

Wisconsin DOR's Interactive Data Visualizations

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Overview

- Data Visualizations: Who/What/Why/How?
- Concerns using new software
 - Moving from SAS and Excel to Tableau
- Examples and Demonstrations
 - Objectives
 - Process Improvement
 - Outcomes

Data Visualizations

What?

 Interactive dashboards that let the <u>users</u> generate the content they want from DOR data

Who?

- By: DOR's Division of Research and Policy
 - Staff of 14 charged with tax policy analysis
 - No dedicated staff for data visualizations
- For: The public, legislative staff, DOR staff, press, local officials, other agencies, researchers

Data Visualizations

Why?

- To increase access to commonly requested data, promote transparency, and provide useful tools for public policy analysis
- It's not 1997 anymore
 - We have the tools (Tableau, Power BI, etc.)
 - We can do more than post PDFs and Excel Files
- Peer pressure -other states and organizations

How?

• Tableau works for us, but plenty of options exist

Initial Concerns

- Utilizing a new software tool
 - Learning curve for analysts and customers
 - Backwards compatibility and software issues
 - Will Tableau be around in 5 years? 10 years?
- Taxpayer confidentiality
 - Current law and DOR policy preclude us from publishing statistics for groups of 10 or fewer
 - Adds some work to tax return dashboards

Current State

- 10 public facing dashboards
- Seven analysts contributing
- More "vizzes" in the works
 - Individual Income Tax Data
 - Property Tax Rates Over Time
 - County Sales Tax Per Capita
 - Tobacco Products
 - Tax Expenditure Budget
- No formal training; learning from others and by experimenting



- •Corporate Tax by Industry •Equalized Property Values
- •Local Gov. Dashboard
- •Motor Fuel Consumption
- •Police and Fire Fees
- •Sales Tax Distributions
- •Sales Tax by Industry
- •Tax Burden Rankings
- •Tax Revenue Since 1963
- •Wisconsin Exports

Some Examples

Equalized Property Values

 One of our first interactive tools; it evolved from massive and overly complicated excel files

Local Government Dashboard

 Second-generation visualization; first tool designed specifically for an outside "client" – State Budget Office

Sales Tax by Industry

 Designed based on common questions from local gov. officials, private sector, and internal audiences

Property Values

- Previously available to the public in massive PDFs
 - One municipality per page
 - Over 2,300 pages long (single year)
 - Data can extracted by DOR staff for analysis and records/data requests in numerous formats
- Comparisons across time and location require multiple reports (#places x #years)

