inefficiency of *not* collaborating to provide fire service, *not* sharing a bucket truck, *not* combining animal control efforts, or *not* working with neighboring governments in any one of the 58 other joint activities identified by TCCOG members.

Moreover, the working relationships created by these joint ventures are important to the overall functioning of local government, making mutual aid an integral part of the governmental culture. They also provide a strong foundation of trust and respect when new inter-governmental concepts, such as the health benefits consortium, arise.

Exploring Other Opportunities for Shared Services

In recognizing the limited field of possibilities, the shared services task force explored several possible areas where structural realignment might produce cost savings and/or service improvements. While public safety was discussed, the task force recognized that the State's June 1, 2015 deadline for a plan would not permit nearly enough time to undertake such a major, and complex, topic as public safety with the quality and care required.

The task force identified centralized "back office," or administrative, services as a potential source of cost savings and quality improvements, and has held countywide meetings to discuss centralized Information Technology services and a coordinated training program aimed at cost-effectively addressing the training needs common to all local governments. Future sessions will focus on property tax collection, payroll and accounting systems, and planning/code enforcement.

In 2014, TCCOG initiated a new Supervisory Training program, offered through Tompkins Cortland Community College that provides a 30-hour, high-quality training at a cost of $300 per student—well within the reach of even the smallest local government. Consideration is now turning toward the creation of a TCCOG training academy to support a variety of training needs.

In addition, the task force has established an expert panel to review the town and village court system to determine whether changes in the structure of municipal courts could enhance the consistency of quality justice and provide cost benefits.

The task force will continue the work it has started, and will remain a resource for the Council of Governments to draw upon on when new concepts for governmental realignment arise, as well as a source of ideas regarding new opportunities to pursue.

Taking Stock: Quantifying the Benefits of Major Mergers, Consolidations, Shared Services and Efficiencies Achieved Prior to 2012

As has been noted, the State's Government Efficiency Plan will recognize only those actions taken after January 1, 2012. To provide the community with a more complete understanding of the magnitude of savings achieved by governments within the County as the result of several major and pioneering joint ventures prior to 2012, TCCOG's shared services committee engaged a team of Cornel University graduate students to objectively analyze the impact of eight prior shared service initiatives, namely:

1. Consolidated Real Property Assessment
2. Consolidated Emergency Dispatch 911
3. Tompkins Consolidated Area Transit (TCAT)

4. Digital Records Management
5. Greater Tompkins County Municipal Health Insurance Consortium
6. The Southern Cayuga Lake Inter-municipal Water Commission (Bolton Point Water System)
7. Ithaca Area Waste Water Treatment Facility
8. Village of Cayuga Heights Wastewater Treatment Plant

As will be fully described in the following sections of this report, the Cornell student team found recurring annual savings of $3.8 million associated with these eight initiatives. Had savings associated with the avoidance of duplicative capital costs been considered, the savings would have been appreciably higher.

The story doesn't end at $3.8 million. There are additional savings, likely measured in the millions, associated with the coming together of two counties—Tompkins and Cortland—to form a single community college and the agreement to consolidate the solid waste and recycling function under the auspices of the Tompkins County Solid Waste Division. Finally, the considerable everyday savings attributable to the 65 joint activities carried out by local governments throughout the County add to the $3.8 million starting point established by the Cornell team, and contribute to the quality of services delivered by those localities.

The balance of this report will be the findings prepared by the Cornell team.

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Introduction and Background

The Tax Freeze Credit program provides a rebate check to homeowners equal to the increase in property taxes paid by homeowners living in "tax freeze compliant" jurisdictions. In the first year of the program, which applies to the 2015 fiscal year of local governments, "compliance" required the local government to keep its property tax levy growth within its State-imposed tax cap.[2] In the second year, "compliance" requires not only staying within the tax cap, but also demonstrating a plan to achieve annual savings equal to, or greater than, one percent of the 2014 property tax levy for years 2017, 2018, and 2019.[3] The savings, generated by shared service, consolidation, or efficiency actions initiated after January 1, 2012, must be documented in a Government Efficiency Plan (GEP) due to the State on June 1, 2015.

To provide a full and appropriate context for the GEP, the Tompkins County Council of Government's Shared Services Committee requested a report that would identify and quantify major, and sometimes pioneering, initiatives that have been implemented in Tompkins County well before January 2012, and that are continuing to generate significant and sustained savings to all classes of property taxpayers within Tompkins County.

In response, this report provides an objective analysis of several major shared services or consolidation initiatives that have been developed and put in place by local governments within Tompkins County, specifically:

1. Consolidated Real Property Assessment
2. Consolidated Emergency Dispatch 911
3. Tompkins Consolidated Area Transit (TCAT)
4. Digital Records Management
5. Greater Tompkins County Municipal Health Insurance Consortium
6. The Southern Cayuga Lake Inter-municipal Water Commission (Bolton Point Water System)
7. Ithaca Area Waste Water Treatment Facility
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Although most of these initiatives are not within the date range requirements of the GEP, our analysis makes it clear that municipalities in Tompkins County have made great progress sharing the delivery of these services, which are determined to be cost-effective, sustainable, and replicable.

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[2] Alger, M. R., & Acquario, S. J. (2014). *A toolkit to county government efficiency*. Retrieved April 14, 2015, from http://nysac.org/documents/NYSACCountyEfficiencyToolkit.pdf

[3] New York State Department of Taxation and Finance. (2014). *Property Tax Freeze Credit Guidance*. Retrieved April 14, 2015, from http://www.tax.ny.gov/pdf/publications/orpts/pub1030.pdf

Savings and Benefits to Taxpayers

Between 2012 and 2019, we expect the eight shared service initiatives included in this study to result in total savings of **approximately $28 million.** It should be noted that savings to taxpayers are expressed as savings to both the county and to municipalities within the county.

Each initiative was analyzed starting in 2012 using financial and anecdotal data provided by county officials, and the research team assessed both monetary and operational efficiencies. For the purposes of this study, cost savings refer to strictly monetary gains/losses resulting from the shared service, while efficiency refers to operational improvements that resulted from the shared service. While conducting this study, the researchers found that residents often received benefits beyond cost savings as a result of shared service initiatives. Some of these benefits include improved 911 service, faster access to records maintained by municipalities, and more user-friendly public transportation. These non-monetary benefits are discussed in more detail in the case studies.

The cost savings below are conservative estimates made given information and data available to researchers, and may not capture all of the benefits of shared services due to the difficulty in monetizing certain efficiencies. The following table (Figure 1) indicates a breakdown of the cost savings by initiative and by year.

Figure 1: Savings to Taxpayers 2012-2014 and Projections ("E") 2015-2019

Initiative	Projected Cost Savings							
	2012	2013	2014	2015E	2016E	2017E	2018E	2019E
Consolidated Real Property Assessment	$ 502,787	$ 468,004	$ 429,653	$ 451,900	$ 475,203	$ 499,612	$ 525,176	$ 551,947
Consolidated Emergency Dispatch 911	$ 199,972	$ 215,570	$ 232,385	$ 250,512	$ 268,639	$ 288,077	$ 308,922	$ 331,276
Tompkins County Area Transit	$ 757,986	$ 733,335	$ 513,526	$ 539,132	$ 565,735	$ 593,361	$ 622,035	$ 651,782
Digital Records Management	$ (88,321)	$ 212,015	$ 538,808	$ 440,718	$ 441,699	$ 442,204	$ 442,174	$ 441,546
Municipal Health Insurance Consortium	$ 669,679	$ 915,299	$ 775,802	$ 2,634,351	$ 1,714,744	$ 1,750,930	$ 1,941,561	$ 2,151,992
Bolton Point Water System	$ 102,224	$ 21,346	$ 1,052	$ 21,286	$ 41,521	$ 61,755	$ 1,990	$ 102,224
Ithaca Area Waste Water Treatment Facility	$ -	$ 200,592	$ 262,007	$ 286,240	$ 313,328	$ 341,385	$ 370,439	$ 377,847
Village of Cayuga Heights WWTF	$ 282	$ 564	$ 847	$ 1,231	$ 1,615	$ 1,999	$ 2,383	$ 2,767
Total Cost Savings	**$ 2,144,609**	**$ 2,766,725**	**$ 2,754,080**	**$ 4,625,370**	**$ 3,822,484**	**$ 3,979,323**	**$ 4,214,680**	**$ 4,611,381**

The figures above capture the cost savings derived from an analysis of expenses and revenue from 2012 to 2014 for each initiative. Savings were calculated by comparing actual expenses and revenues with the expected revenues and expenses had consolidation/sharing not occurred. The projected savings for 2015 through 2019 were calculated using a combination of expectations for operational efficiencies given by county officials and growth projections[4].

The savings listed above represent savings to taxpayers within Tompkins County. Specifically, the shared service initiatives above allow for essential services to be provided to county residents at a lower cost. Expressed as a percentage of the tax levy, these eight initiatives produce savings that equal an

[4] Growth projections were made by averaging the percentage growth of years available for analysis, and applying the percentage growth to projected years. Where the percentage growth in savings was large due to one-time savings, the percentage growth was tapered to the expected gross domestic product (GDP) growth rate.

average of 7.0% off the tax levy annually. The below table shows the savings as a percentage of the annual county tax levy (future tax levies projected using the average growth rate between 2012 and 2014).

Figure 2: Total Savings as a Percentage of the Tax Levy 2012-2019

	2012	2013	2014	2015	2016	2017	2018	2019
Tax Levy	$39,181,619	$43,778,193	$45,068,476	$48,376,226	$51,926,744	$55,737,849	$59,828,665	$64,219,723
Savings % of Levy	5.5%	6.3%	6.1%	9.6%	7.4%	7.1%	7.0%	7.2%

Figure 2 shows the savings expressed in Figure 1 (see page 13) as a percentage off the Tompkins County tax levy. The tax levy is the total amount of money the county raises via taxation in each year. Variations in the savings percentage occurs as a result of shifts in revenues and expenses for the shared service initiatives. For example, expenses for Digital Records Management were offset in some years due to grant money, resulting in more savings.

Tompkins County: Studies in Shared Services

Consolidated Real Property Assessment

Tompkins County Department of Assessment was consolidated by public referendum in 1970. It provides both the assessment and Real Property Tax Service functions for taxpayers within all municipalities of the county. It is the only true countywide assessing unit in New York State (with Nassau County, the other countywide assessing unit, still having some local assessing jurisdictions).

Rationale for Change

As revealed by the countywide revaluation in the mid-1960s, a disproportionate share of local property taxes was paid by local farmers and holders of industrial properties because the assessment practices and capabilities of town assessors varied. By 1968, it was recognized that Tompkins County needed to examine its real property tax administration and achieve a uniformly high degree of training and professional standards.

The main driver of the consolidation was to increase the quality of service to taxpayers of Tompkins County. It was believed that hiring full-time assessors, resulting from the consolidation, would promote more consistency and productivity in the assessment function. Full-time assessors would be less likely to leave their jobs to seek more regular employment. Thus, the county could receive a better return on training provided to the assessors and over time devote fewer resources to recruiting and training new assessors. In addition, full-time assessors would be better at keeping track of the real property market and reflecting these changes in their assessment work. Another personnel consideration was the retirement of many of the assessors; it was difficult to find qualified individuals with enough training, experience and time to devote to the office of assessor. Cost savings were not a significant consideration at the time of consolidation.

Once consolidated, all assessment activities were completed in-house at the county level, with no local assessing responsibilities for municipalities within the county. Only 5 full-time assessors were required for in-house county operations, compared with 14 part-time assessors spread across the county prior to the consolidation.

The main goal of assessment is to ensure that all properties are assessed at a uniform percentage of value. There can be an inequitable distribution of tax burden due to the lack of a consistent reappraisal cycle, as property value trends can change differently from one area to another. The consolidated level of staffing allows for periodic in-house revaluation, which reduces the cost of contracting outside contractors to perform much needed periodic revaluation.

Cost Savings and Benefits

Countywide assessing allows for increased specialization by staff with regards to specific types of properties, including utilities, industrial properties, and complex commercial properties. With consolidation under the county umbrella, each assessor can provide expertise on a specific type of property or be responsible only for specific type of work. For example, one assessor can have responsibility only for commercial properties, while a colleague may be responsible for farm properties, and clerical staff can manage processing exemptions and do data entry. Specialization created efficiencies in the assessment operation by streamlining activities that previously were completed ad hoc by part-time employees. The countywide assessing unit also provides a single equalization rate and a single reassessment cycle structure. It eliminates tax shifts resulting from changing equalization rates within the county by having a single equalization rate for all municipalities in the county. It also removes the confusion felt by some residents caused by dramatically different assessed valuations of neighboring properties.

Over time, the cost savings associated with the consolidation are significant. The estimated savings are $429,653 in 2014, $468,004 in 2013, $502,787 in 2012, $262, 868 in 2011, and $359,673 in 2010. As shown in the following table (Figure 3), the estimated cost savings are calculated by comparing the actual costs of the Tompkins County Department of Assessment and the estimated costs of returning the assessing unit to the municipal level from 2010 to 2014.

