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Meter-Data Analytics for Water Utilities

October 11, 2016

About Valor Water

- ✓ **Focused exclusively on water utilities**
- ✓ Under continual development since 2007
- ✓ Field tested, nine successful deployments
- ✓ Rooted in economic analysis
- ✓ Award winning
- ✓ Nationally recognized in water utility revenue management
- ✓ Certified Woman-owned Business

Valor Customers

> " *The analysis gave us a better understanding of [our system]. It was eye opening to see…the creative approach and variety of data presentation formats makes the report easy to interpret whether you're a data junkie or not. –GM, CCWA*
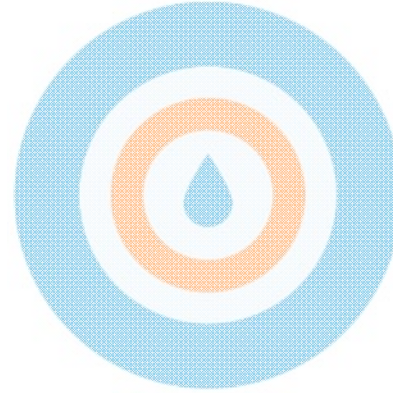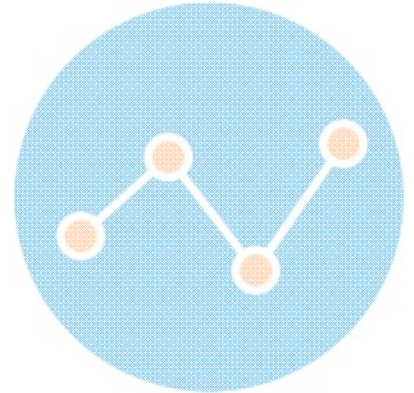
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Valor Products

Hidden Revenue Locator

Cutoff Analyzer

SMART Targets for Conservation

Water Rate Simulator

Hidden Revenue Locator

PROBLEM

- Apparent losses are a real problem for utilities
- On average, about 3-5% of water is unaccounted for
- Approximately 2.3% of meters are impacted
- 0.5 to 5% of top-line revenue is typically lost