Property Values Then

1,962,200

2017 Total

122,546,100

1,863,200

-5%

Date: 08/09/2018

WISCONSIN DEPARTMENT OF REVENUE 2018 STATEMENT OF CHANGES IN EQUALIZED VALUES BY CLASS AND ITEM

PAGE 1 OF 2331

County 01 Adams Town 002 Adams

Total Personal Property

TOTAL EQUALIZED VALUE

Real Estate & Personal Property

REAL ESTATE	2017 RE Equalized Value	Removal of Prior Year Compensation	% Change	\$ Amount of Economic Change	% Change	\$ Amount of New Constr	% Change	Correction & Compensation	% Change	\$ Amount of All Other Changes	% Change	2018 F Equaliz Value	ed	Total \$ Change in R.E. Value	% Chang
Residential									· · ·				24		
Land	20,658,400	0	0%	1,446,100	7%	20,900	0%	0	0%	11,700	0%	22,13	37,100	1,478,70	0 7%
Imp	69,622,700	0	0%	4,873,600	7%	834,400	1%	0	0%	-80,600	0%	75,25	50,100	5,627,40	0 8%
Total	90,281,100	0	0%	6,319,700	7%	855,300	1%	0	0%	-68,900	0%	97,38	37,200	7,106,10	0 8%
Commercial)										0.000.000			
Land	937,700	0	0%	46,900	5%	0	0%	0	0%	0	0%	98	34,600	46,90	0 5%
Imp	2,812,000	0	0%	140,600	5%	0	0%	0	0%	0	0%	2,95	52,600	140,60	0 5%
Total	3,749,700	0	0%	187,500	5%	0	0%	0	0%	0	0%	3,93	37,200	187,50	0 5%
Manufacturing											· · · · ·				
Land	56,100	0	0%	1,300	2%	0	0%	0	0%	0	0%	5	57,400	1,30	0 2%
Imp	898,300	0	0%	0	0%	0	0%	0	0%	0	0%	89	8.300	X	0 0%
Total	954,400	0	0%	1,300	0%	0	0%	0	0%	0	0%	95	55,700	1,30	0 0%
Agricultural				add and the										2000	
Land/Total	555,200	0	0%	12,800	2%	0	0%	0	0%	-1,100	0%	56	6,900	11,70	0 2%
Undeveloped															
Land/Total	1,533,900	0	0%	181,100	12%	0	0%	0	0%	-23,000	-1%	1,69	2,000	158,10	0 10%
Ag Forest															
Land/Total	1,240,800	0	0%	0	0%	0	0%	0	0%	-50,500	-4%	1,19	0.300	-50,50	0 -4%
Forest															
Land/Total	19,678,900	0	0%	0	0%	0	0%	0	0%	244,400	1%	19,92	23,300	244.40	0 1%
Other															
Land	240,700	0	0%	10,200	4%	0	0%	0	0%	0	0%	25	50,900	10,20	0 4%
Imp	2,325,000	0	0%	-41,900	-2%	6,300	0%	0	0%	5,900	0%	2,29	95,300	-29,70	0 -1%
Total	2,565,700	0	0%	-31,700	-1%	6,300	0%	0	0%	5,900	0%	2.54	16,200	-19.50	0 -1%
Total Real Estate				No. Correction											
Land	44,901,700	0	0%	1,698,400	4%	20,900	0%	0	0%	181,500	0%	46,80	02,500	1,900,80	0 4%
Imp	75,658,000	0	0%	4,972,300	7%	840,700	1%	0	0%	-74,700	0%	81,39	96,300	5,738,30	0 8%
Total	120,559,700	0	0%	6,670,700	6%	861,600	1%	0	0%	106,800	0%	128,19	98,800	7,639,10	0 6%
PERSONAL PRO	PERTY	Non-Mfg	Personal F	Property		Manufactu	ring Pers	onal Property			Total of A	I Person	al Proper	tv	
TEROORAETRO		2017	2018	% Change		2017	2018		ap	2017 Total	-	Total		ig in PP %	Change
Watercraft		0			%	0	2010	0	0%	0		0		0	0%
Machinery Tools & I	Patterns	176,000		0 N//		15,400	14	300	-7%	191,400		14,300	2	177,100	-93%
Furniture Fixtures &		60,500	103,20			7,300	2.5	ALC: NOT ALC	-12%	67,800	-	109,600		41,800	62%
All Other		1,718,000	1,760,00		%	1,500			047%	1,719,500		,777,200		57,700	3%
Prior Year Compens	sation	7,700		0		0		0		7,700		0		-7,700	
		1,100				0				1,100		v			

24,200

37,900

57%

1,986,400

1,901,100

2018 Total

130,099,900

-85,300

7,553,800

Total \$ Change % Change

-4%

6%

Property Values

Objectives:

- On-Demand Analysis
 - Allow comparisons of scale and change across municipal and county borders, by property class, over time
- Improve Access to Data
 - Make historical data, previously unavailable, accessible to any/all interested parties
- Increase DOR responsiveness
 - Avoid assembling excel files and reports for the sake of answering ad-hoc requests
 - Build a tool multipurpose tool

Property Values

Process flow and timing



- A single analyst can update the Excel file, Tableau database, and DOR website in a matter of hours
- No concerns over taxpayer confidentiality
- Updates could be automated, eliminating the need for the excel file

Property Values Now

Equalized Value



https://www.revenue.wi.gov/Pages/SLF/EqualizedValue.aspx



City of Green Bay (Brown)

Property Class	009	2010	2011	2012	2013	2014	2015	2016	2017	2018
(AII)	,300	6,019,338,000	5,910,603,600	5,625,397,900	5,786,473,700	5,857,893,700	6,009,465,500	6,080,589,000	6,365,614,900	6,603,759,000
Residential	,900	3,796,500,700	3,801,434,800	3,621,180,200	3,629,694,600	3,674,967,300	3,742,960,000	3,834,984,200	3,984,047,500	4,225,517,700
Commercial	,400	1,592,103,000	1,496,044,100	1,390,101,700	1,532,064,500	1,522,543,800	1,579,907,600	1,559,942,000	1,678,336,400	1,756,687,400
Manufacturing	,700	333,351,100	341,843,700	350,676,800	359,375,100	368,825,700	371,699,300	379,273,700	385,368,800	379,527,600
Personal	,500	294,961,400	268,505,000	260,770,700	262,893,800	289,103,000	312,489,000	303,926,300	315,408,800	239,514,600
Productive Forest L.	,500	1,371,500	1,469,000	1,404,000	1,248,000	1,248,000	1,248,000	1,248,000	1,228,500	1,266,300
Agricultural	,800	426,700	605,900	587,900	553,100	560,500	553,200	560,100	570,200	585,600
Undeveloped	,000	385,000	382,000	385,000	384,000	384,000	347,000	361,000	361,000	361,000
Agricultural Forest	, <mark>600</mark> ,	175,500	156,000	165,800	165,800	165,800	165,800	165,800	165,800	170,900
Other	,900	63,100	163,100	125,800	94,800	95,600	95,600	127,900	127,900	127,900
	<									>