Figure 3: Consolidated Real Property Assessment Cost Savings

	Countywide Actual Costs (per year)	Town Assessing Estimated Costs (per year)	Cost Savings (per year)
2014	$ 1,046,084	$ 1,475,737	$ 429,653
2013	$ 969,039	$ 1,437,043	$ 468,004
2012	$ 895,615	$ 1,398,402	$ 502,787
2011	$ 941,528	$ 1,204,396	$ 262,868
2010	$ 919,567	$ 1,279,240	$ 359,673

In addition, as shown in Figures 4 and 5below, the breakdown of the annual countywide actual costs and the municipal (town) assessing estimated costs, indicate significant amount of savings contributed from personnel/benefit and contractual costs. The countywide budget is the actual cost for Tompkins County. The town estimated assessment costs assume a structure in which the assessment function is returned to the towns, which means that each town is responsible for its own assessment roll. In this case, the County is only responsible for a County Real Property Tax Service Agent, which only assists the assessment function.[5] As such, the town assessment estimated costs were generated based on what a town budget

[5] Department of Assessment, *Tompkins County Study Summary*, Tompkins County.

would look like. The staffing level of town assessment is based on the IAAO (International Association of Assessing Officers) staffing guidelines.

Figure 4: Countywide Assessment Actual Costs

	2010	*2011*	*2012*	*2013*	*2014*
Project Assistant	$ -	$ -	$ 10,000	$ 10,000	$ 24,000
Asst Director	$ 71,265	$ 71,265	$ 71,294	$ 72,720	$ 74,174
Director	$ 86,229	$ 86,229	$ 86,264	$ 87,989	$ 89,749
Data Collector	$ -	$ -	$ 32,082	$ -	$ -
GIS Tech	$ 37,381	$ 37,381	$ 42,738	$ 43,593	$ 44,465
RPS Specialist	$ 94,642	$ 94,642	$ 47,340	$ 48,287	$ 49,253
RPA	$ 321,246	$ 214,165	$ -	o	$ 49,072
Value Specialist	$ 58,898	$ 58,898	$ 176,766	$ 227,166	$ 214,558
Asmt Acct Specialist	$ 67,486	$ 67,486	$ 40,603	$ 41,415	$ 44,299
AAA Specialist	$ -	$ -	$ -	$ -	$ -
Senior Val Specialist	$ -	$ 64,784	$ 64,811	$ 66,107	$ 67,429
Longevity	$ 3,600	$ 3,600	$ 3,200	$ 3,200	$ 3,700
Personnel Subtotal	$ 740,747	$ 698,450	$ 575,098	$ 600,477	$ 660,699
Equipment	$ 3,000	$ 3,000	$ 3,000	$ 7,500	$ 7,000
Supplies	$ 25,000	$ 19,100	$ 16,500	$ 18,000	$ 17,312
Services/Contractual	$ 53,217	$ 54,975	$ 37,737	$ 46,318	$ 52,202
Fringe	$ 300,003	$ 359,003	$ 319,280	$ 351,744	$ 369,371
Total Expense	$ 1,121,967	$ 1,134,528	$ 951,615	$ 1,024,039	$ 1,106,584
Assessors Fees	$ 25,000	$ 28,000	$ 27,000	$ 28,000	$ 33,000
Interfund Revenue	$ 25,500	$ 26,000	$ 29,000	$ 27,000	$ 27,500
Other State Aid	$ 151,900	$ 139,000	$ -	$ -	$ -
Total Revenue	$ 202,400	$ 193,000	$ 56,000	$ 55,000	$ 60,500
County Net Income	$ (919,567)	$ (941,528)	$ (895,615)	$ (969,039)	$(1,046,084)

Source: County Assessor Estimation, Jay Franklin

Figure 5: Town Assessment Estimated Costs

	2010	*2011*	*2012*	*2013*	*2014*
Director	$ 71,265	$ 71,265	$ 78,465	$ 79,660	$ 81,286
Systems Analyst	$ 53,541	$ 53,541	$ 53,589	$ 54,405	$ 55,515
Assmt Account Spec	$ 41,911	$ 41,911	$ 42,767	$ 43,418	$ 44,304
Tax Map Technician	$ 41,911	$ 41,911	$ 42,767	$ 43,418	$ 44,304
Personnel Subtotal	$ 229,584	$ 229,584	$ 238,971	$ 242,610	$ 247,561
Equipment	$ 19,212	$ 19,212	$ 19,212	$ 19,212	$ 19,212
Contractual	$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000
Fringes	$ 92,982	$ 118,006	$ 135,018	$ 144,110	$ 151,012
Total Expenses	$ 361,778	$ 386,802	$ 413,201	$ 425,932	$ 437,785
Total Revenue	$ 52,500	$ 52,500	$ 52,500	$ 52,500	$ 52,500
Town Income Net	$ (309,278)	$ (334,302)	$ (360,701)	$ (373,432)	$ (385,285)

Source: County Assessor Estimation, Jay Franklin

Long-term Sustainability

There are currently approximately 34,500 parcels of real properties in Tompkins County, with a total market value of over $10.5 billion.[6] Tompkins County Department of Assessment has assured that all properties are assessed at 100% of their full market value since 2008, and has shown a significant amount of savings to Tompkins County under the countywide assessing structure. Future savings are estimated to be similar to the 2014 year as there is no perceived need to add more employees to the department and county residents will continue to require assessment services.

The following table is a projection of the cost savings for assessment in Tompkins County from 2015 to 2019. We use the growth rate, expressed as the difference between two values in time in terms of a percentage of the first value, as the key input in our projection. Based on the data from 2010 to 2014, the growth rate of countywide actual costs was -6% (2010-2011), 16% (2011-2012), 3% (2012-2013) and 3% (2013-2014) separately. The growth rate of town assessing estimated costs was 2% (2010-2011), -5% (2011-2012), 8% (2012-2013), 8% (2013-2014). The projected cost is calculated using a yearly growth rate for the county assessing and town assessing separately. In our projection of countywide costs, we use an average growth rate of 3% from 2015 to 2019. In our projection of town assessing costs, we use 4% each year from 2015 to 2019, given that this is a steady rate at which growth in costs is expected to occur.

Figure 6: Consolidated Real Property Assessment Projected Cost Savings

	Countywide Actual Costs (per year)	Town Assessing Estimated Costs (per year)	Cost Savings (per year)
2019	$ 1,237,335	$ 1,789,282	$ 551,947
2018	$ 1,196,474	$ 1,721,650	$ 525,176
2017	$ 1,156,962	$ 1,656,574	$ 499,612
2016	$ 1,118,755	$ 1,593,958	$ 475,203
2015	$ 1,081,809	$ 1,533,709	$ 451,900
2014	$ 1,046,084	$ 1,475,737	$ 429,653
2013	$ 969,039	$ 1,437,043	$ 468,004
2012	$ 895,615	$ 1,398,402	$ 502,787
2011	$ 941,528	$ 1,204,396	$ 262,868
2010	$ 919,567	$ 1,279,240	$ 359,673

Risk and Opportunity

There are no observed risks with a countywide assessment office. There are, however, many opportunities for efficiency and improved service quality associated with consolidation:

- By reducing from 14 part-time assessors to a full-time staff of 5, the Tompkins County Department of Assessment qualified as a Civil Service department, requiring that employees meet a given standard before being considered for a position. This differs from the municipal employment system, where there were few standard procedures for hiring assessors.

[6] Department of Assessment, (2014), *Annual Report*, Tompkins County.

- A full-time office provides residents with the ability to call during regular business hours and reach a staff person directly. In smaller municipalities it was not necessary to employ a full time assessor, resulting in only part-time service to residents and an inconvenience to the general public.
- The countywide assessment office provides more opportunities to hire qualified individuals for a full-time position. Though there are very good part-time assessors, full-time positions tend to attract more credentialed individuals who are experienced and well-trained assessors of real property value.

Replicability

- To achieve a consolidated office, a countywide referendum is needed. This can be a barrier to implementation, as municipalities rarely want to give up control of this function. It is common for a consolidated assessment office to be brought to a vote four or five times before eventually getting to "yes."
- It is perceived by some residents that personalized service would no longer exist if the assessment function were completed at the county level. Also, if there are complaints about job performance, municipalities prefer to retain the right not to reappoint a person to that position. The decision to not reappoint is considered a less obtrusive way to deal with the complaint, though there are formal procedures in place to remove a person from office.
- Bringing all municipalities up to the county level of assessment comes with a cost. For example, some counties have 25 towns that all assess differently. To bring assessment up to a consistent level is about $125/parcel job[7]. For a county such as Tompkins, this would be a $4.4 million project. It is too expensive for most counties to consider the change compared to the would-be savings.
- The aging of the appraisal field, including the assessment field, in New York State was a contributing factor in 1968 when Tompkins County voted to create a countywide assessment structure. With the next reappointment cycle for town assessors slated to take place in 2019, there will be many assessors who will choose to retire, which will cause a shortage. This changing landscape could play a similar role in the consolidation of other counties' assessment functions.
- Moreover, there is very little regulatory oversight over the local assessor, which can lead to errors and omissions in the assessment data. For example, some local assessors have not assessed new houses for 10 years or have left an exemption that must be applied for each year on a property for 10 years after the owner passed away.[8]

Consolidated Emergency Dispatch 911

Prior to 2001, emergency dispatch was decentralized in Tompkins County. Calls for fire, emergency medical services, county police (including the Sheriff and villages), and city police were all dispatched from separate locations. Further, the State Police, Cornell University, and Ithaca College also maintained independent answering points.

In 1997, enhanced 911 service was implemented in Tompkins County, spurring the centralization of countywide dispatching operations in January of 2001. The city police dispatch operations were assumed by the county in 2004, and by January of 2005, a consolidated public safety answering point (PSAP) and dispatch center became operational at the newly constructed Emergency Response Center, which is located in Lansing.

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[7] Franklin, J. (2015, March 5). *Cost Savings of Tompkins County Assessment Department* [Phone interview].

[8] Franklin, J. (2015, March 5).

Initial centralization in 2001 was facilitated by communication systems improvements and radio infrastructure investments made in the 1980s and 1990s. These improvements included a microwave radio network, a shared computer aided dispatch (CAD) and mapping system, new telephone systems, and a mobile data radio system deployed by public safety vehicles. By the early 2000s, this infrastructure was well developed and capable of handling an increased call volume associated with a growing population and the advent of cellular phone traffic.

Rationale for Change

- An increasing number of calls due to a growing population and use of cell phones. In 1998 there were 15,000 calls to 911, compared to 40,000 calls in 2014.
- Increasing congestion and limitations of independently-operated used radio frequencies in the late 1990s guided the determination that a modern and shared radio system would best serve all the dispatched services. This shared system, implemented fully by 2008, greatly simplified dispatching processes and allowed for agencies to more easily communicate with each other on the same radio platform, including non-emergency response agencies such as public works, Tompkins Consolidated Area Transit, and the local colleges.
- Training and supervisory levels and service quality levels were different for each agency, including different call protocols and response times. There was also inefficiencies resulting from "one button transfer" that involved the central 911 office picking up a call, querying the caller, and then transferring the call to an agency for further query and response determination, rather than dispatching an agency directly.

Benefits and Efficiencies

Implementing 911 service and centralizing PSAPs required a large investment in capital expenditures and continued staffing expense. First, no positions from the call center were cut during the centralization process, and salaries for the employees absorbed by the county were re-set uniformly at the highest pay level. Employees of the centralized emergency call center were also put through a rigorous training to standardize levels of quality. The largest cost associated with centralized 911 dispatch was the new building constructed in Lansing in 2004-05, with accompanying upgrades to the radio tower network.

These costs were incurred as a way to improve service quality and catalyze dispatch efficiency among the agencies in the county. Due to the consolidation of employees under the county Emergency Response umbrella, discrepancies in call protocol, supervision, and call times were eliminated, and response times improved as dispatchers moved away from one button transfer. Centralized and consolidated emergency response made easier the practice of dispatching the agency closest to the location of an accident or emergency. This facilitates the fastest response times to emergencies experienced by county residents.

Due to the cost described above, the county did not experience financial savings with the implementation of consolidated emergency response. This was determined via the analysis of personnel and capital expenditures between 2002 and 2014, and accounting for anecdotal evidence. However, county residents benefitted from the efficiencies and improvements described above, and experienced cost savings due to the elimination of duplicative 911 dispatch efforts.

Figure 7: Countywide 911 Service Estimated Annual Cost Difference (Savings)

	Dispatch FTEs	*Personnel Cost*	*Admin/Equipment Costs*	*Total*
Countywide 911 Service	23	$ 1,925,233	$ 455,908	$ 2,381,141
Decentralized 911 Service	26	$ 2,116,279	$ 515,374	$ 2,631,653
Cost Difference (Savings)	-3	$ (191,046)	$ (59,466)	$ (250,512)

Source: Tompkins County 2015 Annual Budget, 2010 Census

The above chart (Figure 7) is intended to show an approximation of savings to county residents with countywide 911 service, estimated as if the service was decentralized among public safety answering points in the county. Savings were determined using the estimated number of dispatchers necessary for decentralized dispatch, which was calculated using the current dispatcher to population ratio and then spreading the ratio over municipalities in the region. The result is an estimated dispatch full time equivalent of 26, illustrating that countywide dispatch achieves staffing efficiency.