VALOR WATER ANALYTICS' SOLUTION

- Provides real-time reporting through analytics
- Uses your meter data to find apparent losses in system
- Locates metering inaccuracies, leaks, data handling errors and unauthorized consumption
- Provides actionable recommendations
- Empowers revenue recovery and increased efficiency
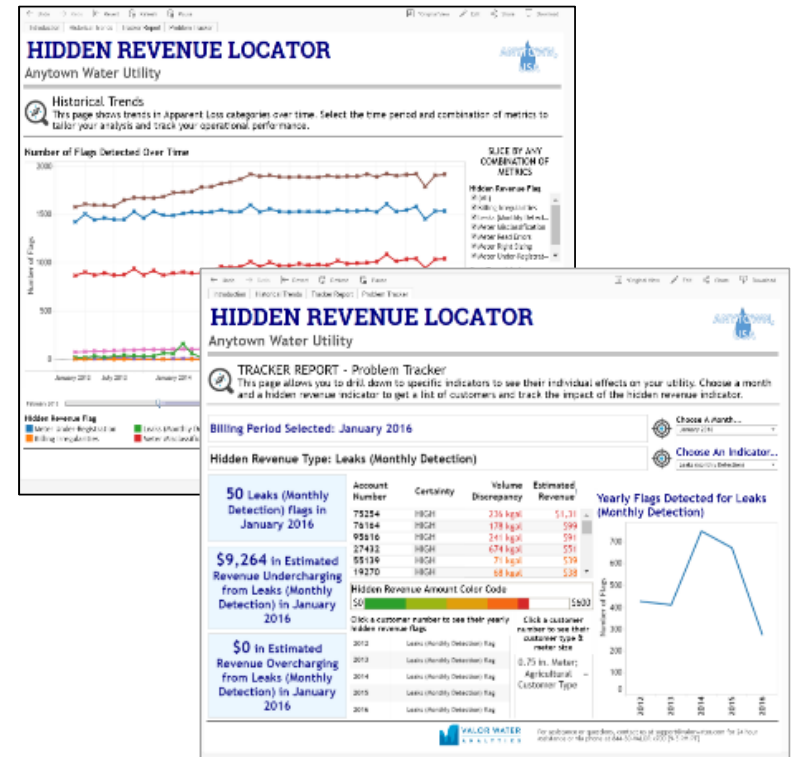
Hidden Revenue Sample Algorithm
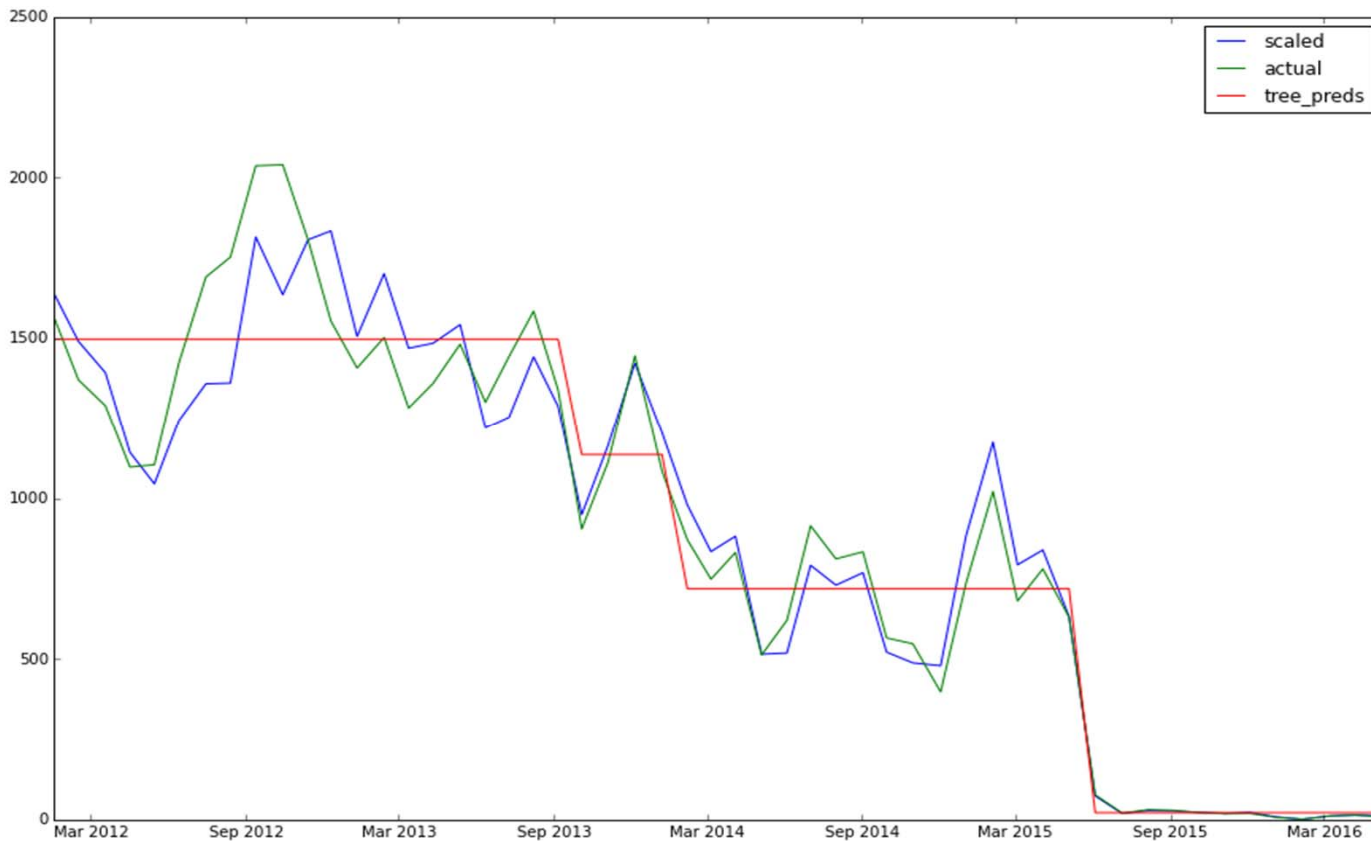
- ✓ Detects pattern of under-registration even with short-term variability in water consumption