Local Gov. Dashboard

Objectives:

- Mandate from the Governor
- Initial budget of \$150,000 and 1 position
- Leverage existing tech, data, and staff to create something modern and useful
- Avoid new reporting requirements for local governments



 Municipal Finance Reports are processed in a decades-old mainframe system; a new system may allow for partial automation of process

Local Gov. Dashboard

Local Government Dashboard

In the 2017-2019 Biennial Budget, Governor Scott Walker signed into law a provision to create a dashboard where the public can view and compare local government financial data. The dashboard provides access to information about local taxes, municipal revenues and expenditures, an overview by county, as well as an ability to do a statewide comparison. Below are the dashboard, instructions and helpful references.

3		(N Internet Street
Overview	Quick Glance				
officials of Wisconsin o units of government. Th	Dashboard contains dat. ounties, cities, villages a he data are then compile CMRE Bullutin https://w	and towns. DOR is respo ed into the County and N	onsible for collecting and Aunicipal Revenues and	l verifying the report Expenditures (CMRE)	ed information from
	Dashboard consists of fi			Ar bat	
Quick Glance: This sect	ion provides a succinct c nment from a drop dowr	ollection of data over a		ser-selected town, vi	llage, city, or count
county. Users can selec	tures: This section conta t a local government fro expenditure for each of t	m a drop down menu, w			
for each local governme	ction contains data for a ent across the user-sele epulation of each politica	tted county. The data in			
The bar graph below th subdivision within the :	e table provides a visual selected county.	ization of the share of c	tertain revenues and exp	penditures attributab	ble to each political
subdivisions on a per ca	This section allows the apita basis. The graph sh lita amounts for the sele	ows the per capita reve	enue, expenditure, or de		
The filters allow the us	er to select (All) local go	vernments, or any com	bination of towns, villag	es, citles, and counti	H.
	ion contains revenue, ex a statewide total for all			ch political subdivisio	in over a five year ;
Hover over amounts in	tables or graphs for add	itional information.			
	g local revenues and exp vailability or issues with onsin.gov				

https://www.revenue.wi.gov/Pages/RA/Local-Government-Dashboard.aspx

<	Overview	Quick Glance	Revenues and Expenditures	Data by County	Statewide Comparison	Tabular Data	>
_	ect Local Government ty of Brillion (Calumet)		•	-	Brillion (Calum Mount % Cha	,	

Total Revenue & Other Financing Sources

2012	\$3,636,070	Null	
2013	\$3,488,603	-4.06%	C
2014	\$3,620,519	3.78%	\mathbf{O}
2015	\$5,714,033	57.82%	\mathbf{O}
2016	\$3,741,832	-34.52%	C

Total Expenditures & Other Financing Uses

2012	\$3,963,017	Null	
2013	\$3,891,868	-1.80%	•
2014	\$3,967,867	1.95%	\mathbf{O}
2015	\$5,475,576	38.00%	0
2016	\$4,133,447	-24.51%	•

General Property Taxes

2012	\$1,450,766	Null	
2013	\$1,174,583	-19.04%	V
2014	\$1,183,281	0.74%	\mathbf{O}
2015	\$1,186,207	0.25%	\mathbf{O}
2016	\$1,245,798	5.02%	\mathbf{O}

Total Debt Service

2012	\$858,320	Null	
2013	\$849,906	-0.98%	C
2014	\$677,847	-20.24%	•
2015	\$759,834	12.10%	\mathbf{O}
2016	\$788,850	3.82%	\mathbf{O}

Equalized Value Used for Calendar Year

2012	191,234,600	Null	
2013	192,598,500	0.71%	\mathbf{O}
2014	187,698,700	-2.54%	•
2015	191,979,200	2.28%	•
2016	197,683,500	2.97%	\mathbf{O}

Total General Obligation Debt

2012	\$8,051,580	Null	
2013	\$7,336,673	-8.88%	•
2014	\$7,010,443	-4.45%	•
2015	\$7,840,648	11.84%	0
2016	\$7,224,067	-7.86%	•