Cost savings were then calculated by multiplying the estimated number of dispatchers by the average salary and benefits for a Tompkins County dispatch employee in 2015 (fringe rate of just under 57%). For countywide 911 service, administration and equipment costs refer to actual costs associated with the department outside of personnel. The decentralized administration and equipment costs were calculated by finding the per FTE current cost and applying it to the decentralized FTE count. Because there are more public safety agencies (fire, EMS, law enforcement) than there are municipalities, this analysis does not express specific savings to each public safety answering point that participated in the consolidation, but rather gives an estimate of taxpayer savings.

It is estimated that the consolidation of emergency response saves Tompkins County residents approximately $250,000 a year, despite increases to county expenses with centralization. This is a conservative estimate, as the personnel and administration and equipment savings depicted above do not include costs associated with complex telephone systems, routing features, and radio systems.

Long-term Sustainability

Despite an increase of 45% in calls to 911 between 2004 and 2014 (27,644 vs. 40,095), and an increase of 23% in the number of incidents dispatched since 2005 (the first fully consolidated year), the number of full time equivalent employees in the Department of Emergency Response remains the same in 2015 as it was in 2005.

Figure 8 shows the estimated savings experienced by county taxpayers over time as a result of the consolidation, with increases in savings calculated using the average growth rate of personnel expense between 2002 and 2015 (personnel expense is the largest driver of expense in the county dispatch unit).

Without consolidation, individual call centers would have been stretched to capacity or would have been required to hire additional staff. As noted in the above section, taxpayers in municipalities within Tompkins County reap significant savings from the consolidation of PSAPs, and as personnel costs increase in future years, these benefits also increase.

Figure 8: Countywide 911 Service Projected Savings

	Savings to Taxpayers[1]
2012	$ 199,972
2013	$ 215,570
2014	$ 232,385
2015	$ 250,512
2016	$ 268,639
2017	$ 288,077
2018	$ 308,922
2019	$ 331,276
Total	$ 2,095,354

[1]Savings to muncipalities calculated by projecting anticipated personnel cost increas

As call volume and population throughout the county continue to increase, it is necessary to have an efficient, well-trained, and well-staffed emergency response team. Tompkins County Emergency Response Center is positioned to provide this service to the community at an economy of scale, with increasing returns to the community as costs from the initial construction of the building are recouped.

Risk and Opportunity

As noted by the current emergency response director[9], consolidation of emergency response can be controversial. Individual emergency response teams often prefer to remain independent, and this sentiment oftentimes impedes the successful implementation of a centralized 911 call center. As 911 service was planned and implemented in the 1990s, a communications oversight committee comprised heavily of representatives of the thirty-plus response agencies (fire, EMS, law enforcement) was established to mitigate this risk.

The benefits to the community far outweigh these risks; centralized dispatch ensures that 911 calls within the jurisdiction are routed to one place, answered quickly and dispatched with a high level of proficiency to the appropriate responders, thereby eliminating the delays, duplications, and inconsistencies that are prevalent where multiple, overlapping public safety answering points exist. Centralization also allows for higher quality training of call professionals and cost-effective supervision of the call center.

Replicability

Centralized 911 dispatch is an important service that Tompkins County provides to residents and visitors. While many communities across the state participate in a shared 911 network, there are lessons to be learned about implementing a full consolidation:

- Buy-in from stakeholders, especially emergency response agencies, is essential. In Tompkins County, key county leaders and responders supported the move and helped to garner support and convince the skeptics of the importance of consolidation.
- State funding for consolidated emergency response is available, including the Interoperable Communications Grant in New York State (administered by the Division of Homeland Security and Emergency Services). Established in 2010, this program provides funds to counties for both initial consolidation and for sustained operation of a public safety answering points. The Local Government Efficiency Program has also funded the study and implementation of consolidated PSAPs, including in Albany County, Oneida County, and Steuben County.
- Tompkins County became eligible for operating funds from New York State as a result of being consolidated. In 2006, Tompkins received a 2006 Wireless 911 Expedited Deployment Grant from the NYS 911 Board to reimburse costs associated with implemented wireless service. More recently, a $500,000 reimbursement was granted for the replacement of the 911 phone system—also as a direct result of consolidation.
- An incremental and deliberate process for implementing full consolidation will ease the transition. Tompkins County spent six years bringing emergency response employees from other agencies on board; City of Ithaca Police Department dispatchers were the last to transition in 2004-05.

[9] Lee Shurtleff, (2015), Tompkins County Department of Emergency Response Director, March 7th, 2015 (interview).

Tompkins Consolidated Area Transit (TCAT)

Tompkins Consolidated Area Transit (TCAT) is a public transportation operator that was formed by consolidating three public transit systems:

- Ithaca Transit, which was started by the City of Ithaca in 1962 as a municipal bus system;
- TOMTRAN, which was started by Tompkins County in 1981 as a rural transit system;
- CU Transit, which was started by Cornell University in 1966 as a campus shuttle bus system[10].

Due to the inherent financial and operational inefficiencies of having separate services, the three parties adopted a consolidation agreement on April 1, 1998 to set up a joint venture government entity as authorized by section 119(s)(1) of the New York General Municipal Law.[11] Following a study of all routes and fares, TCAT implemented a unified route and fare system that went into effect in August 1999.[12] TCAT was incorporated and began operations on January 1, 2005, as a private, not-for-profit corporation and as a single employer providing public transportation services for a population of 102,000 in Tompkins County.

The mission of TCAT is to provide safe, high quality, reliable, efficient public transportation while being a responsive, responsible employer. Since its consolidation, TCAT has made measurable strides in ridership growth, safety practices, workforce training, community outreach and environmental sustainability. In 2011, TCAT was named "Outstanding Public Transportation System" (providing 1 million to 4 million annual trips category) by the American Public Transportation Association (APTA) based on its achievement in efficiency and effectiveness.[13]

Rationale for Change

The advantages of having a consolidated transit system, as opposed to having three separate transit systems in the county, are apparent. Improvement in service delivery and quality was considered to be the primary motivator for the consolidation. Consolidation would eliminate the public's confusion with a profusion of transit services and fares, and the consolidated agency would be able to accommodate demonstrated ridership demands in a better way. From a broader perspective, a unified, robust transit system would provide a basic safety net for the service dependents in the county.

Like other shared services that benefit from economies of scale, there must be some potential for excess capacity in the pre-consolidated transit systems that can be utilized to serve a larger service area. Excess capacity may result from facilities or buses without adequate demand for full utilization, personnel with specialized skills (such as bus operators and vehicle maintenance workers) without adequate demand to use those skills on a full-time basis, or staffing to meet peak demands leading to the excess capacity during non-peak periods.[14] For example, prior to the consolidation, CU Transit provided bus service

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[10] TCAT. (2004). *Transportation agreement among City of Ithaca, County of Tompkins, Cornell University, Tompkins Consolidated Area Transit, and Tompkins Consolidated Area Transit, Inc*. Retrieved March 10, 2015, from TCAT, Inc.

[11] Mckinney's General Municipal Law § 119-s-1: *Provision of mass transportation, in the county of Tompkins*.

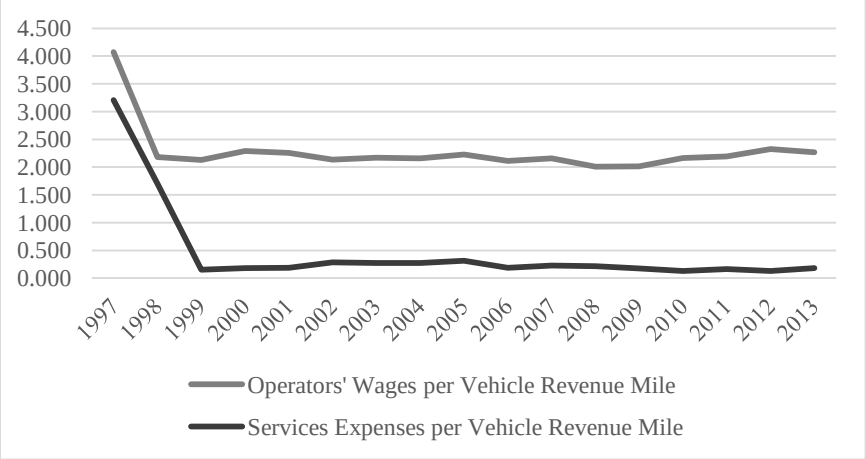
[12] Tompkins Co. Public Transit Archive. (2005). *A brief description of Tompkins Consolidated Area Transit (TCAT, Inc.), Ithaca, New York*. Retrieved April 13, 2015, from http://tompkinstransitarchive.weebly.com/tcat-1997-2005.html

[13] TCAT. (2014). *About TCAT*. Retrieved March 10, 2015, from TCAT, Inc.

[14] Holzer, M., & Fry, J. C. (2011). *Shared services and municipal consolidation: a critical analysis*. Alexandria, Va.: Public Technology Institute, pp. 129-139.

between two peripheral parking areas and the main campus of Cornell University[15]; while at the same time, 4 out of the 6 routes of Ithaca Transit had multiple stops at the central campus of Cornell.[16] By consolidating the three different transit services, unnecessary duplication in efforts could be eliminated, resulting in more efficient use of personnel and material resources. Using the combination of Ithaca Transit and TOMTRAN ("Ithaca Transit-TOMTRAN") as an example for the pre-consolidated agency, as shown in Figure 9 below, both the operators' wages per vehicle revenue mile and the services expenses[17] per vehicle revenue mile decreased by more than 45% after TCAT consolidation (the latter actually decreased by more than 95% from 1997 to 1999).

Figure 9: Examples of Efficiency Achieved from Using Excess Capacity (1997-2013)



Source: National Transit Database. (2013)

Competition between separate transit systems can increase costs or decrease funding for each of the pre-consolidated systems. For example, the Federal Transit Administration supports transit development through such programs as Human Resources and Training and Transit Asset Management[18]. As the two public transits in Tompkins County, Ithaca Transit and TOMTRAN needed to compete with each other in order to attract the funding. Also, funding for the areas served by CU Transit was negatively influenced by the fact that it was not a federal aid recipient[19]. The average total funding for Ithaca Transit-TOMTRAN from 1993 to 1997 was 3.26 million, while the average total funding for TCAT from 1998 to 2002 was 7.15 million (as can be seen in Figure 10 below)[20]. Although we cannot make a conclusion without detailed information about funding sources of the three agencies, we believe that competition did exist and raised the cost of attracting funding for all of them. This is part of the reason why coordination

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[15] Meyburg, A. H., Stopher, P. R., Ryan, J. M., & Coulter, J. W. (1974). *Mass transit development for small urban areas: a case study – Tompkins County, New York*. Retrieved March 20, 2015, from http://catalog.hathitrust.org/Record/009212212

[16] Tompkins Co. Public Transit Archive. (n.d.). *City of Ithaca, NY – Community Transit (1962-75) & Ithaca Transit (1976-97)*. Retrieved April 14, 2015, from http://tompkinstransitarchive.weebly.com/city-of-ithaca.html

[17] The labor and other work procured from an outside organization as a substitute for in-house employee labor. The substitution is usually made because the skills offered by the outside organization are needed for only a short period of time or are better than internally available skills. See Federal Transit Administration. (2013). *NTD Glossary – services (503)*. Retrieved April 15, 2015, from http://www.ntdprogram.gov/ntdprogram/Glossary.htm

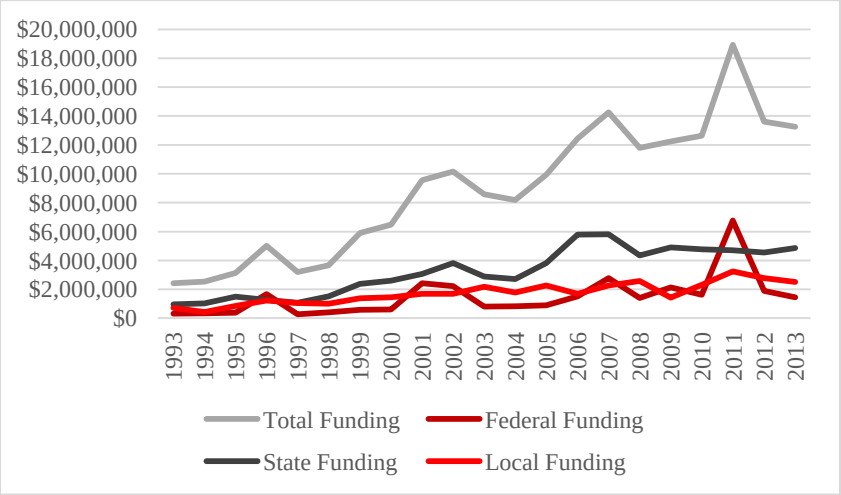
[18] U.S. Department of Transportation Federal Transit Administration. (n.d.) *MAP-21 Program fact sheets*. Retrieved April 25, 2015, from http://www.fta.dot.gov/map21.html

[19] Mengel, D. (2015, April 23). *History of TCAT Consolidation* [Email Interview]

[20] Federal Transit Administration. (2013). *National transit database – historical data files*. Retrieved April 7, 2015, from http://www.ntdprogram.gov/ntdprogram/data.htm

with surrounding municipalities in the design and delivery of bus transportation can produce a more efficient or effective result for the region as a whole, as noted by literature[21].

Figure 10: Ithaca Transit-TOMTRAN's/TCATs Sources of Funding (1993-2013)



Source: National Transit Database. (2013).