- ✓ Accounts for weather, ensures drops in consumption are actually due to under-registration

- ✓ Able to detect dramatic drops in consumption

- ✓ Utilizes machine learning for continued learning within algorithms

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Hidden Revenue Locator Results

RESI + COMM	2012		2013		2014		2015		2016*		Total	
	Rev Loss	Flags	Rev Loss	Flags	Rev Loss	Flags	Rev Loss	Flags	Rev Loss	Flags	Rev Loss	Flags
Billing Irregularities	$1,096	12	$448	8	$533	22	$429	8	$259	2	$2,765	52
Leaks (Monthly Detection)	$131,849	428	$116,009	411	$355,299	750	$332,674	673	$58,702	275	$994,533	2,537
Meter Misclassification	$1,084	10,049	$1,547	10,617	$1,639	11,304	$2,550	12,007	$1,639	5,099	$8,459	49,076
Meter Read Errors	$0	92	$0	124	$0	92	$0	64	$0	29	$0	401
Meter Right Sizing	$0	16,914	$0	19,379	$0	21,885	$0	22,753	$0	9,434	$0	90,365
Meter Under-Registration			$327,468	17,549	$525,958	18,378	$700,929	18,460	$301,939	7,644	$1,856,293	62,031
Tampering	$1,007	471	$15,183	1,049	$34,265	1,409	$86,246	1,873	$56,302	885	$193,003	5,687
Grand Total	$135,036	27,966	$460,655	49,137	$917,694	53,840	$1,122,828	55,838	$418,841	23,368	$3,055,053	210,149

Total Meters	76,018											
$/meter	$1.78		$6.06		$12.07		$14.77		$5.51		$40.19	
flags/meter	0.37		0.65		0.71		0.73		0.31		2.76	

	2012		2013		2014		2015		2016*		Total	
	Rev Loss	Flags	Rev Loss	Flags	Rev Loss	Flags	Rev Loss	Flags	Rev Loss	Flags	Rev Loss	Flags
Billing Irregularities	0.8%	0.0%	0%	0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%
Leaks (Monthly Detection)	97.6%	1.5%	25.2%	0.8%	38.7%	1.4%	29.6%	1.2%	14.0%	1.2%	32.6%	1.2%
Meter Misclassification	0.8%	35.9%	0.3%	21.6%	0.2%	21.0%	0.2%	21.5%	0.4%	21.8%	0.3%	23.4%
Meter Read Errors	0.0%	0.3%	0.0%	0.3%	0.0%	0.2%	0.0%	0.1%	0.0%	0.1%	0.0%	0.2%
Meter Right Sizing	0.0%	60.5%	0.0%	39.4%	0.0%	40.6%	0.0%	40.7%	0.0%	40.4%	0.0%	43.0%
Meter Under-Registration	0.0%	0.0%	71.1%	35.7%	57.3%	34.1%	62.4%	33.1%	72.1%	32.7%	60.8%	29.5%
Tampering	0.7%	1.										
Grand Total	100%	10										

Results Summary	Meters	$/Meter
Residential + Non-Resi	76,018	$13.42
Non-Residential	4,088	$57.24
Residential	71,930	$10.93