Overvie		Quick Glance	Revenues and Expenditures	Data by County	Statewide Comparison	Tabular [
	Cit	y of Alma (Buffa Expenditu	Control & Children marter			al Government na (Buffalo)
			Amount	Share of Total (%)	Expension	ditures
Expenditures	Fire		\$265,677	20.50%	Rever	iues
	General Gov	vernment	\$198,963	15.35%	II. America	s to Change Year
	Highway M	aintenance & Administrati	\$168,392	13.00%	provide the second s	s to Change Year
	Highway Co	onstruction	\$139,504	10.77%	2016	
	Law Enforce	ement	\$113,741	8.78%	1 1	
	Parks & Rec	reation	\$99,039	7.64%		
	Culture & Ed	ducation	\$83,383	6.44%		
	Solid Waste	e Collection & Disposal	\$74,570	5.75%		
	Debt Servic	e - Principal	\$33,603	2.59%		
	Health & Hu	iman Services	\$30,431	2.35%		
	Debt Servic	e - Interest & Fiscal Charge	es \$27,980	2.16%		
	Road-Relate	ed Facilities	\$24,989	1.93%		
	Other Publi	c Safety	\$21,227	1.64%		
	Ambulance		\$13,804	1.07%		
	Other Sanit	ation	\$252	0.02%		
	Conservatio	on & Development	\$208	0.02%		
	All Other Ex	penditures	\$0	0.00%		
	Other Finan	icing Uses	\$0	0.00%		

\$0

\$1,295,763

2014

Other Transportation

Grand Total

\$300,000

\$200,000

\$100,000

\$0

2012

2013

Amount

0.00%

100.00%

2015



•

0 < >



Overvie

Data by County

Ly Statewide

>

Marquette County - 2016 Expenditures: Road-Related Facilities

Political Subdivision	Population 📻	Amount	Per Capita Amount	
County of Marquette (Marquett	15,425	\$45,301	\$2.94	^
City of Montello (Marquette)	1,461	\$22,684	\$15.53	
Town of Packwaukee (Marquett	1,416	\$4,391	\$3.10	
Village of Westfield (Marquette)	1,258	\$56,437	\$44.86	
Town of Buffalo (Marquette)	1,240	\$0	\$0.00	
Town of Montello (Marquette)	1,040	\$0	\$0.00	
Town of Oxford (Marquette)	891	\$0	\$0.00	
Town of Westfield (Marquette)	878	\$0	\$0.00	
Town of Springfield (Marquette)	836	\$0	\$0.00	
Town of Harris (Marquette)	794	\$2,962	\$3.73	
Town of Douglas (Marquette)	735	\$3,909	\$5.32	
Town of Mecan (Marquette)	688	\$150	\$0.22	
Village of Oxford (Marquette)	597	\$10,569	\$17.70	
Town of Moundville (Marquette)	567	\$338	\$0.60	
Town of Neshkoro (Marquette)	552	\$0	\$0.00	
Town of Newton (Marquette)	549	\$0	\$0.00	
Town of Shields (Marquette)	547	\$0	\$0.00	
Town of Crystal Lake (Marquett	492	\$0	\$0.00	
Village of Endeavor (Marguette)	460	¢0 0.25	¢17 / E	Υ.







Actual Cost: \$0.00 | No Additional Staff

Sales Tax by Industry

Objectives:

- Publish monthly sales tax data by industry and geography (where possible)
- Allow for some basic graphing and analysis
- Protect Taxpayer Confidentiality
 - Statewide data: All 2-digit NAICS code
 - County data: Select 2-digit NAICS to avoid disclosure issues (10 or fewer filers)