City, County, and Cornell leaders wisely recognized the advantages of having a single, county-wide transit system. In 1991, an Operating Committee was established to begin process of consolidation. In 1992, the three transit agencies moved into a brand new $5 million transit facility, 737 Willow Ave., Ithaca, and began sharing the cost for a single maintenance department, building maintenance, utilities and administrative staff[22]. However, the three transit entities continued to operate separately until the consolidation agreement was signed in 1998.

Cost Savings and Benefits

Before providing an estimate on the cost savings achieved by consolidation, it is worth discussing the service characteristics:

1. Fixed route bus service;
2. Demand response service, which operates in response to calls from passengers or their agents to the transit operator, who schedules a vehicle to pick up the passengers to transport them to their destinations.[23]
3. Vanpool, which operates as a ride sharing arrangement among a group of individuals traveling directly between their homes and a regular destination within the same geographical area.[24]

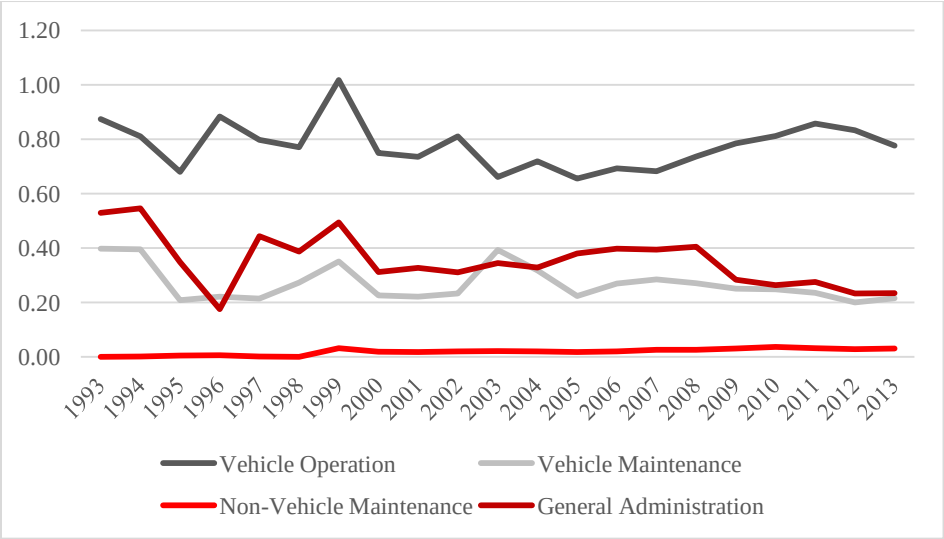
For each of these services, agencies could either operate the revenue vehicles directly or contract with a public or private transportation provider to provide the service to the public. Since the cost savings from purchased transportation are not attributable to TCAT or Ithaca Transit-TOMTRAN, we will only focus

[21] Holzer, M., & Fry, J. C. (2011). *Shared services and municipal consolidation: a critical analysis*. Alexandria, Va.: Public Technology Institute, pp. 129-139.
[22] TCAT. (2014). *About TCAT*. Retrieved March 10, 2015, from TCAT, Inc.
[23] Federal Transit Administration. (2013). *NTD Glossary – demand response*. Retrieved April 15, 2015, from http://www.ntdprogram.gov/ntdprogram/Glossary.htm
[24] Federal Transit Administration. (2013). *NTD Glossary – vanpool*. Retrieved April 15, 2015, from http://www.ntdprogram.gov/ntdprogram/Glossary.htm

on directly operated services in this analysis. Starting from 1994, the only directly operated service was fixed route bus service.

With regard to efficiency measures, we chose to use cost per passenger mile. Such an indicator takes into account both the ridership and passenger trip length, which is comparable across different transit agencies and over time. The only data available to us are data from National Transit Database which includes information on Ithaca Transit-TOMTRAN (1993-1997) and TCAT (1998-2013). Therefore, the analysis is limited to this time range. All the numbers are adjusted to 2015 dollars using CPI data from the Bureau of Labor Statistics[25].

Figure 11: Operating Expenses per Passenger Mile (1993-2013)



Source: National Transit Database. (2013).

As discussed previously, economies of scale are usually associated with functions such as vehicle maintenance and general administration, and the actual results reflect this. It is possible that the pre-consolidated agencies had excess capacity in vehicle maintenance and general administration to serve TCAT without requiring more resources. On the contrary, the costs of non-vehicle maintenance appear to be quite stable across years. The costs of vehicle operation had been fluctuating and seemed to have no predictable pattern between 1993 and 2013. Based on these findings, we can make several assumptions for the purpose of calculating cost savings achieved by consolidation:

1. We assume that major cost savings came from vehicle maintenance and general administration. We choose not to quantify the benefits from funding and service improvement due to lack of data.
2. We assume that prior to consolidation, the level of efficiency and cost-effectiveness of CU Transit was close to that of Ithaca Transit-TOMTRAN;
3. We assume that after more than 15 years of operation, Ithaca Transit-TOMTRAN had optimized their efficiencies and scope of services as of the end of 1997. If they continued to operate individually instead of being consolidated, their level of efficiencies would stabilize at the average results between 1993 and 1997, which would be $0.29 per passenger mile for vehicle maintenance, and $0.41 for general administration (in 2015 dollars).

[25] Bureau of Labor Statistics. (2015). *Consumer price index – all urban consumers*. Retrieved April 15, 2015, from http://data.bls.gov/pdq/SurveyOutputServlet

4. We assume that since 1998, 70% of passenger miles had been traveled by students.[26] Cost savings associated with these passenger miles should be excluded, because they are not savings to the local taxpayers (students generally do not pay property tax).

The calculations for cost savings as a result of consolidation are shown in Figure 12 below. Numbers in parentheses are cost incurrences, instead of cost savings, that TCAT had to pay for the consolidation process. We conclude that by consolidating three transit systems into a single one, at least $4,034,482 (in 2015 dollars) was saved for local taxpayers as of the end of 2013. Out of these savings, which were realized by increased efficiencies in vehicle maintenance and general administration, 73% were achieved from 2009 to 2013. If we only look into years from 2012, the realized cost savings are about $1.49 million.

Figure 12: Cost Savings Achieved by TCAT Consolidation (1998-2013)

Year	*Annual Passenger Miles Traveled*	*Vehicle Maintenance/ Passenger Mile*	*General Admin/Passenger Mile*	*Cost Savings from Vehicle Maintenance*	*Cost Savings from General Administration*	*Subtotal Cost Savings per Passenger Mile*	*Annual Total Cost Savings*
1998	1,340,159	0.27	0.39	$ 0.02	$ 0.02	$ 0.04	$ 16,249
1999	3,699,730	0.35	0.49	$ (0.06)	$ (0.08)	$ (0.14)	$ (159,767)
2000	5,672,951	0.23	0.31	$ 0.06	$ 0.10	$ 0.16	$ 273,954
2001	5,801,899	0.22	0.33	$ 0.07	$ 0.08	$ 0.15	$ 264,153
2002	6,012,990	0.23	0.31	$ 0.06	$ 0.10	$ 0.16	$ 281,740
2003	6,308,349	0.39	0.34	$ (0.10)	$ 0.07	$ (0.04)	$ (72,438)
2004	6,274,236	0.32	0.33	$ (0.03)	$ 0.08	$ 0.05	$ 101,412
2005	7,372,987	0.22	0.38	$ 0.07	$ 0.03	$ 0.10	$ 213,151
2006	7,143,977	0.27	0.40	$ 0.02	$ 0.01	$ 0.03	$ 69,764
2007	7,372,682	0.29	0.39	$ 0.00	$ 0.02	$ 0.02	$ 45,336
2008	7,667,953	0.27	0.41	$ 0.02	$ 0.00	$ 0.02	$ 54,777
2009	8,550,872	0.25	0.28	$ 0.04	$ 0.13	$ 0.17	$ 427,264
2010	9,126,817	0.25	0.26	$ 0.04	$ 0.15	$ 0.19	$ 514,272
2011	9,061,342	0.24	0.28	$ 0.05	$ 0.13	$ 0.19	$ 513,294
2012	9,453,674	0.20	0.23	$ 0.09	$ 0.18	$ 0.27	$ 757,986
2013	9,761,475	0.22	0.23	$ 0.07	$ 0.18	$ 0.25	$ 733,335
						Total Savings since Consolidation (in 2015 dollars):	**$ 4,034,482**

Source: National Transit Database. (2013). Cost savings calculations done by author.

Long-term Sustainability

Several previous or ongoing TCAT projects may have implications for the sustainability of cost savings or benefits, as highlighted below[27]:

- In 2006, TCAT started an aggressive preventative maintenance program to help reduce overall maintenance costs and to increase inspection rates. The result has been a significant boost in the New York State Department of Transportation inspection pass rates, which are now nearing 100 percent.

[26] This assumption is made based on the fact that in 2013, Cornell IDs - used as bus passes – accounted for 71.4% of all of TCAT's ridership. TCAT also noted that Cornell's ridership had been increasing over the previous years. Considering that student riders were also from Ithaca College and Tompkins Cortland Community College, we decide to make a conservative estimate about the percentage of student ridership from 1998 and beyond. See TCAT. (2014). *Cornell to up payments for TCAT passes*. Retrieved April 16, 2015, from http://www.tcatbus.com/cornell-to-up-payments-for-tcat-passes/

[27] All the following highlights are excerpts from TCAT. (2014). *About TCAT*. Retrieved April 16, 2015, from http://www.tcatbus.com/about/about-tcat/

- In 2011, TCAT took steps to trim its already lean operational budget. Those measures, which went into effect early 2012, included implementing rural fare increases, reducing routes, putting wage freezes into place and reducing an already lean staff, now less than 120, through attrition.
- In 2013, the New York State Legislature approved a measure that allows Tompkins County to keep some of the mortgage recording tax for public transit, following the practice in 24 other counties. The funding is expected to generate approximately $700,000 a year to help offset TCAT's costs for buses, both passenger and back-office technology improvements and other capital and operating needs.
- An ongoing Informational Technology/Intelligent Transportation Systems project will allow TCAT to provide passengers with cutting-edge real-time information, while streamlining many of the administrative and maintenance tasks TCAT performs daily.
- Other major actions in service improvement in recent years, including 1) A comprehensive Transportation Development Plan that went into effect in 2010 to offer simplified and streamlined routes and more convenient interlined "one seat" rides; 2) the ongoing "What's a Bus Stop?" Project, which seeks to clearly establish TCAT's bus stops in urban and suburban areas.

Taking all the above factors into consideration, we anticipate the cost savings from consolidation to be sustainable. In addition to the first three assumptions detailed in the last section (we will need to revise the fourth assumption a little bit), we need to make the following assumptions for calculation:

1. We assume that from 2014 to 2019, the overall vehicle maintenance costs and overall general administration costs of TCAT would increase separately by their average growth rates between 2003 and 2013, which was 6.2% for vehicle maintenance, and 2.8% for general administration.
2. We assume continued growth in TCAT ridership due to, among other things, TCAT's consistent efforts in service improvement, which will likely result in an increasing willingness to use public transportation among college students and younger workers.
3. We assume that the annual passenger miles to increase by its average growth rate between 2003 and 2013, which was 4.6%.
4. We assume that 80% of passenger miles will be traveled by students.[28]

The savings from efficiencies gains in vehicle maintenance and general administration, which totals $3,485,570 for years 2014 to 2019, are shown in Figure 13 below. If we only look into 2017 to 2019, the savings will be $1,867,178.

Figure 13: Projected Cost Savings Achieved by TCAT Consolidation (2014-2019)

Year	*Annual Passenger Miles Traveled*	*Vehicle Maintenance/ Passenger Mile*	*General Admin/Passenger Mile*	*Cost Savings from Vehicle Maintenance*	*Cost Savings from General Administration*	*Subtotal Cost Savings per Passenger Mile*	*Annual Total Cost Savings*
2014	10,214,954	$ 0.22	$ 0.23	$ 0.07	$ 0.18	$ 0.25	$ 513,526
2015	10,689,499	$ 0.22	$ 0.23	$ 0.07	$ 0.18	$ 0.25	$ 539,132
2016	11,186,090	$ 0.23	$ 0.22	$ 0.06	$ 0.19	$ 0.25	$ 565,735
2017	11,705,751	$ 0.23	$ 0.22	$ 0.06	$ 0.19	$ 0.25	$ 593,361
2018	12,249,553	$ 0.23	$ 0.21	$ 0.06	$ 0.20	$ 0.25	$ 622,035
2019	12,818,618	$ 0.24	$ 0.21	$ 0.05	$ 0.20	$ 0.25	$ 651,782
						Total Cost Savings (2014-2019):	**$ 3,485,570**

[28] This assumption is made to reflect the increased willingness among students to use public transportation. Note that the percentage is higher than what we used for calculating cost savings (70%) in the last section.

