

# *Pollutant Based Utility Charge System*

**Presented at Wisconsin Wastewater  
Operator's Association**

Green Bay, Wisconsin  
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# Types of Sewer Utility Charge Systems

**A. 100% Fixed or Flat Rate**

**B. 100% Variable or Flow Based**

**C. Combination of Fixed and Variable**

**D. Combination of Fixed and Variable with  
Pollutant Charges**





**COMPLEX SYSTEM**





© Dennis Flood

**SIMPLE SYSTEM**

# 100% Fixed or Flat Rate System

## Example

- **Community of 500 People**
- **No Public Water System**
- **200 Connections**
- **Utility Costs - \$100,000/year**
- **Utility Bills Monthly**
- **All Residential Users**

**Sewer Utility Rate:**

$$\frac{\$100,000}{200 (12)} = \$41.67/\text{Month}/\text{Connection}$$

# 100% Variable or Flow Based System

## Example

- **Community of 500 People**
- **Public Water System**
- **200 Connections**
- **Each Connection has a Water Meter**
- **Utility Costs - \$100,000/Year**
- **Utility Bills Monthly**
- **All Residential Users**
- **Water Usage 5,000 Gallons/Month/Connection**

**Average Sewer Utility Rate:**

**$\frac{\$100,000}{5,000 (12) 200} = \$8.33/1,000 \text{ Gallons}$**

**5,000 (12) 200**

**Average Sewer Utility Rate: \$41.65/Month/Connection**

# Combination of Fixed and Variable

## Example

- **Community of 5,000 People**
- **Public Water System**
- **2,500 Connections**
- **Each Connection has a Water Meter**
- **Utility Costs - \$1,100,000/Year**
- **Utility Bills Monthly**
- **Residential Users and Commercial/Industrial Users**
- **Set Fixed Rate at \$10/Month/Connection (25% Budget)**
- **Variable Rate - \$4.41/1,000 Gallon**
- **Residential Water Usage – 5,000 Gallon/Month/Connection**
- **Total Daily Sewer Flow – 500,000 GPD**
- **No Pollutants Higher than Residential**
  - **BOD<sub>5</sub> – 250 MG/L**
  - **TSS – 250 MG/L**
  - **TKN – 25 MG/L**
  - **P – 4 MG/L**

**Average Sewer Utility Rate = \$32.05/Month/Connection**

# Combination of Fixed and Variable With Pollutant Charges

## Example

- **Community of 5,000 People**
- **Public Water System**
- **2,500 Connections**
- **Each Connection has a Water Meter**
- **Utility Costs - \$1,130,000/Year**
- **Utility Bills Monthly**
- **Residential Users and Commercial/Industrial Users**
- **Set Fixed Rate at \$10/Month/Connection (25% Budget)**
- **Variable Rate - \$4.41/1,000 Gallon**
- **Residential Water Usage – 5,000 Gallon/Month/Connection**
- **Total Daily Sewer Flow – 500,000 GPD**
- **Industrial P ~ 50% of Total P at WWTF**

**Average Sewer Utility Rate = \$32.05/Month/Connection**

**Industrial Pays Additional \$30,000/Year (\$5.63/lb. P)**



# Capital Cost Rate with Pollutant Charge System

## Example

- **Community of 5,000 People**
- **Industrial P ~ 50% of Total Phosphorus**
- **Upgrade Cost - \$2 Million**
- **Borrowing at 3%, 20 years, Annual Cost is \$147,840**
- **Assign Costs to Flow and Phosphorus Only**

## **Rate Increase:**

- **Residential - \$.60/1,000 Gallon**
- **Phosphorus - \$8.32/lb. Phosphorus**
- **Industrial – Pays 33% or More of Upgrade Cost**
- **Average Residential Increase - \$3/Month/Connection**

WWOA  
Sanitary Sewer Utility

Schedule 5

Date: October, 2014

WWOA

Capital Cost/WWTP Interest: 3.00%

Phosphorus Upgrades Years: 20

No.	Equipment	Installed Cost (\$)	% Local Cost	Local Portion Capital O & M	Annual Expense (\$/YR)	Annual Flow %	Annual Flow Cost	BOD %	Annual BOD Cost	TSS %	Annual TSS Cost	TKN %	TKN Cost	Phosphorus %	Annual Phosphorus Cost
1	WWTF Upgrades	\$2,000,000	100%	\$2,000,000	\$147,840	40%	59,136	0%	\$0	0%	\$0	0%	\$0	60%	88,704
	Subtotal	\$2,000,000		\$2,000,000	\$147,840		\$59,136		\$0		\$0		\$0		\$88,704

WWOA  
Sanitary Sewer Utility

Schedule 6

Date: October, 2014

WWOA

Unit Treatment Costs

Phosphorus Upgrades

Cost per Unit:

Cost per 1000 gal domestic WW:

Flow: \$0.32 per 1000 gal based on annual flow  
 BOD: \$0.000 per lb BOD based on annual BOD loading  
 TSS: \$0.000 per lb TSS based on annual TSS loading  
 TKN: \$0.000 per lb TKN based on annual TKN loading  
 Phosphorus: \$8.323 per lb Phos based on annual P loading

Flow: \$0.32  
 BOD: 0.000  
 TSS: 0.000  
 TKN: 0.000  
 Phosphorus: 0.277

Total Cost: \$0.601 per 1000 gal

WWOA

Sanitary Sewer Utility

Schedule 7

Date: October, 2014

WWOA

User Charges for O, M, & R Costs  
(By User Category)

No.	User	Avg Flow GAL/YR	P LB/YR	Flow (\$)	P (\$)	Total (\$)
1	Residential	164,250,000	5,475	98,720	0	98,720
2	Industrial	18,250,000	5,183	10,969	38,004	48,973
	<b>Total</b>	<b>182,500,000</b>	<b>10,658</b>	<b>109,689</b>	<b>38,004</b>	<b>\$147,693</b>



# Requirements for Pollutant Based Charge System

## Industry

- **Flow Metering**
- **Pollutant Testing**
- **Submit Data to Municipality**

## Municipality

- **Political Will to Charge Industry/Commercial**
- **Create Charge System per Pollutant**
- **Modify User Charge System Ordinance**
- **Create Spread Sheets for Fee Calculations**
- **Monitor Pollutant Concentrations**
- **Adjust Rates as Needed**

# Pollutant Based Utility Rates (PBUR)

## Summary

- **PBUR System not Needed if You Have All Residential Users**
- **PBUR System is Recommended When You Have Contributors With Higher Pollutant Concentrations (Phosphorus, etc.)**
- **Revenue Increases can be Calculated to See if PBUR is Worth Doing**
- **For a Capital Improvement for Phosphorus Treatment, PBUR is a Very Good Option**
- **PBUR System will Require Data Collection and Analysis**



**SECURITY PROBLEM**

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**QUESTIONS?**