Sales Tax by Industry

Monthly State and County Sales and Use Tax Reported by Industry

	State: Compare Multiple Industries Over Time			ounty: Compare an County: Tabular Data idustry Across fultiple Counties	
s	elect Year				
2018			0 <	2018	
Wisconsin Sales T	axes by Ind	ustry - 20	18		
		2018			
Industry	Salesa	and Use Tax	Share of Tota		
11 Agriculture, Forestry, Fishing and Hunti	ng	1,983,610	0.079	16	
21 Mining, Quarrying, and Oil and Gas Extra	action	2,938,620	0.109	16	
22 Utilities	1	21,075,859	4.109	16	
23 Construction		59,062,307	2.009	16	
31 Manufacturing	1	08,285,069	3.67% 6.51%	Industry Legend I1 Agriculture, Forestry, Fishing and Hunting	
42 Wholesale Trade	1	92,036,440			
44 Retail Trade 48 Transportation and Warehousing 51 Information		64,000,319	46.22% 0.23%	 21 Mining, Quarrying, and Oil and Gas Extracti 22 Utilities 23 Construction 	
		6,713,092			
		34,689,428	7.959		
52 Finance and Insurance	1	24,375,032	0.839	6 31 Manufacturing	
53 Real Estate and Rental and Leasing		74,840,549	2.549	42 Wholesale Trade	
54 Professional, Scientific, and Technical Se	ervices	72,983,848	2.479	44 Retail Trade	
55 Management of Companies and Enterpr	ises	33,406,341	1.139		
56 Administrative and Support and Waste I	Manag	40,592,377	1.389		
61 Educational Services		7,322,409	0.259		
62 Health Care and Social Assistance		10,221,434	0.359		
71 Arts, Entertainment, and Recreation		53,203,274	1.809	54 Professional, Scientific, and Technical Serv	
72 Accommodation and Food Services	34	44,617,199	11.689	55 Management of Companies and Enterprises	
81 Other Services (except Public Administr	ation) 1	75,237,823	5.949		
92 Public Administration		12,521,823	0.429		
99 Not Reported		10,758,013	0.369		
Grand Total	2,9	50,864,866	100.009		
				71 Arts, Entertainment, and Recreation 72 Accommodation and Food Services 81 Other Services (except Public Administrati	

https://www.revenue.wi.gov/Pages/RA/Sales-Use-Tax-Reported-by-Industry.aspx

State: Sales Tax by State: Compare Industry Industries Over		dusties In	ounty: Compare an County: Tabular Data idustry Across Multiple ounties
Select Yea	ır		
2018	1. A 12 A A		2018
Wisconsin Sales Taxes	by Industry - 2 2018 Sales and Use Tax		
11 Agriculture, Forestry, Fishing and Hunting	1,983,610	0.079	
21 Mining, Quarrying, and Oil and Gas Extraction	2,938,620	0.109	
22 Utilities	121,075,859	4.109	
23 Construction	59,062,307	2.009	
31 Manufacturing	108,285,069	3.679	4
12 Wholesale Trade	192,036,440	6.519	Industry Legend
14 Retail Trade	1,364,000,319	46.229	11 Agriculture, Forestry, Fishing and Hunting
48 Transportation and Warehousing	6,713,092	0.239	 21 Mining, Quarrying, and Oil and Gas Extract 22 Utilities
51 Information	234,689,428	7.959	K
52 Finance and Insurance	24,375,032	0.839	23 Construction
53 Real Estate and Rental and Leasing	74,840,549	2.549	 31 Manufacturing 42 Wholesale Trade
54 Professional, Scientific, and Technical Services	72,983,848	2.479	
55 Management of Companies and Enterprises	33,406,341	1.139	
56 Administrative and Support and Waste Manag	40,592,377	1.389	51 Information
61 Educational Services	7,322,409	0.259	
52 Health Care and Social Assistance	10,221,434	0.359	
71 Arts, Entertainment, and Recreation	53,203,274	1.809	
72 Accommodation and Food Services	344,617,199	11.689	
81 Other Services (except Public Administration)	175,237,823	5.949	
92 Public Administration	12,521,823	0.429	
99 Not Reported	10,758,013	0.369	
Grand Total	2,950,864,866	100.009	







Sales Tax by Industry

Process flow and timing – January 1 transaction





Data Requests DOR Website Social Media





Wis Dept of Revenue @wi_revenue · Sep 19 Check out our Local Government Interactive Dashboard! Compare local municipal revenues and expenditures by county or do a statewide comp revenue.wi.gov/Pages/RA/Local... @LeagueWIMunis @WisCounties @WisPolicyForum



Wis Dept of Revenue @wi_revenue · Aug 24

Fun Friday! Our Sales and Use Tax by Industry interactive dashboard provides a lot of great data. Whether you're a data geek or you're not, it's interesting Check it out! revenue.wi.gov/Pages/RA/Sales... #AccountableGov @WisCounties @LeagueWIMunis @WisPolicyForum @WisBusiness



Final Thoughts

Successes:

- ✓ Creation of more powerful data tools for internal/external use
- ✓ Simple (in most cases) Interface
- ✓ Low cost of implementation

Future Challenges:

- Keep trying new visualizations
- Automate where feasible

Risks:

- Going too far sometimes a simple spreadsheet is best
- New normal we need to be open to and ready for change
- Software changes and contract issues

Questions?

Contact: Bob Schmidt, Administrator Division of Research and Policy Wisconsin Department of Revenue Email: <u>robertk1.Schmidt@Wisconsin.gov</u> (608) 266-5773