Replicability

The efficiency gains and cost savings from vehicle maintenance and general administration are replicable in other cases of consolidating transit services. However, consolidation is a complex task to accomplish. Several factors should be considered:

- The consolidation process is costly, especially when the pre-consolidated transit agencies do not have excess capacity, or the consolidation requires building new facilities. The transitional costs could be substantial, thus the agencies should make sure they would have adequate funding or fare revenues to break even.
- Cost savings are not assured. Literature suggests an inverted U-shaped relationship between size and efficiency on a general level.[29] In TCAT's case, savings will only be achieved when the growth rates of the overall costs (vehicle maintenance or general administration) are lower than the growth rates of ridership and passenger miles. As can be seen above, instead of saving costs, TCAT actually incurred more unit costs for vehicle maintenance than the pre-consolidated level in years 1999, 2003, and 2004. The post-consolidated agency should pay close attention to cost efficiency and take actions to delay the arrival of the turning point of the "inverted U-shape".
- The implementation of consolidation is time-consuming. In TCAT's case, after the operating committee was established in 1991, it took the three pre-consolidated transits 7 years to finally sign on the consolidation agreement in 1998, yet another year for TCAT to reorganize the routes and fares into a single system in 1999, and another 6 years for TCAT to be incorporated as a single employer and began operations in 2005.
- Union resistance can be an obstacle to consolidation, particularly when it involves changes to personnel policies (such as, job elimination or reclassification, compensation, loss of seniority, etc.). In TCAT's case, the agency needed to spend substantial time on addressing controversies and grievances from two bargaining units.[30] Simply assuming a better organizational culture and better procedures in the consolidated entity does not provide an accurate estimate of the results.

Digital Records Management

The Tompkins County Clerk's Office digitized 198 years of clerk records between 2001 and 2009, and working with the New York State Office of Court Administration, included court documents in this process. Additional county records were digitized from its records center between 2010 and 2013. The process was funded through a total of $1.4 million received from the New York State Archives. Later, the county collaborated with the surrounding municipalities (nine towns, six villages, and the City of Ithaca) to digitize records in a cloud service, leveraging the already existing investment in Tompkins County. This collaboration is termed the Tompkins Shared Services Electronic Records Repository (TSSERR).

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[29] Holzer, M., & Fry, J. C. (2011). *Shared services and municipal consolidation: a critical analysis*. Alexandria, Va.: Public Technology Institute, pp. 109-110.

[30] Mengel, D. (2015, March 20). *History of TCAT Consolidation* [Personal Interview]; Tompkins Co. Public Transit Archive. (n.d.). *Tompkins Consolidated Area Transit (TCAT) - history and background*. Retrieved April 16, 2015, from http://tompkinstransitarchive.weebly.com/tcat-1997-2005.html

Rationale for Change

- An outdated record keeping system, with over 9,000 physical boxes located in an understaffed facility.
- The need to protect against natural disaster, brought to the attention of county staff due to the consequences Hurricanes Irene and Sandy had on county records in neighboring parts of the state.
- Transparency and the lack of accessibility to records, including the 48 hours necessary to respond to each data request.
- Facilitating a "smart office" environment and the capability for employees to access documents from outside of the office and reduce reliance on paper.

Cost Savings and Benefits

The digitization process began with the engagement of Laserfiche along with assistance from the County Information Technology Services (ITS) department to help develop the hardware infrastructure. The initiative also included partnering with a local non-profit, Challenge Industries, to scan and convert the records into machine-readable, searchable text. Costs associated with digital records management implementation include training for employees, licensing for new users, and staff time for coordination. Had digital record management not been implemented, a 10,600 sq. ft. building would have been built costing the county $2.17 million to serve as storage for paper records.[31] Costs associated with financing, maintaining, and securing this building were incorporated into expenses for the status quo.[32]

Prior to digitization, procuring a single record could take a county employee up to two hours, whereas records take just a few minutes to pull up with the new software. This difference produces significant discrepancy in cost for staff time between the status quo and digitization scenarios. According to county staff, digital records management accounts for 1.05 FTE hours after digitization, whereas before there were 2 FTEs dedicated to records, in addition to supervisory time.

The difference in cost between the status quo and digital records management between 2012 and 2014 varied, with digitization costing more in 2012, but cost savings above $200,000 reached in 2013 and 2014 (see Figure 14). Revenue from grants offset the extra cost of hardware and professional service contracts with digitization, while higher staff costs and the debt service associated with a new building resulted in higher expenses for the status quo.

[31] LaBella Associates, (2008), Records Management Master Plan.

[32] This analysis assumes that the $2.17 million building was financed with level debt service on a 20 year horizon with 5% interest. Annual utility payments of $17,800 were calculated using estimated electricity usage, building structure, and square footage. An initial security system costing $10,000 was assumed necessary in 2010, with maintenance and annual charges for security assumed in the following years.

Figure 14: Digital Records Management Cost Savings

	2012		2013		2014		2015 (Proj)	
	Status Quo	*Digitization*	*Status Quo*	*Digitization*	*Status Quo*	*Digitization*	*Status Quo*	*Digitization*
Grants	$ -	$ 143,307	$ -	$ 150,000	$ -	$ 150,000	$ -	$ -
Total Revenues	$ -	$ 143,307	$ -	$ 150,000	$ -	$ 150,000	$ -	$ -
Building	$ 173,987	$ -	$ 173,987	$ -	$ 173,987	$ -	$ 173,987	$ -
Rent	$ -	$ -	$ 11,140	$ 11,140	$ 9,000	$ 9,000	$ 9,000	$ 9,000
Utilities	$ 18,146	$ 346	$ 17,800	$ -	$ 20,300	$ 2,500	$ 20,300	$ 2,500
Security	$ 2,000	$ -	$ 2,000	$ -	$ 2,000	$ -	$ 2,000	$ -
Staff Time	$ 90,811	$ 71,083	$ 92,628	$ 71,344	$ 94,480	$ 72,698	$ 96,370	$ 75,701
Training	$ 2,500	$ 2,568	$ 2,500	$ 5,245	$ 2,500	$ 4,500	$ 2,500	$ 4,500
Software	$ -	$ 51,024	$ -	$ 59,150	$ -	$ 55,150	$ -	$ 66,150
Professional Contracts	$ -	$ 392,122	$ -	$ 92,755	$ -	$ 95,853	$ -	$ 40,200
Total Expenses	$ 287,444	$ 517,143	$ 300,054	$ 239,634	$ 302,267	$ 239,701	$ 304,157	$ 198,051
Net Gain (Loss)	$(287,444)	$ (373,836)	$(300,054)	$ (89,634)	$(302,267)	$ (89,701)	$ (304,157)	$ (198,051)
Difference (Savings)	$ (86,392)		$ 210,421		$ 212,566		$ 106,106	
Adjusted Savings[1]	$ (88,321)		$ 212,015		$ 210,758		$ 106,106	

Source: Tompkins County Annual Budgets

[1] Adjusted to 2015 dollars

Pursuing the digitization of records for other municipalities in the county has also produced savings. The county finances the licensing and training of municipal employees in 9 towns, 6 villages, and the City of Ithaca, due to efficiencies and cost benefits associated with contracting for these services as a single entity. As a result, digital records management saves municipalities in the county an average of approximately $20,000 annually, depending on size.[33]

Municipal employees participate in training provided by the county, a value of $4,500 annually. In addition, digitization saves municipal employees time. By applying the county level proportion of time savings (23%) to municipalities, a time savings related to clerk staff was calculated (see Figure 15, page 31).

There are also intangible benefits to digitization, including insulation from the impact of natural disaster, synergies with other municipalities, and improved service for constituents. Tompkins County and the other municipalities in the county are less susceptible to damage from flooding (as occurred in the neighboring Tioga County in 2011). Municipalities are better able to share information, collaborate, and serve constituents. Before digital records management, constituents could expect to wait between 24 and 48 hours for requested documents. The implementation of digital records management improves accessibility and transparency by cutting this time down to nearly instantaneous service.

[33] Maureen Reynolds, (2015), Tompkins County Clerk, February 23, 2015 [phone interview].

Figure 15: Digital Records Management Municipal Annual Cost Savings

	Training Savings	*Time Savings to Clerk*[1]	*Total Savings*
City of Ithaca	$ 4,500	$ 104,877	$ 109,377
Town of Caroline	$ 4,500	$ 9,514	$ 14,014
Town of Danby	$ 4,500	$ 6,994	$ 11,494
Town of Dryden	$ 4,500	$ 12,092	$ 16,592
Town of Enfield	$ 4,500	$ 4,759	$ 9,259
Town of Groton	$ 4,500	$ 7,993	$ 12,493
Town of Ithaca	$ 4,500	$ 29,049	$ 33,549
Town of Lansing	$ 4,500	$ 13,733	$ 18,233
Town of Newfield	$ 4,500	$ 11,819	$ 16,319
Town of Ulysses	$ 4,500	$ 11,411	$ 15,911
Village of Cayuga Heights	$ 4,500	$ 17,250	$ 21,750
Village of Dryden	$ 4,500	N/A	$ 4,500
Village of Freeville	$ 4,500	$ 3,068	$ 7,568
Village of Groton	$ 4,500	$ 5,474	$ 9,974
Village of Lansing	$ 4,500	$ 14,820	$ 19,320
Village of Trumansburg	$ 4,500	$ 3,197	$ 7,697
Total	**$ 72,000**	**$ 256,051**	**$ 328,051**

Source: Tompkins County Clerk, Municipal Budgets (most recent year available 2014-15)

[1] 23% of clerk personnel expenditures

N/A indicates unavailable data

Long-term Sustainability

The county will need to continue payments for software support, IT hardware, and training, though there are few remaining expenses associated with implementing digital records management at current levels. However, the county is interested in continuing to expand the digitization of records to the Social Services, Probation, 911 Dispatch, Planning, and Human Rights departments in addition to other municipal entities within the county. The streamlining of digital records management for departments within the county will produce additional savings in coming years (especially if financed with grants), and also increase the return to the county for the associated software, hardware, and training expenses noted above.

The following table shows savings to county taxpayers through 2019 if digital records management continues in its current form (no expansion, no new grant assistance). As shown, between 2012 and 2019 digital records management is expected to have a savings of $2.87 million.

Figure 16: Digital Records Management Projected Cost Savings

	Savings to County[1]	*Savings to Municipalities*[2]	*Savings Total*
2012	$ (88,321)	$ -	$ (88,321)
2013	$ 212,015	$ -	$ 212,015
2014	$ 210,758	$ 328,051	$ 538,808
2015	$ 106,106	$ 334,612	$ 440,718
2016	$ 100,395	$ 341,304	$ 441,699
2017	$ 94,074	$ 348,130	$ 442,204
2018	$ 87,082	$ 355,093	$ 442,174
2019	$ 79,352	$ 362,195	$ 441,546
Total	$ 801,461	$ 2,069,384	$ 2,870,844

[1] *Saving to County calculated by projecting costs at average rates of change 2012–2015.*
[2] *Savings to Municipalities calculated by projecting anticipated personnel cost increases.*

Risk and Opportunity

The implementation of digital records management involved a number of risks, including challenges associated with training employees and security concerns. These risks were addressed via the thorough vetting of digitization software providers; county leadership was committed to contracting for user-friendly and secure software service.

The risks associated with implementing digital records management were small compared with the opportunities for Tompkins County. In addition to the financial and intangible benefits discussed above, digitization allows employees to access records remotely from a secure server, eliminating the need for employees to physically be in the same building with records. Moreover, New York State requires the county to keep records for at least 6 years; digitization allows the county to comply easily, while also improving the audit process.

Replicability

Implementation of digital records management saved Tompkins County money and also streamlined operations. The following key actions were integral to the success of digitization, and could help other communities implement a similar program:

- Digitization was funded entirely through grants from New York State for digitization and shared services. This funding model allowed the county to implement digital records management at no additional cost. Funding can be pursued through the Local Government Records Management Improvement Fund (LGRMIF) managed by New York State Archives, as well as through the Local Government Efficiency program administered by the New York State Department of State.
- The initial scope of the project was widened to include other municipalities within the county. Not only do these other communities now enjoy similar efficiencies and savings, but Tompkins County also became eligible for additional shared service funding from the state because of these collaborations.
- It was important to county leadership that employees be excited about digital records management, so by making staff buy-in and engagement a priority, the roll out of digital records management did not receive any push back.

Greater Tompkins County Municipal Health Insurance Consortium

The Greater Tompkins County Municipal Health Insurance Consortium (GTCMHIC or "Consortium") is an entity established by the Tompkins County Council of Governments (TCCOG) to address the problem of rapidly escalating health insurance costs. On October 1, 2010, the Consortium was issued a certificate of authority under Article 47 of the New York Insurance Law. Under this certificate, Tompkins County—in collaboration with other local, participating municipalities—sought to create its own self-insured health insurance company, administered by a third party, to share the costs of health benefit plans with the oversight of a board of directors made up of municipal officials.[34]

[34] Koplinka-Loehr, M. (2009). *Vision: Create one cost-efficient inter-municipal shared health benefits plan without diminishing benefits*. Tompkins County GTCMHIC.

The consortium began operations as of January 1, 2011 with 13 municipal participants. This has now expanded to 17, including 14 from Tompkins County,[35] plus the City of Cortland, the Village of Homer, and the Town of Willet. In addition to these municipalities and TCCOG, other major stakeholders included Don Barber, Executive Director of the Consortium; and Steve Locey, President of Locey & Cahill, LLC that served as the health benefits consultant for the Consortium.

Rationale for Change

The goal of the Consortium is to provide health insurance plans and benefits that are less costly and more stable while maintaining the level of benefits guaranteed by each municipality's collective bargaining agreements, personnel policies, and/or local laws.[36] TCCOG anticipated that the Consortium would produce more than $5 million in savings for the county's taxpayers within its first five years of operation, with accelerated savings in future years, as more and more employees join the initiative.[37]

Cost Savings and Benefits

To date, the Consortium has achieved significant savings in three areas: broader spreading of risks; lower administrative fees; and the ability to invest excess funds in reserve accounts.