✓ Data from a SE utility with 76,000 meters

✓ Analytics going forward from historical data

✓ **Located $1M in identified annual revenue**

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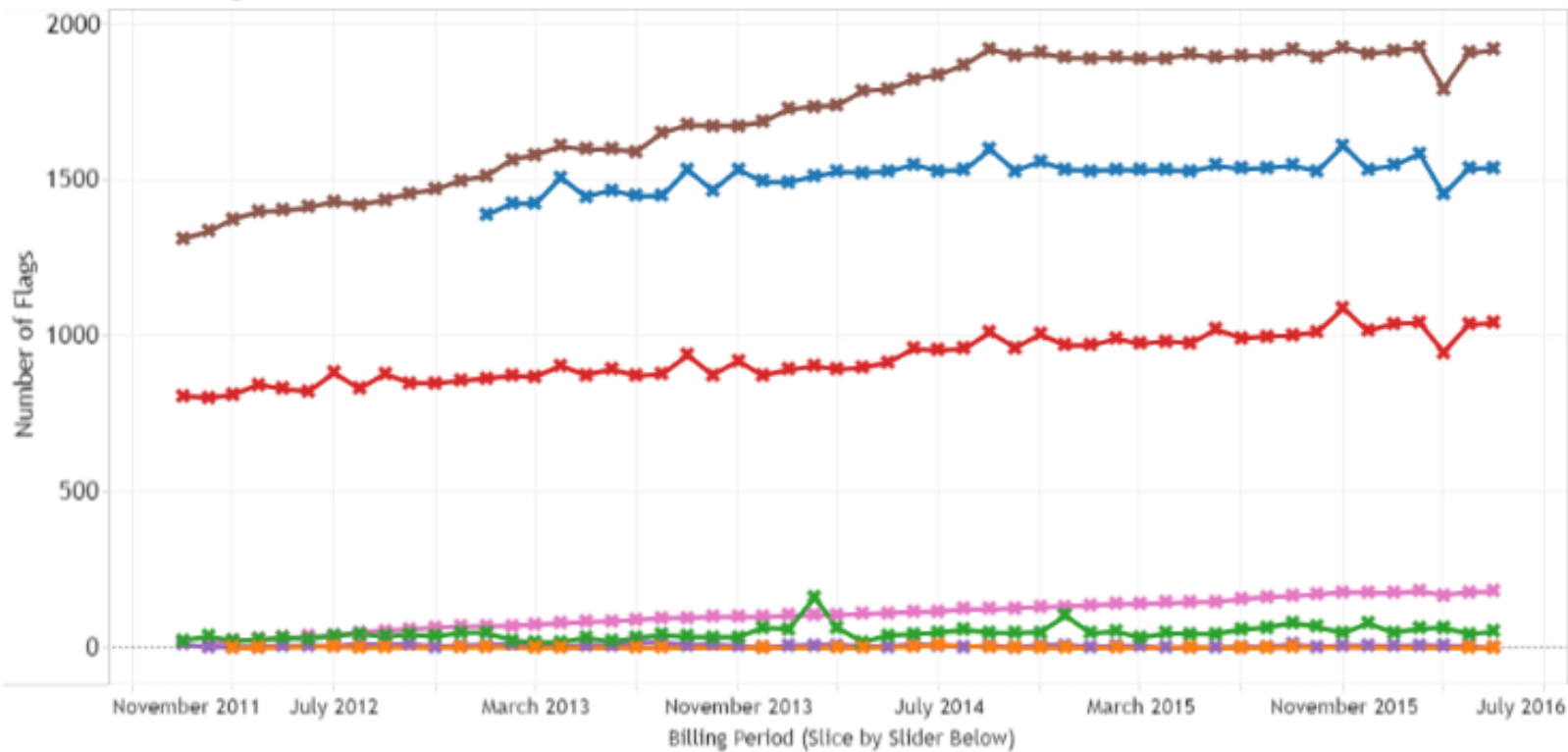
VALOR WATER ANALYTICS

Historical Trends

This page shows trends in Apparent Loss categories over time. Select the time period and combination of metrics to tailor your analysis and track your operational performance.

Number of Flags Detected Over Time

SLICE BY ANY COMBINATION OF METRICS

Hidden Revenue Flag
- ☑ (All)
- ☑ Billing Irregularities
- ☑ Leaks (Monthly Dete...
- ☑ Meter Misclassificati...
- ☑ Meter Read Errors
- ☑ Meter Right Sizing
- ☑ Meter Under-Registr...

Cust Type labels
- ☑ (All)
- ☑ Agricultural
- ☑ Commercial
- ☑ Industrial

Meter Size
- ☑ (All)
- ☑ 0.75 in. Meter
- ☑ 0.625 in. Meter
- ☑ 1 in. Meter
- ☑ 1.5 in. Meter

Municipality
- ☑ (All)
- ☑ Breannaton
- ☑ Chaunceyview
- ☑ Danielmouth
- ☑ Donnellyshire

January 2012 ◁——————————————————————————▷ May 2016

Hidden Revenue Flag

- ■ Meter Under-Registration
- ■ Leaks (Monthly Detection)
- ■ Meter Read Errors
- ■ Tampering
- ■ Billing Irregularities
- ■ Meter Misclassification
- ■ Meter Right Sizing

TRACKER REPORT - Revenue and Volume Discrepancies

This page tracks and compares each hidden revenue locator, summarized by month. Slice by month assess how these apparent loss categories are being addressed by your utility.