A major source of savings comes from small municipal participants (i.e. with 50 or fewer employees) that used to pay community-rated premiums.[38] Under community rating, the premium for all people covered by a policy or contract form is the same based on the experience of the entire pool of risks without regard to age, sex, health status, or occupation (N.Y. Ins. Law § 3231). When joining the Consortium, the smaller municipalities were able to move to group-rated policies based on the claims experience of members of a larger group. The broader spreading of risk caused significantly lower premium rates. As shown in the table below (Figure 17), since the establishment of the Consortium, the average annual increase in premiums for small municipalities has been 8.2%, while Excellus BCBS (insurance company) has seen premiums for its community-rated plans increase by 11.4% per year on average.

Figure 17: GTCMHIC Budget Income % Increase and Excellus Small Group HMO % Increase

Fiscal Year	***Consortium Budget Income % Increase***	***Excellus BCBS Small Group HMO % Increase***
2011	9.50%	10.00%
2012	9.50%	11.50%
2013	9.00%	11.90%
2014	8.00%	- (Affordable Care Act)
2015	5.00% (estimated)	12.20%
Average Increase	**8.20%**	**11.40%**

Source: Locey. (2014).

The large size of the Consortium allows municipalities more leverage to negotiate lower administrative fees with their claims administrators, Excellus and ProAct. As shown in Figure 18 below, the administrative fees as a percentage of operating expenses have dropped considerably since 2012. This

[35] All municipalities joined the Consortium except Town of Newfield, Villages of Lansing, and Villages of Freeville.
[36] Barber, D. (2014). *GTCMHIC Overview*. Tompkins County GTCMHIC.
[37] GTCMHIC. (2007). *SMSI grant application*.
[38] Barber, D. (2015, February 25). *Cost Savings of Tompkins County Health Consortium* [Personal interview].

ratio was 2.93% for the first 7 months of 2014[39], which provides compelling evidence for the administrative efficiency achieved by the Consortium.

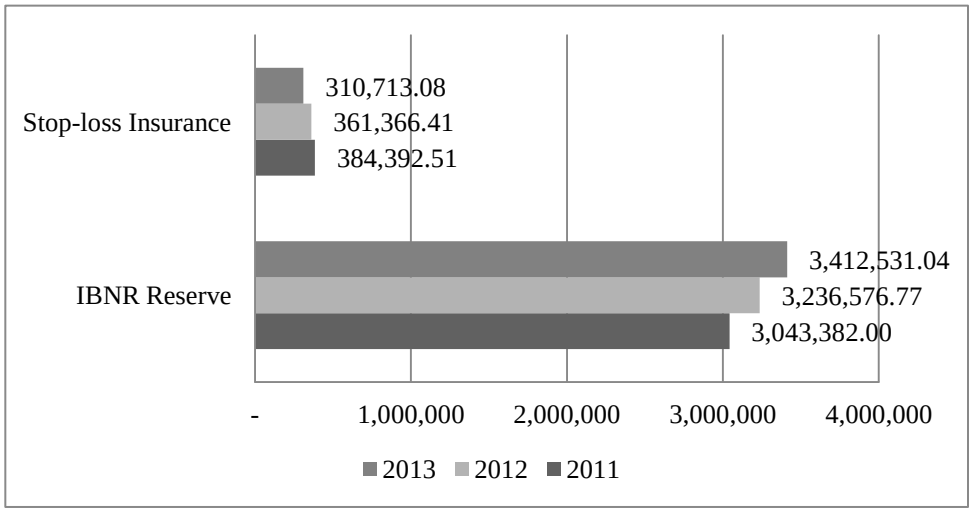
Figure 18: Administrative Fees as a Percentage of Operating Expenses

Year	***2011***	***2012***	***2013***
Administration Fees	841,543	928,502	939,946
Operating Expenses	26,160,407	25,510,592	29,875,306
Admin Fees Ratio	**3.22%**	**3.64%**	**3.15%**

Source: GTCMHIC Financial Reports. (2011 – 2013).

In addition, cost savings are made possible by the Consortium's ability to invest excess funds in reserve accounts. The New York State Insurance Department requires the Consortium to set up an "incurred but not reported" (IBNR) reserve to ensure that sufficient funds would exist to pay for claims reported, should the program be terminated.[40] Besides, the Consortium has been investing part of its unappropriated fund balance in a Catastrophic Reserve. With adequate reserves in place, the Consortium was able to retain more risk and spend less on stop loss insurance (see Figure 19 below), which is a policy that protects the Consortium against catastrophic claims. For illustration, in 2011, the Consortium would pay all claims up to $250,000; in 2014, this was increased to $300,000.[41] The Board of Directors decided to review this on an annual basis to ensure a tolerable balance is achieved between the risk and cost of the stop-loss insurance.[42]

Figure 19: Stop-Loss Insurance vs. IBNR Reserve



Source: Locey. (2014).

Meanwhile, participating municipalities have earned substantial returns on their initial investment in the Consortium. The New York State Insurance Department required the Consortium to deposit $1.22 million in a Rate Stabilization reserve fund at the time it began operations. As a way to "soften the blow" to the municipalities, the Consortium committed to paying this initial investment back within 5 years at an

[39] Locey, S. (2014). *GTCMHIC Growing Larger & Stronger*. Tompkins County GTCMHIC.
[40] GTCMHIC. (2010). *Press release 7/19/10: State decrease reserve requirements for health insurance consortium*.
[41] Locey, S. (2015, March 10 & April 8). *Cost Savings of Tompkins County Health Consortium* [Email interviews].
[42] GTCMHIC. (2013). *2013 Financial Report*. Tompkins County GTCMHIC.

interest of 3% per annum[43], which was much greater than the returns earned in traditional investment vehicles available to the municipalities. Therefore, at the close of 2013, when the Consortium paid back all the initial investments, the municipalities had already earned some benefits from collaboratively posting the reserve up front.

Cost Savings Achieved in Years 2012 and 2013

Though the official launch of GTCMHIC is not within the date range requirements of Government Efficiency Plan guidelines, demonstrated efficiencies achieved by the Consortium from January 1, 2012 forward are significant and are highlighted here to underscore the ongoing cost savings to the local taxpayers. The City of Cortland, the Village of Homer, and the Town of Willet are not included in this analysis, as they are not located within Tompkins County. As of this writing, the 2014 data is not available from all the municipalities, therefore cost savings calculations presented here are from January 1, 2012 to December 31, 2013. The amount is stated in 2015 dollars adjusted for inflation using the CPI Inflation Calculator from the United States Bureau of Labor Statistics.

Cost Savings Associated with Spreading Risk

With regard to cost savings realized from spreading of risk, we chose to demonstrate the savings on premiums from 11 small municipalities in Tompkins County other than County of Tompkins, City of Ithaca, and Town of Ithaca. For comparison, the status quo is the actual premiums paid to the Consortium, while the alternative is the estimated premiums under community-rated insurance policies. Our assumptions are as follows:

- Excellus Small Group HMO Plans for Syracuse Region (as shown in figure above) is a reliable proxy for the community-rated insurance policies used by small municipalities in Tompkins County;[44]
- The number of employees in each small municipality remained steady from 2011 to 2013.

Thus, by using the percentages of premium increase in Excellus small group HMO plans, we were able to estimate the costs for these municipalities if they were insured with a community rating system. Cost savings were derived from the difference of the estimated costs and actual medical insurance expenses. It should be noted that Town of Lansing did not have a cost saving for 2012 in this analysis, because it did not join the Consortium until 2013. As shown Figure 20 (see page 36), the total cost savings for years 2012 and 2013 amount to $1,548,142 (in 2015 dollars).

[43] Locey, S. (2015, March 10). *Cost Savings of Tompkins County Health Consortium* [Email interviews].

[44] This assumption is made based on the information provided by Figure 17, which was used by Locey, S. (2014) in the Consortium Retreat – 9/15/14. Retrieved March 4th, 2015, from http://tompkinscountyny.gov/files/healthconsortium/Resources/2014%20GTCMHIC%20Educational%20Retreat%20%2809-15-2014%29%20-%20Final%20Version.pdf

Figure 20: Cost Savings by Municipalities, 2012-13

	Town of Enfield	*Town of Caroline*	*Town of Ulysses*	*Town of Danby*	*Town of Dryden*	*Town of Groton*	*Village of Cayuga Heights*	*Village of Dryden*	*Village of Groton*	*Village of Trumansburg*	*Town of Lansing*	*Year Total*	*Inflation-adjusted*
Consortium													
2012	$ 70,702	$152,449	$149,943	$125,959	$590,991	$ 83,017	$ 496,669	$ 113,894	$ 97,848	$ 103,311	---	$1,984,783	$ 2,029,113
2013	$ 82,533	$180,137	$155,459	$106,700	$720,485	$ 90,325	$ 448,603	$ 110,927	$ 105,845	$ 131,402	$366,026	$2,498,442	$ 2,517,371
Alternative													
2012	$ 76,120	$199,958	$195,673	$242,918	$882,869	$143,417	$ 517,014	$ 123,834	$ 129,108	$ 114,759	---	$2,625,669	$ 2,684,314
2013	$ 85,179	$223,752	$218,958	$271,825	$987,930	$160,484	$ 578,539	$ 138,570	$ 144,471	$ 128,415	$446,545	$3,384,669	$ 3,410,313
Cost Savings													
2012	$ 5,418	$ 47,509	$ 45,730	$116,959	$291,878	$ 60,400	$ 20,345	$ 9,940	$ 31,260	$ 11,448	--	$ 640,886	$ 655,200
2013	$ 2,646	$ 43,615	$ 63,499	$165,125	$267,445	$ 70,159	$ 129,936	$ 27,643	$ 38,626	$ (2,987)	$ 80,519	$ 886,227	$ 892,942
									Total Cost Savings in 2015 Dollars:				**$ 1,548,142**

Source: Consortium's data from Open Book New York-Office of the State Comptroller. (2015).

Cost Savings Associated with Returns on Initial Investment

The financial benefits associated with returns on initial investment are quantifiable and should be included as "cost savings" or "revenue increments" for local taxpayers. This analysis applies to 14 municipalities in Tompkins County that joined the Consortium before the end of 2013.

Here, the status quo is the 3% of return on initial investment promised by the Consortium, and the alternative is the rate of return that municipalities could get from traditional investment vehicles. The assumption is that the average 1-year rate of certificate of deposits (CDs), which is 0.5% for the current period[45], is a good proxy for the alternative interest earnings. As computed below, the total benefit earned for all municipalities is $58,304 (in 2015 dollars).

Figure 21: Benefits Earned by Municipalities by Joining the Consortium, 2012-2013

		Consortium				Alternative		Cost Savings
Date of Investment	*Entity Name*	*Initial Investment*	*# Months Since 2012*	*Interest Earned Since 2012*	*% Interest/Month*	*Average Monthly CD Interest Rate*	*Potential CD Interest Earnings*	*Benefit Earned*
10/1/2010	City of Ithaca	$300,000	24	$17,072	0.24%	0.04%	$3,000	$14,072
10/1/2010	County of Tompkins	$500,000	24	$28,453	0.24%	0.04%	$5,000	$23,453
10/1/2010	Town of Caroline	$37,000	24	$2,106	0.24%	0.04%	$370	$1,736
10/1/2010	Town of Danby	$62,000	24	$3,528	0.24%	0.04%	$620	$2,908
10/1/2010	Town of Dryden	$137,032	24	$7,798	0.24%	0.04%	$1,370	$6,428
10/1/2010	Town of Enfield	$2,520	24	$143	0.24%	0.04%	$25	$118
10/1/2010	Town of Groton	$6,305	24	$359	0.24%	0.04%	$63	$296
10/1/2010	Town of Ithaca	$137,033	24	$7,798	0.24%	0.04%	$1,370	$6,428
12/1/2012	Town of Lansing	$18,400	15	$581	0.21%	0.04%	$115	$466
10/1/2010	Town of Ulysses	$5,659	24	$322	0.24%	0.04%	$57	$265
10/1/2010	Village of Cayuga Heights	$18,040	24	$1,027	0.24%	0.04%	$180	$846
10/1/2010	Village of Dryden	$6,067	24	$345	0.24%	0.04%	$61	$285
10/1/2010	Village of Groton	$7,545	24	$429	0.24%	0.04%	$75	$354
10/1/2010	Village of Trumansburg	$4,535	24	$258	0.24%	0.04%	$45	$213
						Total		$57,866
						Total Cost Savings in 2015 Dollars:		**$58,304**

Source: Locey. (2015)

[45] Bankrate. (2015). *CD rates history (1984-2013).* http://www.bankrate.com/finance/cd-rates-history-0112.aspx

Aggregate Cost Savings

Putting together the numbers from above, it is estimated that in the years 2012 and 2013, the Consortium has realized at least $1,606,446 of cost savings for local taxpayers. This is a conservative estimate, as savings derived from administrative efficiency are not included.

Long-term Sustainability

So far, in addition to municipalities in Tompkins County, participation in the Consortium is open to any municipality in Cayuga, Chemung, Cortland, Schuyler, Seneca, and Tioga Counties. Don Barber, Executive Director of the Consortium, believes that more municipalities will join the Consortium because of the obvious benefits. As a result, the cost savings realized from broader spreading of risk is sustainable.

Although the benefits earned from initial investments do not have recurring effects, the Consortium has identified new sources for cost savings. One source is the cost avoidance associated with the Affordable Care Act (ACA). As a self-insured entity, the Consortium does not have to pay the Health Insurance Sector Fee ($990,000 for 2015) and the Transitional Reinsurance Program Fee ($222,376 for 2015 and $136,458 for 2016).

Also, the Consortium is looking to launch a preventative health care or wellness program in order to contain claim costs. By offering preventative screening and wellness coaching, the wellness program aims to help people stay healthy and avoid becoming high risk patients. Studies show an overall favorable trending and 7% of reduction in medical expenses for employees with wellness program[46], which is a significant source of cost savings. Barber believes that the wellness program adoption would allow the Consortium an opportunity for keeping the long-term premium increases lower than 8% per year; while the traditional community-rated insurance plans are forecasted to see premiums increase by at least 9% per year.

Using the above information, we could make the following assumptions about premium increases:

- For years 2014 and 2015, we assume the growth rates are the same as the ones listed in Figure 17. We assume the rate for Excellus BCBS Small Group HMO to be 12.05% in 2014, which is the average of the growth rates of 2013 and 2015.
- For years after 2015, we use 8% for the Consortium's premium increases, and 9% for Excellus BCBS Small Group HMO.

As a result, we are able to project future savings and show the aggregate effect of cost savings, which total $ 13,064,109 from 2011 to 2019 (see Figure 22, page 38).

[46] Zoe Consulting. (2014). *Proof positive: study demonstrates interactive health outcomes-based wellness program lowers medical costs and increases productivity*. http://interactivehealthinc.com/wp-content/uploads/2014/06/Claim-Study-Research-Summary-Interactive-Health.pdf

Figure 22: Cost Savings and Benefits Summary (2011-2019)

	Savings on Premiums	*Benefits from Initial Investment*	*Health Insurance Sector Fee Avoidance*	*Transitional Reinsurance Program Fee Avoidance*	**Total**
2011	$481,051	$28,700	-	-	$509,751
2012	$640,886	$28,793	-	-	$669,679
2013	$886,227	$29,073	-	-	$915,299
2014	$1,094,204	-	-	($318,402)	$775,802
2015	$1,421,975	-	$990,000	$222,376	$2,634,351
2016	$1,578,286	-	-	$136,458	$1,714,744
2017	$1,750,930	-	-	-	$1,750,930
2018	$1,941,561	-	-	-	$1,941,561
2019	$2,151,992	-	-	-	$2,151,992
Total	$11,947,111	$86,566	$990,000	$40,432	**$13,064,109**

Source: Locey. (2015). Projections done by author.

Replicability

As demonstrated above, the Consortium achieved substantial cost savings for local taxpayers since its establishment, and the savings are sustainable. This approach is replicable in other counties, but the process requires close collaboration among all stakeholders involved. Some key challenges are as follows.

- Municipalities must come together and work as equals, which may not be readily accepted by all. According to Koplinka-Loehr (2009), "Tompkins County's initial challenge was to bring together representatives from the county's 17 municipalities in the same room and focused on the same topic, each with its own history and interests. This feat took about a year-and-a-half to accomplish."
- In order to apply for a Certificate of Authority, inter-municipal health insurance plans must meet the reserving requirements by the New York State Insurance Department. For the Consortium's case, $1.22 million for a Rate Stabilization reserve was required before the certificate would be issued; and over $3 million of IBNR reserve was required to be posted by the end of first year's operation. Some municipalities could struggle to come up with their proportionate share of the initial investment due to a number of financial and budget constraints.
- Once established, the Consortium could grow too large to be manageable as more municipalities join. To mitigate this risk, a Board of Directors should be set up with clear representation processes.
- Municipalities should exercise due diligence to make sure third-party administrators are addressing the claims as expected, and to ensure that the Consortium is covering the people it is supposed to cover.
- There could be resistance from organized labor/unions when changes are made to the current plan. Buy-in from employees and municipal officials is essential to overcoming this obstacle, and the details and benefits of the plan should be made clear to stakeholders through accessible means (public meetings, documents, website, etc.).

The Southern Cayuga Lake Inter-municipal Water Commission (Bolton Point Water System)

The Southern Cayuga Lake Inter-municipal Water Commission, also known as Bolton Point was initially constructed in 1976 and consists of three main elements, the intake system (raw water pumping from Cayuga Lake), the water treatment plant, and the transmission system (Oakcrest pumping station, transmission mains, and transmission storage tanks). The system was designed for potable water treatment and transmission serving the Towns of Dryden, Ithaca and Lansing, and the Villages of Cayuga Heights and Lansing. The entire facility was designed for efficient operation consisting of 20 employees. The system includes 24 storage tanks, 20 pumping stations and 34 pressure reducing valves[47]. The Southern Cayuga Lake Intermunicipal Water Commission operates the system, which is owned jointly by the Towns of Dryden, Ithaca and Lansing, and the Villages of Cayuga Heights and Lansing. Each municipality is entitled to two seats on the Commission, one of which must be filled by a member of the Town or Village Board, the other by an appointed citizen from the community.

Rationale for Change

- Increased demand from customers resulting in the need for capacity enhancement.
- The facility was constructed in 1976, with several pieces of equipment nearing the end of their design lives. These pieces of equipment need to be replaced or upgraded in order to function properly.
- Pumps, which were the largest consumers of electricity within the plant, were not operating as efficiently as they should, resulting in high electricity consumption.

Cost Savings and Benefits

The facility has undergone several upgrades in the past few years. In 2007, a 3 million gallon storage tank was installed. The main reason for installing this new tank was that the pumps associated with this system were not running at the peak of their performance curves and therefore had lower than optimal efficiency. The installation of this tank allowed the pumps to run more efficiently—saving on electricity. The new tank also provided three million gallons of storage capacity—something that was previously lacking.

Original construction of the system in the 1970s included a 1.5 million gallon steel transmission storage tank. It could not be taken out of service because it was the only tank serving this function. Therefore, the tank could not be re-coated. Inspections in the 2000s indicated that the tank was becoming corroded; in particular the roof structure was severely corroded. In 2012, a 900,000 gallon concrete tank was constructed next to the existing tank, allowing the existing steel tank to be demolished and replaced with a 1.5 million gallon concrete tank in 2013. The result is a "sister tank" configuration that allows either tank to be removed from service for maintenance. The two new concrete tanks will resist corrosion and the new configuration provides an additional 900,000 gallons of transmission storage. Large electric pump motors are replaced on an ongoing basis with motors that are more energy efficient.

In addition to upgrades around the pumping and storage infrastructure, there were also a few upgrades made to the transmission lines themselves. Repairs were carried out to replacement and repair sections of an 18" main transmission line (3rd main) because of high frequency of failure. A parallel main was also constructed to the section of the main that runs under route 13. The section of the main under route 13 is

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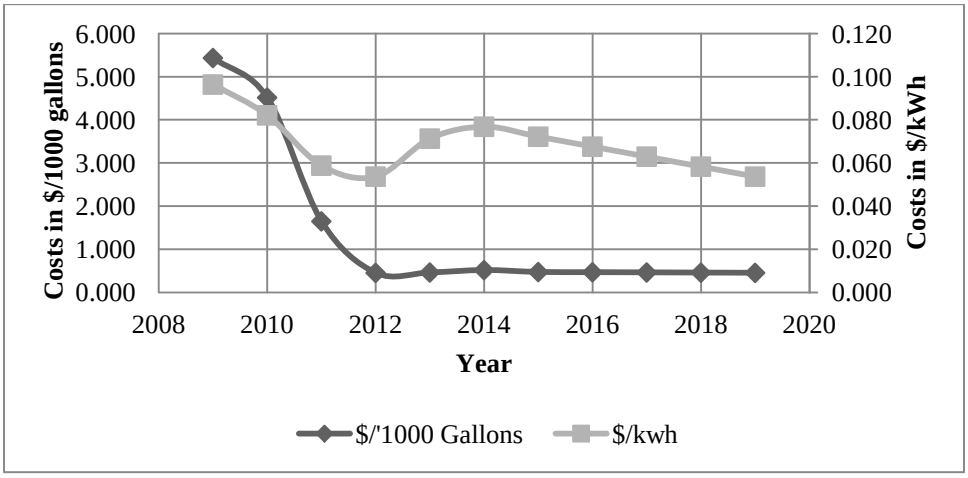
[47] Bolton Point Water System. (2015). *About the Southern Cayuga Lake Inter-Municipal Water Commission.* http://www.boltonpoint.org/

underground which takes weeks to repair. The parallel main therefore allows for efficient operation even during the repair phase. [48] The cost of the Route 13 project was shared with the Village of Lansing, with which the new main is shared. This cooperation resulted in major project cost savings for both entities.

Bolton Point purchases electricity through a consortium from sources other than NYSEG at more favorable rates. From the above, it is apparent that the key cost savings take place around the electricity savings (mainly around the pumping infrastructure) and more efficient water pumping operations at the same operating costs.

The following chart highlights the total electricity costs incurred by the one of the major pumping stations of the facility (Finished water) on a per gallon basis and on a per kWh basis.

Figure 23: Bolton Point Water System Electricity Costs (per kWh)



Historical trends were used to project the savings forward to the year 2019. It is apparent from the chart (Figure 23) that there has been a significant reduction in the cost or processing per gallon (90% reduction) and almost a 50% reduction in the total cost of processing on a per kWh basis.

A similar analysis was carried out around all the major pumping stations in the Bolton Point water treatment facility and quantified the savings, which are presented in Figure 24, page 41. "E" indicates an estimated value.

In the absence of other capital expenditures, the plant achieves its lowest operating expenses in the year 2012. In the future, the capital expenditures are expected to decrease and the plant should be able to achieve the low point again in 2019. It must be highlighted that this approach is conservative as the facility should be able to achieve low operating expense much earlier.

A total savings is estimated of approximately $515,000 as a result of these upgrades from 2011 to 2019.

Long-term Sustainability

Upgrades made to the facility are expected to be sustainable in the medium term (next 10-15 years). Long term sustainability of the upgrades is limited by two factors:

[48] Rueckheim, J. (2015, March 1). *Efficiencies of the Bolton Point Water System* [Phone interview].

- Each piece of equipment, including the overall plant, has a typical operating life. As this operating life reaches its limits, the equipment functions less efficiently, resulting in the need for more maintenance and upgrades. The plant must monitor operating life and maintain these facilities during the course of their lives.
- As demand increases, investments will be required in capacity expansion to meet the growing demand from the region. Care should be taken that the upgrades continue to ensure efficient operation as a drop in efficiency can result in significantly higher operating costs. As capacity increases and pumps reach stonewall mode, the pump operation may become inefficient.

Figure 24: Bolton Point Cost Savings

Year	*Savings*	
2011	**$**	**82,232.54**
2012	**$**	**102,224.36**
2013	**$**	**21,346.02**
2014	**$**	**1,051.65**
2015E	**$**	**21,286.19**
2016E	**$**	**41,520.73**
2017E	**$**	**61,755.28**
2018E	**$**	**81,989.82**
2019E	**$**	**102,224.36**
Total	**$**	**515,627.00**

Risk and Opportunity

Risks associated with the upgrades mainly pertain to the expertise and decision making ability of people involved. Upgrades to pump and tank infrastructure require several key decisions in terms of the right size, material, and characteristics of equipment. Incorrect procurement can result in even lower efficiency and higher operating and capital investment costs. Facilities need to ensure such upgrades are carried out by skilled contractors.

Replicability

The shared service and upgrades can be replicated fairly easily:

- When developing a shared facility for water treatment, cost and revenue allocation is a major consideration to be discussed among stakeholders. As this is a potable water facility, there will be continuous and almost constant demand. It's essential that agreements on cost and revenue sharing are reached at the time the facility is implemented.
- Prior to sharing the service, municipalities need to thoroughly evaluate design capacity, land requirements and location, and the potential displacement of homes. Reasonable forecasts of demand should be carried out for capacity prior to implementation of the service.
- Most upgrades made to the plant are standard and can be easily replicated across other facilities. Care should be taken to ensure that other facilities have access to funds for upgrades and that the processes followed in the facilities will actually benefit from upgrades, the skilled workforce is available to manage the facility and that contracting, and management does a good job at procuring material at low costs. As there are several manufacturers of pumps and pump parts at varying prices, it should be ensured that the lowest price is paid for the right parts—this requires a great deal of technical expertise.

Ithaca Area Waste Water Treatment Facility

The Ithaca Area Waste Water Treatment Facility (IAWWTF) was first commissioned 27 years ago as a shared service for the City of Ithaca, Town of Ithaca, and Town of Dryden. The plant deals with a wide variety of truck waste including waste from the distillery, liquid waste from Cornell, and glycol and waste from Greek yogurt manufacturers. More than one third of the biogas produced from the waste is a residual, meaning it can be used for purposes of heat and electricity generation.[49]

Rationale for Change

As the IAWWTF was first established in 1988, this section shall focus mainly on the rational for change around recent improvements and upgrades made to the facility that result in cost savings.

- As the plant has aged, several pieces of equipment were in need of upgrades, as well as regular repair and maintenance activities.
- As the number of people and customer base increased, the facility was in need of an upgrade to handle increasing demand.
- As several new technologies emerged in the last few decades, these could be used to help improve operating efficiency.