Selected Month's Summary: January 2016

Hidden Revenue Flags Found This Month	Total Volume Discrepancies Detected:	Estimated Revenue Undercharging This Month	Estimated Revenue Overcharging This Month
4,723	**17,086 Kgal**	**$83,606**	**$40,357**

Hidden Revenue Statistics for January 2016

Hidden Revenue Flag	Number of Flags	Volume Discrepancy	Est. Revenue Undercharging	Est. Revenue Overcharging
Billing Irregularities				
Leaks (Monthly Detection)	50	3,775 kgals	$9,264	$0
Meter Misclassification	1,038	0 kgals	$332	$0
Meter Read Errors	6	2 kgals	$0	$0
Meter Right Sizing	1,911	0 kgals	$0	$40,357
Meter Under-Registration	1,543	11,224 kgals	$63,185	$0
Tampering	175	2,085 kgals	$10,826	$0

Note: A blank value in the chart indicates no flags were found for that month.

TRACKER REPORT - Problem Tracker

This page allows you to drill down to specific indicators to see their individual effects on your utility. Choose a month and a hidden revenue indicator to get a list of customers and track the impact of the hidden revenue indicator.

Billing Period Selected: January 2016

Hidden Revenue Type: Leaks (Monthly Detection)

50 Leaks (Monthly Detection) flags in January 2016

$9,264 in Estimated Revenue Undercharging from Leaks (Monthly Detection) in January 2016

$0 in Estimated Revenue Overcharging from Leaks (Monthly Detection) in January 2016

Account Number	Certainty	Volume Discrepancy	Estimated Revenue
75254	HIGH	236 kgal	$1,313
76164	HIGH	178 kgal	$993
95616	HIGH	241 kgal	$913
27432	HIGH	674 kgal	$511
55139	HIGH	71 kgal	$395
19270	HIGH	68 kgal	$380

Hidden Revenue Amount Color Code

$0 ▮▮▮▮▮ $600

Click a customer number to see their yearly hidden revenue flags

2012	Leaks (Monthly Detection) flag
2013	Leaks (Monthly Detection) flag
2014	Leaks (Monthly Detection) flag
2015	Leaks (Monthly Detection) flag
2016	Leaks (Monthly Detection) flag

Click a customer number to see their customer type & meter size

0.75 in. Meter; Agricultural Customer Type ...

Yearly Flags Detected for Leaks (Monthly Detection)
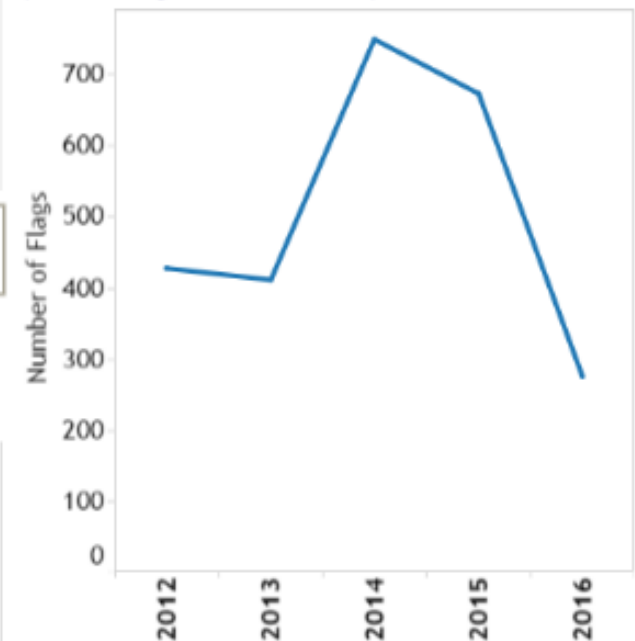
Utility Benefits

1. Revenue Recovery & Stability

2. Workflow Efficiency

3. Proactive Customer Communication and Satisfaction

Thank you!

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VALOR WATER
ANALYTICS