Cost Savings and Benefits

The plant underwent several upgrades that should result in cost savings from 2012 onwards. Facility improvements include upgrades to HVAC systems, installation of solar panels, upgrades to the turbines, upgrades to the Combined Heat and Power systems (CHP) by Johnson Controls, as well as upgrades to the dissolved oxygen control and delivery system for efficient aeration.

Upgrades to the dissolved oxygen control and delivery system include upgrades to the blower systems to provide more efficient aeration. The upgrades to the dissolved oxygen system also include significant upgrades to plant capacity, resulting in almost doubled production capacity. The facility can now process much higher volumes at the same operating cost, resulting in lower cost per gallon of waste processed.

The most significant upgrade has been to the combined heat and power (CHP) generation systems. The system was upgraded to include cogeneration, allowing the plant to utilize a part of the stream of biogas produced to generate electricity, thereby saving on the electricity costs. Owing to these upgrades, the dissolved oxygen system is now 50% self-sufficient compared to 20-30% for the old system. This means that 50% of the heat and power required to run this system is now produced in house.

Given the fact that customers are charged for disposing their waste, this means that the plant receives a double kick in that it saves on electricity costs from biogas production as well as gains additional revenues from waste disposal.

As explained above, the major savings achieved by plant upgrades are in the area of heat and electricity production. As a result of improvements in the CHP and its ability to use biogas produced by the facility, the facility produces part of its own electricity and does not have to buy electricity from the NYSEG.[50]

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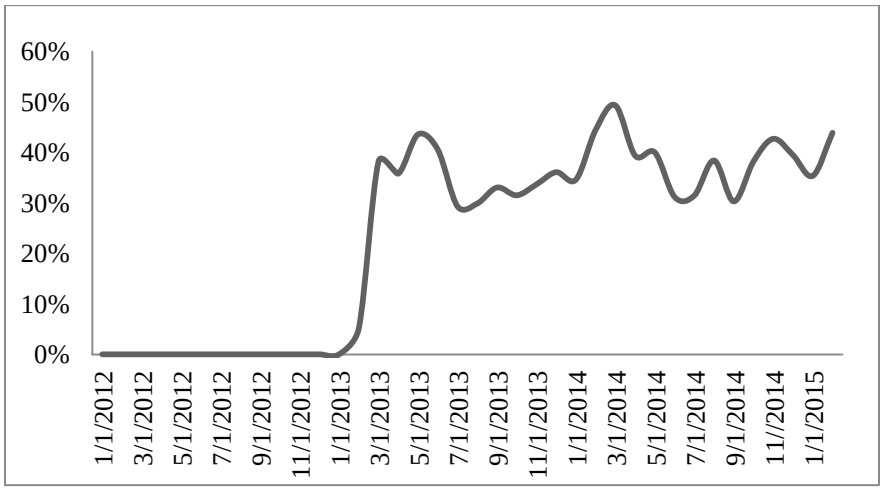
[49] Ithaca Area Wastewater Treatment Facility. (2015). *Wastewater Treatment.* http://www.cityofithaca.org/331/Wastewater-Treatment

[50] Ramer, D. (2015, March 15). *Ithaca Wastewater Treatment Facility Cost Savings.* [Phone interview].

Figure 25: Percent Energy Generated from Cogeneration



As is apparent from the above chart (Figure 25), as of 2015, the facility was producing 44% of its own electricity, up from 0% in 2012 and 38% on average in 2014. The facility has been designed to produce 50% of its own electricity and therefore, we have forecasted a gradual increase to 50% when determining our forecasts for cost savings.

Cost savings associated with the upgrades are as a result of not having to purchase electricity from NYSEG. The table shown below (Figure 26) summarizes the average energy consumption of the plant in a given year, the expected electricity production from cogeneration, and the cost savings associated with this. In calculating the cost savings, we have assumed a standard NYSEG electricity supply rate of $0.000250 per kWh. The expected savings between 2013 and 2019 amount to $2.15 million and the ratio of savings to operating costs is high. For instance, the calculated savings of $262,000 in 2014 account to 8% of the total annual operating budget for the year.

Figure 26: Waste Water Treatment Cost Savings

Year	***Average consumption (kwh)***	***Average cogeneration***	***Savings***
2012	261,759	0%	—
2013	312,408	30%	$ 200,592.27
2014	316,878	38%	$ 262,006.55
2015	323,215	41%	$ 286,239.55
2016	329,680	44%	$ 313,327.58
2017	336,273	47%	$ 341,384.65
2018	342,999	50%	$370,438.66
2019	349,859	50%	$ 377,847.43
Total			**$ 2,151,833**

Long-term Sustainability

As several of the upgrades made to the facility are operational and design improvements much like those made to Bolton Point, the long term sustainability of the IAWWTF is similar to that of Bolton Point. Upgrades are expected to be sustainable in the medium term (next 10-15 years). Long term sustainability of the upgrades are limited by two factors:

- Each piece of equipment, including the overall plant, has a typical operating life. As this operating life reaches its limits, the equipment functions less efficiently, resulting in the need for more maintenance and upgrades. The plant must monitor operating life and maintain these facilities during the course of their lives.
- As demand increases, investments will be required in capacity expansion to meet the growing demand from the region. Care should be taken that the upgrades continue to ensure efficient operation as a drop in efficiency can result in significantly higher operating costs. As capacity increases and pumps reach stonewall mode, the pump operation may become inefficient.

Risk and Opportunity

Risks associated with the upgrades are the same as the concerns for long term sustainability listed above. In addition, there are several risks associated with cogeneration of power using electricity and biogas. In the event of an overload or malfunction of turbines, the plant may have to face considerable downtime, and procure electricity from outside. This will result in a loss of revenue, a backlog in terms of waste processing, as well as higher costs from electricity as the electricity bought on the market is considerably more expensive. The biggest opportunity is that when cogeneration is effective, it can be enhanced to save the plant money by reducing the electricity purchases, while also making the facility more self-sufficient.

Replicability

- When developing a shared facility for water treatment, cost and revenue allocation is a major consideration to be discussed among stakeholders. As this is a potable water facility, there will be continuous and almost constant demand. It is essential that agreements on cost and revenue sharing are reached at the time the facility is implemented.
- Prior to sharing the service, municipalities need to thoroughly evaluate design capacity, land requirements and location, and the potential displacement of homes. Reasonable forecasts of demand should be carried out for capacity prior to implementation of the service.
- Most upgrades made to the plant are standard and can be easily replicated across other facilities. Care should be taken to ensure that other facilities have access to funds for upgrades and that the processes followed in the facilities will actually benefit from upgrades, a skilled workforce is available to manage the facility, and that contracting and management does a good job at procuring material at low costs. As there are several manufacturers of pumps and pump parts at varying prices, it should be ensured that the lowest price is paid for the right parts—this requires a great deal of technical expertise.

Village of Cayuga Heights Waste Water Treatment Facility

The Village of Cayuga Heights Waste Water Treatment Facility was initially constructed in 1956 with a maximum treatment capacity of 1 million gallons per day. In 1975 upgrades were made to double the plant capacity to 2 million gallons per day and these upgrades were completed in 1988. The plant purpose is to treat sewage and performs functions similar to the IAWWTF. The facility serves the following municipalities: the Village of Lansing, Town of Dryden, Town of Ithaca and the Village of Cayuga Heights. Of all the municipalities served by the facility, the Village of Lansing is the largest consumer and the Village of Cayuga Heights is the second largest.[51]

Rationale for Change

- The facility was first constructed to meet the growing needs of the municipalities it services. The idea of a shared service was considered because the municipalities were located close together and despite the fact that there was growing demand, the demand wasn't enough to justify the creation of a standalone facility per municipality.
- In 1996, as a result of the Clean Water Act, the plant submitted applications for grant funds that, unfortunately, were denied. At that time, it was anticipated that demand would exceed the maximum capacity of 2 million gallons/day and therefore the plant required additional funds for further upgrades and expansions.
- Given the plant construction in 1956, several part of the plant required maintenance, repair and upgrades owing to ageing of the plant. These included filters, tanks, and transmission pipes.

Cost Savings and Benefits

Since 1996, several agreements and upgrades have been carried out, helping shareholders see cost savings 2012 onwards. In 1996, the Village of Cayuga Heights Waste Water Treatment Facility (VCHWWTF) submitted a joint application for funds with the IAWWTF in order to increase capacity. The two plants were granted $17 million jointly to provide for capacity enhancements and other upgrades.

In the early 2000's the plant embarked on a project to implement trickling filters and in the late 2000's another project to improve phosphorous filtration. The improvements to the trickling filters and phosphorous filtration allow for better removal of contaminants, prevent corrosion in the lines, and helps improve the operational life of the facility. Improved operational life means less frequent replacement, saving operating costs.

The following table (Figure 27) summarizes the costs of the two projects. It should be noted that both projects were subsidized by government grants and thus the tax levy associated with upgrades was significantly lower.

[51] Cross, B. (2015, March 14). *Village of Cayuga Heights Wastewater Treatment Facility Cost Savings.* [Phone interview].

Figure 27: Cayuga Heights Waste Water Treatment Facility Upgrades

Project in early 2000's to upgrade existing trickling filter systems		
Cost		$1,500,000.00
Grant		$700,000
Cost to taxpayer		$800,000.00
New phosphorous filtration system		
Cost		$2,500,000
Grant		$1,200,000
Cost to taxpayer		$1,300,000

On December 2005, the two plants were connected via an Intermunicipal pipeline to allow for sewage from the VCHWWTF to be directed to the IAWWTF, thereby opening up additional capacity and allowing both plants to operate at higher capacity utilization and also providing a buffer in case one plant had to reduce capacity in the event of scheduled or unscheduled shutdowns or maintenance activities. This connection became operational in 2008, allowing for independent but cooperative operations.

The main cost savings associated with these plants is the ability of the plant to now process a higher capacity at the same operating costs. In addition, the debt service owed by the facility should decrease by about $10,000 a month based on a debt amortization schedule constructed.

The following table (Figure 28) summarizes the operating costs, the costs per gallon, and the savings associated with processing more water at the same operating expenses. An inherent assumption made while forecasting is that the plant would achieve its maximum operating capacity of 2 million gallons a day by 2019. At present the facility is operating at around 65% capacity.

Figure 28: Cayuga Heights Waste Water Treatment Facility Cost Savings

Year	*Gallons processed per day*	*Gallons processed per year*	*Total cost*	*Cost per Gallon*	*Savings*
2011	1,000,000	365000000	$930,000	$0.0025	**$ —**
2012	1,100,000	401500000	$920,000	$0.0023	**$ 282.19**
2013	1,200,000	438000000	$910,000	$0.0021	**$ 564.38**
2014	1,300,000	474500000	$900,000	$0.0019	**$ 846.58**
2015	1440000	525600000	$890,000	$0.0017	**$ 1,230.68**
2016	1580000	576700000	$880,000	$0.0015	**$ 1,614.79**
2017	1720000	627800000	$870,000	$0.0014	**$ 1,998.90**
2018	1860000	678900000	$860,000	$0.0013	**$ 2,383.01**
2019	2,000,000	730000000	$850,000	$0.0012	**$ 2,767.12**
Total					**$ 11,684.00**

The savings associated with the Village of Cayuga Heights are significantly lower than those observed for Bolton Point and the Ithaca Area Waste Water Treatment Facility. This is primarily due to the fact that there were no noticeable upgrades made to equipment like pumps, compressors, turbines etc. that tend to have much high electricity consumption and operating costs. Savings were calculated as $11,500 between 2012 and 2019.

Long-term Sustainability

The upgrades to the facility are designed to be sustainable for the next 20 years, anticipating that capacity over the next 20 years can be handled by the current plant setup. Given the corrosive nature of the plant operations, it is anticipated that the plant will have to continue investing in plant repairs and maintenance. As the plant gets older, the frequency of repairs and maintenance is expected to increase, resulting in higher costs and more downtime. It is possible that the plant will have to make significant upgrades in infrastructure after 20 years in order to keep operating costs low and maintain reliability.

Risk and Opportunity

Current and future upgrades include the following risk and opportunities:

- Capacity forecasts may be incorrect and therefore both plants may not have sufficient capacity in the near future.
- As the plants get older, maintenance and repairs will get more expensive.
- Intermunicipal lines require a large amount of maintenance and repair owing to the nature of potential corrosive material flowing through them.
- The biggest opportunity is to demonstrate cooperation between waste water treatment facilities spanning multiple municipalities. There are several technical and non-technical challenges associated

with the construction of pipelines and other equipment between two existing facilities—successful integration of these projects can provide a model for other facilities in improving their own operations. If successful, the cooperation could be a benchmark for other facilities for follow resulting in significant savings overall.

Replicability

Implementation of the shared service and more specifically the upgrades in other facilities can provide lessons for other municipalities:

- When developing pipeline infrastructure, facilities should be close enough to be connected with no obstructions (either natural or man-made) in between. Pipeline construction is very expensive so any such barriers can derail the project completely.
- Staff within the facilities should be skilled and trained to handle upgrades, though such upgrades should not result in hiring significantly more employees as wages and other expenses can nullify the cost savings.
- Contracting of procurement of materials for upgrades is critical, as this can directly affect the cost savings and capital expenditures associated with the upgrades.

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